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**An Investigation on Intercohort Income Inequalities and
Millennials Impoverishment in Great Britain's Regions**

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Jeremy Smith (Head of the Department of Economics, University of Warwick) and Michael Ward
(Head of the Department of Economics, Monash University)

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An Investigation on Intercohort Income Inequalities and Millennials Impoverishment in Great Britain's Regions

Marco Sarandrea*

Abstract

This paper investigates intercohort income inequalities and Millennials' impoverishment in Great Britain between 1991 and 2018, focusing on the regional heterogeneity of the phenomena. Results show that Millennials' cohorts (1980-1984 and 1985-1989) are the first ever to experience intercohort income regressions and that inequalities are extremely diverse among regions. Each cohort's monthly incomes are compared to the previous cohort's for Great Britain, England's macro-areas and for Government offices for the regions (GORs). In Great Britain, the 1980-1984 cohort loses £144 each month compared to the 1975-1979 cohort. The cohort-on-cohort income reduction increases to £297 for the 1985-1989 cohort. In Northern England, Millennials experience intercohort income regressions only for the 1985-1989 cohort. In Southern England, the 1985-1989 cohort sees a higher intercohort income regression than the 1980-1984 cohort in absolute terms (- £368 for 1980-1984 versus - £425 for 1985-1989). The same happens in the North (+ £68 for 1980-1984 versus - £407 for 1985-1989), whereas in the Midlands regressions are constant for both cohorts (- £151 for 1980-1984 and - £148 for 1985-1989). The 1980-1984 cohort undergoes a substantial cohort-on-cohort income loss only in four GORs, even enjoying income increases in three GORs.

JEL Classifications: R12, E24, J62

Keywords: Economic Geography, Regional Inequality, Spatial, Intergenerational Income Distribution, Intergenerational Mobility

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Online appendix: https://www.dropbox.com/sh/j2r475p3m4ue9yu/AABJfnkvQc_TWdxLxZ0gCYiLa?dl=0

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1. Introduction

Millennials (people born between 1980 and 1996) are confronted with a progressive impoverishment. The 1980-1984 cohort is the first in the United Kingdom's modern history to have a lower income than the previous five-year cohort (Intergenerational Commission 2018), and the 1985-1989 cohort reaches an even lower wealth status (Intergenerational Commission 2018).

This paper generates in-depth stylized facts on intercohort income disparities for Great Britain and its regions between 1991 and 2018.¹ Intercohort income comparisons will be carried out for Great Britain, for England's macro-areas (Northern England, the Midlands, Southern England) and for Government offices for the regions (GORs) in Great Britain. I will investigate the income of people born between 1945 and 1989. Individuals will be grouped into five-year cohorts, shown in Table 1. Data are collected from the harmonised British Household Panel Survey (BHPS) and the United Kingdom Household Longitudinal Study (UKHLS) (University of Essex, Institute for Social and Economic Research 2021).

Table 1

1945-1949	1950-1954	1955-1959
1960-1964	1965-1969	1970-1974
1975-1979	1980-1984	1985-1989

Millennials' impoverishment threatens the social principle of distributive justice as defined by Tozer (2019), as well as the intergenerational contract. Projections see the old-age dependency ratio steadily increasing in the next decades (House of Commons Work and Pensions Committee 2016). This ratio shows the number of retired people per worker. The increase of the ratio will enhance the economic burden on younger workers and endanger the very existence of the welfare state. Intercohort inequalities lead also to higher within-cohort inequalities. The impoverishment of younger cohorts means they rely

¹ The data present a gap in 2009

more heavily on inheritances (Hood *et al.* 2013). Therefore, only Millennials who benefit from considerable inheritances will maintain high economic standards.

The adoption of a spatial approach to the study stems from the huge socio-economic disparities at the regional level in Great Britain. The effect of social backgrounds on people's employment, educational and housing outlook are completely different based on where they live (Social Mobility Commission 2017). Being born to parents with low income in London does not hinder a kid's opportunity as much as it does in the Yorkshire (Bell *et al.* 2018). Further, kids' jobs are less derivative of their parents' ones in the South compared to the North of England (Rohenkohl 2019). The enormous importance of intercohort and intergenerational inequalities called for both the House of Lords and the House of Commons to request *ad hoc* committees on the matter: the Select Committee on Intergenerational Fairness and Provision and the House of Commons Work and Pensions Committee respectively (House of Commons Work and Pensions Committee 2016; Select Committee on Intergenerational Fairness and Provision 2019). The committees highlight the direct link between research on the issue and policy making.

The depletion of the youngest cohorts is an international phenomenon as well, as many studies have demonstrated: Pitt *et al.* (2018) in the European Union; Afman (2020) in the Netherlands and Daley *et al.* (2014) in Australia. The international interest on the issue is a testament to its relevance.

In this paper, intercohort income differences are calculated as the difference between one cohort's lifelong earnings and the lifelong earnings of the previous cohort. A similar approach is adopted by the Intergenerational Commission (2018) and Afman (2020). Income differences are calculated in real terms and for monthly salaries. Only incomes earned at ages reached by both cohorts are considered. For Great Britain and England's macro-areas, this paper will also show the income's trend for each cohort. A similar methodology is also employed in Intergenerational Commission (2018) and Afman (2020). Intergenerational income differences will be studied using gross personal income. As personal income includes all income earnings of the individual, it is the best vehicle for capturing all changes in cohorts' revenues over time. This paper will also present complementary statistics for gross labour income.

The study finds stark dissimilarities in intercohort income differences both among England's macro-areas and among GORs. In Northern England, the 1980-1984 cohort earned £68 a month more than the 1975-1979 cohort. In the South, the same cohort was losing as much as £368 monthly in comparison to 1975-1979. In the Midlands, the 1980-1984 lost a monthly £151. The impoverishment of Millennials happened with a one-cohort lag in the North compared to the rest of the country. Furthermore, in the North and in the South the second Millennials' cohort saw an increase in the intercohort personal income regression in absolute terms. In the North, the 1980-1984 cohort actually earns £68 more a month than the previous one, while the 1985-1989 cohort loses £407. In the South, the 1980-1984 cohort sees an income regression of £368 and the 1985-1989 a reduction of £425. In the Midlands instead, the 1980-1984 and 1985-1989 cohorts share almost the exact same cohort-on-cohort personal income regression in absolute terms (-£151 for 1980-1984 and -£148 for 1985-1989).

