

People, Policy and Polarization:

A Study of Income Inequality in the UK in 1980s using Synthetic Control Method

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Abstract

Income inequality in the UK rose to historic proportions in the 1980s. Within that one decade, the Gini coefficient increased five-folds compared with the increases since. Policy played a definite role. In 1979, in addition to other policy reforms, the tax code was drastically changed in favor of the rich - 9% cut for the bottom rate compared to 28% for the top rate. I find that, in the short run, the regressive nature of the tax cut was the catalyst for over 10% increase in the income share of the top decile earners in the UK compared with its counterfactual. What drove the changes in policy is as important as the intervention itself. For if not the impetus, we might not have had these policy changes. This paper presents a unique case that outlines the socio-economic and political factors leading to policy change; the drastic nature of the policy change, encapsulated by the 1979 tax cut; and its effect on the income distribution.

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1 Introduction

Extraordinary polarization of the income distribution requires remarkable changes in policy. But remarkable policy changes, in a democratic system, can only happen with the consent of the people. This is exactly what happened in the United Kingdom in the eighties. UK had a very sharp increase in income inequality between 1979 and 1990. The Gini coefficient jumped from an average of 0.25 in the 1970s to an average of 0.34 by the early 1990s. To put that in perspective, consider the change in the Gini over the next three decades, from 1990 to 2017. The Gini in this period increased by a mere 0.02 points. In other words, income inequality in the 1980s increased by more than five folds as compared with the next three decades. This increase in income inequality, within one decade, has been both unprecedented and unmatched by any nation in the post-World War II period.

This much is obvious. What is not as obvious is - first, what triggered this rise in inequality, and, second, what was the underlying context for the former. In this paper, I argue that the underlying socio-economic conditions pushed the people to demand radical changes, radical policy changes, in particular reform of the tax code, followed, and this was what led to the polarization of the income distribution.

Inequality, which is a measure of dispersion of the income distribution, is a complex phenomenon. Changes in the income distribution affects and is affected by social, political and economic factors. All play a role, and almost always they work in tandem. This is exactly what happened in the UK. After decades of stable (political and economic) post-war consensus years, there was an increase in social and economic upheavals in the 1970s. This was caused by both internal and external geopolitical situations - oil crisis, high inflation, and labor contract stand-off among others. This socio-economic friction led to a drastic shift in the political paradigm by the end of the 1970s. Something radical was necessary, and in Margret Thatcher and her Conservative government, UK got exactly that. For the first time in the developed world, extremely market-oriented liberal policies, which have been termed neoclassical, were implemented. While this definitely did spur economic growth, it also contributed to the drastic divergence of income in the UK.

The decade of the 1980s, as have been pointed out by researchers (see Atkinson (1995), Jenkins (1995)), can be separated into two distinct parts. The early part of the decade had large unemployment combined with low proportion of the population who were employed. This presented extremely fertile conditions for the people with jobs to financially outperform the people without jobs. On the other hand, towards the latter part of the decade, employment had bounced back, but financial liberalization was taking shape. There was mass privatization of national industries. This, in addition to the differential capacity of the rich and of the poor to buy stock into these freshly privatized companies, provided a fertile ground for diverging trend in financial outcomes among the income groups. This latter consequence has been referred to as the “Big Bang” effect (see Tanndal and Waldenström (2018)).

These were the necessary conditions, but by themselves were not sufficient. As one might note, there have been similar instances where neoliberal policies have been implemented and/or there has been mass unemployment, neither of which have increased inequality, at least not as drastically and within a short time-span as what happened in the UK. What makes UK different is both the regressive nature of changes, and the speed at which they were performed. These changes were embodied by two regressive tax cuts that bookended the decade. These tax cuts, the first in 1979 (when top earnings tax rate was cut from 83% to 60%) and a second in 1988 (when top earnings tax rate was further cut from 60% to 40%), made it possible for the underlying socio-economic conditions to take full shape. The focus of this paper will be on the first of these cuts, which provides the inflection point for the changes in the distribution.

In what follows, this paper not only provides the context for the policy changes, without which it is difficult to imagine the depth and speed of the changes, but also an improved cross-country comparison on the effect of the policy. I use the synthetic control method (SCM) to find the effect of the tax cut in 1979 in the UK relative to its peers. This is an improvement on prior literature which has relied on either UK in the previous decades as the counterfactual, or another control country matched along limited dimensions. The SCM improves on both by accounting for the post intervention shock, which is not possible with

the former, and using a data driven matching method along several variables, making the estimates more robust.

Section 2 discusses the socio-economic and political changes leading up to the 1979 policy intervention. Section 3 discusses the data and methodology. Section 4 presents the main findings of this paper. In section 5, I discuss some placebo studies. Conclusions are presented in section 5.

2 Socio-Economic and Political Background

2.1 Post-WWII to 1970

Consensus Politics

The 1950s started where the politics of the forties had ended. As highlighted by Addison (Addison, 1975), the shared experience of the Second World War had given rise to a consensus of social and political thought. This center-left consensus was characterized by enforcement of full-employment, Keynesian demand management, commitment for a welfare state, facilitation of trade-unions, and a mixed economy. Although implemented by the Labor government 1945-51, it was *accepted*¹ by the conservative government that came to power in 1951. While some see consensus politics highlighting the postwar years, others (see Pimlott (1988), Pimlott et al. (1989)) have argued that there was no such consensus between the two main political parties. Regardless of the view point, there were many similarities in policy of the Labour and Conservative governments. For example, the National Health Service was created by the Labor government in 1946, and despite opposition from the conservatives, it was left intact after the conservatives came to power in 1951. Likewise, the case for using means-testing on welfare policies was made by the Conservative opposition when the National Insurance Act was established in 1946, but the Conservatives left it largely intact in the Labour mold post 1951 (Hickson, 2004).

This wasn't to say that the goals of the two major parties were the same. They weren't. The key, as Hickson (2004) points out, was in understanding the difference between the

¹As opposed to policies being dismantled by the new incoming government.

means (the policies implemented) and the *ends* (value goals attempted through policy). While the choice of policy methods, which is what I refer to as consensus here, was the same, the values they represented were different. The conservatives saw it as a way to improve efficiency (like the policies to nationalize industry) and were primarily concerned about the notion of equalizing opportunity (like policies to increase government spending in education). Labour, on the other hand, saw nationalization of industry and universal education as a policy promoting socialist values of equality. As Crosland (2013) points out, the same means were adopted to attain different ends by the two main opposing parties.

Why did this policy consensus hold well into the 1960s? The consensus was, in-effect, demanded by the populous. During the period following the war, there was a consensus among voters which distilled down to a notion of better health, education, and housing. The economic slump in the 1920s and 1930s had caused mass unemployment. The war had changed that, and the public didn't want to revert to the conditions of the Great Depression. It was the pressure from the electorate that forced policies to shift left of center. There was little space for policy variation. This is evident by the share of votes received by the two main parties in this period. The Labour and Conservative parties together won close to, or more than, 90% of the votes in each election between 1945 and 1970². This was the classic case of tending to the median voter (Downs, 1957). Diverting away from this center-left position would have been a political suicide.

Social Changes in 1960s

While the political parties remained steadfast to the consensus policies in the sixties, the mentality of the voters had started to change. With full employment³ and protected by the social safety nets, the expanding and educated middle class now covered the bulk of UK populous. As opposed to their parents, youth from this generation were devoid of the restraints of the war⁴ and enjoyed much more social and economic freedom. They had evolved into a generation that believed in post-materialist values and were more concerned with socio-political changes. Arts and music flourished, mass protests became a thing.

²see Figure 1.

³The British unemployment from 1950-1965 was 1.8% (Matthews, 1968).

⁴Conscription was abandoned for the first time since WWII.

The radical social changes at the ground level was emulsified by “the rise of the new-left, student militancy, anti-Vietnam war demonstrations, trade-union militancy and civil rights movement” (Fraser, 2000). The times, definitely, were changing.

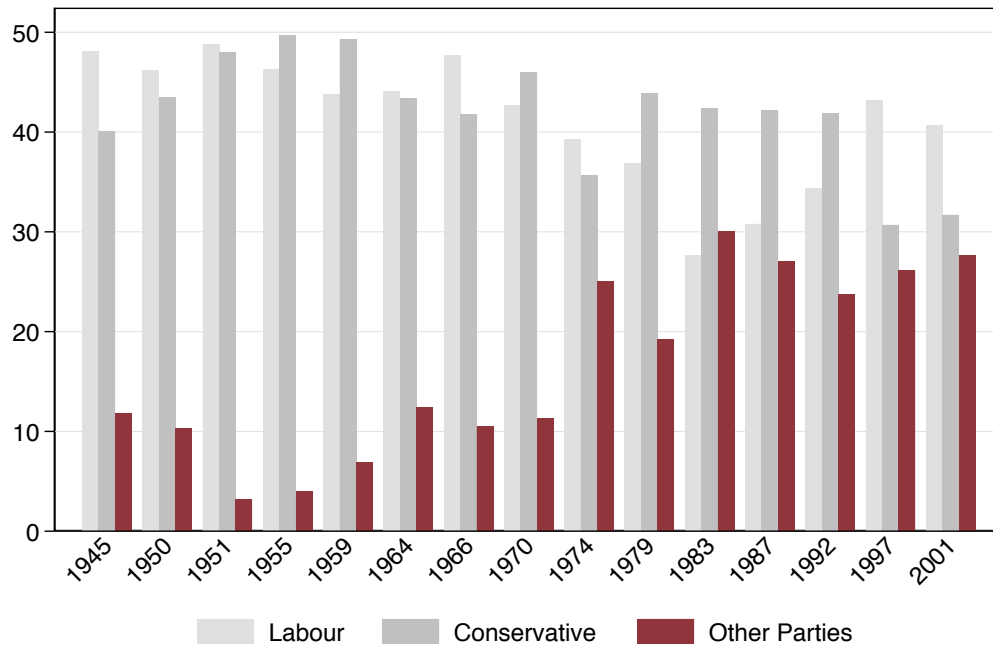
2.2 Turbulence in 1970s

Political Upheaval

The social changes in the sixties, extended to other spheres in the seventies. In the past, political revolutions had engendered drastic social and cultural changes. This was certainly true of most of the 19th century revolutions. Here, maybe as an indication of higher welfare of the people, things ran in reverse. Mass social unrest preceded, rather forced political change. This was highlighted in the election in 1974⁵. The political parties on the fringes won more than 25% of the votes. Figure 1 compares the share of votes of the two main political parties with the rest. Vote share of the Liberal party more than doubled from under 10% in the post WWII years to over 20% in the 1974 elections. Simultaneously, the combined share of the two main parties dropped to less than 75%, from around 90%, for the first time since the Great Depression. People were now responding to polarizing policies not only in the streets, but also at the polls. Thus, the median voter was lost. The policies of the two main parties started to get polarized. What was debated in the streets during the sixties, now took the limelight of discussions in the political sphere. If the idea of policy consensus had become hazy in the sixties, it was lost in the seventies. The shares of the two main parties has never recovered to the consensus years since.

⁵In 1974, there were two separate national elections, first on February 28th and second on October 10th. Labour, under Harold Wilson, formed the government in both cases.

Figure 1: Vote share of the Labour and Conservative parties compared with the rest



Note: This chart presents the vote share of Labour, Conservative and other parties in UK national election from 1945 to 2001. The three shares add up to 100%. In 1974, there were two separate national elections, first on February 28th and second on October 10th. The results used here are from the latter, although both paint similar picture. *Source:* Authors calculation using Kimber (2018).

