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DISCUSSION PAPER SERIES

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ABSTRACT

What Really Happened to British Inequality in the Early 20th Century? Evidence from National Household Expenditure Surveys 1890–1961

We estimate income/expenditure inequality in Britain, exploiting five household surveys, spanning the years 1890 to 1961, some of which we recovered and digitised. After adjusting for differences in scope and sampling, we find little change in inequality among worker households over the period and that the three decades after World War 2 were probably the low point of survey-based inequality measures in the eight decades since the late 1930s. Our findings are consistent with the evidence from wage censuses on the overall variance of earnings, which only falls marginally over the period. We argue this relative steadiness was the result of opposing proximate forces, one being the decline in manual skill differentials due largely to changing wage-setting institutions. On the other side was growth in the employment share of non-manuals, with their higher skill and wage variance. We also argue that two demographic factors also played their parts. The sharp decline in fertility in the early part of the century reduced inequality, while the emergence of pensioner households in the 1950s tended to increase inequality in the lower end of the distribution. Lastly, our work suggests a substantial downward revision in the estimated size of the fall in inequality through World War Two. We find a fall of between one and two Gini percentage points between 1937/8 and 1953/4, compared with the often-quoted Blue Book estimate of almost seven Gini percentage points.

JEL Classification: D31, J31, N14
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1. Introduction

This paper is an investigation of the pre-1960s history of the size distribution of incomes among working households in Britain. It is likely that many think of this period as featuring a well-established international downward trend in income inequality. Most existing research finds this trend, from Kuznets' seminal study (Kuznets, 1955) to the pioneering work of the top-incomes group (see, for instance, wid.world/country/united-kingdom/). This trend has been inferred from the estimation of a rising share of labour in national income (see, for instance, Table 1, below) and from tax returns showing a declining share of top incomes. Here we look below the top income groups and put households centre stage, to gain a more complete and nuanced picture of movements in the income distribution in the early 20th century. Our work links to the standard reference time series for Britain: the Gini coefficients and other measures derived from Family Expenditure Survey and more recently the Family Resources Survey[1]. The earliest year of those series is 1961, and we extend knowledge of the path of inequality in Britain back to the late 1930s, and in a more limited way, to the turn of the 20th century.

We take five national household expenditure surveys, dating from, in turn, 1890/1, 1904, 1937/8, 1953/4 and 1961. In order to extract inequality trends from a set of surveys spanning this period, we have to confront two serious problems of comparability. First, the earlier surveys tended to cover narrower subsets of the population. For instance, many earlier enquiries were interested in establishing the cost of living and were likely to be focussed upon 'typical' urban households, such as households in which the male head was at work in a manual occupation and wife and children were present. Early surveys taken for other reasons were also limited in scope; by industry or occupation for instance. Secondly, the science of statistics and best practice with respect to sampling only began to replace older methods from the 1920s onwards. In particular, sampling methods in Britain around the turn of the 20th century might now be described as snowball sampling. The development of statistical methods and international efforts to improve methods of estimating living standards meant that by the late 1930s stratified random sampling had become the norm. Alongside this was a clear trend towards widening the focus of study well beyond manual workers in nuclear families, as Table 1 shows. Both the move away from snowball sampling to stratified random sampling and the broadening of focus from nuclear households are likely to raise measured inequality. Thus,

[1] These are regularly published and updated by the Institute for Fiscal Studies, see https://www.ifs.org.uk/uploads/publications/comms/R117.pdf

unless we acknowledge, and correct for, these changes of method and scope inference on trends will be compromised.

We find initially exactly as these considerations predict: lower inequality among the households of manual workers in the two earlier surveys of 1890/1 and 1904 than in the later interwar and mid-twentieth century surveys. To make the surveys more comparable we take the best of our later surveys and select sub-samples that reflect the selection biases and partially adjust for the sampling methods of the earlier surveys. We then find only a small, positive change in underlying inequality 1904-1937/8, and that rise is likely to be partially attributable to the advancement of survey methods in the intervening period. To emphasise this result: we do *not* find a trend of declining inequality among working households in the first half of the twentieth century. We pay special attention to the comparison of 1937/8 and 1953/4. Here we can make comparisons between randomised samples that can be made to take into account non-working and middle class households, thus getting close to the FES-based post-1960 series. We find at most a modest fall in the Gini over this period, between one and two Gini percentage points, which is very different from the oft-quoted Blue Book series (Atkinson and Micklewright, 1992) that gives a fall of almost 7 Gini percentage points through World War Two. We discuss how the Blue Book figure for 1938 was almost certainly an over-estimation, so that a lower figure, such as the one we find, is plausible.

The next substantial part of the article collects evidence on the path of the wage distribution. First the trend of manual worker's wage rate skill differentials is described showing large falls in differentials during both world wars. These are contrasted with much less pronounced movements in manual earnings inequality taken from earnings censuses. Then we illustrate the slow rise in the share of non-manual occupations in employment and the rise in the importance of (high variance) non-manuals within the overall variance of earnings. The final overall picture of earnings inequality that emerges is unclear, but the impression of a downward trend is not sustained, so that our results in household inequality are not inconsistent with the record on earnings.

