Economic uncertainty and the redistributive effect of taxes and transfers in the UK and the US since the 1980s

Oscar Claveria[1*], **Petar Sorić**[2]

[1] AQR-IREA, University of Barcelona
[2] University of Zagreb, Faculty of Economics and Business

Abstract

This study examines the relationship between economic uncertainty and the redistributive effect of taxes and government transfers in the UK and the US over the period 1980-2021. We find that the sign of the relationship between uncertainty and redistribution goes from being negative at the beginning of the 1980s to taking a positive and significant sign in recent years. In the US, economic uncertainty Granger-causes the redistributive effect of taxes and transfers in the short run, but the same does not hold for the UK.

JEL Classification: C50; D30; E62; H50

Keywords: economic uncertainty; redistributive policy; income inequality; taxes; government transfers

Funding
This research was supported by the project PID2023-146073NB-I00 ('Sustainable Territories') from the Spanish Ministry of Science and Innovation (MCIN) / Agencia Estatal de Investigación (AEI).

[*] Corresponding Author. Diagonal, 690, 08034 Barcelona, Spain. Tel.: +34-934021825. e-mail: oclaveria@ub.edu

1. Introduction

Over the last four decades, income inequality has shown a sustained increase in most developed countries. Since the 1970s, there has been a growing trend in inequality in the US and Europe (Piketty and Saez, 2014). In the effort to combat economic inequality, governments often face an obstacle of rising economic uncertainty. Namely, during uncertainty shocks (e.g. recessions, episodes of high inflation, financial or trade crisis, etc.), tax revenues often decline due to a slowdown of aggregate economic activity, lower disposable incomes, and lower corporate profits. Governments may use debt financing to introduce redistributive packages, but high levels of debt may also disable the sustainability of such policies. These tendencies inevitably reduce the fiscal capacity for any type of redistributive policy. The issue at hand is even more accentuated if, when faced with uncertainty, governments prioritize short-term stabilization over long-term structural programs for counteracting inequality in a systemic fashion.

Given the existing evidence of the negative impact of unexpected increases in uncertainty on real activity (Bloom, 2009, 2014), and of the positive association between redistribution and per capita income (Claveria, 2024, 2025), one would expect economic uncertainty and redistribution to be related. This work explores the impact of unexpected increases in economic uncertainty on redistributive policies, and more specifically on the redistributive effect of taxes and transfers.

Whereas income inequality has been widely studied (e.g., Berg et al., 2018; Flechtner and Gräbner, 2019; Claveria and Sorić, 2024), the lack of comparable information regarding the impact of taxes on disposable income across countries, has caused the analysis of redistribution to be underesearched. The recent availability of historical series on the distribution of income after taxes, freely accessible from the World Income Database (WID.world), allowed us to analyze the evolution of the role of governments in reducing inequality. To the best of our knowledge, this is the first study to evaluate the impact that economic uncertainty has had on the effectiveness of redistributive measures. To examine the stability of this relationship and whether there are differences in the effects of positive and negative changes in uncertainty, as well as to allow for the possible existence of non-linearities, we combine a time series analysis by state space methods with a non-linear autoregressive distributed lag (NARDL) model.

2. Data

Economic uncertainty is gauged by Baker et al.'s (2016) EPU index, which is a proxy based on the frequency with which concepts related to uncertainty appear in the media. To be precise, EPU index quantifies the relative frequency of articles within main newspapers in the country at hand, focused on three specific topics: *economy/economic* (or economy-related keywords), *policy*, and *uncertainty/uncertain*. The index is normalized for easier interpretation (see e.g. Baker et al. (2016) for methodological details). The redistributive effect of taxes and transfers is calculated as the difference between inequality in primary income (i.e., before taxes and government transfers, except pensions and unemployment insurance among adults) and in disposable income (i.e., after taxes and transfers). We use annual data from the WID.world, which is the most extensive dataset available on the historical evolution of income inequality.