Stagflation

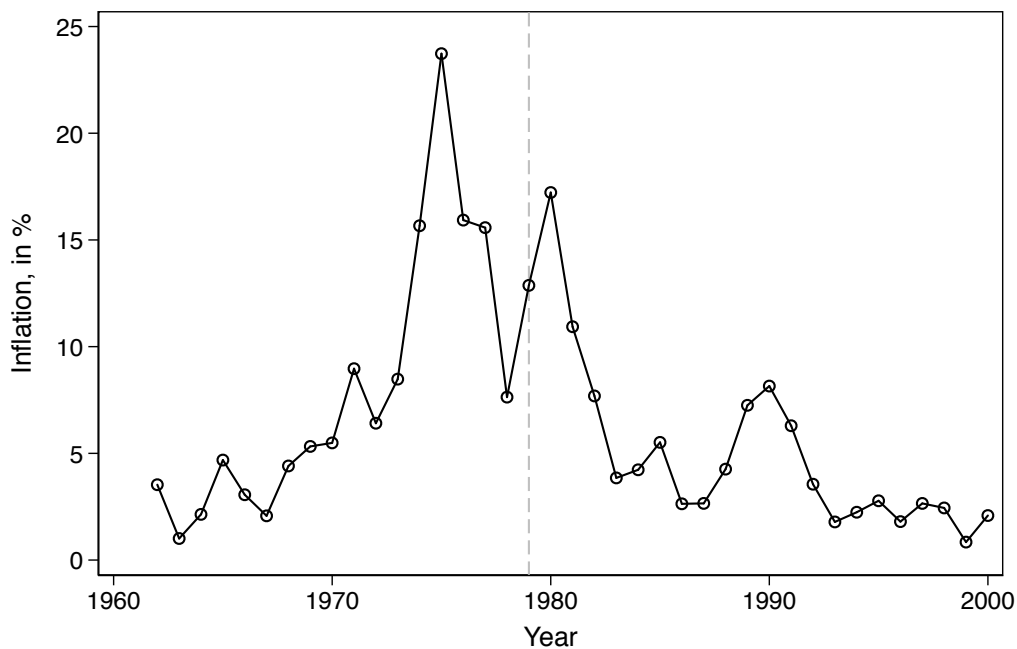
Why hadn't the polls showed the polarization of ideas of the sixties? Why was this the case only in 1974? Change in action, as opposed to change in thought, requires a jolt. That jolt came in the form of an economic crisis in the seventies.

The end of the Bretton Woods system in 1971 signaled the end of fixed exchange rates. The Arab oil embargo and the ensuing inflation led to mass public unrest. Inflation, Figure 2, by 1975, grew to an all-time high of 24%⁶, while it had been just over 5% at the start of the decade. Reeling from these shocks, the government was forced to introduced 3-day work weeks and electricity rationing. Simultaneously, to keep the inflation in-check, pay raises for the public employees was capped. Spurred by the economic insecurity, trade

⁶This was the highest inflation had been since the Napoleonic wars.

unions started to push for higher wages. Reeling from international and domestic pressures, UK did what was, and still is, unthinkable - they went to the IMF for help. This was the first time that any developed western democracy had asked for financial help from the IMF (Caryl, 2014). To put it in context, consider that this would also be the last time, until the financial crisis of 2008, any other developed nation would need support from the IMF.

Figure 2: Inflation in the UK, 1960 - 2000



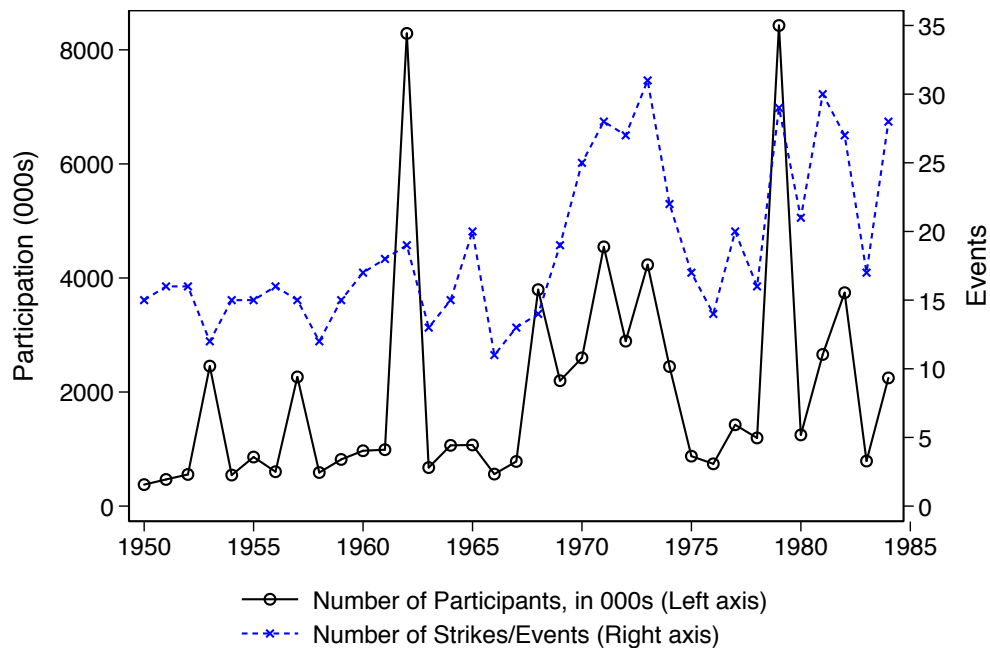
Source: Institute for Fiscal Studies (IFS, 2018)

Social Unrest

More austerity measures followed, in part due to the loan deal with the IMF. Wages were capped; the unions, unimpressed, pushed even harder on the streets. The 1970s saw a sharp increase in not only the size but also the frequency of strikes as compared with the earlier decades. Figure 3 shows the number of strikes and the total participants in strikes annually. The number of strikes doubled in the seventies compared with the prior decades, while the number of protesters quadrupled in that same decade relative to earlier decades.

The impasse between the government and the unions reached a crescendo in the winter of 1978/79 - the so called *winter of discontent*. Neither the unions, nor the Labour government had room to wiggle. Something had to give.

Figure 3: Protests in the UK, 1950-1984



Note: The solid line (left axis) measures total strike participants (in thousands) per year. The broken line (right axis) measures total number of strikes each year. Source: Biggs (2016).

2.3 Policy Change

In all, the British in the seventies were looking for an identity that was drastically different from their past. In 1974, they turned left - but the downward spiral of the economy, the constant protests by the unions, and a lack of clear fiscal or monetary policies disappointed them. In 1979, disgruntled and wanting radical reform, the people would turn right.

Out of the shadow of winter of discontent came to the fore the most unlikely of leaders. The first female leader to run for office under the conservative umbrella, and the first woman to be the prime minister of UK. Both the previous two governments had already

acquiesced the adoption of monetarism. Thatcher government intensified the move towards more neoliberal policies. The government decided, among other things, to privatize national industries, sell-off its public housing stock, decrease direct taxation, and at the same time increase indirect taxation and National Health Insurance contributions. In short, the policies not only deviated from the course, but completely moved in the opposite direction compared with the consensus of the past three decades.

Tax Cuts

Thatcher's reign saw considerable changes in the tax code. Pre-1979, there were as many as 10 different tax brackets. These were collapsed to 2 rates by 1988 (Johnson and Webb, 1993). In 1979, the bottom earnings tax rate, which was 33%, was cut to 30%. The top earnings tax rate, which was 83% prior to 1979, was dropped to 60%. Clearly, the 1979 tax cut was very regressive - 9% cut for the bottom earners compared with a 28% cut for the top earners.

In subsequent budgets since 1979, ensuing cuts in the lower rate followed. By 1988, the bottom rate stood at 27%. In the budget of 1988, this rate was cut to 25%. The top earnings tax rate however, had not changed since 1979. In 1988, the top rate was slashed again to 40% from 60%. This constituted a cut of one-third for the top earners, while only one-sixteenth for the bottom earners.

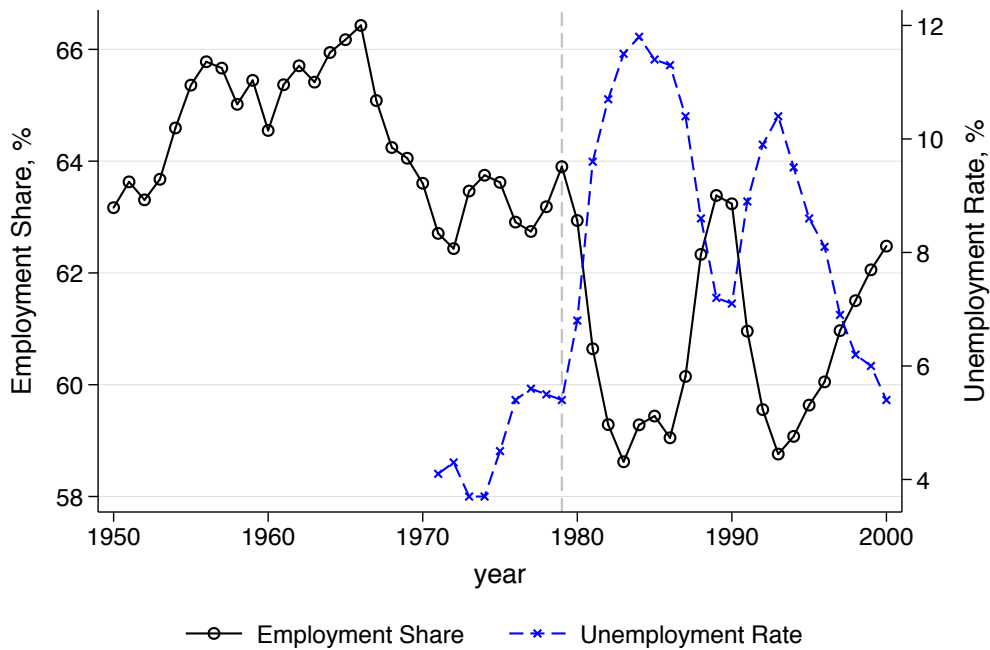
In addition to these regressive cuts in earnings tax rates, rates for investment income were also slashed. There was a 15% premium for investment incomes (or unearned income) over the earning tax rate. For example, prior to 1979, the very top earner would pay 83% of the earned incomes and 98% of the unearned incomes. This unearned premium was abolished in 1985.

Unemployment

Austerity measures had already been underway under the previous government, a more pronounced spending cuts ensued under Thatcher's government. This led to the worst unemployment in UK's history. Figure 4 shows the unemployment rate and the share of the adult population employed. From a low of 4.1 percent in 1970, unemployment, had slowly crept up to 5.5% by the end of that decade. By 1984, it had jumped to 12%. While the

number of people who were looking for jobs increased, these weren't the people who were out of the labor force in the past. These were previously employed people. The proportion of working age population who were employed had also dropped to an all-time low. The proportion employed went down from 72%, in Figure 4, at the end of 1960s to less than 60% in the first half of 1980s.

Figure 4: Employment share in the UK, 1970 - 2000



Note: The left axis measures the share employed among age 20+ in the population, while the right axis measures unemployment rate among the population who are over 16 years and actively searching for employment in the UK. While unemployed rate only takes into account people who are actively searching for employment, the share employed makes no such assumptions. It includes both, those who are active and those who are inactive in the labor force. Source: Authors calculation using World Wealth and Income Database (WID, 2018); Institute for Fiscal Studies (IFS, 2018).