Finally, we investigate the impact of changes in household structure on inequality. The first change derives from the fertility decline of the early 20th century that resulted in much smaller households. The other change is the emergence of pensioner households in the 1950s. We demonstrate that the fertility transition this had a negative impact on income inequality in *per capita* or per adult equivalent terms. To explain, over the period the variance of the number of

people per household declined markedly. One might expect this to have lowered, *ceteris paribus*, inequality in income *per capita* and it did. In contrast, the rise of the pensioner household after 1950, while continuing the decline in household size, also widened the lower end of the distribution of household per capita incomes.

We conclude that the evidence suggests little change in inequality among working households in our period, at least until World War 2. This steadiness in inequality is reflected in the huge decline in absolute poverty among workers over this period, see Gazeley and Newell (2011). We give evidence that this steadiness in inequality among working households is consistent with the evidence on earnings inequality that was held steady by offsetting movements in wage rate differentials and non-manual employment, among other things. We also highlight two sources of change, also pulling inequality in different directions, from the demographic side: fertility decline and the rise of the pensioner-headed household.

2. Context

It has been very well documented (see Atkinson and Morelli, 2014) that top income shares declined and the share of labour increased 1980-1961, see Table 1 for a summary. The only Gini coefficient series that stretches back before World War Two is the Blue Book series given in the final column of Table 1 (see, inter alia, Atkinson and Morelli, 2014). It is based on tax revenue statistics and has been extensively quoted. Given our findings it deserves a brief discussion here. A Gini of 42.6% is given for 1938, which contrasts to the much lower Gini coefficients just under 36% for the years after the war. We discuss the validity of this estimate in Section 4 below.

Subsequent to 1961 the path of economic inequality is very well-known, but worth briefly restating. Top income shares declined steadily to around 1979 but then increased fairly constantly until 2009 from whence they steadied, see Atkinson and Morelli (2014). The behaviour of the IFS household-based Gini was slightly different. At 26% in 1961, it stayed roughly constant until the very late 1970s and then grew throughout the following decade and reached 34% in 1992. Since then it has fluctuated around that figure, reaching a peak of 35.8% in 2007/8 before falling back a little. The 90/10 percentile ratio followed a similar path. About 60% of the rise in the 90/10 ratio between 1961 and 2007/8 was a rise in the 90/50 ratio. The other 40% of the rise was due to a rise in the 50/10 ratio. Turning to earnings, (see Atkinson

and Morelli, 2014) we observe a similar path to the top income shares of a long-period steady increase from around 1980 to around 2010. The 90/50 ratio stood at 167.6% in 1961, then at 171.3% and 173.8% in 1971 and 1981 respectively. By 1991 it had risen to 184%, then to 193.3% by 2001 and 200.4% by 2011.

Table 1. Indicators of inequality in the UK.

	1	2	3	4	5
	Share of top 0.1%	Share of top 1%	Share of income from employment	Share of income from employment plus self-employment	'Blue book' Gini coefficient: after-tax tax unit income
1890	.	.	54.2	76.4	.
1904	.	.	55.1	72.7	.
1913	11.2	.	54.7	73.0	.
1918	8.7	19.2	62.7	.	.
1937	6.6	17.0	61.8	75.2	42.6[1]
1953	2.8	9.7	65.9	75.5	35.8[2]
1961	2.3	8.4	68.2	77.2	35.6[3]

Sources: Cols 1, 2, and 5: Anthony B. Atkinson and Salvatore Morelli (2014) *Chartbook of Economic Inequality*, ECINEQ 2014 - 324 March; Cols 3 and 4, C.H. Feinstein (1972) *National Income, Expenditure and Output of the United Kingdom, 1855–1965*, Cambridge University Press, Table 18.
Notes. [1] 1938, [2]1954, [3] 1962.

3. Data

We employ five main surveys; The United States Commissioner of Labor survey (hereafter USCL1890/1); The Board of Trade's 1904 enquiry (BoT1904); the Ministry of Labour 1937/8 (MoL1937/8); The Ministry of Labour 1953/4 (MoL1953/4); and the 1961 Family Expenditure Survey (FES1961). These surveys have been documented several times recently. Full discussions are given in Gazeley, Newell and Bezabih (2015) for USCL1890/1, Gazeley and Newell (2011) for BoT1904 and MoL1937/8, and Gazeley *et. al.* (2016) for MoL1953/4 and FES1961, though a short description of these surveys is provided here to help make sense of the subsequent discussion.

USCL1890/1 was part of an international study of living standards among workers in up to eight export industries in America and Europe. It was undertaken to inform the tariff debate in the US. The UK sample of this survey comprises just over one thousand households working in export industries. BoT1904 was the first official large-scale UK survey and was

part of a larger Board of Trade investigation into the standard of living of urban workers across several countries. It served to allow the calculation of weights for the UK retail price index (Searle 2015). Originally, the survey covered around 2,000 working class households across a wide variety of working class occupations, though only about half this number are extant, with a fairly large proportion drawn from 'trades union lists.' By 1937/8 the Ministry of Labour had been separated from the Board of Trade and this survey stands as arguably the first national, official *and modern* household survey. It is taken from a stratified random sample of over 10,000 working class households, which were surveyed over 4 quarters in 1937-8. Only just over 600 are extant for each quarter, but Gazeley and Newell (2011) show that these are reasonably representative of the entire survey. The MoL1953/4 survey was the most comprehensive and ambitious of all of these surveys, and the FES series could be thought of as a smaller, stripped down version of MoL1953/4. It was based on a stratified random sample of nearly 13,000 households from the entire population, all of which are extant. FES1961 was a slimmed down version of MoL1953/4 based upon around 3,000 households. Table 2 summarises some salient features of these data sets. Of particular note are the variations in scope already discussed.

