Effects of Tax Shocks on Inequality: Empirical Evidence from the United Kingdom

Conference on Research on Economic Theory and Econometrics - 2025 - Tinos

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11 July 2025

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Introduction

- Most of the literature focuses on the impact of fiscal policy on economic performance.
- Empirical findings on the economic effects of tax policies vary significantly.
  - For example, estimated tax multipliers for the US range from -0.5 (Favero and Giavazzi, 2012) to -5 (Romer and Romer, 2010).
- Tax cuts raise GDP in the US and UK: by 3% over three years (Romer and Romer, 2010) and 2.5% (Cloyne, 2013), respectively.
- However, higher output and growth do not necessarily imply lower inequality.
- Do growth-boosting tax policies reduce inequality in a developed economy like the UK? Which segments of the income distribution are most affected?

Contribution and Findings

- We extend Cloyne's (2013) analysis to examine the distributional effects of tax shocks in the UK.
- Construct inequality measures for 1970–2020 using granular survey data (FES/EFS/LCFS).
- Identify discretionary tax shocks via a narrative approach, and study their impact on inequality measures including macroeconomic variables.
- **Main findings**: A 1% tax cut raises the Gini coefficient of gross income in the short run; the effect persists for 2 years while it is longer for consumption.
- Top-income households (90^{th} percentile and above) benefit the most; the left tail is largely unaffected.
- Main contribution: new evidence on how tax cuts affect different types of households, inequality, channels of transmission.

Related Literature

- We extend the literature on taxation and macroeconomic performance by focusing on distributional effects.
- Few studies have indirectly addressed the distributional implications of taxation, and these are mostly US-focused: (Piketty et al. (2014, 2018), Nallareddy et al. (2022), Zidar (2019), Thompson and Smeeding (2013)).
- **Findings:** Bottom 50% income has stagnated, the middle class has experienced moderate growth, and the income of the top 1% has surged.
- Capital gains often taxed at lower rates (corporate tax cuts) is a main contributor.
- UK-specific evidence on distributional impacts is limited: Webber and Thomas (2016), Ramos and Roca-Sagales (2008) show indirect taxes are regressive; direct taxes mildly progressive.

Related Literature

- Narrative identification a la Romer and Romer (2010) and Cloyne (2013)
- Narrative shocks produce larger GDP effects than other identification strategies: up to -3% drop in GDP from a 1% tax increase.
- Recent applications: effects of direct vs. indirect taxes (Nguyen et al. (2021)), and personal vs. corporate taxes (Mertens and Ravn (2013); Cloyne et al. (2024)).
- Cross-country narrative series: UK Cloyne (2013), Germany Hayo and Uhl (2014), Portugal Pereira and Wemans (2015), Spain Gil et al. (2019), Canada Hussain and Liu (2024).

Empirical Model

- We estimate a structural VAR to assess the impact of tax cuts on macroeconomic and inequality variables.
- Baseline specification:

$$Z_t = \begin{pmatrix} f_t \\ y_t \end{pmatrix} = \begin{pmatrix} c_F \\ c_Y \end{pmatrix} + \sum_{j=1}^{P} \begin{pmatrix} B_{FF}^j & B_{FY}^j \\ B_{YF}^j & B_{YY}^j \end{pmatrix} \begin{pmatrix} f_{t-j} \\ y_{t-j} \end{pmatrix} + \begin{pmatrix} u_t^F \\ u_t^Y \end{pmatrix}$$

- f_t: exogenous discretionary tax changes
- y_t: log per capita real GDP, consumption, investment, and log Gini (gross income or consumption)
- Sample: 1970Q1–2019Q4
- Estimation: Bayesian VAR (Gibbs sampling, loose Minnesota prior, $P = 4$ lags)

Identification Strategy

- Structural shock identified using the narrative approach by Romer and Romer (2010), as adapted by Cloyne (2013) and Cloyne et al. (2025).
- Definition: Exogenous tax changes uncorrelated with current or future macroeconomic conditions.
- Identification via recursive ordering (shock ordered first):
  - Equivalent to Proxy VAR if instrument is valid (Plagborg-Møller and Wolf, 2021)
  - Simpler implementation, avoids two-stage estimation
- Robustness: Also estimated using proxy BVAR, BLP (tax shock as instrument); results are unchanged.
- Lag structure and identification consistent with Romer and Romer (2010)