Almost every time that a cohort in a particular macro-area earned significantly less personal income than the same cohort in the other macro-areas, that cohort earned less from their work than the previous cohort in the same macro-area. This happened in the Midlands for the cohorts 1960-1964 and 1970-1974, as well as in Northern England for the 1975-1979 cohort. For GORs, in the South West, the North East and the North West the first Millennial cohort experienced an intercohort income increase. For Yorkshire and the Humber, The East Midlands, Wales and Scotland the reduction never surpassed £57 monthly. Instead, Londoners born 1980-1984 lost a monthly £1197, and the 1985-1989 cohort lost a further £725 a month. In every GOR the 1985-1989 cohort has earned less than the 1980-1984 one. This has never happened for any other cohort before.

2. Literature review

The topic of intercohort income regression is novel in Economics. The contribution to the literature of this paper consists in the creation of original stylized facts produced at a detailed spatial level, i.e. for various regions of Great Britain.

“Tackling intergenerational unfairness”, by the Select Committee on Intergenerational Fairness and Provision (2019), displays and expands on information from the House of Commons Work and Pensions Committee (2016) and the Intergenerational Commission (2018). The report shows intercohort wage progression has stalled. At 30 years of age, the first Millennials’ cohort earns approximately the same as the cohort born 15 years prior. The Intergenerational Commission (2018) also argues how intercohort income declines for young cohorts are a structural phenomenon, as it manifested itself even before the 2008 crisis.

Professor Hills’ research², as cited by the House of Commons Work and Pensions Committee (2016), compares tax payments to the value of received social services for various five-year cohorts. From 1951 onwards, the younger the cohort, the lower the net gain between services and taxes. The youngest cohort even experienced a net loss. Although this study stopped at the 1971-1976 cohort, it is indicative of the increasing economic burden imposed on younger cohorts.

Afman (2020) shows how the first Millennial cohort is the first Dutch cohort to experience an income reduction since World War II. Pitt *et al.* (2018) demonstrate that, although within the European Union inequality has declined over the years, since the 2008 financial crisis the risk of relative poverty has increased more for the young than for any other cohort, leading to a high intercohort pay disparity for younger cohorts. Daley *et al.* (2014) express how Australian younger households saw a reduced income increase compared to older households between 2004 and 2010.

The Social Mobility Commission (2017) creates an index stating people’s employment, educational and housing outlook depending on their social background. Different regions diverge considerably with regards to the index, with London performing well above average and the Midlands at the opposite end of the spectrum. Further proof of regional differences is provided by Bell *et al* (2018) and Rohenkohl (2019). The region an individual is born in plays a notable effect on intergenerational mobility (Bell *et al*

² John Hills, ‘Distribution and redistribution’, chapter 8 in *Inequality and the State*, OUP 2004; analysis reproduced in John Hills, *Good Times Bad Times: The Welfare Myth of Them and Us*, Policy Press, 2015, ch. 13 fig 3.13.

2018). Being born to parents with low income in London does not hinder a kid's opportunity as much as it does in the Yorkshire (Bell *et al* 2018). Rohenkohl (2019) studies regional intergenerational mobility using the BHPS and UKHLS data. Rohenkohl (2019) finds intergenerational mobility to be lower for the North East and Yorkshire and the Humber than it is in the East of England and the South West of England. Bourquin *et al.* (2020) study the inheritances which will be received by cohorts of the 1960's, the 1970's and the 1980's. The region in which an individual lives entails major discrepancies in terms of inheritance. Indeed, kids born in the 1980's in London have parents who are 66% richer than the national average.

Hood *et al.* (2013) study household income differences for ten-year cohorts, from the 1940's to the 1970's in Great Britain. They show younger cohorts earn less than cohorts born ten years prior at the same age. The study then asserts that the depletion happened in the North, the Midlands, the South, London, Scotland and Wales. This paper will expand the findings of Hood *et al.* (2013). Sharing a different approach (I use both personal and labour income, analysed at the individual level) this paper studies a bigger number of cohorts to analyse the differences in intercohort income inequalities at both a macro-regional level and for individual GORs.

3. Dataset construction

To study intercohort inequality, I created a highly detailed, custom-made dataset.

3.1 Data source

The data were collected from the BHPS and the UKHLS surveys (University of Essex, Institute for Social and Economic Research 2021). Both surveys are designed by the Institute for Social and Economic Research (ISER) of the University of Essex and gather information on various social aspects of UK residents. The data are compiled from annual surveys sent to all adult members of selected households.

The BHPS gathers panel data from 1991 to 2008. In 1991, surveys were sent out to 10,300 people from 5,500 households in different areas of Great Britain. In 1999, the survey was expanded to include 1,500

more households from Scotland and 1,500 more households from Wales (Fumagalli *et al.* 2017). Northern Ireland started to be represented in the study only from 2001 onwards with 2,000 households (Fumagalli *et al.* 2017).

The UKHLS builds on the BHPS. It started in 2009, and was prompted by the idea of expanding the BHPS. In fact, the survey sample increased considerably, reaching roughly 40,000 households in the first year.

3.2 Homogenisation of data categories

The differences between BHPS' and UKHLS' data have been limited thanks to work from Fumagalli and Buck (Fumagalli *et al.* 2017). However, the creation of the dataset required further meticulous data polishing.

The problems which needed to be addressed were the following:

- 1) In the BHPS and UKHLS datasets there were categorical variables containing the same information, but with categories identified by different parameters. The parameters needed to be recoded unambiguously to make them compatible.
- 2) Specific information contained in a single variable in one dataset was instead distributed among several different variables in the other. In such cases, in the latter dataset the data were regrouped into a unique counterpart variable of the former dataset.
- 3) In the two datasets there were categorical variables expressing the same information with different levels of specificity. New *ad hoc* broader categories have been created to make the different levels of detail of the information compatible.

The result of this work of data analysis is a dataset containing 46 variables for 582,981 observations from 1991 to 2018³. The number of observations for each region divided by cohort and year brackets is reported in the Appendix.

4. Methodology

The study will divide people born between 1945 and 1989 into the five-year cohorts shown in Table 1. The paper will then study the development of each cohort's income from 1991 until 2018.⁴ The paper will mainly focus on the analysis of Millennials' cohorts. The five-year cohorts allow to capture the various fluctuations in working conditions Millennials have experienced.