In Table 2 the two shifts in survey design and implementation discussed in the introduction are clear. The three earlier surveys concentrated on households in which at least one person was working. The 1904 and 1937/8 survey contain a few households where the head of household is not working, but the clear intention is to capture working peoples' households. The 1953/4 and 1961 surveys are much more comprehensive of the population and include non-working households. Similarly we record the shift in sampling methodology, from snowball to stratified random samples, between the 1904 and 1937/8.

In Table 3 we present some demographic and labour supply statistics from the surveys. First we note the fall in average household size of more than 1.5 people over this period of seventy years. This may reflect a number of trends, such as the decline of three-generation households, but the central cause is the reduction in completed family size that fell fastest in the second and third decades of the century (Coleman and Salt, 1992). Alongside the fall in average household size is the fall in the standard deviation of household size. Note that for MoL1953/4 and for FES1961 we report statistics for all households (Table 6, Columns 4 and 6) and for households where there is at least one worker (Columns 5 and 7). Clearly, for both surveys, households

with at least one worker are on average larger, but with lower variances. This is because of the greater proportions of one- and two-person households among non-working households.

The lower part of Table 3 shows a mild fall in the average number of workers present and the proportion of households with more than one worker. This proportion, which is available for all datasets, shows a fall from 56.7% in 1904 to 46.9% of working households in 1961. The lower number for USCL1890/1 is likely due to the industrial focus of the survey. In many regions of heavy industry, there was little work for women. For example the average labour participation rate of wives of the heads of households range from under 5 percent for heads who were coal and steel workers to over 20 percent for cotton and wool workers.

Table 2. Five large household expenditure surveys compared.

Survey	USCL1890/1	BoT1904	MoL1937/8	MoL1953/4	FES1961
Available number returns	1024	1025	623[1]	12806	3046
Income measure	Annual*	Weekly	N/A	Weekly	Weekly
Spending covered	Comprehensive	Food and rent	Comprehensive	Comprehensive	Comprehensive
Period of spending enquiry	1 year*	1 week	4 weeks in different quarters	3 consecutive weeks, staggered over a year	2 consecutive weeks
Target population	Workers in 7 export industries	Working class households	Working class households	Whole population	Whole population
Sampling method	Via firms	Principally via unions	Stratified random sample (SRS)	SRS	SRS

Notes: [1] the original 1937/8 sample collected was of 10,762 households. 623 were randomly chosen to be saved from destruction, see Gazeley and Newell (2011). * Probably weekly as figures are all multiples of 52.

Table 3. Demographic and labour supply statistics compared.

	USCL 1890/1	BOT 1904	MoL 1937/8	MoL 1953/4	MoL 1953/4[1]	FES 1961	FES 1961[1]
Household Size							
Mean	5.00	4.92	3.88	3.18	3.62	3.01	3.31
Std. dev.	1.93	2.22	1.66	1.52	1.45	1.56	1.52
Median	5	5	4	3	3	3	3
Number of Workers							
Mean	1.93		1.80			1.34	1.63
Std. dev.	1.17		1.15			0.96	0.81
Median	2		1			1	1
% with >1 workers	49.0	56.7	55.1	45.0	50.0	37.8	46.9

Notes: [1] Survey restricted to households with at least one worker present.

4. Inequality among working households, 1890-1960.

Appendix tables A1-A4 give detailed inequality estimates, without any adjustment for comparability, from each of our five surveys, using three commonly employed measures: the Gini coefficient, and the 90/50 and 50/10 percentile ratios. Throughout this section we use the OECD Modified equivalence scale to create per equivalent adult income and expenditures from the surveys.[2] This has the advantage of facilitating comparison with the IFS estimates of inequality for 1961 onwards. We report these measures across households, for both income and expenditure where possible, and then, weighting by family size, we offer a lower bound to inequality across individuals.[3]

In Table 4 we collect together results from these surveys, limiting each to households headed by a person in employment, referred to as 'working households'. Taken at face value, these surveys feature a marked rise in measured inequality in the later surveys. This raises two big questions. First, is the rise of measure inequality from the pre-WW1 studies to the later surveys a matter of changing methods and objectives, or was there actually a rise in inequality? Secondly, does the lack of a fall in measured inequality between MoL1937/8 and MoL1953/4 stand up to a detailed inspection of the groups included from each study? Recall this is a very

[2] The main results in this section are unchanged if *per capita* data or data normalised by other commonly used equivalence scales are employed.

[3] Two points here. First it is a lower bound because we implicitly assign equal portions of income/expenditure to all household members. Secondly, it may seem inconsistent to measure economic well-being as income or expenditure per equivalent adult, and then to estimate inequality *per capita* in that measure. In terms of inequality outcomes, though, it makes almost no difference at all.

different finding from the standard Blue Book series. In order to try to answer these questions, we work separately in two directions. First, for a comparison between pre-WW1 surveys and later surveys we perform restrictions on the MoL1953/4 survey, where we have enough information to perform this, to create subsamples of similar households to the earlier surveys. Secondly to investigate the path of inequality from the late 1930s to the early 1950s we turn to supplementing the MoL1937/8 data set.

One final observation to note is the mild rise of inequality between the 1953/4 and 1961 data sets. We hypothesise this is related to the changes in household demographics that we discuss in section 7 below.