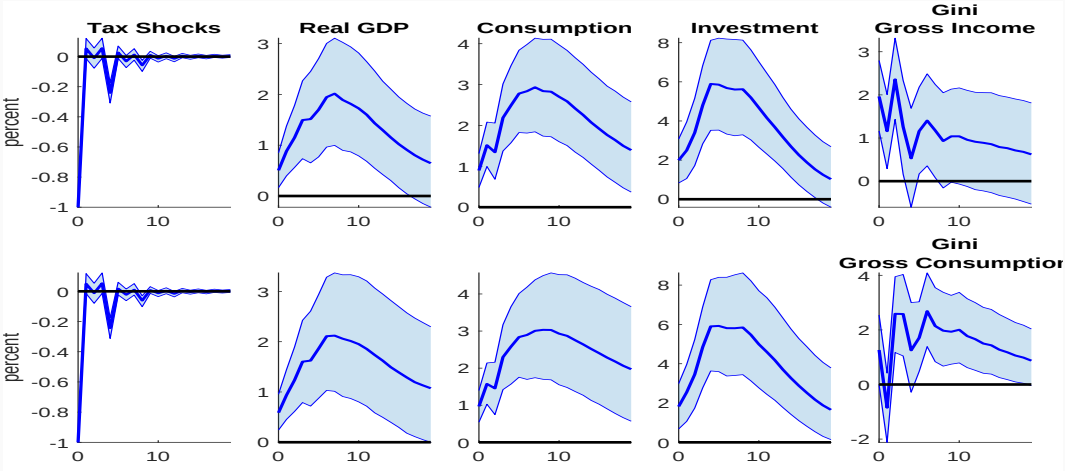
Data: Tax Shocks and Exogeneity

- Exogenous tax changes from Cloyne (2012) updated in Cloyne et al. (2025), quarterly from 1970Q1 to 2019Q4.
- Based on narrative sources (Budget documents, speeches, FSBR, EFSR, Hansard).
- Shocks classified by motivation: growth, ideology, external pressure, or budget consolidation.
- Projected revenue changes normalised by GDP, assigned by implementation quarter.
- Exogeneity test: Following Forni and Gambetti (2014), we regress estimated tax shocks on principal components of UK macro data.
- Granger causality p-value $= 0.998 \rightarrow$ cannot reject the null $\rightarrow$ shocks are orthogonal to lagged macro conditions.

Data: Inequality and Macroeconomic Variables

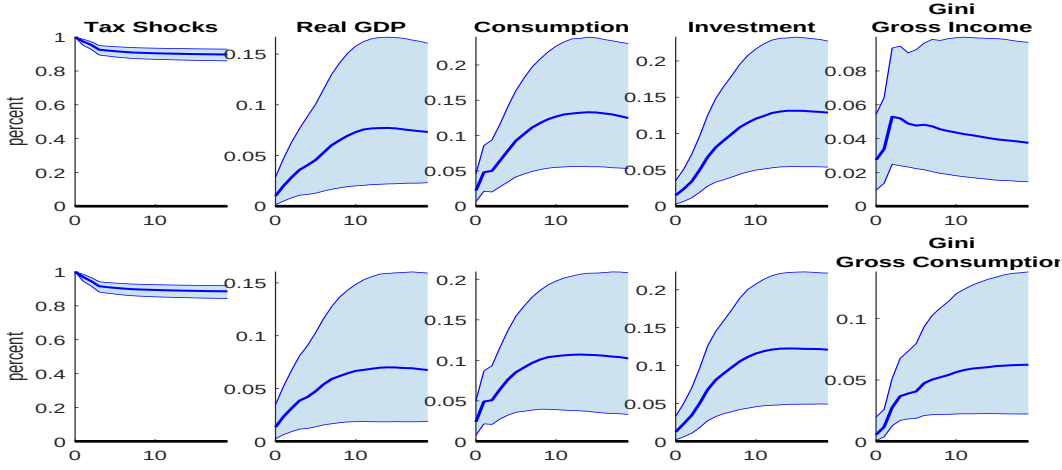
- Inequality measures constructed from FES (1970–2000), EFS (to 2008), and LCFS (2009–2020).
- Annual surveys of 7,000 UK households per year $\rightarrow$ total of 343,000 observations.
- Income: gross weekly income from wages, self-employment, benefits, investments.
- Consumption: total household expenditure. Both equivalised for household size.
- Inequality measures: Gini, P90/P10, standard deviation of logs (all quarterly via survey timing (Cloyne and Surico, 2017)).
- Macroeconomic variables (GDP, consumption, investment) from ONS, constant prices, per capita.