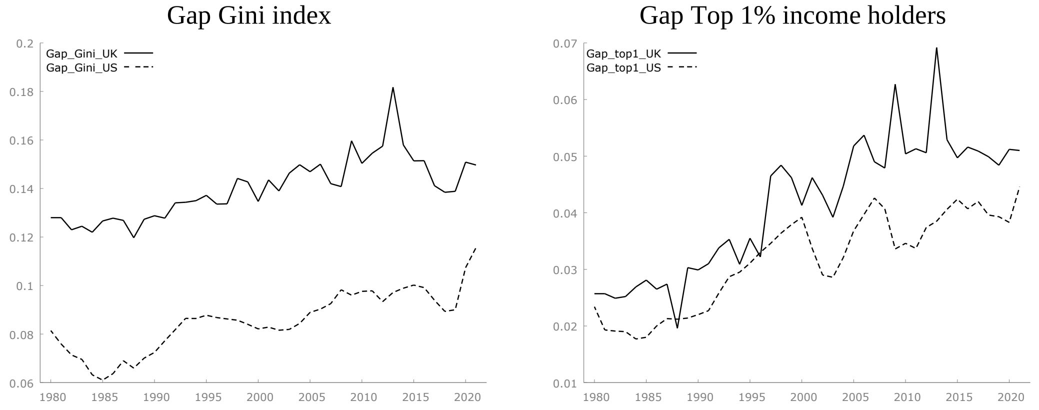
Since it has been shown that the top percentile income holders play a very large role in the surge back of inequality (Atkinson et al., 2011), we use two different metrics of income inequality: the Gini index (G) and the share of income accumulated by the upper percentile (top1). Table 1 presents the summary statistics. Figure 1 shows the evolution of the long-term dynamics of the redistributive effect of taxes and transfers both at the aggregate level (Gap_G) and among the top 1% income holders (Gap_top1).

Table 1. Summary statistics (1980-2021)

UK	Mean	Minimum	Maximum	Std.Dev.
Gini pre-tax	0.467	0.408	0.507	0.029
Gini post-tax	0.327	0.280	0.358	0.022
Gap Gini	0.140	0.120	0.182	0.013
Top 1% pre-tax	0.112	0.068	0.147	0.026
Top 1% post-tax	0.070	0.042	0.098	0.016
Gap top 1%	0.041	0.020	0.069	0.012
US	**Mean**	**Minimum**	**Maximum**	**Std.Dev.**
Gini pre-tax	0.539	0.454	0.585	0.037
Gini post-tax	0.454	0.373	0.495	0.028
Gap Gini	0.085	0.061	0.116	0.012
Top 1% pre-tax	0.160	0.104	0.195	0.027
Top 1% post-tax	0.128	0.081	0.157	0.020
Gap top 1%	0.032	0.018	0.045	0.008

Notes: Std. Dev. denotes standard deviation.

Figure 1. Evolution of redistribution



Notes: The black line represents the evolution of redistribution in the UK, and the dotted line in the US. The graph on the left shows the evolution of the difference of the Gini index before and after taxes and transfers (Gap_G), while the graph on the right the evolution of the difference between the pre-tax and post-tax share of income accumulated by the top 1% income holders.

The graph highlights the growing role of governments in mitigating the effects of income inequality through progressive taxation and public transfers. However, this effort has not been enough to prevent sharp increases in income inequality since the 1980s, especially for top incomes shares. Furthermore, in the UK there has been a substantial setback in redistributive terms since 2014. The continuous rise in inequality is reflected in the fact that in the UK the share of post-tax income accruing to earners in the top percentile of the distribution rose from 4.2% in 1980 to 7.6% in 2021, while in the US it rose from 8.1% to 14.6%, practically doubling in both cases. These figures are in keeping with recent evidence presented by Chancel et al. (2022), who showed that in 2021 the ratio between top 10% and bottom 50% incomes was 9 in the UK and 17 in the US.