Undoubtedly, the top tax rates prior to 1979 were extremely high. This was, most likely, detrimental to economic growth and part of the cause for the socio-economic problems in the 1970s. That said, tax code changes that were implemented clearly favored the very top of the income distribution. Not only the regressive nature of the cuts, but the speed at which they were implemented, combined with the labor market situation generated conditions

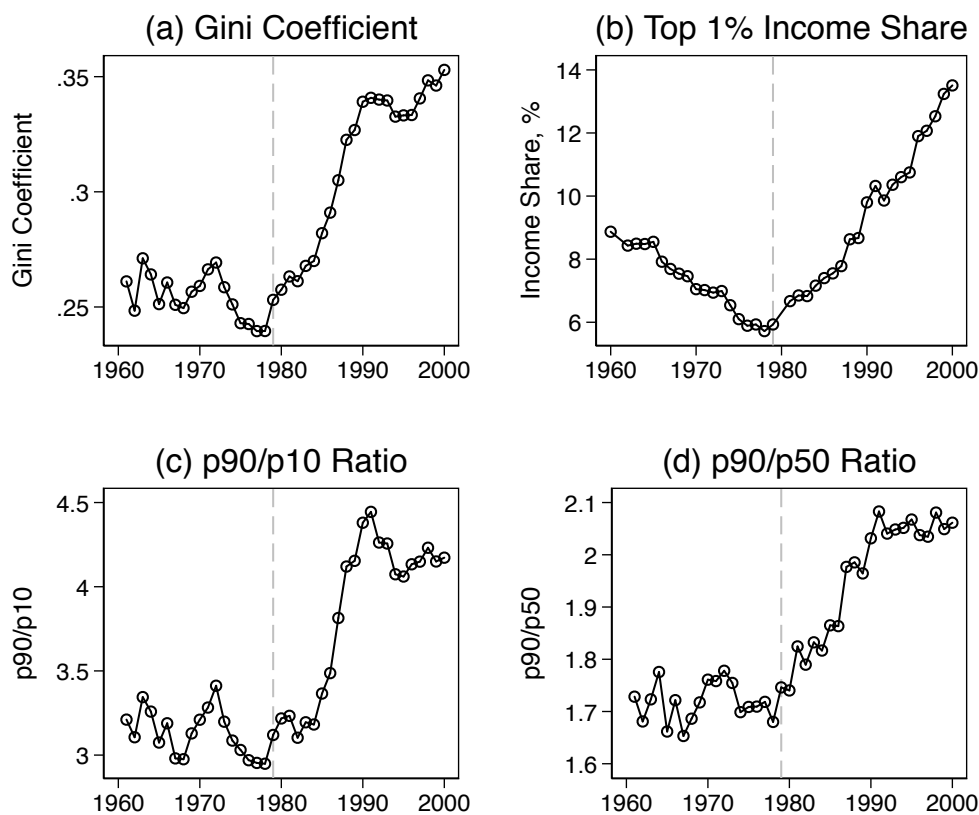
that clearly advantaged certain segments of the population.

Income Inequality

Figure 5 measures income inequality in the UK using four different metrics. Panel (a) looks at the Gini coefficient⁷, panel (b) compares the top market incomes shares of the top 1% income group, and panels (c) and (d) compares the income ratio of the 90th percentile to the 10th and 50th percentiles respectively. Regardless of the measure used, it is clear that income inequality increased significantly in the eighties, the turning point of which was 1979.

⁷The Gini coefficient ranges between 0 and 1, with 0 representing absolute equality and 1 representing absolute inequality.

Figure 5: UK inequality using different measures, 1960 - 2000



Note: Gini coefficient ranges from 0 to 1, with 0 implying perfect equality and 1 perfect inequality. Panel (b) measures the fiscal income share of the top 1% income group. Panel (c) and (d) measures the ratio of income of the 90th percentile (p90) of the income distribution to 10th percentile (p10) and median (p50) groups respectively. *Source:* Panels (a), (c), and (d) - Institute for Fiscal Studies (IFS, 2018); panels (b) - World Wealth and Income Database (WID, 2018).

This mix of underlying socio-economic conditions brought about the policy change. The top tax rates, in 1979, were cut from 83% to 60%, while the bottom rates were cut from 33% to 27%. This differential in the tax cut, in the order of 3-to-1 in favor of the rich, instigated the changes in the income distribution over the next decade. In what follows, I present a cross-country study of the impact of the 1979 tax cut on the income dispersion using synthetic control method.

3 Data and Methodology

3.1 Synthetic Control Method

The choice of the right control group is the most important part of a comparative study. To that end, I use the synthetic control method (SCM) proposed by Abadie and Gardeazabal (2003). The goal is to use a number of pretreatment years, which here are years upto and including the tax reform in 1979, to find the best weights for a pool of countries that minimizes the distance between the treatment unit and the counterfactual unit along a number of defined dimensions. This weighted control group resembles most closely the treatment group given a choice of a vector of variables in the pretreatment period. The important assumption is that the donor countries did not have the same intervention as UK in the period of interest. In this study, the countries in the donor pool should not have had a large and regressive tax cut in the pre-intervention period. This is satisfied.

Below I present a brief discussion of the methodology, for a detailed explanation see Abadie et al. (2010).

We have a total of $t \in \{1, 2, \dots, T\}$ periods. T_0 is the period of intervention. So, there are $t \in \{1, 2, \dots, T_0\}$ pre-intervention periods and $t \in \{T_0 + 1, T_0 + 2, \dots, T\}$ the post-intervention periods.

D_{jt} is defined as the presence or absence of the treatment. So:

$$D_{jt} = \begin{cases} 1 & \text{for the treatment unit, } \forall t \in \{T_0 + 1, \dots, T\}, \\ 0 & \text{for the treatment unit } \forall t \in \{1, 2, \dots, T_0\}, \text{ and} \\ 0 & \text{for the control units } \forall t \in \{1, 2, \dots, T\} \end{cases} \quad (1)$$

There are $j \in \{1, 2, 3, \dots, J\}$ units. $j = 1$ is the treatment unit, and $j \in \{2, 3, \dots, J\}$ is a $(J - 1) \times 1$ vector of units that form the donor pool for the counterfactual.

Following Rubin (1974), we can think of the effect on the outcome variable without treatment as follows:

$$y_{jt}(D_{jt} = 0) = \delta_t + \beta_t Z_j + \lambda_t \mu_j + \varepsilon_{jt} \quad (2)$$

where $y_{jt}(D_{jt} = 0)$ (written as $y_{jt}(0)$ henceforth) is the outcome without the intervention, δ_t are the time fixed effects, μ_j are unit fixed effects, and ε_{jt} are unit specific time shocks. Z_j is a $K \times 1$ vector of variables that influence the outcome.

We could then think of the treated outcome, $y_{jt}(D_{jt} = 1)$ (written as $y_{jt}(1)$ henceforth), as follows:

$$y_{jt}(1) = \theta_{jt} + y_{jt}(0) \quad (3)$$

where θ_{jt} is the effect of the treatment for the treated unit. Then the treatment is the difference between the treated state, Equation 3, and the untreated state, Equation 2. In this framework, the effect of the treatment on the treated unit can be expressed as follows:

$$\theta_{1t} = y_{1t}(1) - y_{1t}(0), \forall t \in \{T_0 + 1, \dots, T\} \quad (4)$$

Since we do not observe the $y_{1t}(0)$ in the post-intervention period for the treated unit, we estimate it through a counterfactual. The synthetic control estimator (SCE) estimates $y_{1t}(0)$ using a combination of weights from the list of units in the donor pool. The synthetic counterfactual will be composed of a convex combination of $J - 1$ units in the vector $J \in \{2, 3, \dots, j\}$, each contributing weights $w_j \in [0, 1]$. The weight vector, W , then is a $(J - 1) \times 1$ vector of unit weights used to construct the counterfactual. The SCE can thus be expressed as:

$$\hat{\theta}_{1t} = y_{1t}(1) - \sum_{j=2}^J w_j \cdot y_{jt}(0), \forall t \in \{T_0 + 1, \dots, T\} \quad (5)$$

Since, we observe the outcome is for the treatment unit, $y_{1t}(1)$, and for all the control units, $y_{jt}(0)$, in the post-intervention period, it remains for us to estimate the weights, w_j . These weight are chosen such that we minimize the pre-intervention distance between the treatment and the estimated counterfactual. The optimal weights are calculated such that:

$$w^*(V) = \underset{w}{\operatorname{argmin}} \left(X_1 - \sum_{j=2}^J w_j \cdot X_j \right)' V \left(X_1 - \sum_{j=2}^J w_j \cdot X_j \right) \quad (6)$$

where X is a $(K + t_y) \times 1$ vector of variables with all the regressors and the outcome variable, $(Z_j', y_{j1}, y_{j2}, \dots, y_{jT_0})'$. t_y is the number of year of the outcome variables used in the X vector. We pick V such that the k^{th} diagonal entry is:

$$v_k^* = \underset{v}{\operatorname{argmin}} \frac{1}{T_0} \sum_{t=1}^{T_0} \left(y_{1t} - \sum_{j=2}^J w_j^*(V) \cdot y_{jt} \right)^2 \quad (7)$$

The synthetic control estimator is then:

$$\hat{\theta}_{1t} = y_{1t} - \sum_{j=2}^J w_j^* \cdot y_{jt}, \forall t \in \{T_0 + 1, \dots, T\} \quad (8)$$

In line with Abadie et al. (2010), we impose two restrictions on the weights⁸: first, we impose that the weights are non-negative, $w_j \geq 0$, and second, that their sum is bounded above to equal a single unit, $\sum_{j=1}^J w_j = 1$. The relaxation of the first restriction, which would allow for negative weights, would in-turn find controls that better match the trend of the treatment unit in the pre-intervention period. Here, in line with past studies (Abadie et al. (2015), Jones and Marinescu (2018)), I have imposed the more-strict matching criteria.

To pre-treatment match between the treatment and the control units is given by the root mean squared prediction error (RMSPE):

$$RMSPE = \sqrt{\frac{1}{T_0} \sum_{t=1}^{T_0} \left(y_{1t} - \sum_{j=2}^J w_j^* \cdot y_{jt} \right)^2} \quad (9)$$

A good counterfactual would minimize the RMSPE in the pre-intervention period.

Inference

As the SCM does not have a traditional method of calculating the p -value, for inference we follow Abadie et al. (2015). The p -value is calculated as follows:

⁸Following Tanndal and Waldenström (2018) we can assume that the weights are not negative, nor do they sum to less than 1 due to the non-symmetric nature of the top income shares. Doudchenko and Imbens (2016) have suggested that it may be feasible to use non-restrictive weights for symmetric outcome variables.

$$p\text{-value} = \frac{\sum_{j=2}^J \sum_t^T 1(|\hat{\theta}_{1,T_0}| \leq |\hat{\theta}_{j,t}|)}{N_{jt}} \quad (10)$$

where N_{jt} is the total number of placebo studies. $\hat{\theta}_{j,t}$ is the treatment effect of all possible combinations of time and unit placebo studies from the donor pool. Hence, the p -value gives us the share of the placebos that have an effect as large or larger than the actual treatment effect.

3.2 Data and Variables

The outcome variable is the concentration of market income of the top income groups in the income distribution. This variable measures the pre-tax and pre-transfer income shares. I break the top decile of the income distribution into five groups. For each group, I construct a synthetic counterfactual. The groups represent market income share for Top 1%, Top 5%, Top 10%, Top 5-1% (Top 5% excluding Top 1%; income percentiles 96-99), and Top 10-1% (Top 10% excluding Top 1%; income percentiles 91-99) groups. The outcome variable measures the share of market income held by these groups of the overall income of the national distribution. The source for the income concentration variable is *World, Wealth and Income Database*⁹.

The SCM requires that the outcome variable is not missing for the entire length of the study. This limits the number of available countries that can be used in the pool of control countries¹⁰. The series for the outcome variable is available for ten countries in addition to the UK for the years 1970-1988. 1970 is the first year for which data is available for most the control variables (see Table 1). I end the UK study in year 1988 as this is the year UK had another large tax cut. Ten years of pre-intervention should be sufficient for the matching process, and the nine years of post-intervention period should be enough to see the short term trend due to the intervention. Finland has income concentration data for only the Top 1% and the Top 5%; hence, I have excluded Finland from the donor pool for

⁹The database can be accessed here: <https://wid.world/> (WID, 2018)

¹⁰There are a few years missing in the list of countries used here. Top income share of is missing for Denmark in 1973, Spain in 1980 and UK in the 1980. For all these missing years, following Tanndal and Waldenström (2018), using the years before and after I have linearly imputed the missing data.

constructing counterfactuals for the Top 10% and the Top 10-1% groups.