Baseline Results: Response of Inequality to Tax Shocks



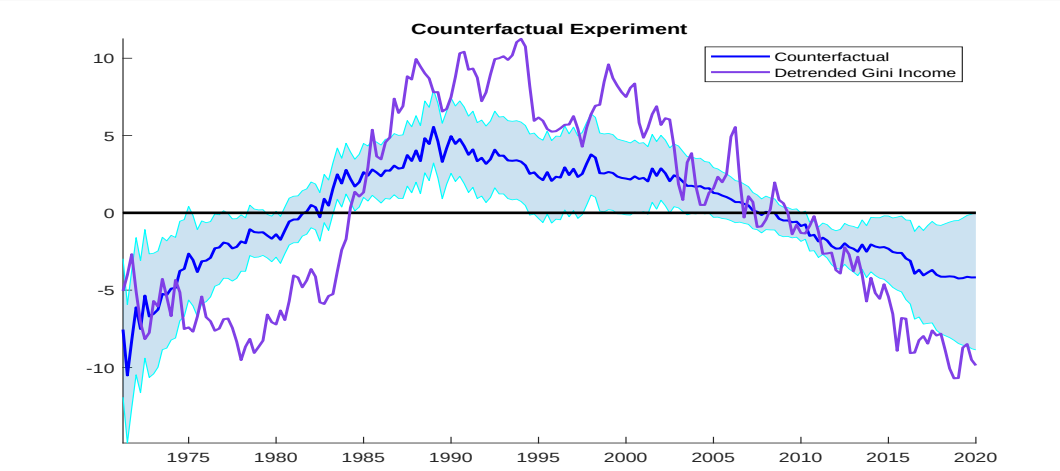
Impulse response functions to a one percent tax cut. The vertical axis plots the responses in percent. The horizontal axis indicates time in quarters. .

Contribution: Forecast Error Variance Decomposition



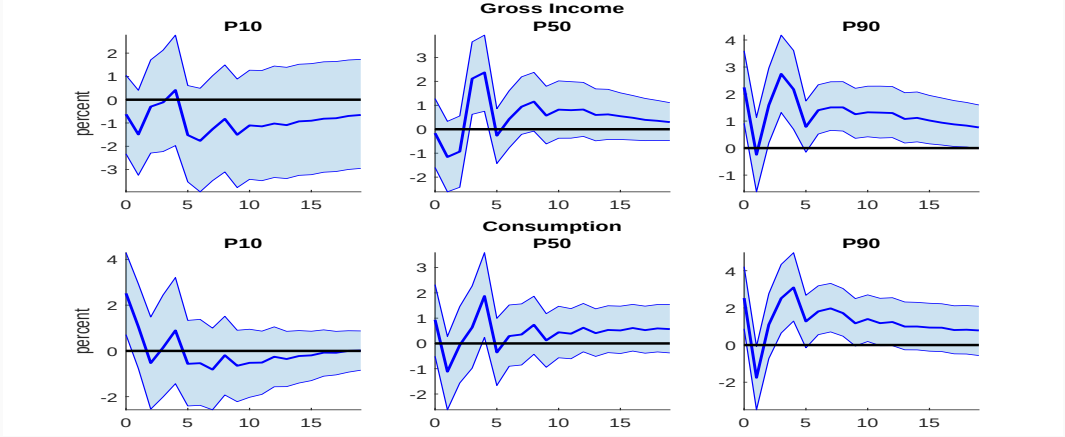
Forecast Error Variance Decomposition following a one percent tax cut. The vertical axis shows the contribution in percent; the horizontal axis indicates time in quarters.