3. Empirical analysis

To examine the stability of the relationship between economic uncertainty and redistribution over time, we used a state-space model with time-varying parameters (TVP). The model comprises an observation equation and a state equation:

$$Y_t = z_t{}'\beta_t + \varepsilon_t, \quad \varepsilon_t \sim \mathrm{N}\left(0, \sigma_{t,\varepsilon}^2\right) \tag{1}$$

$$\beta_{t+1} = \beta_t + \eta_t, \quad \eta_t \sim \mathrm{N}(0,\mathrm{Q}), t = 1, \ldots, T, \tag{2}$$

where T denotes sample size; Y_t is the observation vector, which contains the corresponding metric of redistribution (the Gini index first, and then the share of post-tax income accruing to earners in the top percentile of the distribution, respectively), $\beta_t{}' = \left(\beta_{t,0} \;\; \beta_{t,1} \;\; \ldots \;\; \beta_{t,m}\right)$ is an unobserved state vector, $Q = diag\left(\sigma_{t,1}{}^2, \sigma_{t,2}{}^2, \ldots, \sigma_{t,m}{}^2\right)$ is a diagonal covariance matrix, $z_t{}' = \left(1 \;\; x_{t,1} \;\; x_{t,2} \ldots \;\; x_{t,m}\right)$ is the regressor vector (economic uncertainty), $\eta_t{}' = \left(\omega_{t,1}, \omega_{t,2} \ldots \omega_{t,m}\right)$ the error term, m denotes the number of state variables, and $\beta_{t,0}$ is a potentially time-varying parameter often referred to as the local level.

Following Durbin and Koopman (2012), we used the Broyden–Fletcher–Goldfarb–Shanno (BFGS) algorithm to estimate the unknown variances in the covariance matrix Q. Unobserved state values of β_t were obtained via the diffuse Kalman filter. We only allowed for time-variability of the uncertainty parameter and the local level. Model selection is carried out via AIC.

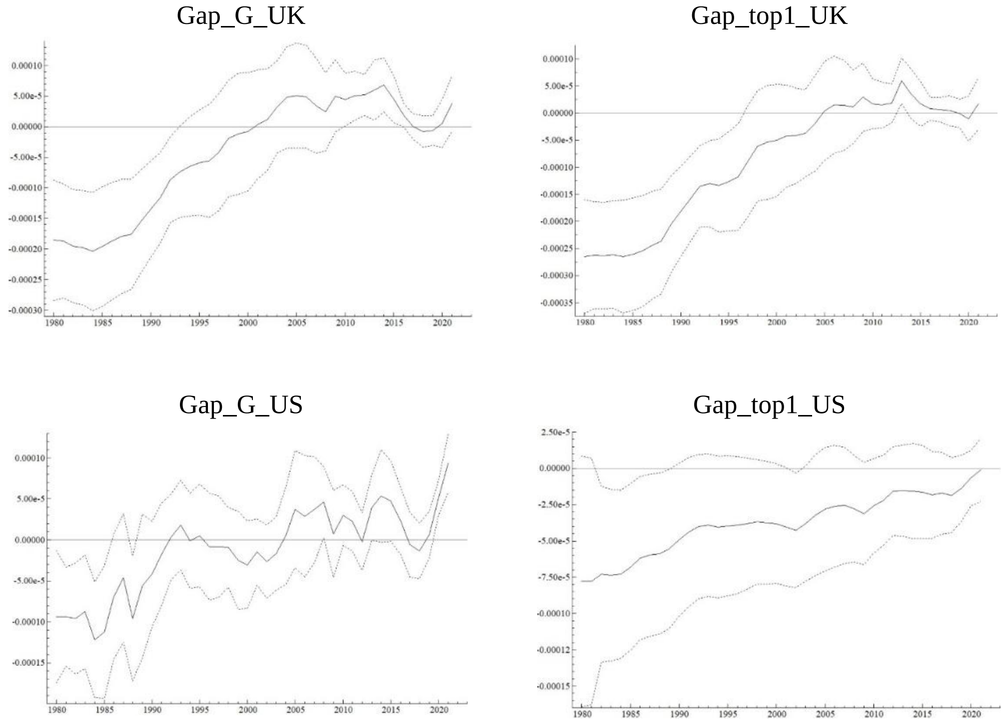
Table 2 shows that most specifications passed the diagnostic tests. The lowest AIC was obtained for the models with a time-varying impact of economic uncertainty on redistribution. As a robustness check, we replicated the analysis including GDP growth as a control variable, obtaining very similar results, which have been omitted for the sake of brevity. To better illustrate the time dynamics of the relationship, in Figure 2 we present the evolution of the parameters.