Table 1 lists all the control variables that are used to create the weights for the units in the synthetic control group. I have used variables that have been cited in literature as factors influencing income inequality. These variables can be summed up by the acronym *TOP* - technology, openness and policy (Milanovic, 2016). I use human capital development index, investment share of GDP, and patents per capita to proxy the level of technology advancement of the economy. Trade share of GDP and KOF globalization index measure openness. Policy, in the form of tax cut, is the intervention in this study. Roine et al. (2009) present a detailed long-run cross-country study of factors influencing income inequality. In addition to the factors mentioned above, they find that level of financial development within a country a better indicator of inequality than their Anglo-Saxon heritage. Although the major period of this study is before the start of the financialization of UK economy, also referred to as the *Big-boom*, I do add control variables that measure the level of financial development of the nation. I use real growth of money supply, money to reserves ratio, and real short-term interest rates. All these financial variables are all available from Bordo et al. (2001). To the above list, I've added GDP per capita, as there seems enough evidence to suggest a correlation between inequality and the different stages of economic development within a country (see Kuznets (1955), Deininger and Squire (1998), Persson and Tabellini (1994)). Finally, decrease in share of workers who are part of unions has also been cited as a probable cause for the stretching of the dispersion of wages (see Freeman (1991), Farber et al. (2018)). Hence, I've added a union density variable (available from the Organisation for Economic Co-operation and Development (OECD, 2016)) that captures just this.

Table 1: Definition of the Variables

Variables	Variable Definition	Source
Top Income Share	Total market income share of held by the group	WID
GDP per capita	Gross domestic product per capita	OECD
Human Capital	Human capital index, based on years of schooling and returns to education	PWT
Patent per capita	Stock of domestic patent	Madsen 2007
KOF Globalization Index	Globalization index along economic, social and political dimension	KOF
Trade Share	Trade (% of GDP)	WDI
Government Expenditure	General government final consumption expenditure (% of GDP)	WDI
Investment Share	Total investment (% of GDP)	BL 1994
Union Density	Union membership (% of total labor force)	OECD
Real Interest Rate	Real short-term interest rate	Bordo et al. 2001
Inflation	Change in CPI, %	Bordo et al. 2001
Money Reserve	Money to reserves ratio	Bordo et al. 2001
Growth Rate of Money	Growth rate of money, %	Bordo et al. 2001

Note: The outcome variable is the total market income (income before tax and transfer) share held by each top income group. Income share of the top groups are calculated using World Wealth and Income Database (WID). The top groups here are the Top 1%, Top 5%, Top 10%, Top 5-1% (percentiles 96-99), and Top 10-1% (percentiles 91-99). All variables, besides investment share, are available annually. Investment share is available every 5 year. *Abbreviations:* BL 1994 - Barro and wha Lee (1994); WDI - World development Indicators, World Bank (WDI, 2017); OECD - Organisation for Economic Co-operation and Development (OECD, 2016); WID - World Wealth and Income Database (WID, 2018); KOF - KOF Swiss Economic Institute (Dreher, 2006); PWT - Penn World Table, v9.0 (Feenstra and Timmer, 1993); Madsen - Madsen (2007); Bordo - Bordo et al. (2001).

4 Main Results

4.1 Counterfactuals

Counterfactual weights

Counterfactuals are constructed with weights of countries in the donor pool. These weights are chosen by calibrating income share of each of the top income groups. Since, new calibrations are made for each counterfactual series, the weights and countries may differ across the control groups.

Table 2 presents country weights for each synthetic counterfactuals. Each column presents weights used to construct a control group. There are five counterfactual studies related to each income group in the top income decile. These are Top 1%, Top 5%, Top 10%, and the Top 5% and Top 10% excluding the Top 1% group (viz. Top 5-1% and Top 10-1%). Each entry in a column represents country weights, w_j , for the corresponding

country in the synthetic counterfactual. Weights in each column sum to a unit. For instance, counterfactual income series for the Top 1% income group, which is column (1) of Table 2, is composed with weights from Australia (50.2%), Canada (26.8%), Denmark (8.7%), Japan (3.7%), and Sweden (10.5%).

Table 2: Counterfactual Weights

	(1)	(2)	(3)	(4)	(5)
	Top 1%	Top 5%	Top 10%	Top 5-1%	Top 10-1%
Australia	0.502	0.533	0.598	0.567	0.532
Canada	0.268	0.263	0.193	0	0
Denmark	0.087	0	0	0	0
Finland	0	0	-	0	-
France	0	0	0	0.072	0
Japan	0.037	0	0	0.361	0.468
New Zealand	0	0	0.094	0	0
Norway	0	0.102	0.115	0	0
Sweden	0.105	0.102	0	0	0

Note: Each column represents a synthetic control counterfactual. Each entry in a column represents country weights, w_j , for the corresponding synthetic counterfactual, with $\sum_{j=2}^J w_j = 1$ for each column. Additionally w_j is bounded below, $w_j \geq 0$. Top 10% income share is not available for Finland, so Finland is excluded from the donor pool for the corresponding counterfactuals. Columns may not add to one due to rounding error.

Balance of the control variables:

Table 3 lists the average of each control variables used in the matching process. The variables are averaged for the pre-treatment period 1970-1979. Column (1) presents the average of the variables for the UK series. Columns (2) through (6) presents averages of the variables for each counterfactual series. The variables for the counterfactual are averaged using weights defined in Table 2. The bottom panel of Table 3 presents average income shares for the UK series and the corresponding counterfactual series. I have used two lagged years (1976 and 1978) of the outcome variable in the matching process¹¹.

A good counterfactual would match the treatment unit's trend in the pre-treatment years. The RMSPE at the bottom of Table 3 estimates the match given all the variables

¹¹Klößner et al. (2018), show the sensitivity of the matching process to changes in the unit and variable list. In particular, they note that if the outcomes for each pre-intervention period are used to estimate the weights, the iterative process mechanically sets the elements of V that nullifies all the other variables in the Z vector, and thus, these additional covariates cease to inform the procedure. Hence, I have used two years, but the results hold with one year or averaging all the years.

(for how it is calculated see Equation 9). RMSPE of most counterfactuals are close to zero, implying the match between the counterfactual and the real UK series is fairly good¹². The iterative process defined in Equation 6 and 7 minimize the RMSPE given the list of units and variables in the pre-intervention period.

Table 3: Pre-treatment Balance of Variables, 1970-1979

	(1) UK	(2) Top 1%	(3) Top 5%	(4) Top 10%	(5) Top 5-1%	(6) Top 10-1%
GDPpc (in 1000s)	18.20	23.14	23.87	23.50	20.26	19.74
Human Capital	2.83	2.94	3.04	3.06	2.95	2.98
Patent per capita	397.16	463.31	384.48	335.95	586.78	676.40
KOF	61.34	47.03	48.49	50.59	40.91	39.39
Trade Share	49.44	36.40	28.34	35.78	25.87	24.72
GovExpend	19.33	19.81	18.41	17.33	14.76	14.26
Investment	21.55	27.40	26.65	28.51	33.99	35.00
Union Density	46.34	54.62	45.20	46.36	40.85	41.23
Real Interest Rate	-3.38	-1.74	-1.43	-1.78	-2.96	-3.24
Inflation	12.59	8.38	8.09	8.84	9.58	9.67
Money Reserve	10.94	7.75	6.14	5.19	5.22	5.69
GRM	13.80	16.73	14.19	13.27	13.79	14.68
Top 1%	6.44	6.43	-	-	-	-
Top 5%	17.84	-	17.89	-	-	-
Top 10%	28.23	-	-	28.24	-	-
Top 5-1%	11.41	-	-	-	11.39	-
Top 10-1%	21.80	-	-	-	-	21.80
<i>RMSPE</i>		0.092	0.184	0.484	0.344	0.552

Note: Each column represents the average of the variable for the UK and all the counterfactuals for the pre-treatment period 1970-1979. Outcome variables are averaged for the years 1976 and 1978. Root mean square prediction error (RMSPE) is the average difference between the UK and the counterfactual in the pre-treatment period. See Equation 9 for how RMSPE is calculated.

4.2 Baseline Results

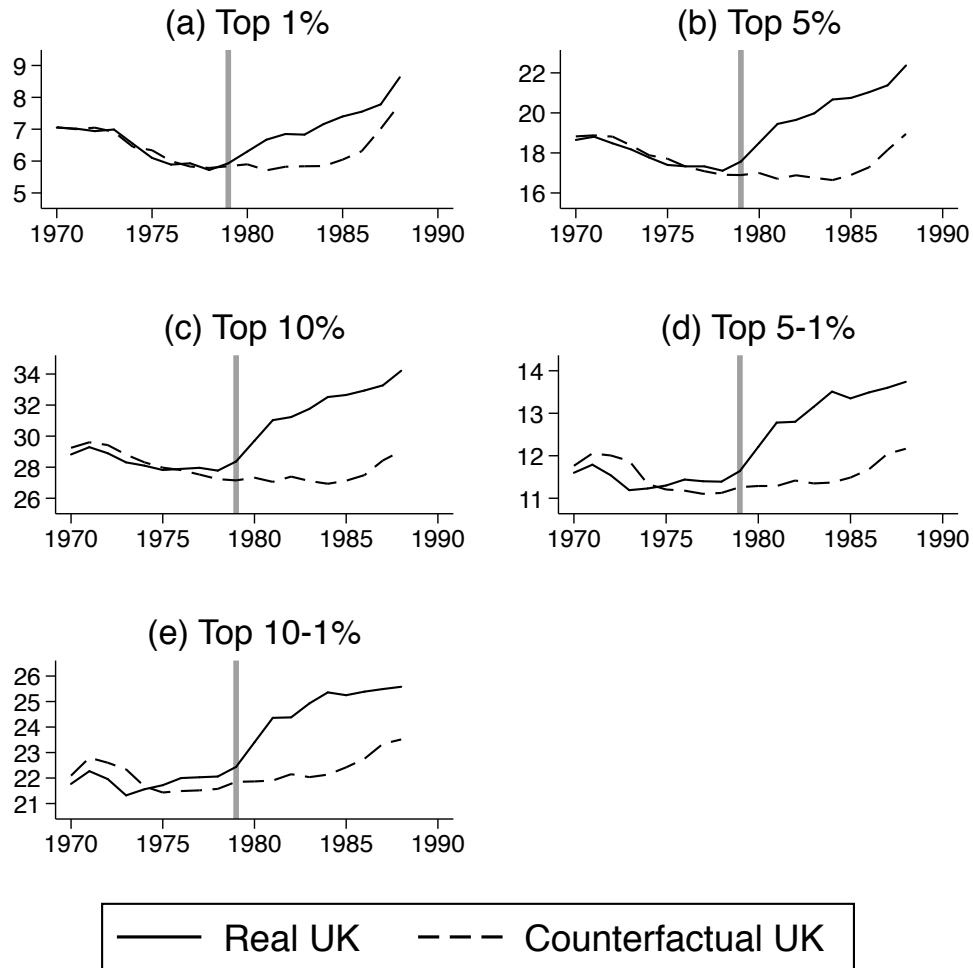
The panels of Figure 6 present the income share trends of the real UK series (solid dark line) and its counterfactual series (broken dark line) for each income group. Income share is measured in percent of income held by each group. The solid vertical line in each panel indicates the year of the policy change. The match between the real UK series and its

¹²For a relative comparison of the RMSPE values, see Table 4

counterfactual series in the pre-intervention years corresponds to the RMSPE values from Table 3. The trends in the income shares between the real UK and the corresponding counterfactual series match very well in the pre-intervention period. For instance, the average income held by the Top 1% group in the pre-treatment period was 6.44%, while the corresponding average for its counterfactual was 6.43%.

Conditional on the pre-intervention match, there is a clear divergence between the real and counterfactual series for all the income groups in the post-intervention period. Significantly, the divergence starts right after the year of intervention. What is also notable is that the decoupling between the real and counterfactual series is relevant for all the income groups in the top decile of the income distribution. Contrary to what has been argued in recent literature, Top 1% is not the only driver of inequality here. I find significant divergence for all income groups in the top decile of the income distribution. This post-intervention difference between the real and counterfactual series is the SCE, $\hat{\theta}_{1t}$, in Equation 8.