Cohorts' comparisons will occur through real incomes. All real incomes are adjusted to 2015's Consumer Price Index (Office for National Statistics). Intercohort disparities will be seized through the analysis of personal income, which is comprised of every source of income received by the individual. Data for labour income will be used to complement the personal income study. Both labour and personal incomes will be studied on a gross basis.

5. Intercohort income differences in Great Britain

The progressive impoverishment of newer cohorts is established at the UK level (Select Committee on Intergenerational Fairness and Provision, 2019). In this section, I examine whether this holds true also for Great Britain alone.

Figure 1⁵ projects the trend in monthly real gross personal income for each cohort, broken down by age brackets. I calculate the average monthly personal income when people of each cohort are in a certain age bracket. Therefore, the income of each cohort for a specific age bracket is generated from a very large

³ See note 1

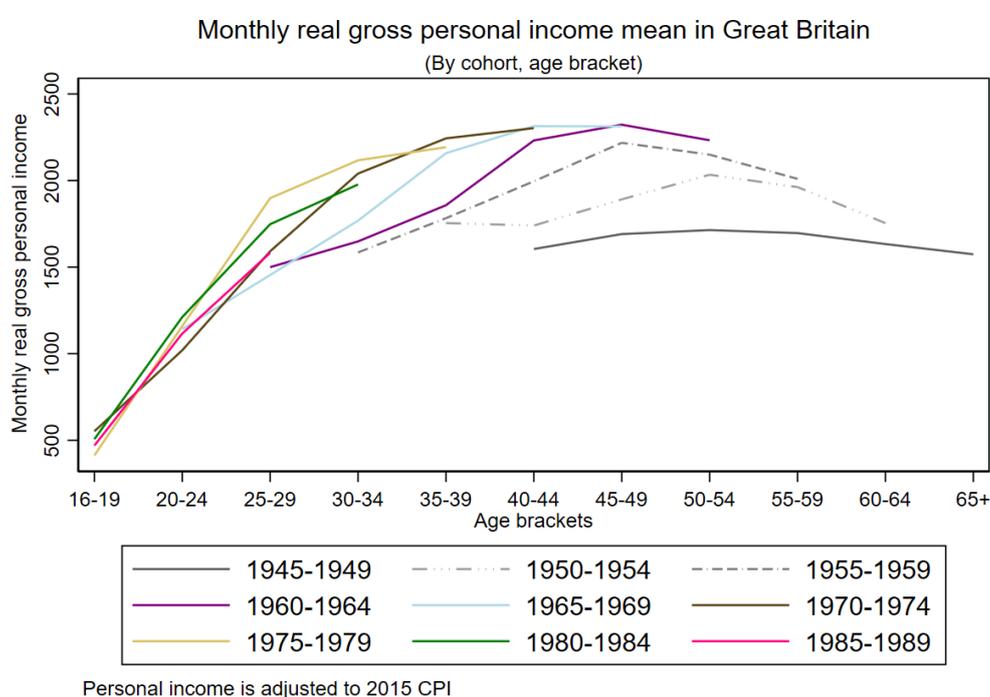
⁴ See note 1

⁵ I would like to thank Andrew Musau from the Statalist forum for his help regarding the code for the Figure.

number of observations, yielding significant results. In fact, the cohort's income per age bracket is given by the average monthly income that each person belonging to that cohort receives over 5 years. The number of observations for each cohort divided by age bracket are reported in the Appendix.

Figure 1 clearly expresses how the impoverishment of newer cohorts is not present only in the United Kingdom (Intergenerational Commission 2018) but is also apparent in Great Britain. Each cohort has earned more than the cohort immediately preceding it at almost every age bracket.

Figure 1



However, this trend came to an abrupt halt from the 1980's onwards. The 1980-1984 cohort is the first cohort to consistently earn less than their immediate predecessors. This trend reversal does not seem spurious. Indeed, the 1985-1989 cohort suffered a further loss of income. People born 1985-1989 have never earned more than people born 1980-1984, at any of the age categories. This has never happened to any cohort prior to them.

The income loss of recent cohorts is alarming in absolute terms too. The 1985-1989 cohort has suffered a loss of income that sets them back fifteen years, as they earned about the same between the ages of 25

and 29 as people from 1970-1974. Individuals born 1980-1984 earned less than the cohort born ten years prior when both cohorts were between 30 and 34 years of age.

Figure 2

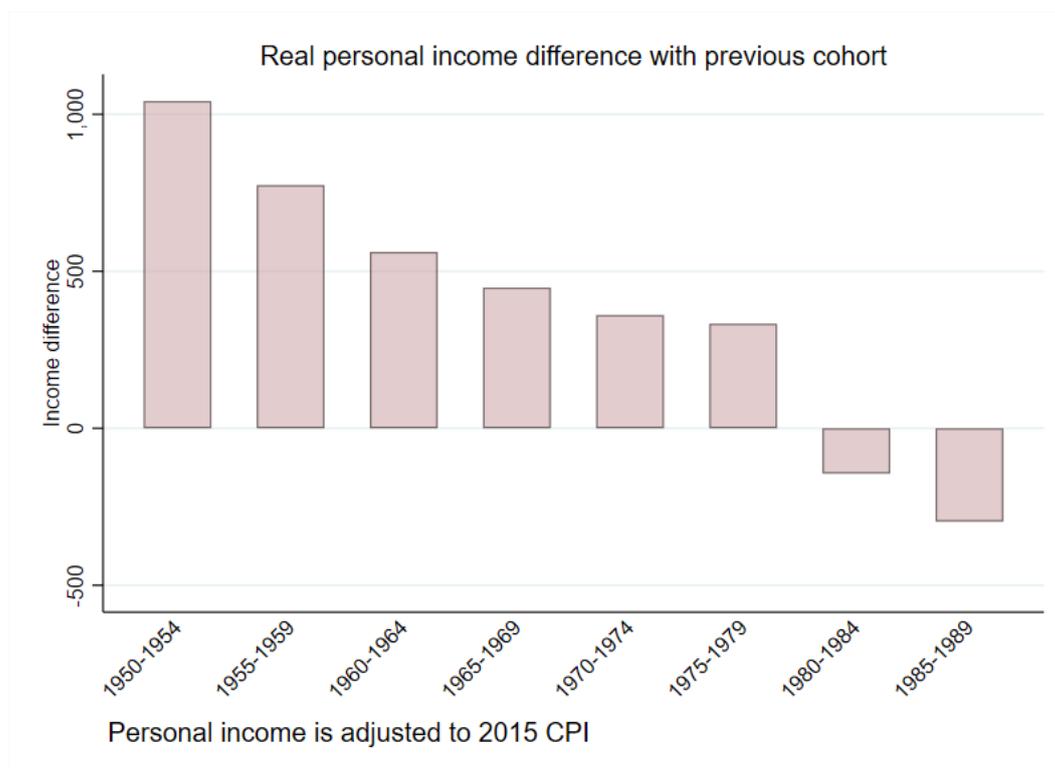


Figure 2 portrays the difference in lifelong gross real monthly personal income between a cohort and the cohort immediately preceding it, calculated as the sum of the differences between the average monthly personal incomes of the cohorts, when they are in the same age brackets. The age brackets are the ones used in Figure 1. This method thus allows us to calculate the average lifetime difference in monthly income between two cohorts. This graph will be our main reference for the remainder of the paper.