Table 4. Inequality in equivalised (after-tax) income and expenditure among individuals in working households in five historical surveys, unadjusted for comparability.

Year	1890	1904[1]	1937/8[2]	1937/8[3]	1953/4	1961[4]
GINI-inc	18.8	20.9			24.3	24.7
GINI-exp	15.4		25.2	23.3	24.1	27.5
90/50-inc	1.59	1.57			1.73	1.68
90/50-exp	1.41		1.74	1.66	1.72	1.81
50/10 –inc	1.48	1.70			1.60	1.65
50/10-exp	1.43		1.78	1.79	1.58	1.62

Notes. [1]For 1904 we present results weighed by 1901 Census occupation weights (Halsey, 1995, table 2.1) for the 1937/8 survey, the results marked [2] are the averages of 4 separate weekly sets of statistics and thus more comparable with earlier surveys and the results marked [3] are calculated from data averaged over 4 weeks, and thus more comparable with later surveys. [4]Also note that the Gini coefficients and other statistics for 1961 are for working households only. If we include all households, which importantly includes households of retired people, we find an income Gini very close to the 26% given by the IFS series and mentioned in Section 2.

Turning to the first of these exercises, we select the MoL1953/4 sample in two ways. First we select industries covered in USCL1890/1 and occupations covered in BoT1904, as MoL1953/4 has excellent industry and occupation information. To adjust to USCL1890/1 we keep only managerial, manual and clerical workers working in Mining and Quarrying, non-Metalliferous Mining Products other than Coal, Metal Manufacture, and Textiles. This is as close as we can get to the USCL1890/1 concentration on metals, coal, coke, glass, wool and cotton. To compare with BoT1904 we exclude from MoL1953/4 workers working in agriculture, armed forces, the police and fire services, national and local government and professional services, as well as the following occupational groups: employers, professionals, managers and teachers. Our second restriction is to approximate the earlier snowball sampling methods. To do this we further

restrict attention to households where the head was a member of a trades union, as trade union contacts were certainly used to find respondents for BOT1904, and probably exploited for USCL.

Results are given in Table 5. It is clear that taken together, these two adjustments create much lower estimates of inequality in both cases for MoL1953/4, with Gini coefficients only about one half of a Gini point above that of the earlier survey. Bear in mind that the income and expenditure Ginis for working households in MoL1953/4 in Table 4 are both 23.5% and 23.3% respectively, while the income Ginis for USCL1890/1 and BoT1904 were 18.8 and 19.8 respectively. The first step of selecting similar groups industries or occupations does most of the reconciliation, well over half the gap in both the USCL1890/1 and BoT1904 cases. The second step of focussing only on union members, in order to reflect the sampling method, further reduces the gap by around one percentage point, leaving a gap of only half a percentage point in both cases.

Table 5. Adjusting MoL1953/4 to estimate income inequality in households selected and sampled in ways to make a near replication of the 1890/1 and 1904 surveys.

	1	2	3	4	5	6
	USCL 1890	MoL1953/4 adjusted to USCL selection	MoL1953/4 adjusted to USCL selection and sample	BoT 1904	MoL1953/4 adjusted to BoT 1904 selection	MoL1953/4 adjusted to BoT 1904 selection and sample
Gini	18.8	20.8	19.5	20.9	21.9	20.7
90/50	1.59	1.64	1.60	1.57	1.64	1.61
50/10	1.48	1.54	1.51	1.70	1.56	1.51

Notes: (1) In columns 2 and 5 we take subsamples of the MoL 1953/4 data set that correspond to the groups selected in USCL 1890 and BoT 1904. To adjust to USCL we keep only managerial, manual and clerical workers working in Mining and Quarrying, Treatment of Non Metalliferous Mining Products other than Coal, Metal Manufacture, and Textiles. This is a close as we can get to the USCL concentration on metals, coal, coke, glass, wool and cotton. To compare with BoT 1904 we exclude from MoL 1953/4 workers working in agriculture, armed forces, the police and fire services, national and local government and professional services, as well as the following occupations: employers, managers, professionals and teachers. (2) In Columns 3 and 6 we further restrict the MoL 1953/4 data to union members, who were the primary set of people interviewed in USCL 1890/1 and BoT 1904.

These results in Table 5 suggest, therefore, that the rise in measured inequality among surveyed households in the early part of the 20th Century is due mostly to changes in the methods of data collection. Note that in our estimation these restrictions in the sample did not reverse the rise in inequality: we have no evidence of a fall in inequality among working households.

Now we turn to the second question on the movement of inequality from the late 1930s to the early 1950s. For the MoL1937/8 data set we have other sources of household expenditure data. In particular, Massey (1942) documents a 1938/9 survey of middle class households. Given information on the relative prevalence of middle class and working households, the tables in Massey allow us to re-weight the MoL1937/8 data set, giving appropriately more weight to the higher income groups. This is carefully documented in Appendix 3. In addition we have Rowntree's (1941) extremely meticulous study of poor households in York, covering poorer working households, households headed by unemployed workers and households headed by non-participants in the labour market. Tables in Rowntree's study allow us to use these results for York to perform a similar re-weighting, putting more weight on the poorest households in the MoL1937/8.