Table 2. Economic uncertainty and redistribution – TVP model

Dependent variable	Local level	*H*	*BS*	*Q*
Gap_G_UK	0.139**	5.952**	1.737	3.318
Gap_top1_UK	0.047**	4.487*	2.755	2.350
Gap_G_US	0.617**	0.695	0.614	0.791
Gap_top1_US	0.016**	2.726	2.569	2.074

Notes: * (**) denotes significance at 5% (1%) level. *H, BS,* and *Q* are respectively test values of the Koopman-Harvey-Doornik-Shephard heteroskedasticity test, the Doornik-Hansen normality test, and the Ljung-Box autocorrelation test.

Figure 2. Time-varying effect of economic uncertainty on redistribution



Note: Dotted lines represent the 95% confidence interval.

Figure 2 shows that in both countries the effect of increases in economic uncertainty on the redistributive impact of taxes and transfers turned from negative in the early 1980s, to positive in recent years. This change of sign could be reflecting the economic policy turn-around in 1979 in the UK and in 1980 in the US, marked by an increasing deregulation that contributed to boosting top wealth shares. This result is line with the findings of Kemp-Benedict (2011), who showed the key role of political regimes in determining within-country income distribution.

Additionally, in order to examine whether there are differences in the effects of positive and negative changes in economic uncertainty, we used a NARDL model:

$$\Delta Y_t = a_0 + \theta_1^+ EPU_t^+ + \theta_1^- EPU_t^- + \rho Y_t + \delta GDP_t + \sum_{j=1}^{p-1} a_j \Delta Y_{t-j} + \sum_{j=0}^{q_1^+-1} \pi_{1,j}^+ \Delta EPU_{t-j}^+ + \sum_{j=0}^{q_1^--1} \pi_{1,j}^- \Delta EPU_{t-j}^- + e_t, \quad (3)$$

where $EPU_t^+ = \sum_{j=1}^{t} max(\Delta EPU_t, 0)$ and $EPU_t^- = \sum_{j=1}^{t} min(\Delta EPU_t, 0)$. The optimal lag structure of the model (p, q_1^+, and q_1^-) was determined using the general-to-specific approach (Greenwood-Nimmo and Shin, 2013).

We tested for cointegration using a standard Wald test ($\boldsymbol{H_0}$: $\rho = \theta_1^+ = \theta_1^- = 0$) and for the existence of significant nonlinearities in both the long term ($\boldsymbol{H_0}$: $\theta_1^+ = \theta_1^-$) and short term ($\boldsymbol{H_0}$: $\sum_{j=0}^{q_1^+-1} \pi_{1,j}^+ = \sum_{j=0}^{q_1^--1} \pi_{1,j}^-$). NARDL estimations are provided in Table 3. Although we do not obtain evidence of cointegration, we do find a significant short-run relationship, presented in the form of Granger causality from economic uncertainty to redistribution.