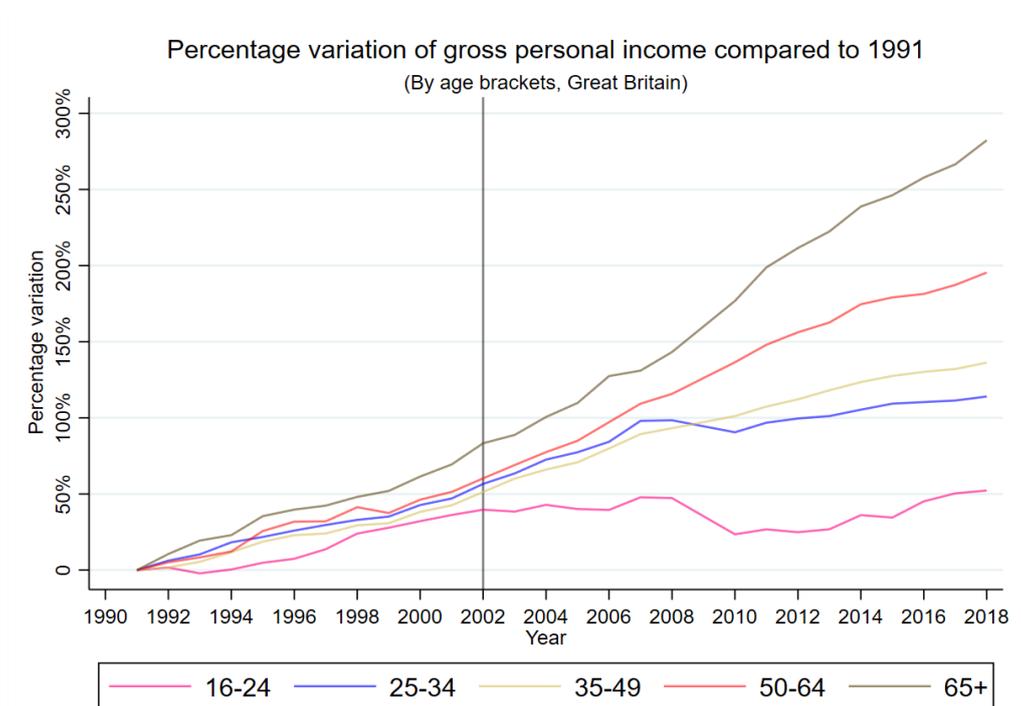
Figure 2 is extremely eloquent. People born from 1980 onwards are the first to lose personal income when compared to their forerunners. More specifically, the 1980-1984 cohort experiences an average monthly loss of £144 when compared to people born between 1975 and 1979. The situation worsened with time. In fact, the 1985-1989 cohort gained £297 less a month compared to the 1980-1984 cohort.

Although it has only been the last two cohorts to earn less than their immediate predecessors, Figure 2 shows that no cohort has ever benefited from a higher income progression than the 1950-1954 cohort.

Further, every new cohort has enjoyed a lower income progression than the previous one. Cohorts went from earning £1042 more than their predecessors in 1950-1954, to an income progression of £333 in 1975-1979. People born later in the 20th century have constantly been offered less opportunities of income progression.

Figure 3 displays the percentage change of gross personal income by age brackets compared to 1991. The age brackets have been chosen to represent different stages of a professional career.

Figure 3



For Figure 3, personal incomes do not need to be expressed in real terms, as I am comparing incomes among age categories in the same time span.

Figure 3 is self-explanatory. The youngest members of the labourforce have experienced the lowest increase in personal income. Whilst all age brackets have at least doubled their income in 2018 compared to 1991, the 16-24 category has seen a meagre increase of close to 50%. Figure 3 portrays a clear switch of trend for the youth from 2002 onwards. From 1991 to 2001, personal income of individuals aged between 16 and 24 increased by 40%, against an average increase of 52%. From 2002 onwards, people

between 16 and 24 years of age saw a personal income increase of just 6%, compared to an average increase of 58%. Evidence of these figures is reported in the Appendix.

This is the aspect which connects the age-bracket graph with the intercohort study. Indeed, in 2002 Millennials were only just starting to work, being at most 22. Millennials' cohorts have therefore entered a job market in dire conditions, which has stalled their income progression, widening intercohort inequality. The stylized facts just produced also confirm that the condition of youth's poverty is a structural condition, since it was present even before the 2008 financial crisis (Intergenerational Commission 2018).