Historical Decomposition



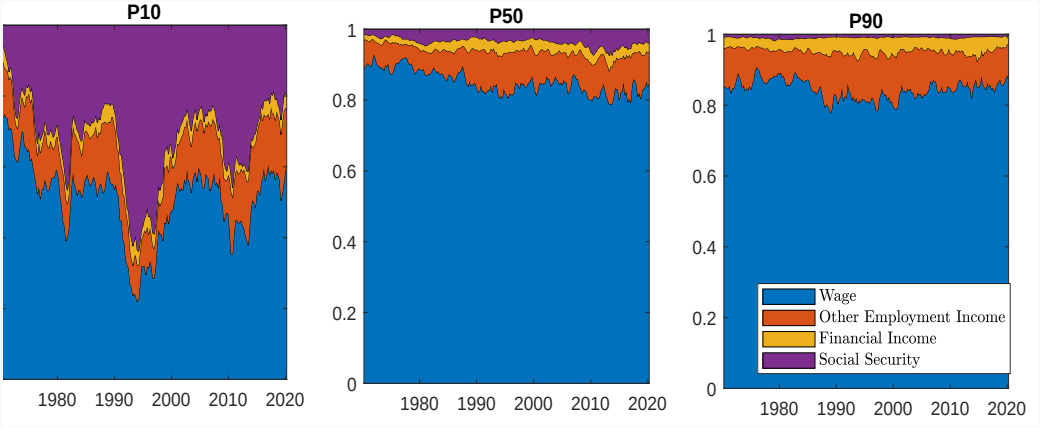
Historical decomposition of the Gini coefficient of gross income. The purple line shows the detrended series

Heterogeneity



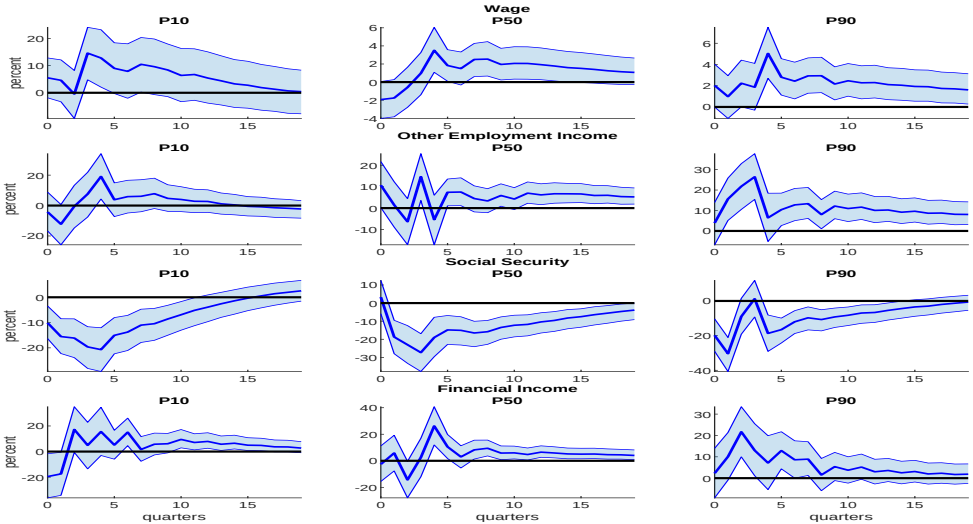
Impulse responses of gross income and consumption percentiles to a one percent tax cut. The vertical axis shows responses in percent; the horizontal axis indicates time in quarters.

Income Decomposition

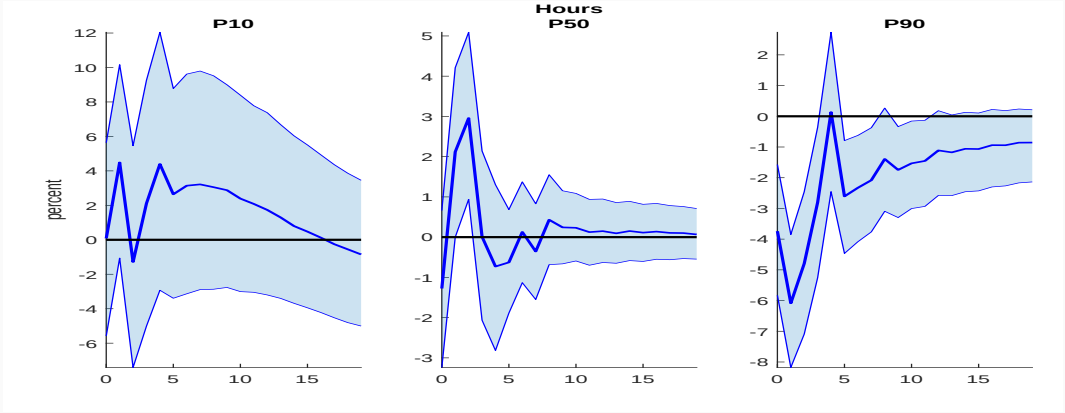


Main components of gross income for households in the 0–10th (left), 40th–50th (middle), and above the 90th (right) percentiles.