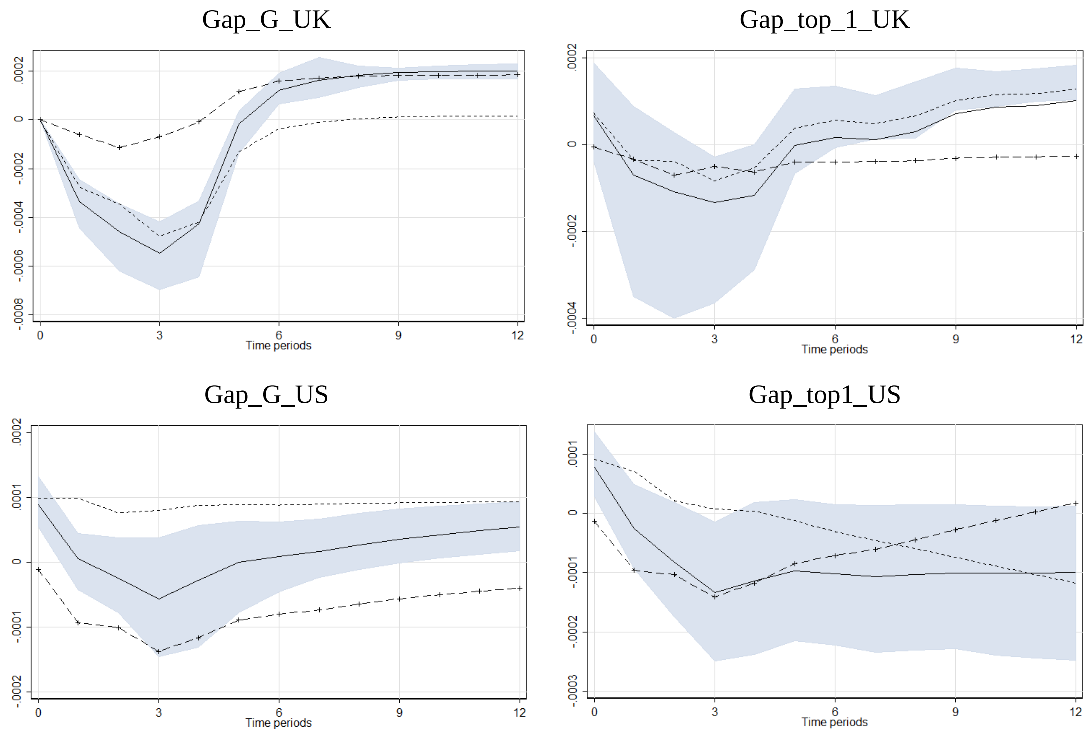
Table 3. Economic uncertainty and redistribution – NARDL cointegration test

	Gap_Gini_UK	Gap_top1_UK	Gap_Gini_US	Gap_top1_US
Asymmetry	short- and long- run	long-run	short-run	long-run
Granger causality	4.82**	-	-	11.05**
Cointegration	8.33*	0.22	4.33	1.30

Notes: * (**) denotes significance at 5% (1%) level. “Granger causality” denotes *F* test statistics for the null hypothesis of all lags of economic uncertainty being insignificant. “Cointegration” contains *F* test statistics of the NARDL cointegration test.

Finally, in Figure 3 we graphed the evolution of dynamic multipliers, which show how redistribution responds to positive and negative unit changes in uncertainty.

Figure 3. Impact of economic uncertainty on redistribution – Dynamic multipliers



Notes: Dotted lines show the impact of negative changes of economic uncertainty on redistribution. Dashed lines show the impact of positive changes of uncertainty. Solid black lines show the evolution of the asymmetry, computed as the difference between positive and negative impacts of changes in economic uncertainty. Shaded areas correspond to 95% confidence intervals.

Overall, the graphs in Figure 3 show that decreases in uncertainty usually feed into an increase of the redistributive effect of taxes and transfers, while unexpected increases in economic uncertainty shocks are followed by a decrease in redistribution. The former effect seems to be stronger in most specifications, but is dominantly restricted to the short run, few years after the initial shock.

These results are in keeping with economic theory, given the existing evidence of the negative relationship between uncertainty and economic growth (Dibiasi and Iselin, 2021; Jo and Sekkel, 2019), and that *ceteris paribus*, greater tax collection can be expected during periods of growth. The most surprising finding is that the adjustment is asymmetric, with the impact of decreases in economic uncertainty being greater than that of increases. This asymmetry could be partly justified by the implementation of countercyclical policies, which would somehow cushion the negative impact that increases in economic uncertainty can have on redistribution through a lower economic growth, once again highlighting the key role of governments in reducing income inequality.