Figure 4

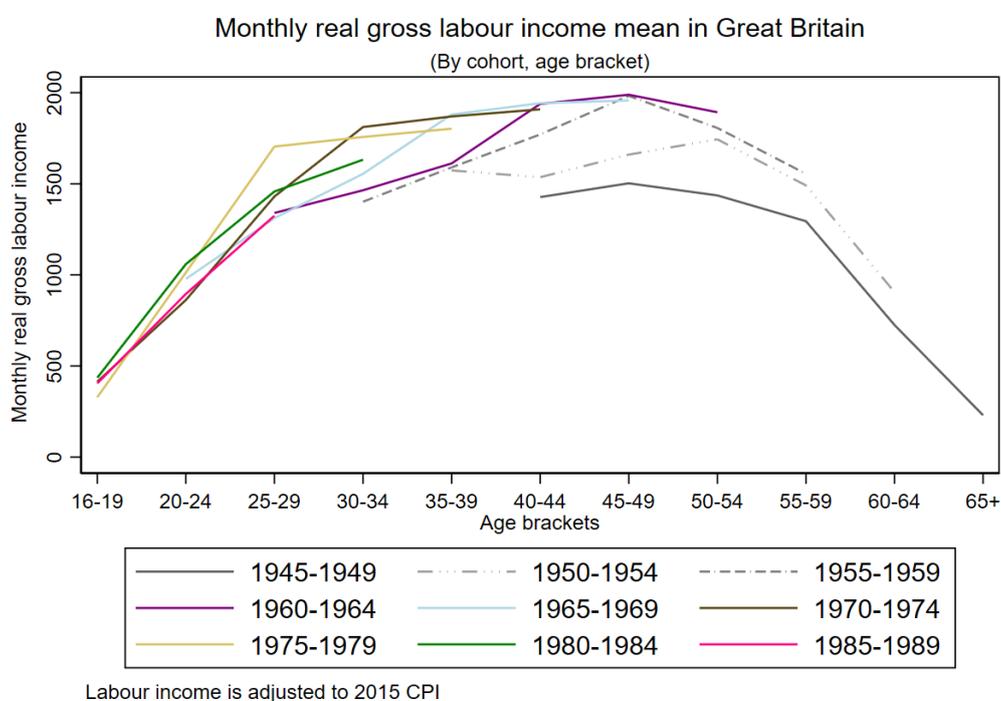
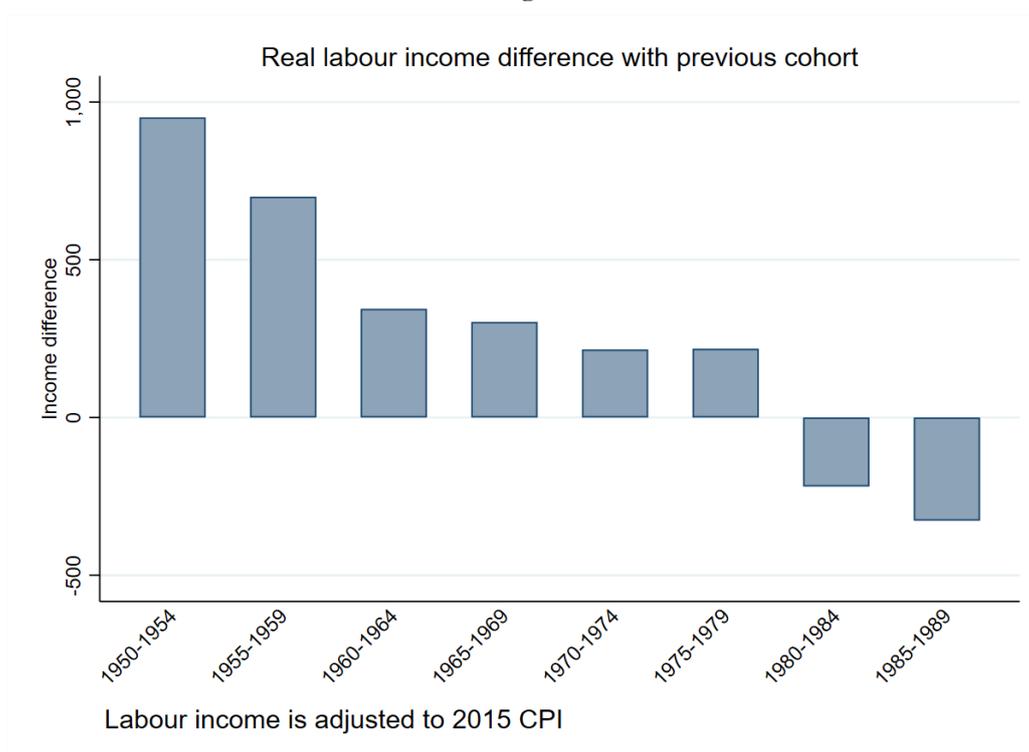


Figure 4 is constructed adopting the same approach of Figure 1, but with monthly real gross labour income. Figure 4 shows how each cohort from 1950 until 1979 has enjoyed a steady labour income progression, although the 1975-1979 cohort was already showing signs of a trend reversal. The trend then switches drastically for the two Millennials' cohorts. The 1980-1984 cohort is significantly poorer compared to the previous cohort. The 1985-1989 cohort is in even worse shape, earning considerably less than the 1980-1984 cohort. The 1985-1989 cohort lost 25 years of labour income gains, as it earns about the same real gross labour income as the 1960-1964 cohort between 25 and 29 years of age.

Figure 5 illustrates how Millennials' cohorts are the first to sustain an intercohort reduction in labour income. 1980-1984 individuals lost an average of £218 each month compared to their predecessors, and individuals born between 1985 and 1989 saw an average monthly salary of £326 less than those born in the previous 5 years. Just as for personal income, no cohort has experienced the same cohort-on-cohort labour income progression than the £951 increase enjoyed by the 1950-1954 cohort. Further, like for gross personal income, labour income increases by cohort have been declining over time, even before becoming

Figure 5



negative with millennials. However, it is easy to notice a difference between labour and personal income in this regard. In fact, every successive 5-year cohort experienced a significantly reduced personal income progression. This phenomenon seems smoother for labour income. Indeed, gross labour income progressions remained stable for 1960-1964 (+ £345) and for 1965-1969 (+ £303), before reducing notably for 1970-1974. However, the 1970-1974 intercohort labour income difference (+£216) was again almost the same as the one for 1975-1979 (+£218). This suggests that differences in labour incomes can take up to 10 years to properly manifest among cohorts.

6. Intercohort income differences in England's macro-areas

This section will focus on intercohort income inequalities in England's macro-areas. The United Kingdom is one of the countries with the highest degree of inequality among regions (McCann 2020). Interregional inequalities have been a historic feature, and concern many economic aspects, from unemployment rates to competitiveness indicators (Bachtler 2004). Producing regional statistics shows where intercohort income inequalities and Millennials' impoverishment are most intense, allowing policymakers to tackle the issues at their roots.

Given the absence of an official subdivision of England into macro-areas (Rohenkohl 2019), the macro-areas will be divided as follows. Northern England will be comprised of the North West, the North East and Yorkshire and the Humber. The Midlands will consist of the West Midlands and the East Midlands. The South of England will include the South West, the South East, London and the East of England. The number of observations for each macro-area is reported in the Appendix.