Figure 6: Top income Shares in %, UK and counterfactual series

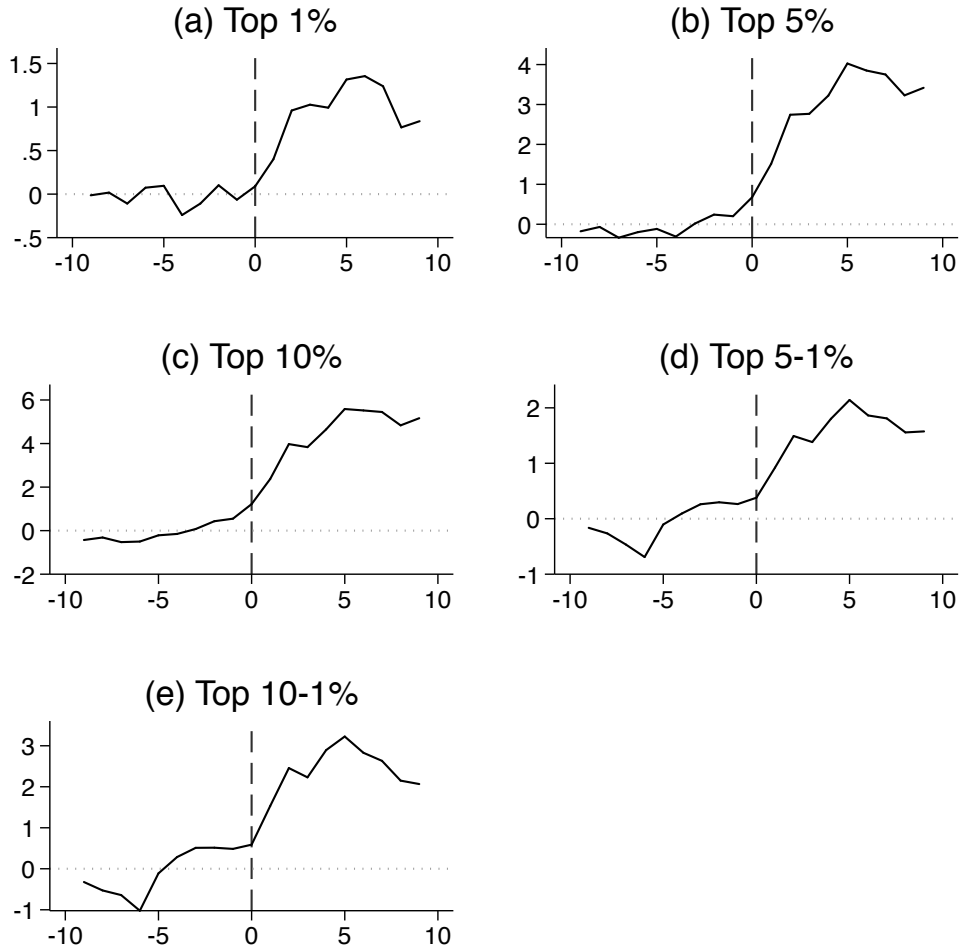


Note: The vertical axis, in all panels, measures the income share held by each income group. Each panel represents the trend in the income series of the UK and SCM derived counterfactuals. The solid lines are the trend of the real UK series, while the broken lines are the trend of the counterfactual series. The horizontal gray line in 1979 is the year of the tax cut.

Figure 7 presents this raw percentage points difference between the real UK series and its corresponding counterfactual series. The dotted horizontal line at zero on the vertical axis represents the case when both the series match perfectly. The solid dark line, in each panel, measures the size of the deviation, in percentage points, between the real

series and the counterfactual series. The intervention, 1979, is represented by the broken vertical line centered at zero on the horizontal scale. The horizontal axis measures, in years, the period before and after the intervention. In the pre-intervention period, the counterfactuals fit the pre-treatment trend of the real UK series very well. It is clear that the real and counterfactual series start to deviate immediately after the policy intervention. This deviation is also persistent and increasing in the short run. Especially for the bottom groups, the percentage points difference is higher and remained so even after a decade after the policy intervention.

Figure 7: Deviation between the UK and counterfactual series



Note: The vertical axis measures the percentage point difference between the real UK series and its counterfactual series. The running variable measures time in years; year of the intervention, at zero, the years before the intervention, negative values, and the year after the intervention, positive values. Each panel presents the trend in gap between the real UK series and the counterfactual series, before and after the policy intervention. The horizontal dotted-gray line represents the case when the two trends perfectly match to each other. The vertical broken line marks the year of the intervention, 1979.

The SCE values for each income group is presented in Table 4. This table presents $\hat{\theta}_{1,t}$ as a percent over the counterfactual series. Each column list the SCE for each year post-intervention for the corresponding income groups. The first year post-intervention,

the effect was close to 10% for the top decile including the Top 1% group. Excluding the top percentile, the effect for the Top 5-1% was close to 9% and for the Top 10-1% was over 5%. This effect also increases in the short term. By the fifth year, the annual effect is over 20% for the Top 1% and the Top 5% groups, both including or excluding the top percentile for the latter group. The effect of the 9% below the top percentile also increases to over 11%.

P-values are calculated based on every possible placebo intervention for all year and unit combinations. The units used are from the donor pool in Table 2, and I've used the years 1973 to 2000 to calculate these placebos. There were a total of 3,537 placebo intervention cases for the income groups excluding the Top 10% and the Top 10-1%, who had 3,159 placebo specifications¹³. *P*-value is calculated as the share of these placebo studies that are greater in magnitude than the actual effect for the UK. For the Top 1% group, there were 8.6% of the placebos that had higher SCE. Note that these post-intervention effect sizes are unconditional on the pre-intervention match. In traditional inference terms, this would imply a significance at the 10% level. The SCE for the other groups are all significant at the 5% level.

The second aspect of the SCM is to compare the pre-intervention match. Here, I compare the RMSPE for the UK treatment in 1979 with all placebos that have at least as many pre-treatment years as the UK. In this measure, the UK, when including the Top 1% income group, best fits the pre-intervention data compared to its counterfactuals. Hence, a post-intervention effect larger than 90% of the placebos with a match better than almost all of the placebos, is a significant finding for the UK.

¹³These groups do not include Finland whose income shares for the Top 10% are not available.

Table 4: Annual Effect for the UK, $\hat{\theta}_{1,t}$

$\hat{\theta}_{1,t}$	(1) Top 1%	(2) Top 5%	(3) Top 10%	(4) Top 5-1%	(5) Top 10-1%
1980	9.53	11.25	9.08	8.96	5.22
1981	19.62	19.42	15.68	15.12	9.68
1982	20.88	20.03	15.35	13.93	8.58
1983	19.69	20.49	16.69	17.19	11.40
1984	25.45	25.28	20.39	22.08	13.87
1985	25.54	24.08	20.74	21.16	13.07
1986	23.59	23.96	21.80	22.68	13.06
1987	14.54	21.17	20.19	22.57	12.08
1988	15.10	22.79	22.38	23.77	12.15
<i>p</i> -value	0.086	0.043	0.039	0.043	0.040
<i>N</i>	3,537	3,537	3,159	3,537	3,159
RMSPE	0.092	0.184	0.484	0.344	0.552
RMSPE Pectentile	0.000	0.000	0.000	0.322	0.380

Note: Each column represents $\hat{\theta}_{1,t}$ for each year after. $\hat{\theta}_{1,t}$ are expressed as the percent increase over the counterfactual income share. *p*-value is constructed using the permutation test described in Section 3. *N* represents the number of placebos, which are all possible unit-year combinations for years 1973-2000. RMSPE for the UK is calculated for the pre-treatment years, 1970-1979. RMSPE percentile is based on a comparison among all placebo estimates with equal pre-treatment period as the treatment unit.

As discussed earlier, there are a number of policy changes that happen throughout the 1980s. It is very difficult to untangle the effect of all the policies on the income shares. Hence, it is better to focus on the short term effect of the tax cut. To this end, Table 5 presents the SCE¹⁴ averaged over 3- and 5-year periods. To compare the above study to a study that includes US in the donor pool, I have presented these short-term averages of both including and excluding US from the donor pool. The top panel presents average SCE for the case without the US and the bottom panel includes the US. Generally, the effect size is larger when US is excluded from the study. Excluding the US, the short-term effect is close to 15% for the top decile, and close to 10% for the bottom nine percentiles of the top decile. Including the US, the effect is larger than 10% in the 3- and 5-year term for all groups in the Top 5% income group. For the bottom 9% the effect is over 5% when I include the US as compared with over 9% when I do not. In either case, there seems to be an effect of over

$$^{14}\hat{\theta}'_{UK} = \frac{1}{T - (T_0 + 1)} \sum_{t=T_0+1}^T \hat{\theta}_{UK,t}$$

10% for the top five percentiles of the distribution, and over 5% for the bottom 9% of the top decile.

Table 5: Average 3- and 5-year Effect, $\hat{\theta}'_{UK}$

	(1) Top 1%		(2) Top 5%		(3) Top 10%		(4) Top 5-1%		(5) Top 10-1%	
	3-year	5-year	3-year	5-year	3-year	5-year	3-year	5-year	3-year	5-year
Excluding US										
$\hat{\theta}'_{UK}$	16.680	19.037	16.903	19.295	13.367	15.436	12.669	15.455	7.827	9.749
<i>p</i> -value	0.143	0.140	0.054	0.047	0.061	0.052	0.066	0.054	0.126	0.108
<i>N</i>	258	258	258	258	231	231	258	258	231	231
Including US										
$\hat{\theta}'_{UK}$	14.234	12.954	10.444	10.984	9.600	11.762	11.071	13.661	4.515	5.657
<i>p</i> -value	0.218	0.256	0.182	0.182	0.074	0.058	0.067	0.060	0.066	0.043
<i>N</i>	285	285	285	285	258	258	285	285	258	258

Note: Each column represents 3- or 5-year average effect, $\hat{\theta}'_{UK} = \frac{1}{T - (T_0 + 1)} \sum_{t=T_0+1}^T \hat{\theta}_{UK,t}$, for each counterfactual. The top panel presents averages for the first 3- and 5-year periods after the intervention. The corresponding annual effect can be found in Table 4. *p*-value is constructed using the permutation test described in Section 3. *N* represents the number of placebo studies, which are all possible unit-year combinations for years 1973-2000. For a study with US in the donor pool, see Appendix A.

5 Robustness Checks

What was so special about UK and, in particular, the year 1979? In this section, I discuss the significance of the above results relative to placebo studies. Further, since UK and the US is compared in the literature for having similar policies in the period of interest, I present a comparative study using SCM for the two nations.