4. Conclusion

This study evaluates the relationship between economic uncertainty and the redistributive effect of taxes and transfers in reducing income inequality in the UK and the US. Despite the fact that in both countries the gap between income inequality before and after taxes has been increasing due to progressive taxation, since 2014 we observe a sharp decrease in the redistributive role of the government in the UK. The impact on redistribution of unexpected increases in economic uncertainty varies throughout the sample, going from a negative association during the first 80s to taking a positive sign in recent years, providing evidence that inequality is not deterministic. Despite the fact that for the US we obtain a significant relationship between uncertainty and redistribution in the short term, there is no evidence of cointegration between both variables. Finally, we also find that there is an asymmetric adjustment between economic uncertainty and the redistributive effect of taxes and transfers, with the impact of decreases in uncertainty being greater than that of increases. These results show that, in spite of the fact that tax evasion could be neutralizing the effect of redistributive policies, said measures seem to be rather marked by the political agenda than by the economic cycle.

Finally, we want to point out that the obtained results might have been influenced by biases derived both from the measurement of redistribution and from the fact that additional determinants have not been considered, leaving it for a subsequent analysis, in which it is intended to extend the study to other countries as the time series of disposable income after taxes become available.

References

Atkinson, A., Piketty, T., and E. Saez (2011) “The top 1% in international and historical perspective” *Journal of Economic Literature* **49**, 3–71.

Baker, S. R., Bloom, N., and S.J. Davis (2016) “Measuring economic policy uncertainty” *The Quarterly Journal of Economics* **131**, 1593–1636.

Berg, A., Ostry, J. D., Tsangarides, C. G., and Y. Yakhshilikov (2018) “Redistribution, inequality, and growth: New evidence” *Journal of Economic Growth* **23**, 259–305.

Bloom, N. (2009) “The impact of uncertainty shocks” *Econometrica* **77**, 623–685.

Bloom, N. (2014) “Fluctuations in uncertainty” *Journal of Economic Perspectives* **28**, 153–76.

Chancel, L., Piketty, T., Saez, E., and G. Zucman (2022) World Inequality Report 2022. *Harvard University Press.* https://wir2022.wid.world/

Claveria, O. (2021) “Uncertainty indicators based on expectations of business and consumer surveys” *Empirica* **48**, 483–505.

Claveria, O. (2024) “Redistribution and human development: Evidence from Europe” *Economics and Business Letters* **13**, 68–81.

Claveria, O. (2025) “Do taxes and transfers stimulate development in Latin America?” *Public Finance Review* **53**, 200–225.

Claveria, O., and P. Sorić (2024) “Inequality and redistribution: Evidence from Scandinavian and Mediterranean countries” *Applied Economic Analysis* **32**(94), 1–22.

Dibiasi, A., and D. Iselin (2021) “Measuring Knightian uncertainty” *Empirical Economics* **61**, 2113–2141.

Durbin, J., and S.J., Koopman (2012) *Time Series Analysis by State Space Methods*. Oxford University Press, Oxford.

Flechtner, S., and C. Gräbner (2019) “The heterogeneous relationship between income and inequality: A panel co-integration approach” *Economics Bulletin* **39**, 2540–2549.

Greenwood-Nimmo, M., and Y. Shin (2013) “Taxation and the asymmetric adjustment of selected retail energy prices in the UK” *Economics Letters* **121**, 411–416.

Jo, S., and R. Sekkel (2019) “Macroeconomic uncertainty through the lens of professional forecasters” *Journal of Business & Economic Statistics* 37, 436–446.

Kemp-Benedict, E. (2011) “Political regimes and income inequality” *Economics Letters* **113**, 266–268.

Piketty, T., and E. Saez (2014) “Inequality in the long run” *Science* **344**, 838–843.