Figure 6

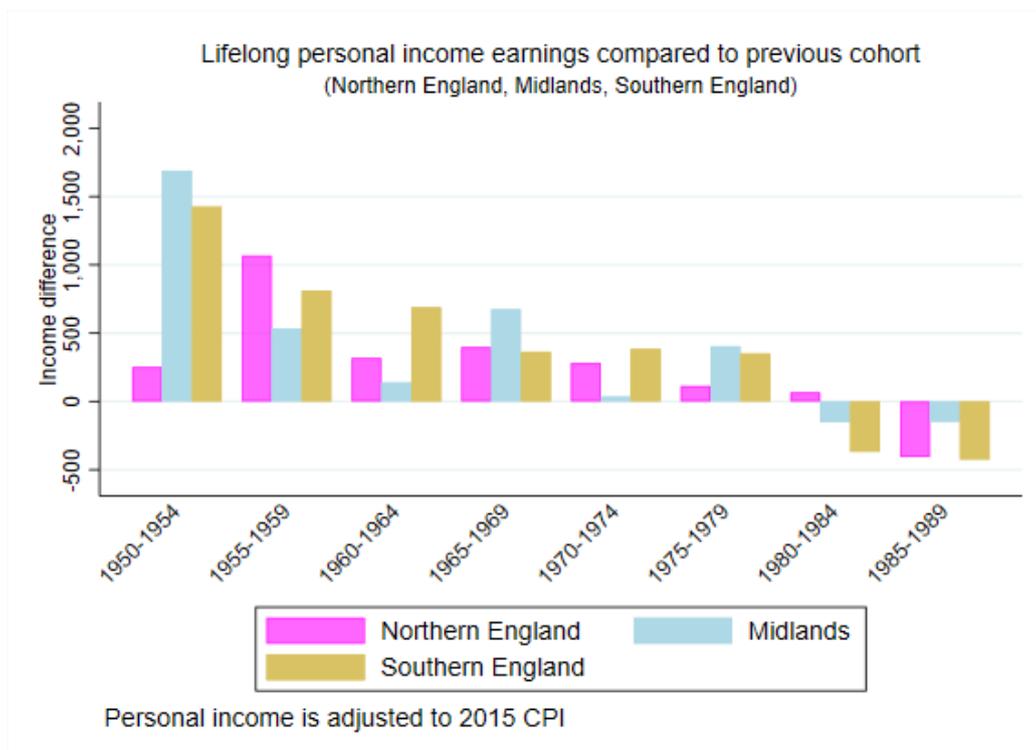


Figure 6 shows there are straightforward discrepancies in the pattern of personal income development among cohorts in the North, the South and the Middle of England. In the North of England, the cohort which enjoys the highest personal income progression is the 1955-1959 cohort. This is an anomaly, as the 1950-1954 is the cohort with the highest personal income progression in both the Midlands and Southern England. Further, in the North, Millennials experienced an income regression only for the 1985-1989 cohort. This is in marked contrast with the rest of the country, as the 1980-1984 cohort was the first one to suffer an income regression in every other region. Whilst the 1980-1984 cohort earned £68 a month more than the 1975-1979 cohort in the North, in the South it was losing £368 in comparison to 1975-1979. In the Midlands, the 1980-1984 lost a monthly £151. However, the North of England resynchronises with the national trend for the latest cohort. The 1985-1989 cohort in the North did endure an income reduction. The 1985-1989 cohort's personal income contraction was also in line with the one experienced in the South (£407 loss in the North versus a £425 loss in the South). Figure 6 may therefore suggest Millennials' impoverishment happened with a one-cohort lag in the North compared to the rest of the country. Rohenkohl (2009) found more intergenerational perseverance in the North than in the South. Although this result is obtained on a generational basis, it might also hint to a general stickiness of incomes at a cohort level too.

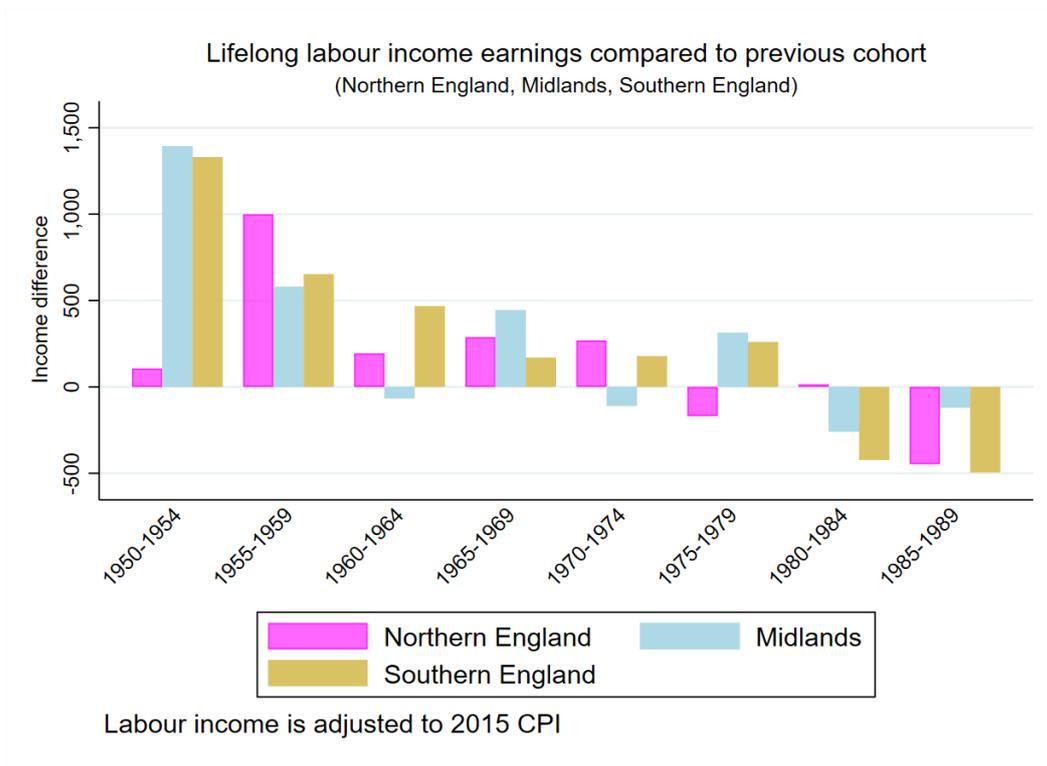
In the Midlands, the intercohort income difference trend has been highly inconsistent. The 1965-1969 category enjoyed a cohort-on-cohort personal income monthly progression of £674, almost five times the £139 the 1960-1964 benefited from. The progression then almost halted for the following 1970-1974 cohort, reaching a meagre £35 a month. The low income progressions experienced by the 1970-1974 and 1960-1964 cohorts are a specific Midlands' feature. In fact, compared to the 1960-1964 Midlands' cohort, the same cohort experienced a personal income progression 2.3 times higher in the North, and almost five times higher in the South. For the 1970-1974 cohort, Northern individuals progressed almost eight times more than their counterpart in the Midlands. The personal income monthly progression for the Southern 1970-1974 cohort was more than ten times the progression for the same cohort in the Midlands. For Millennials, the Midlands exhibit a unique aspect. In fact, the 1980-1984 and 1985-1989 cohorts share