Responses of Income Components



Heterogeneous Responses in the Labour Market



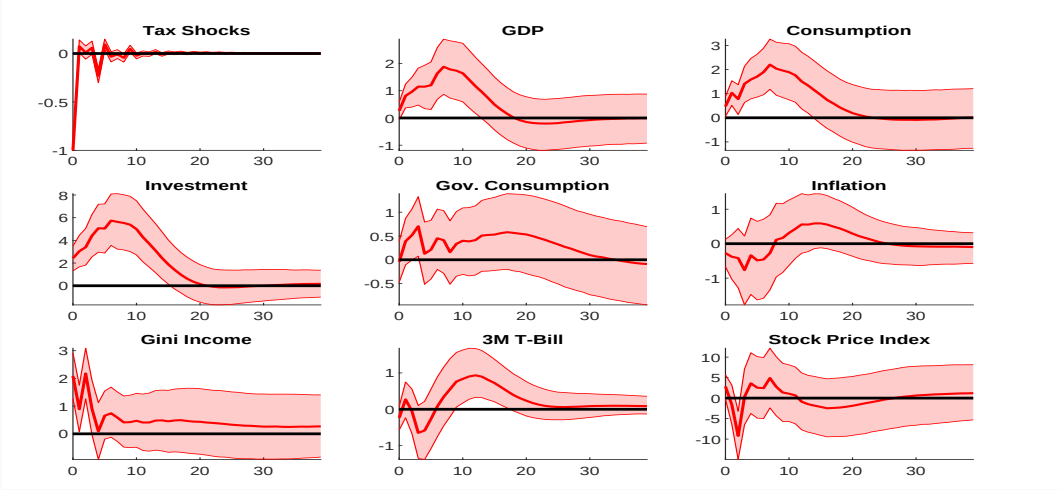
Impulse response functions of usual weekly hours to a one percent tax cut, for households in the 10^{th}, 50^{th}, and 90^{th} percentiles of the income distribution.

Robustness Checks

We assess the robustness of our findings across four dimensions:

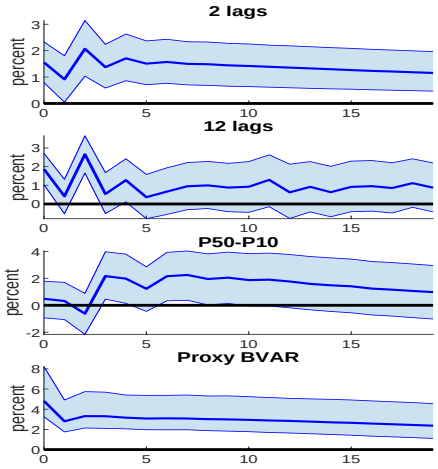
- **Model Specification**
  - Add government spending, interest rate, inflation, and stock market variables
  - Vary lag length (AIC/BIC and long lags (Baumeister (2025))
- **Data Choices**
  - Alternative inequality measures
  - P50/P10, P90/P50, standard deviation of logs
- **Identification Strategy**
  - Instrumental variable (Proxy VAR) using narrative tax series
  - Response to average tax rate cut
- **Estimation Method**
  - Bayesian LP with VAR-centred prior from Ferreira et al. (2023)

Robustness



Impulse response functions of macroeconomic variables to a one percent tax cut.

Robustness



Responses of inequality measures to a 1% tax cut across alternative model specifications.

Conclusions

- We study the distributional effects of UK tax shocks using narrative-based identification à la Cloyne (2013).
- Tax cuts, while expansionary on average, are found to increase inequality — measured by the Gini coefficient, ratios, and standard deviation of logs.
- Right-tail households (90^{th} percentile) benefit the most, primarily via wages, self-employment and financial income.
- Social benefits decline, adversely affecting low-income households, contributing to rising inequality.
- Similar trends are observed on consumption inequality where the impact is more persistent.
- Historical decomposition shows a shift: tax shocks reduced inequality pre-1980 but increased it post-1985.

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