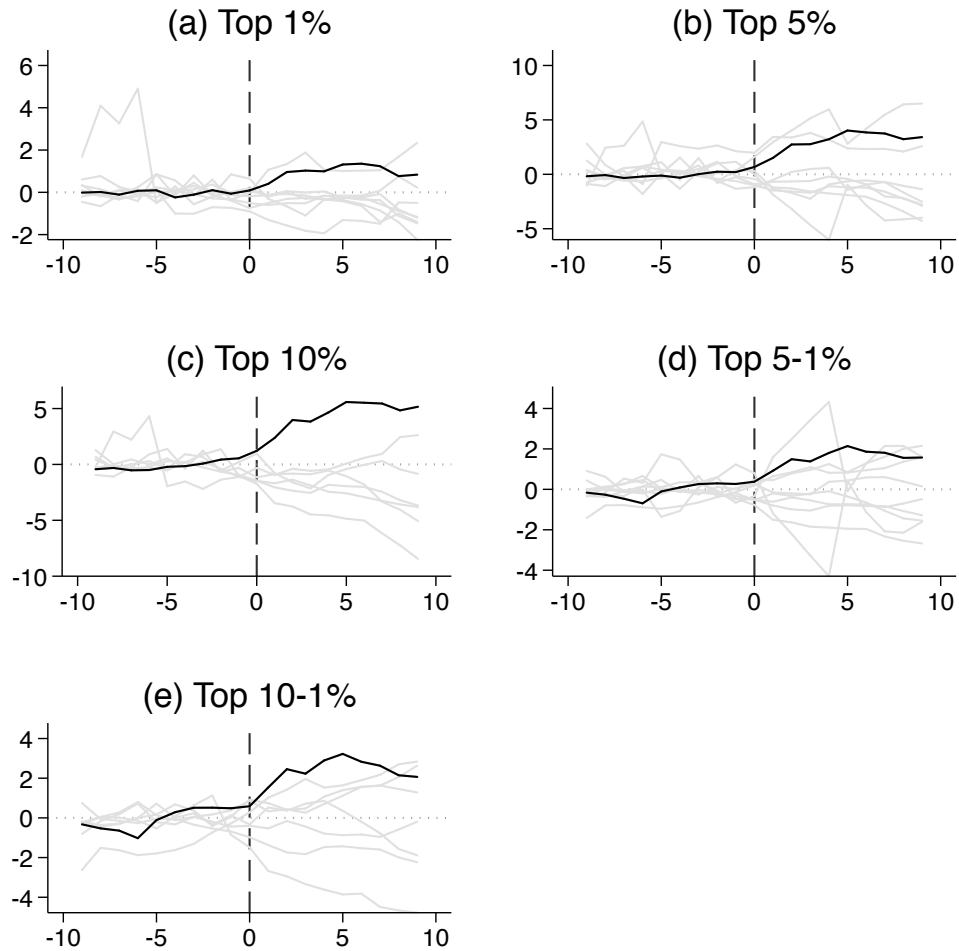
5.1 Placebo Studies

First, I compare the placebo cases anchored on the year 1979 (referred to below as *space-placebos*). Here, I compare the results of SCM study for all countries in the donor pool in Table 2 using 1979 as the year of the intervention. Figure 8 compares the SCE of each country to that of the UK. I have excluded UK from the donor pool for all the placebo studies.

Relative to the space-placebos, if the pre-intervention deviation from its counterfactual is minimal and the post-intervention deviation is the largest for the UK, we can be assured that the effect was unique to the UK in the time period. Ex post, since we know that the other countries did not experience the same intervention as the UK, we expect them not to have as significant effect as was the case for the UK.

For the space-placebos, we run the SCM for all the countries in the donor pool, while keeping constant the intervention year. Each panel of Figure 8 presents the deviation of the real series from its corresponding counterfactual series. These deviations are the same for the UK as in Figure 7. All deviation trend lines are constructed in the same way for the space-placebos. UK's deviation is the dark solid line, while the other space-placebos are the solid gray lines. We can see that the pre-intervention fit for the UK is very good relative to the placebos. Given the pre-intervention fit, the post intervention deviation for the UK is the largest.

Figure 8: Difference between UK and space-placebos

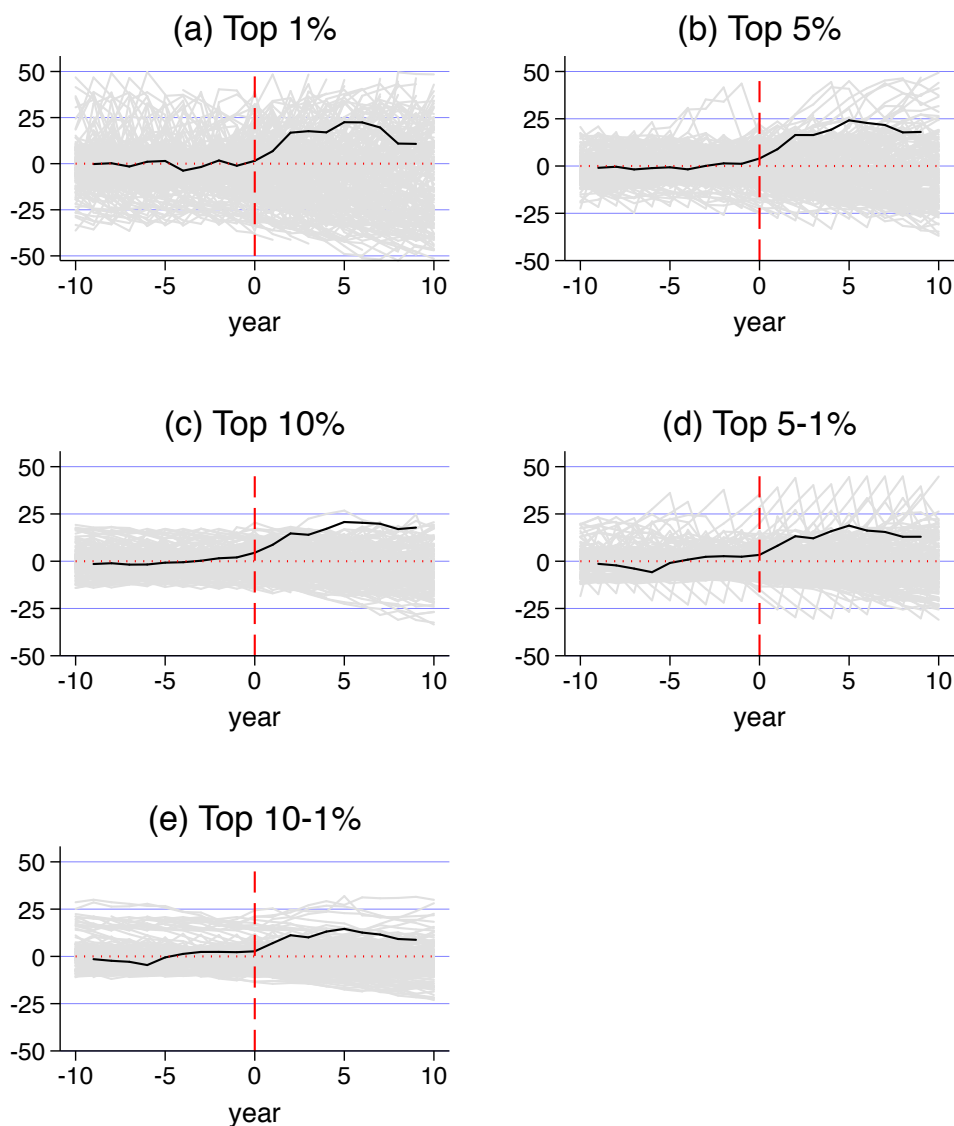


Note: The vertical axis measure the difference between the real UK and its counterfactual series expressed as a percent over the counterfactual's income share. The intervention year is 1979 and is marked by the broken line. Each panel represents a study of the corresponding income group for the UK and all countries in the donor pool. Each solid line shows the gap in the trends between the real series and the counterfactual series for that income group. The dark solid line is the gap between UK and its counterfactual; the gray solid lines are the gap for the other units and their counterfactuals.

Second, I consider placebo intervention for all year and units combinations. This includes UK for other time periods than 1979. The placebo cases here are the same as used to calculate the p -value in the preceding section. The units used are from the donor pool

in Table 2, and I've used the years from 1973 to 2000 to calculate these placebo studies. There were a total of 3,537 placebo intervention cases for the income groups excluding the Top 10% and the Top 10-1%, which had 3,159 placebo specifications. As noted in Table 4 the post-intervention effect is larger than 90% of the placebos for all income groups. This relatively large deviation is especially important given that the fit for the UK in the pre-intervention period is superior to most placebos. For the Top 1%, Top 5% and Top 10% income groups, the pre-intervention fit is better than 99.9% of the placebos.

Figure 9: Difference between UK and placebos



Note: The vertical axis measure the difference between the real UK and its counterfactual series expressed as a percent over the counterfactual's income share. The intervention year is 1979 and is marked by the broken line. Each panel represents a study of one income group for all countries in the study. Each solid line shows the gap in the trends between the real series and the counterfactual series for that income group. The dark solid line is the gap between UK and its counterfactual; the gray solid lines are the gap for all the other countries and their counterfactuals.

These placebo studies provide further evidence that the intervention in 1979 in the UK had significant effect on the increase of income share of the top decile.

5.2 Comparing UK with the US

In literature, UK and the US have been compared as similar cases of very high and rising income inequality, especially since the beginning of the 1980s. They share a few common characteristics - high levels of income inequality, high financialization of the economy, and both are anglophone countries¹⁵. In addition, US had its share of market-oriented policies implemented in the 1980s, including changes in its tax code. The first of those was a tax cut in 1981, which affected all the tax brackets equally. This tax cut in the US, unlike the one for the UK, was not regressive, actually it was a proportional cut of 25% for all the tax brackets. Additionally, the change in the tax code was phased-in in three years, not in one year as was the case in the UK.

In this section, I compare the two countries, and show how the trends differed.

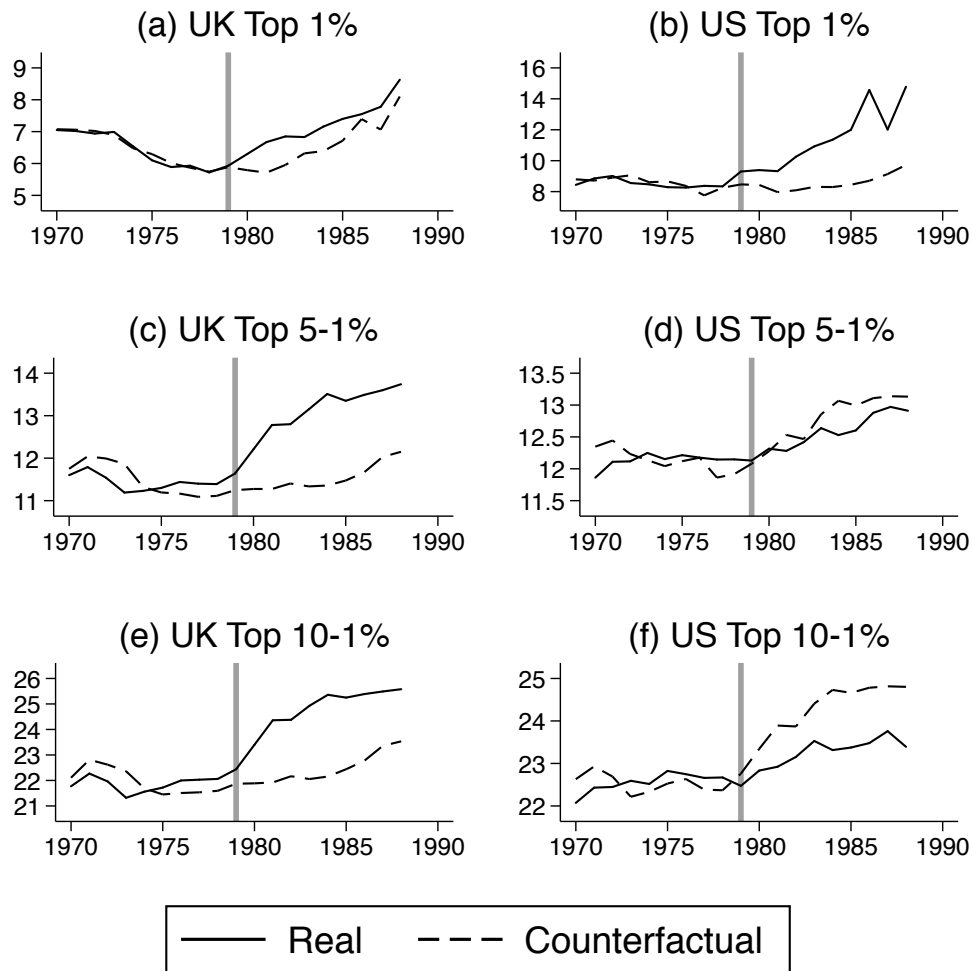
Figure 10 compares the result of UK and the US for the Top 1%, the Top 5-1% and the Top 10-1% income groups for the intervention year 1979. Income for the top 1% in the US increased at a significantly higher rate than it did in the UK. Although it is difficult to say when the deviation started in the US case, there is some evidence that the US and its counterfactual starts diverging a year before 1979, remains stable until 1980 and begin to diverge once again in the early 1980s. While the significance of the 1979 intervention for the divergence of the top 1% series is very clear in the UK case.