These weightings permit three fairly exact pairwise comparisons of the situations in 1937/8 and 1953/4. These are reported in Table 6. The first comparison is between blue-collar workers' households, the second is for all households with a working head, in other words, white-collar workers are included. The third comparison adds households headed by unemployed and other non-working people. In all three cases, once we have made adjustments to ensure appropriate comparisons, a significant decrease in inequality emerges, of between one and two Gini percentage points, which is much smaller than the decline of almost seven Gini percentage points given in the Blue Book series in Table 1.

Table 6: Comparing like with like between 1937/8 and 1953/4

	Wage workers' households	All workers households	All households
MoL1937/8			
Gini	23.3	24.9	26.7
90/50	1.66	1.71	1.86
50/10	1.79	1.82	1.77
MoL1953/4			
Gini	22.0	23.8	25.0
90/50	1.64	1.70	1.73
50/10	1.58	1.60	1.69

All statistics refer to inequality in household *expenditure* per equivalent adult, among individuals.

The 1938 Gini estimate in Table 1 is taken from *Royal Commission for Income and Wealth* (1979). It was constructed from data on 10 million tax units from the Inland Revenue. The Royal Commission estimated there were actually more like 26 million tax units. As a

consequence, the Royal Commission added an extra 16 million tax units to the Inland Revenue statistics, and assumed all the additional units all had incomes below the income tax threshold income. This assumption caused their Gini estimate to be much higher than if they had taken the Inland Revenue data without modification, on the alternative assumption that that the missing households were a random draw from the population. We estimate that this alternative assumption would have generated a Gini for 1938 of around 34%. Indeed, we estimate that if only 20% of the missing tax units are assumed to have incomes above the tax threshold, then the estimated 1938 Gini would be around 36%, the same as the post-war estimates.

Which assumption is appropriate? To illuminate the issue, we note the income tax threshold of £250 per year, equivalent to around £5, or 100s a week, was a high but not extreme wage for a manual worker. Ainsworth (1949) finds 1938 upper quartile weekly wages for full-time men of 78s for time rates and 93s for piece rates. Thus 100s per week was clearly attained by a non-trivial fraction of blue-collar worker-headed households, as well as many professional and technical workers... We have no information as to why the Inland Revenue failed to receive returns from over 60% of tax units, but as we have shown, the extent to which the Gini is more than or less that the post-war level of around 36% is very sensitive to the assumption of the earnings of those who did not submit returns. It seems to us that to assume none of the missing tax units to have been in a higher income bracket implies we should think of the published 1938 Gini as an upper bound estimate.

The Commission themselves did not even commit to the direction of change (*op. cit*. p17) '…(these estimates) should not be interpreted as precise comparisons between 1938 and 1949 but as approximate indicators of a significant change in the distribution between these two years.'

Now we are in a position to state our findings. First, we find a higher level of inequality among wage-workers' households in 1937/8, with a Gini of 23.3% than in 1904, with a Gini of 20.9. This might be a real increase, but the 1937/8 survey was one of the first to adopt stratified random sampling and that the 1904 survey used a 'snowball' method. Gazeley *et. al*. (2016a) find that Gini coefficients estimated from 'snowball' samples of households are between one and four percentage points lower on average, *ceteris paribus*, than those generated from stratified random samples of households. This means that we might expect a rise in measured inequality between the two surveys of roughly the magnitude we find, just from the change of method.

Following on from that we find in Table 6 that 1953/4 Gini coefficients are between one and a half and three percentage points lower than those of 1937/8. Putting this all together we conclude the most likely path of household inequality from these surveys is of little change from 1904 to 1937/8 (though there may have been temporary changes as a result of the First World War), followed by a drop of between 1.5 and 3 percentage points though WW2. Additionally, that fall largely reflects a large contraction of the lower tail of the distribution, as evidenced by the movements in the 50/10 percentile ratio.

We summarise as follows. First, for predominantly manual worker households, after making adjustments to render estimates more comparable, we find little difference in measured inequality between either of the early turn-of-the century datasets and the 1953/4 data set. Secondly, When comparing 1937/8 data and 1953/4 data, we find the later dataset has lower inequality for manual worker households, but as we add white-collar and workless households, the fall in inequality disappears. Thirdly, when comparing the 1953/4 and 1961 data sets, we mostly find that the 1961 inequality measures are a little higher.

Thus, the simple takeaway is that the evidence from household surveys strongly suggests little or no movement in household per equivalent adult inequality over this period. One implication is, as Gazeley and Newell (2012) demonstrate, the large rise in average *per capita* real incomes over the period 'trickled down' the income distribution delivering major economic welfare gains to households of working people. Also, this stability is perfectly consistent with declining overall inequality due to a decline in top income shares. In the next sections we discuss how this stability arose from a set of forces pulling in different directions, some increasing, and some decreasing, inequality.

5. Wage inequality 1886-1960

We begin with the wage rates of manual workers. It is very well known that relative mean wage rates by skill declined in the first half of the century, (see Table 7). There are at least two possible reasons for this decline. Firstly, national industry-level wage negotiations, greatly extended during WW1, resulted in flat-rate wage rises, which lowered differentials during both WW1 and WW2, (Bowley 1921, Knowles and Robertson 1951, Gazeley 2008). This levelling was partially reversed after WW1, but not immediately after WW2, see Gazeley (2008) and

Table 7. Secondly, the extension of primary education to all in the 1918 Education Act. Goldin and Katz (2008, Table 1.1, p27) give evidence that years of schooling rose substantially by the 1930s, and they argue, for the US in particular, this extension of secondary education raised the productivity of less-skilled workers. The timing of the falls in the British differentials, though the wars, see Table 7, suggests the wage bargaining was important at least in the medium term, though this does not rule out an education effect.