almost the exact same cohort-on-cohort personal income regression in absolute terms (-£151 for 1980-1984 and -£148 for 1985-1989). Instead, in the North and the South of England the second Millennial cohort saw an increase in the cohort-on-cohort personal income regression in absolute terms. In the North, the 1980-1984 cohort actually earns £68 a month more than the previous one, while the 1985-1989 cohort loses £407 monthly. In the South, the 1980-1984 cohort sees an income regression of £368 and the 1985-1989 a reduction of £425. This suggests that the cohort-on-cohort income regression phenomenon starts with the 1980-1984 cohort and increases in absolute terms with the following cohort. In the Midlands instead, the 1985-1989 cohort shares the same cohort-on-cohort income regression of the 1980-1984 cohort in absolute terms.

The trend for Southern England mirrors Great Britain's trend. Indeed, for Southern cohorts the personal income progression reduces gradually starting from the 1950-1954 cohort, although with more persistence in the 1970-1974 and 1975-1979 cohorts. The cohort-on-cohort personal income difference then becomes suddenly negative for the 1980-1984 cohort, and increases in absolute terms for the last cohort. The similarity between Great Britain and the South of England is due to the presence of London in the region, the economic fulcrum of the United Kingdom (Brown 2019), and therefore of Great Britain as well.

An additional difference between the North and the South of England lies in the pattern of cohort-on-cohort personal income difference leading up to the Millennials cohorts. From the 1965-1969 cohort, every Southern England cohort saw approximately the same income progression in absolute terms. The 1965-1969 cohort experienced a £363 monthly personal income increase; for the 1970-1974 and the 1975-1979 cohorts the income increases were of £384 and £351 respectively. The cohort-on-cohort income regression for the 1980-1984 cohort happened abruptly. Instead, cohorts in the North of England started to see a smooth gradual reduction in their intercohort income progression from 1965 onwards. Starting from a monthly income progression of £398 for the 1965-69 cohort, it reduced to £283 the following cohort, to then £113 the next.

Figure 7



The trend of intercohort labour income differences is represented in Figure 7. Although these stylized facts do not offer the possibility of establishing causal links, Figure 7 provides scope for an interesting key of interpretation of intercohort income developments. Almost every time that, in a specific macro-area, a cohort experienced an unusually lower personal income increase compared to the same cohort in other areas, this cohort experienced a decrease in intercohort labour income. That is, nearly every time a cohort in a specific region gained much less total income compared to the same cohorts in the rest of the country, said cohort earned less from their jobs than the previous cohort in the same macro-area. This happened in the Midlands for the cohorts 1960-1964 and 1970-1974, as well as in Northern England for the 1975-1979 cohort. For the Millennials' cohorts, Figure 7 is very similar to Figure 6. This does not come as a surprise, given that for young people wages cover most of their personal income.

7. Intercohort income inequalities at GOR level

This section will present stylized facts for intercohort income inequalities for GORs in Great Britain.

Table 2

Lifelong personal income earnings compared to previous cohort

Cohorts	NE	NW	YH	EM	WM	EE	SE	SW	LND	WAL	SCO
1950-1954	-555.038	759.518	29.123	1642.66	1828.433	2188.18	430.718	1800.6	1969.31	729.451	1036.73
1955-1959	1372.44	1151.122	745.788	718.247	274.254	-150.14	1753.97	227.57	923.624	341.571	993.347
1960-1964	621.751	279.363	58.617	-370.112	587.713	195.24	1180.06	326.56	686.845	619.169	1239.7
1965-1969	44.822	-144.695	1470.262	1029.153	381.818	540.741	698.435	898.13	-349.78	625.854	-28.516
1970-1974	-148.284	559.9646	127.8769	-93.4086	168.3321	1181.86	496.082	397.08	-504.82	935.956	205.658
1975-1979	223.904	138.1265	68.3067	396.4412	356.7114	-227.995	184.224	199.18	1100.62	41.471	539.443
1980-1984	142.462	108.5352	-17.3044	-57.3657	-216.132	-189.687	-160.49	342.58	-1197.5	-4.9026	-41.737
1985-1989	-130.103	-546.132	-336.237	-168.514	-120.507	-200.819	-520.93	-160.93	-725.23	-238.85	-121.21

The higher the intercohort income increase, the greener the cell. The higher the intercohort income loss, the redder the cell.

NE = North East; NW = North West; YH = Yorkshire and the Humber; EM = East Midlands; WM= West Midlands; EE = East of England; SE = South East; SW = South West; LND = London; WAL = Wales; SCO = Scotland.

Table 3

Lifelong labour income earnings compared to previous cohort

Cohorts	NE	NW	YH	EM	WM	EE	SE	SW	LND	WAL	SCO
1950-1954	-234.483	544.3631	-242.297	1001.869	1921.112	2109.42	325.345	1736.9	1848.58	1124.51	934.079
1955-1959	1107.18	1230.564	587.739	1027.011	2.863	-311.919	1786.34	-367.98	948.234	278.799	1044.63
1960-1964	472.782	135.742	-20.723	-593.875	403.151	126.326	928.938	104.3	416.934	536.932	981.672
1965-1969	27.913	-269.134	1342.153	795.044	154.1755	513.619	388.538	914.93	-615.9	544.99	8.323
1970-1974	35.4592	411.1512	168.6037	-221.73	7.3955	872.614	413.332	49.795	-656.74	794.101	41.0526
1975-1979	36.0988	-106.095	-313.603	322.3817	247.4329	-345.739	82.3619	134.81	1008.21	-21.108	658.623
1980-1984	8.1139	109.3106	-90.6661	-111.433	-366.073	-149.428	-251.61	353.79	-1298.3	-104.47	-158.91
1985-1989	-123.886	-641.127	-328.368	-161.079	-73.8397	-250.317	-625.45	-280.68	-755.79	-240.99	-140.17

The higher the intercohort income increase, the greener the cell. The higher the intercohort income loss, the redder the cell.