Where the two countries are vastly different is in the bottom groups of the top decile. While the bottom groups of the top income decile in the UK did see an increase in the income share of the real series compared with their counterfactuals, there is no such increases for the income group in the US. Actually, there was a decrease in income concentration for the US top 5-1% and top 10-1% series, compared with its counterfactual. This suggests that there might have been other factors driving income concentration in the US. It is clear that

¹⁵Although Roine et al. (2009) don't find any significance of same language or cultural traits in determining long-term income inequality.

what happened in the UK was very peculiar to that nation and that time.

Figure 10: UK v US: Top income shares for the UK and US with intervention year 1979, shares in %

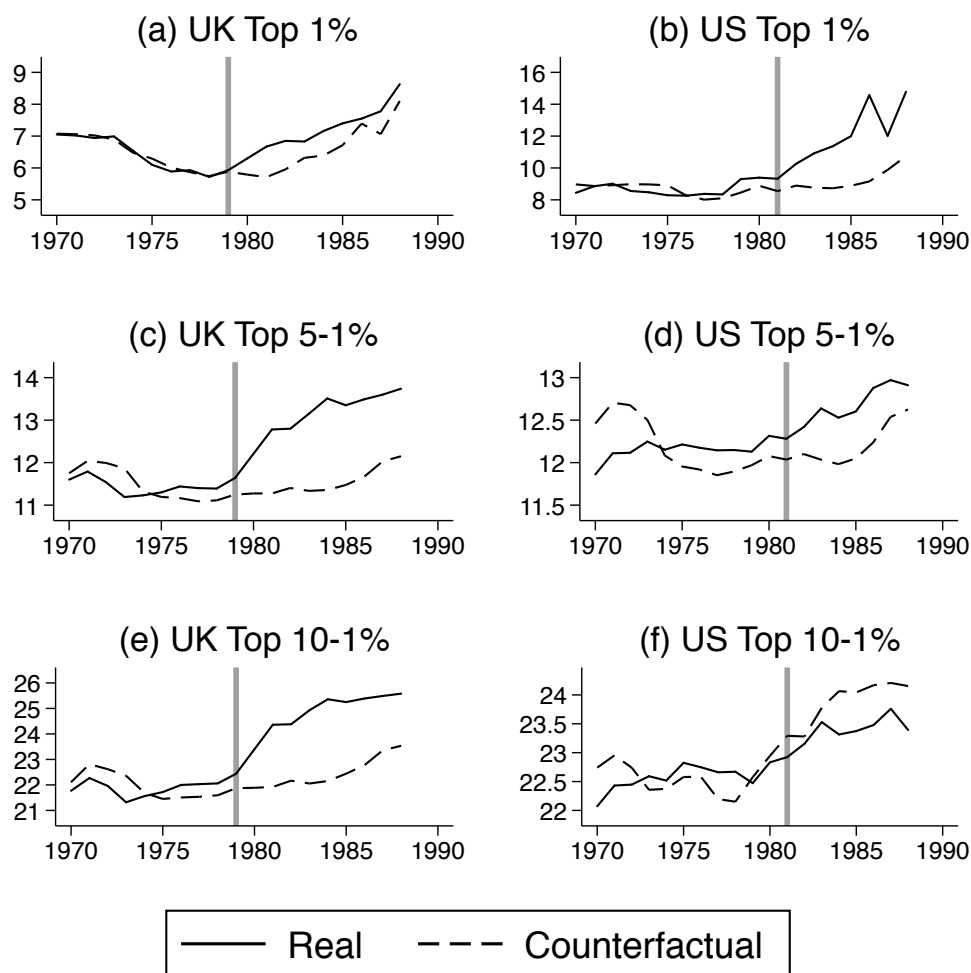


Note: The left-hand panels present income series for the UK, while the right-hand panels present income series for the US. Each panel represents the trend in the income share of the real series (solid line) and the SCM derived counterfactual series (broken line). Income shares are measured as a share of income each income group holds of the total nation income. The vertical gray line in 1979 is the year of the tax cut.

In Figure 10, I have used the same intervention year for both countries, which was 1979. But recall that the US had its first tax cut in 1981 and not 1979. To that end, Figure 11 compares the real and the counterfactual series using the corresponding year of tax code

changes, which was 1979 for the UK and 1981 for the US. I find that, while there is some divergence for the Top 1% series in the US post 1981 intervention, it is clear that there is no such divergence in the bottom 9% of the distribution. Additionally, the pre-intervention match in trends in the US case is not good relative to the UK case. For the Top 1% in the US, it is difficult to affirm that the deviation starts following the year of the intervention. As we know in the US, the tax cuts relative to the UK was not as regressive, nor was it sudden. Hence, I also find that the effect on the income share series are different for the two countries.

Figure 11: Top income shares with intervention: UK (1979) and US (1981), income share in %



Note: The left-hand panels present income series for the UK, while the right-hand panels present income series for the US. Each panel represents the trend in the income share of the real series (solid line) and the SCM derived counterfactual series (broken line). Intervention year (marked by vertical gray line) for the UK is 1979, while it is 1981 for the US. Income shares are measured as a share of income each income group holds of the total nation income.

Table 6 shows the percentage difference between the real and its counterfactual series for all the income groups of the UK and the US. The values are presented annually for the first seven years post intervention. These values represent the size of the gaps in Figure 11.

Note that the size of the effect for the first year of the Top 1% (column (1)) is 15% for the US while the corresponding value for the UK is 9%. Generally, the effect is higher for the US for the Top 1% income group than for the other income groups. While the size of the post-intervention effect is larger for the Top 1% group for the US, the pre-intervention fit is worse. This suggests that the effect for the US should be taken with caution.

Removing the top income percentile from the top decile, the fit for the UK and the US (column (5)) is very comparable. RMSPE for the US is ranked 38.5th percentile, while for the UK it is ranked 38.0th percentile. With the same fit, it is telling to note that the effect is in the opposite direction. While the deviation is positive and close to 5% in the short-term for the real UK series, the deviation is negative and more than 2% for the US series. This suggests that the US had no effect increasing the income shares for the bottom 9% of the top decile following the years of the tax cut. While the effect is significantly positive for the UK for the same income group.

Table 6: Annual Effect: UK (1979) v US (1981), $\hat{\theta}_{UK,t}$

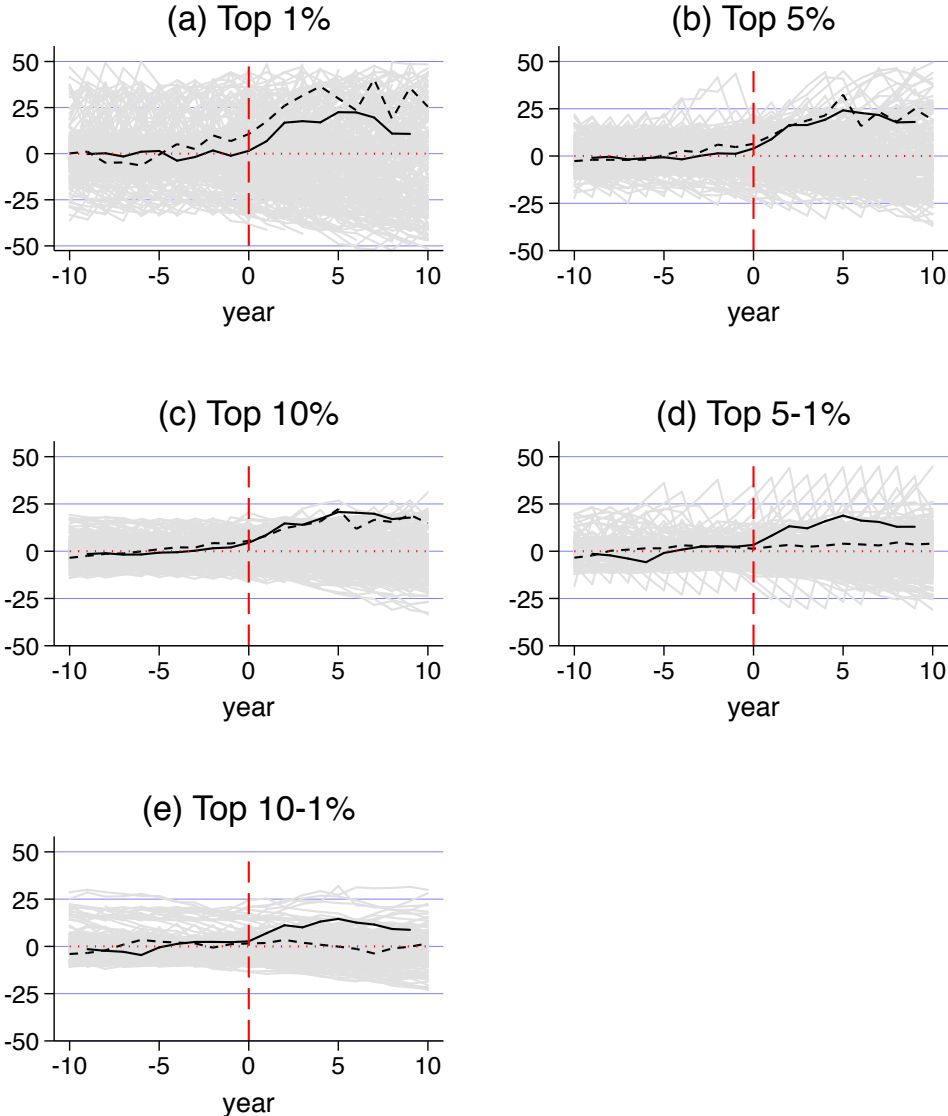
post-intervention period	(1) Top 1%		(2) Top 5%		(3) Top 10%		(4) Top 5-1%		(5) Top 10-1%	
	UK	US	UK	US	UK	US	UK	US	UK	US
1	9.36	15.32	6.94	10.15	7.04	7.73	7.89	2.62	3.43	-0.54
2	17.46	24.67	13.36	15.17	10.57	11.74	13.24	5.01	5.29	-1.05
3	15.88	30.16	11.03	18.13	11.20	13.38	12.08	4.56	4.83	-3.12
4	9.00	35.08	10.24	20.78	13.82	15.26	15.74	4.59	7.24	-2.78
5	13.06	59.18	13.35	31.77	16.19	21.84	19.35	5.23	7.50	-2.85
6	11.30	21.61	10.82	15.29	16.69	11.46	17.35	3.45	6.70	-1.85
7	3.51	37.62	4.71	22.96	18.85	16.28	17.38	2.26	5.88	-3.15
<i>p</i> -value	0.160	0.043	0.143	0.040	0.065	0.044	0.039	0.159	0.088	0.175
<i>N</i>	3,915	3,884	3,915	3,884	3,537	3,506	3,915	3,884	3,537	3,506
RMSPE	0.092	0.452	0.184	0.709	0.484	0.916	0.344	0.303	0.552	0.554
RMSPE Pectentile	0.000	0.287	0.000	0.187	0.000	0.197	0.322	0.200	0.380	0.385

Note: Each column represents $\hat{\theta}_t$ for each year after the tax cut for the UK (tax cut in 1979) and US (tax cut in 1981). $\hat{\theta}_t$ are expressed as the difference in percent between the treatment and counterfactual. *p*-value is constructed using the permutation test described in Section 3. *N* represents the number of placebos, which are all possible unit-year combinations of units in Table 2 and years 1973-2000. RMSPE is calculated for the pre-treatment years 1970-1979 for the UK, and 1970-1981 for the US. RMSPE percentile rank is based on a comparison among all placebo estimates with equal pre-treatment period as the treatment unit.

Figure 12 presents the placebo studies for all possible unit-year combinations for both

the countries. These studies are presented for all the income groups. Again, besides the Top 1% income group, the post-intervention effect for the UK is clearly larger than that for the post-intervention effect of the US. It is also clear that for the Top 1% group, the pre-intervention fit is significantly better with a significant post-intervention effect for the UK relative to the US.