Table 7. Weekly Wage Rate Differentials by Skill for Manual Workers in Selected Industries 1886-1949 (skilled/unskilled *100)

Industry	1886	1906	1913	1920	1924	1929	1938	1946	1949
Construction	160	158	150	116	132	132	133	125	124
Engineering	189	180	186	131	147	145	134	119	116
Shipbuilding	174	167	163	124	126	137	138	123	119
Railway	243	201	184	136	165	172	153	141	137
Woollen Textiles	172	159	143	128	135	135	140	119	124
Pig Iron	240	255	189	154	154	154	148	134	129
Vehicle Building	-	-	-	147	151	150	137	119	118

These data refer to: bricklayer/labourer (Leeds), fitter & turner/labourer (Manchester), ships' fitter/labourer (North East Coast), engine driver/ labourer (Grade A Towns), wool sorter/combers (Yorkshire), furnace keeper/labourer (Cleveland) and vehicle body maker/labourer. See Appendix 2 for details of data sources.

This reduction in wage rate differentials seems in conflict with our findings in Section 4. There is, however, a long chain of connection between wage rate differential by skill and household incomes. Some key links in that chain connect wage rates to earnings. Examples include the extent of wage drift (plant or individual level wage supplements), overtime payments, and the prevalence of piece rates. In Table 8 we present the results of calculating inequality measures from four national earnings surveys 1886-1960. The movements between 1886 and 1906 in Tables 7 and 8 are different, which is perfectly possible, but we choose not to pursue that here, as our main concern in the early 20th century. After 1906 the two tables are consistent, with 1938 being a point when wage dispersion had not reached pre-WW1 levels, and some steadiness after 1938. However the changes in the Table 8 much smaller than those in the skill premia in Table 7. It is beyond us to try to piece together why wage rate skill premia move more than earnings inequality over the period, but the key effect of table 8 for this article is that it reports statistics that are both more relevant to and fit much better with, those from our household survey data.

Table 8 UK earnings inequality for full-time manual men, 4 national wage surveys 1886-1960

	1886	1906	1938	1960
Gini	15.0	17.8	16.8	16.6
90/50	1.43	1.57	1.40	1.45
50/10	1.46	1.50	1.48	1.42

Source: Ainsworth (1949), p41 and Department of Employment and Productivity (1971), Table 79.

Next we include non-manual employment in the discussion. Occupational data in Routh (1980, Tables 1.1 and 2.19) allow us to study how changes in mean wages by occupation, and changes in the occupational mix, impact upon the distribution of earnings. From these statistics it is possible to approximate the between-occupation portion of the variance of log earnings. Interestingly, this portion of the earnings variance changes little over the years, as shown in the first row of Table 9. The contribution of non-manual occupations to this variance increases gradually throughout the period, roughly in proportion to their share in employment.

Critically, non-manual occupations display significantly higher within-occupation variances. For instance, in the 1953/4 data, we find that white-collar occupations have very high earnings variances. For instance, among single-earner households the standard deviations of log earnings are 0.44 for professional workers, 0.53 for managerial workers, 0.40 for clerical workers and 0.38 for *all* manual employees. This leads us to hypothesise that the between-occupation log wage variance stayed roughly constant from before WW1 until the 1960s as a result of a balance between two main forces: declining manual skill premia and the rise of higher-inequality white-collar occupations.

Table 9. (A) Estimated between-group variance in log earnings, all workers, Great Britain 1913/14 to 1970 and (B) changes in the composition of Britain's workforce 1911-1971.

(A)	*1913-14*	*1922-24*	*1935-36*	*1955-56*	*1970*
Between group variance log earnings	0.426	0.420	0.420	0.420	0.417
% between non-manual	16.1	19.7	19.8	27.1	38.9
(B)	*1911*	*1921*	*1931*	*1951*	*1971*
Share of non-manuals in employment (%)	14.6	17.5	18.0	26.8	38.7

Notes: The estimated variance of log earnings is the between-group element of the overall variance, where the groups are 8 occupational categories, by gender, thus 16 groups. The group wages and weights are for slightly different years: 1911, 1921, 1931, 1951 and 1971 respectively. Data limitations required the approximation of mean log wage with the log of the mean wage for each group, so these are lower bounds for the variances. Source, Routh (1980, Tables 1.1 and 2.29).

To summarise. The evidence of declines in skill differentials is not inconsistent with our findings of stable household inequality. Two pieces of evidence support this statement. Firstly, measures of earnings inequality among manual workers fell much less than wage rate skill differentials, possibly due to a number of factors, such as wage drift, overtime working, changing skill mixes, or changes in the proportions of piece workers. Second, the growth of non-manual employment, which features much higher wage variance, would certainly help to offset the impact of declining manual skill differentials.

6. The influence of the demographic change.

First we use a simple decomposition of the variance of log household income per equivalent adult to unpack the role played by the large reduction in household size, visible in Table 3, on household inequality during this period (see Table 10). As household size decreased so did the variance of household size. This was the major contributor to the decline in the variance of (log) income per equivalent adult, though mildly offset of a rise in income variance. The fall in household size in the first half of the 20th century in Britain was largely due to falling fertility, see, for instance Gazeley and Newell (2011) for a discussion of how this contributed to falling absolute poverty. The post-WW2 baby boom would partially reverse this until the mid-1960s.