NE = North East; NW = North West; YH = Yorkshire and the Humber; EM = East Midlands; WM= West Midlands; EE = East of England; SE = South East; SW = South West; LND = London; WAL = Wales; SCO = Scotland.

Table 2 shows clear differences among GORs. In London, intercohort personal income regressions started way before the Millennial generation. In the capital, the 1965-1969 cohort earned £350 less a month than the 1960-1964 cohort. This happened whilst in the nearby South West the same cohort was gaining £898. London's progressive intercohort income reduction was interrupted only for the 1975-1979 cohort.

Consistent intercohort regressions began before Millennials in the East Midlands and the East of England too. In the former, with an extremely spurious pattern; the 1960-1964 cohort experienced a loss (- £370), whereas the following cohort saw a significant increase (+ £1029). This pattern repeated for the following two cohorts (- £93 for 1970-1974 and + £396 for 1975-1979), before both Millennial cohorts experienced intercohort income losses. In the East of England intercohort income losses began with the £228 loss of the 1975-1979 cohort, and continued with Millennials. The English capital was also the location in which Millennials suffered the most. Londoners born 1980-1984 lost a monthly £1197 compared to their predecessors, and the 1985-1989 cohort lost a further £725 a month. The 1985-1989 income regression figure is more than six times the intercohort income loss experienced in the West Midlands.

Yorkshire and the Humber presents a unique intercohort income inequality trend. The three cohorts going from 1970 to 1984 experienced slight income variations. The income regression for the first Millennial cohort is negligible (-£17 each month). Instead, the intercohort income regression experienced by the 1985-1989 cohort is the fourth biggest out of all GORs.

The South West, the North East and the North West are the only regions in which the first Millennial cohort experienced an intercohort income increase. The highest increase was in the South West (£342). The overall intercohort income regression for the 1980-1984 cohort was however contained, as for Yorkshire and the Humber, The East Midlands, Wales and Scotland the reduction never surpassed £57 a month. For the second Millennials' cohort the situation is markedly worse. In no region has the 1985-1989 cohort earned more than the 1980-1984 one. This has never happened for any other cohort before.

For every GOR, the pattern of intercohort labour income follows the trend of intercohort personal income extremely closely.

8. Conclusions

Millennials' impoverishment and intercohort income differences are extremely novel in economics. This paper contributes to the literature by producing original stylized facts using the BHPS and UKHLS harmonised survey data (University of Essex, Institute for Social and Economic Research 2021) for Great Britain, England's macro-areas (North, Midlands, South) and for Great Britain's Government offices for the regions (GORs). The study covers both intercohort labour income inequalities and intercohort personal income inequalities. Since Millennials' cohorts impoverishment is only documented for the United Kingdom (Select Committee on Intergenerational Fairness and Provision, 2019), this paper begins by confirming the existence of the phenomenon in Great Britain.

The regional stylized facts provide extremely valuable understanding of the spatial heterogeneity of intercohort income inequalities. In Northern England, Millennials' depletion happened with a one-cohort lag. The 1980-1984 cohort earned £68 more each month than the 1975-1979 cohort, whilst the same cohort was losing £368 in the South and £151 in the Midlands. However, 1985-1989 cohort's personal income contraction in the North was in line with the one experienced in the South (£407 loss in the North versus a £425 loss in the South). In the Midlands, the 1980-1984 and 1985-1989 cohorts experienced essentially the same cohort-on-cohort personal income regression in absolute terms (-£151 for 1980-1984 and -£148 for 1985-1989). In the North and the South instead, the loss for the 1985-1989 cohort increased significantly in absolute terms. In the North, the 1980-1984 cohort actually earns £68 a month more than the previous one, while the 1985-1989 cohort loses £407. In the South, the 1980-1984 cohort sees an income regression of £368 and the 1985-1989 a reduction of £425. This suggests that the cohort-on-cohort income regression phenomenon starts with the 1980-1984 cohort and increases in absolute terms with the following cohort. In the Midlands, instead, this trend does not show. Further, nearly every time a cohort in a specific region gained much less personal income compared to the same cohort in the other regions, said cohort experienced an intercohort labour income reduction.

Millennials' impoverishment is remarkably heterogeneous for GORs. In the South West, the North East and the North West the first Millennial cohort experienced an intercohort income increase. The highest increase was in the South West (£342). In Yorkshire and the Humber, the East Midlands, Wales and Scotland the intercohort income regression for 1980-1984 never surpassed £57. The regression was significant only in London, the South East, East of England and the West Midlands. There is high inconsistency in the amount of intercohort income losses too. If in London the 1980-1984 cohort lost £1197 a month cohort-on-cohort, the second highest loss was of only £216 in the West Midlands. For the second Millennials' cohort the situation is markedly worse. In no region has the 1985-1989 cohort earned more than the 1980-1984 one. This has never happened for any other cohort before.

The evidence uncovered by this study has unvaluable importance for policy making. Figure 3 shows that, at the current rate, newer birth cohorts will earn even less between the ages of 16 to 24 relatively to other age brackets than both the 1980-1984 and the 1985-1989 cohorts, enhancing intercohort personal income losses with time. Heavier wealth taxes, which typically hit the oldest, could be applied to subsidise the income of younger cohorts. Further, higher inheritance taxes would redistribute wealth and limit intracohort income inequalities.

A crucial factor in the impoverishment of Millennials was the increase of elders in the labourforce (House of Commons Work and Pensions Committee 2016), which blocked Millennials' access to the market. To avoid this from happening to cohorts after 1989, the state could make it more profitable for employers to hire young workers by guaranteeing them tax cuts. Regional data suggests the areas where to allocate the biggest part of the subsidies. These would be London, the South East and the East of England.

Further research on the relationship among regional intercohort income inequalities, educational qualification and house tenure is encouraged, as well as research on how social backgrounds affect intercohort inequality at a regional level, given the established interregional differences in intergenerational social mobility (Bell *et al.* 2018; Rohenkohl 2019). Further research on cohorts' tax payments and transfers

through the years would also contribute to the research on intercohort income inequality. Extending the regional study of intercohort inequalities to household's wealth is also encouraged.

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