Figure 12: Difference from counterfactual, UK-1979 (solid line) v US-1981 (broken line)



Note: The left-hand panels present income share series for the UK, while the right-hand panels present income series for the US. Each panel represents the trend in the income share of the real series (solid line) and the SCM derived counterfactual series (broken line). Intervention year (marked by vertical gray line) for the UK is 1979, while it is 1981 for the US. Income shares are measured as a share of income each income group holds of the total nation income.

6 Conclusion

In this paper, I have outlined a unique case of income inequality in the UK in the 1980s. The top decile of the income distribution significantly deviated from the bottom 90% of the population. Drastic and abrupt change in policy played a big role. I find that the tax cuts had a consistent effect of over 10% increase in income share for the top income groups, compared with their counterfactuals. This is true for all groups of the top decile including the top percentile of the income distribution. For the bottom 9% of the top decile, I find the increase in income share to be larger than 5%. What led to this policy intervention is as important as what happened after it was implemented. If not for what had happened before, we might not have had the policy intervention, and definitely not the conditions that were ripe for the tax cuts to exploit. Not understanding the historical socio-economic and political impetus driving the change would be misleading. Policy did polarize the distribution, but it was the people that influenced the policy change.

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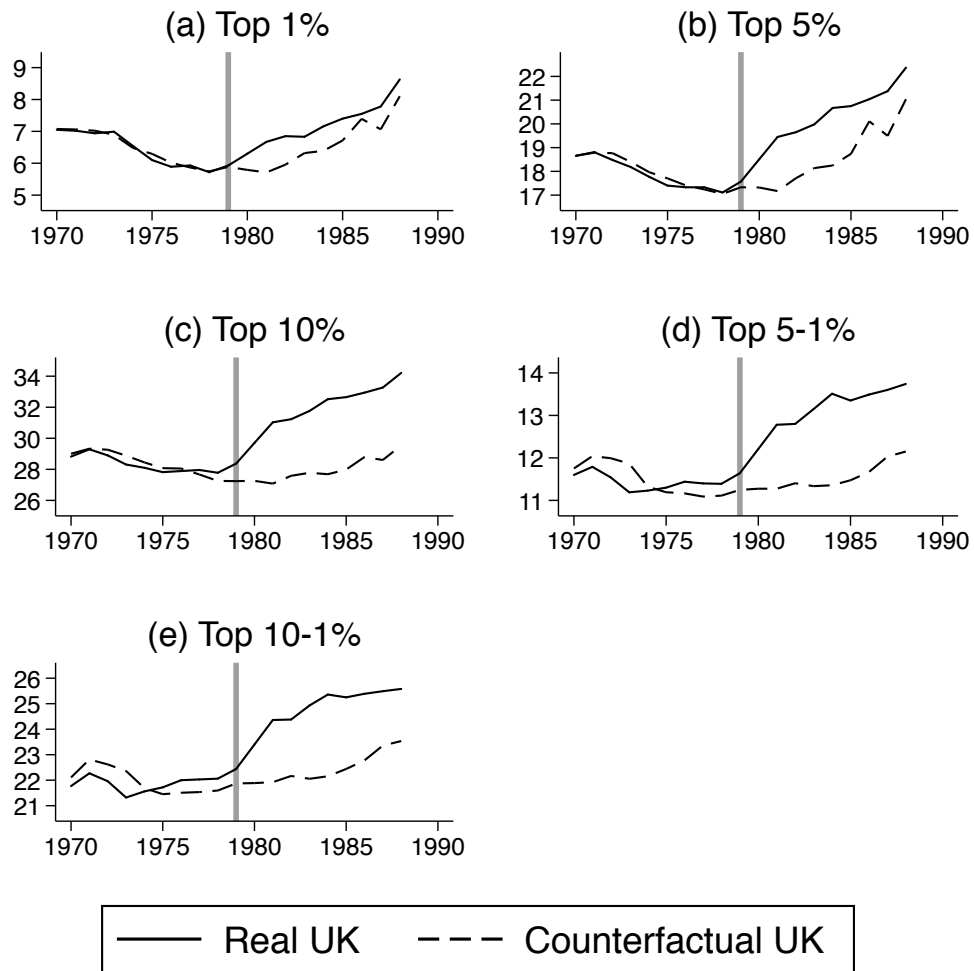
A Synthetic Control Study of the UK including US in the Donor Pool

A.1 Counterfactual weights of the controls

	(1) Top 1%	(2) Top 5%	(3) Top 10%	(4) Top 5-1%	(5) Top 10-1%
Australia	0.145	0.276	0.300	0.567	0.528
Canada	0	0	0	0	0
Denmark	0.039	0	0	0	0
Finland	0	0	-	0	-
France	0	0	0	0.072	0
Japan	0.050	0	0	0.360	0.472
New Zealand	0	0	0.144	0	0
Norway	0	0	0.131	0	0
Sweden	0.511	0.299	0.126	0	0
United States	0.254	0.425	0.299	0	0

Note: Each column represents a synthetic control counterfactual. Each entry in a column represents country weights, w_j , for the corresponding synthetic counterfactual, with $\sum_{j=2}^J w_j = 1$. Additionally w_j is bounded from below $w_j \geq 0$. Finland does not have income shares for the Top 10%.

A.2 UK v Counterfactual income share series including US, income share in %



Note: The vertical axis, in all panels, measures the income share held by each income group. Each panel represents the trend in the income series of the UK and SCM derived counterfactuals. The solid lines are the trend of the real UK series, while the broken lines are the trend of the counterfactual series. The horizontal gray line in 1979 is the year of the tax cut.

A.3 Annual Effect for the UK (including US), $\hat{\theta}_{1,t}$

theta	(1) Top 1%	(2) Top 5%	(3) Top 10%	(4) Top 5-1%	(5) Top 10-1%
1980	9.36	6.94	7.04	7.89	3.43
1981	17.46	13.36	10.57	13.24	5.29
1982	15.88	11.03	11.20	12.08	4.83
1983	9.00	10.24	13.82	15.74	7.24
1984	13.06	13.35	16.19	19.35	7.50
1985	11.30	10.82	16.69	17.35	6.70
1986	3.51	4.71	18.85	17.38	5.88
1987	10.79	9.75	14.46	15.52	4.81
1988	7.43	6.41	16.60	15.80	3.99
p-value	0.160	0.143	0.065	0.046	0.088
N	3915	3915	3537	3915	3537
RMSPE	0.092	0.184	0.484	0.344	0.552
RMSPE Pectentile	0.000	0.000	0.000	0.322	0.380

Note: Each column represents $\hat{\theta}_t$ for each year after the tax cut for the UK. $\hat{\theta}_t$ are expressed as the percent increase over the counterfactual. p -value is constructed using the permutation test described in Section 3. N represents the number of placebos, which are all possible unit-year combinations for years 1973-2000. RMSPE for the UK is calculated for the pre-treatment years, 1970-1979. RMSPE percentile is based on a comparison among all placebo estimates with equal pre-treatment period as the treatment unit.

B Literature Review

Brewer et al. (2010) write “ ... top income shares did respond to the lower METR [marginal effective tax rate]. From a long-term perspective, the top 1% income share doubled from 6% in 1978 to 12.6% in 2003 while the net-of-tax rate (1 minus the METR) doubled from $1-0.79 = 21\%$ in 1978 to $1-0.53 = 47\%$ in 2003... this would imply a substantial elasticity almost equal to one.” They further argue that these changes due to the tax cuts only significantly increased incomes of the top 1%, and that there was little change for the next 4% (top 5-1%). Exploiting this variation in the response to the tax policies, they do a difference-in-difference between the top 1% versus the next 4% to study the elasticity for incomes due to the tax rates.

Although it is clear from their observation that there are distributional effects of the tax cuts, they are more interested in finding an optimal tax rate. Hence, they do not explain the effect of the tax cuts on inequality. Further, in their difference-in-difference analysis, they assume that the incomes of the top 1% group did not influence the income of the next 4% income group, and that the top 5-1% didn't see an increase in their incomes. Labor earnings, at least in the first part of the 1980s, played a huge role in divergence in the income distribution¹⁶. Wages were then a big part of the income composition. This was especially true for the top 10-1% whose income share did increase drastically in this period. More on this is discussed in the results section.

Atkinson (2005) documents the evolution of the top incomes in the UK over the twentieth century. He finds that the market income shares of the top 0.1% decreased from 10% in 1908 to 0.125% in 1978. However, he observes a drastic change after 1979. In the next two decades, the share of the top recovered the ground lost since the Second World War. From these observations, he concludes that increase in a more regressive tax system in the 1980s has caused a rise in the top earnings in the UK.

Clark and Leicester (2004) use microsimulation to study the effect of tax reform on income inequality in the UK. They find conflicting evidence depending on the counterfactual

¹⁶Johnson and Webb (1993) find that the earnings of the bottom decile increased by 114% from 1979-1988, while the earnings of the top decile changed by 185% in the same time period.

used. They find the total effect of this fiscal reform to be minimal if the counterfactual accounted for a pure price-indexation (here benefits increase in line with prices and hence were treated to be constant in real terms); however, if the benefits were allowed to rise with national incomes (the authors cite that this was the case historically leading up to 1979), they find half of the inequality in incomes can be explained by these fiscal reforms.

Johnson and Webb (1993) conclude that half the increase in inequality between 1979 and 1988 can be attributed to taxes and benefit changes, and part of the rest due to ‘changes in patterns of economic activity’. Jenkins (1995), on the other hand, states that the increase in income inequality between the years 1979-1986 was not due to the tax cuts, but due to the changes in earnings inequality, employment structure and unemployment. The author does agree that due to the shifting nature of the change in sources of income, self-employment and investment income becoming a growing share, compared with wages, of total household income, “... cut in direct income tax rates rather than wage inequality seem to have played the dominant role [in the latter part of his study].”

All these studies compare UK in the 1980s to the UK in the 1970s. As we will see in the next section, the two decades were vastly different both from the events within and without. Instead of focusing only on pre-intervention UK as the counterfactual, I use weighted combination of other similar economies as my counterfactual. This has two important improvements over the studies cited above: first, it accounts for all the global economic and political changes in the post intervention period¹⁷ - as would be captured in the data for the UK; and second, instead of comparing the UK to other economies over a single variable (for example the size of their economy, similar historical background, or language spoken), I use multiple variables to match UK with the control. This makes the counterfactual in this study more robust.

This study is closest to Tanndal and Waldenström (2018), who use the synthetic control method in explaining the diverging income trends in UK and in Japan using financial liberalization as their intervention. They find that financial liberalization in the UK, particularly the intervention in 1986, played a significant role in changing the distribution

¹⁷I refer to the years before 1979 as the pre-intervention years and years after 1979 as the post-intervention period.

of income, especially for fractiles within the very top percentile. However, while their findings are robust for Japan, it is not the case for the UK. They state that “... the effect of the Big Bang *appears to materialize two to three years before* the actual reform... .”¹⁸ As stated above, financial liberalization does play a role, but the effect of liberalization only comes to fruition with a complementary benefit for the rich. This precise tilting of balance of power in the distribution to favor the rich is due to the regressive nature of the tax cuts. As we will see in the next section, UK’s income distribution had already drastically changed by the mid-1980s. In addition, financial liberalization took shape through gradual changes throughout the 1980s. In that case, it would be difficult to use one period, 1986, as the year of intervention¹⁹. On the contrary, the 1979 tax cut was implemented rather swiftly, they were relatively large compared with what has been experienced by other nations²⁰, and most importantly, they were clearly regressive in nature.

¹⁸Emphasis mine.

¹⁹In the placebo studies in section 5, I find no effect for the year 1986.

²⁰Only US has had a tax cut that was as big among the developed nations. They slashed 25% of the prevalent rates in 1981. While the magnitude of the tax cut was large, it was slashed for uniformly across all tax brackets, making it less, if at all, regressive as compared with the cuts in the UK.