Table 10. Decomposing the change in the variance of log income per equivalent adult (Y/N) 1904-1953/4

	Var log Y/N	Var log Y	Var log N	-2*Cov
1904	.141	.137	.110	-.106
1953/4	.112	.151	.070	-.109
Δ 1953/4-1904	-.029	.014	-.040	-.003

Notes: Authors' calculations. The 1953/4 numbers differ from those presented in Table 4 as the sample is restricted to that comparable to the 1904 survey.

Also, at the end of our period, through the 1950s, another shift in household structures shaped the distribution of household income. As Gazeley *et. al.* (2016b) describe, there was a large increase in elderly households over that decade. They calculate that 11 percent of households in the 1953/4 survey were fully retired from work, while in the 1961 FES, 27.5% of households were pensioner households. In both surveys, Gazeley *et. al.* find the poverty rates of these

elderly groups were very high, around 36%, so an increase in their numbers is very likely to have raised inequality in the lower part of the incomes distribution, as we saw in Table 4. Gazeley *et. al*. (2016b) also document census evidence that between the 1951 and 1961 censuses, the proportion of elderly single person households rose from 4.7% to 7.4% of all households. This trend to smaller households continued to the end of century. In FES data the share of single-person households in all households doubled to just under 30% between 1961 and 1991. In summary, the large decline in numbers of children per household that occurred in the first half of the twentieth century served to reduce inequality between households. We also find that the large-scale emergence of the pensioner household after World War 2 is a likely cause of increasing inequality at the lower end.

7. Conclusions

Here we draw together the main messages of this work. First, after we adjust our surveys for comparability, we find only minor changes in economic inequality among working-class households 1890-1961. Thus we find no evidence consistent with the idea of a long period of equalisation of incomes, but we do find a modest fall in inequality through World War Two. Second, for working households overall, several important main offsetting proximate determinants seem to have been at work. On the income side, manual wage rate differentials by skill fell, during the two world wars, caused by the implementation of wartime wage policy. However, these falls translated into only minor changes in earning inequality and there was an offsetting increase in the preponderance of higher wage-variance white-collar jobs. Changes in household structure seem likely to have had two main effects. First, the decline in fertility of the early 20th century reduced household size and, with it, the variance of household size. Also, from 1950s onwards, a rise in pensioner households further reduced average household size, but also began to raise inequality among the lower income groups (Gazeley *et. al*., 2016b).

Thirdly, our finding of little or no reduction in inequality among our households does not challenge the results of the top income researchers. It does mean, however, that in the UK the overall reduction in inequality in the first 60 years of the 20th century was not reflected throughout the distribution. Fourthly, if we accept that the wage policies in wartime were responsible for equalising the wage rate of workers, then we note that there was a mild underlying upward drift in wage differentials through the 1920s and 1930s in the majority of industries in Table 7. This upward drift and the increasing preponderance of high wage variance

white-collar work seem to have combined with wartime wage gap narrowing to leave relatively little change in working household inequality from the turn of the century to the 1950s.

This paper also demonstrates that those wishing to utilise household expenditure evidence to investigate inequality, need to be cognisant of the survey method utilised to collect household income/expenditure data. We show that moving from snowball to random sampling has a measurable effect on the estimation of indices of inequality. This has important implications for the measurement of historic trends in inequality and potentially for international comparisons.

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Appendix 1

Table A1

1890 USCL, working households, Household Income/expenditure per equivalent adult (1024 households)				
Income	Households	People	Households (wage survey weights)	People (wage survey weights)
Gini %	18.9	18.8	17.1	17.5
90/50 percentile ratio	1.60	1.59	1.51	1.53
50/10 percentile ratio	1.48	1.48	1.44	1.44
Expenditure	Households	People	Households (wage survey weights	People (wage survey weights)
Gini %	15.6	15.4	14.5	14.8
90/50 percentile ratio	1.44	1.41	1.36	1.37
50/10 percentile ratio	1.42	1.43	1.41	1.44

1904 Department of Labour, working households, Household Income per equivalent adult (996 households)				
Income	Households	People	Households (weighted for occupations)[1]	People (weighted for occupations)[1]
Gini %	20.0	19.8	20.8	20.9
90/50 percentile ratio	1.54	1.56	1.58	1.57
50/10 percentile ratio	1.63	1.65	1.68	1.70

[1]For 1904 we present results weighed to reflect 1901 Census occupation weights (Halsey, 1995, table 2.1)

Table A2

1937-38 Ministry of Labour: working households: Household expenditure per equivalent adult, each household observed four times (n observations = 2496)

	Households	People
Gini %	25.1	25.2
90/50 percentile ratio	1.72	1.72
50/10 percentile ratio	1.78	1.79

1937-38 Ministry of Labour: working households, Household expenditure per equivalent adult average of 4 observations for each household. (n observations = 623)

	Households	People in households
Gini %	23.0	23.3
90/50 percentile ratio	1.64	1.66
50/10 percentile ratio	1.80	1.79

Table A3

1953-54 Ministry of Labour: working households, Household expenditure per equivalent adult
(n households = 9804)

	Households	People in households
Gini %	24.2	23.5
90/50 percentile ratio	1.72	1.70
50/10 percentile ratio	1.58	1.56

1953-54 Ministry of Labour: working households, Household income per equivalent adult (n households = 9804)

	Households	People in households
Gini %	24.4	23.5
90/50 percentile ratio	1.73	1.70
50/10 percentile ratio	1.60	1.58

Table A4

1961 Ministry of Labour: working households: Household expenditure per equivalent adult (n=

	Households	People in households
Gini %	27.5	26.9
90/50 percentile ratio	1.81	1.80
50/10 percentile ratio	1.71	1.61

1961 Ministry of Labour: working households: Household income per equivalent adult (n=

	Households	People in households
Gini%	24.0	23.7
90/50 percentile ratio	1.68	1.66
50/10 percentile ratio	1.65	1.65

Appendix 2

Sources of wage data in Table 2:

1886: General Report on the Wages of the Manual Labour Classes in the United Kingdom with tables of the average rates of wages and hours of labour of persons employed in several of the principal trades in 1886 and 1891, C.6889 (1893)

1886: Returns of Rates of Wages in the Principal Textile Trades of the United Kingdom, C.5807 (1889)

1906: Board of Trade (Labour Department) Standard Time rates of Wages in the United Kingdom at 1st October 1906, Cd 3245

1906: Earnings and Hours Enquiry. Report of an Enquiry by the Board of Trade into the Earnings and hours of Labour of the Workforce of the United Kingdom

Part I Textile Trades in 1906, Cd. 4545 (1909)

Part III Building and woodworking Trades in 1906, Cd.5086 (1910)

Part VI Metal, Engineering and Shipbuilding Trades in 1906, C.5814 (1911)

Part VII Railway Service in 1907, Cd. 6053 (1912)

1913: Standard Time Rates of Wages in the United Kingdom at !st October 1913, Cd.7194 (1914)

1920: Ministry of Labour. Standard Time Rates of Wages and Hours of Labour in the United Kingdom at 31st December 1920, Cmd 1253 (1921)

1929: Ministry of Labour Standard Time Rates of Wages and Hours of Labour in Great Britain and Northern Ireland at 31st August 1929 (HMSO, 1929)

1938: Changes from 1913 -1949 calculated from monthly reports on 'Changes in Rates of Wages and Hours of Labour" published in the Ministry of Labour *Gazette*, with 1920, 1929 and 1946 used to confirm benchmark. 1938 values are average for year. Figures for construction and railways from British Labour Statistics Historical Abstract 1886-1968 (1971), Table 9, pp 40-1

1946: Ministry of Labour and National Service. Time Rates of Wages and Hours of Labour 1st august 1946 (HMSO 1946)

1949: Ministry of Labour and National Service. Time Rates of Wages and Hours of Labour 1St October 1949 (HMSO, 1949)

Appendix 3, Re-weighting 1937/8

1. Adding white-collar workers to the 1937/8 data set. From Massey (1942) we have 4 income groups with average total weekly expenditures of 1632, 2081, 2733 and 3860 pence.

Annual Income group	>£250 to £350	>£350 to £500	>£500 to £700	>£700
Average weekly expenditure(pence)	1632	2081	2733	3860
Share of sample %	44.0	37.3	13.7	5.1
Estimated share of employment	10.5	8.9	3.3	1.2

From Routh (1980) the census share of Professional, Managerial and Clerical workers is 21.9% in 1931 and 27.8% in 1951. Linearly interpolating between those points gives a share of 23.8% for 1937/8. The estimated share of employment of each group (4th row) is calculated assuming only 100-23.8 = 76.2%. of the population are represented.

The 1937/8 data set has weekly expenditure percentiles as follows. Adjusting to include

percentile	1%	5%	10%	25%	50%	75%	90%	95%	99%
pence	309	428.	505	673.8	880.5	1199	1643	1963	2973
Adjusted percentile	.0076	0.038	.0762	0.190	0.381	0.571	.7908	.8714	.9618
weight	.762	.762	.762	.762	.762	.762	1.462	1.612	2.262

2. Adding the old and the unemployed from Rowntree's (1941) 2nd study of York. Rowntree presents distributions by equivalising households to a structure of a man, wife and three children. His equivalence scale is complicated. We present it and a simplified version in the next table

Rowntree's bare minimum income poverty line, in old pence (d.) net of rent

	Rowntree	Simplified	Simplified applied
Constant		168	
Single man	310		305
Single woman	255		260
Man and wife	383		397
Man, wife and child	457		447
Man, wife and 2 children	493		497
Man wife and 3 children	522		547
Each addition child	60	50	
Each extra woman	92	92	
Each extra man	137	137	

Source: B. Seebohm Rowntree (1941), page 30. 'Poverty and Progress: A second Survey of York', London, Longmans and Green.

Rowntree and his team applied this equivalence scale to each household budget, so that, for instance, a single woman earning 300d a week net of rent was recorded as having 300*522/255=614d of equivalised net income. He then set class boundaries for this equivalised net income, rising by 120d. (10s.).

Rowntree's equivalent income class boundaries and population shares in York

	Lower bound (d.)	% working class	% population
Class A	0	14.2	8.1
Class B	402	16.9	9.6
Class C	522	18.9	10.8
Class D	642	13.9	8.0
Class E	762	36.1	20.5
□		100.0	57

See Rowntree (1941) page 32.

Using the simplified version of the Rowntree scale we have

	Lower bound (d.)	% of households in MoL 1937/8	Weights required
Class A	0	6.5	2.18
Class B	427	11.0	1.54
Class C	547	12.7	1.49
Class D	667	16.5	0.84
Class E	787	53.3	0.68
□		100.0	57