

Income Inequality, Policies and Inclusive Growth



First Stage Report, May 2021

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FOREWORD

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Addressing inequalities has long been a priority for social, economic and place-based policies. This is particularly the case in the UK, where sub-national inequalities are particularly pronounced. So, while concern with inequalities is not new, the fact that the Covid-19 pandemic has seen an exacerbation of many inequalities, many of which had already been increasing, means that the issue has become more urgent.

This report from WMREDI and the WMCA, authored by Dr Maryna Ramcharan, is a timely contribution to the evidence base. It presents empirical analysis on income inequality, which lies at the centre of socio-economic debate. It uses a data source that is not often used: The Survey of Personal Incomes from HMRC. The particular focus of the analysis is on the West Midlands, but within a broader regional context.

There is something in this report for everyone concerned with inequalities in the West Midlands:

- It provides a brief introduction to the seminal literature on the nature of inequalities.
- It sets out the scale of income inequality.
- For those interested in sub-regional variations, it graphs median and median incomes at local level.
- For the statisticians, it measures inequality using the Gini Index and the Theil Index.
- It presents analyses by source of income, gender, age and industrial sector, and sets out the contributions each of these make to income inequality.
- It outlines relationships around income inequality with other policy domains.

Part of the contemporary focus on levelling up in the UK is about boosting living standards – particularly where they are lower and spreading opportunity. But levelling up is not a short-run or simple endeavour. The causal loop diagram presented in this report illustrates the complexity of the relationships around income inequality, including with economic growth, the labour market and poverty, and highlights how unequal life chances accumulate over the life course and are passed from generation to generation. This underscores the need for policy to address underlying structural challenges and not just interventions focusing on particular sub-groups in particular places (which obviously have a place too).

Executive summary

The UK has very high level of income inequality compared to other countries. Income inequality is entrenched across genders, ages, ethnicities, and regions, being accumulated during individuals' lifetimes and inherited by the next generation. Income inequality lies in the heart of many current problems and policies which society is focused on e.g., gender disparities, inclusive growth, social mobility, inequality in opportunities, and has complex relationships and strong associations with many other issues like health inequalities, poverty and unemployment.

This report examines income inequality in the UK at a regional level with a particular focus on West Midlands. This includes analysis of main metrics of income inequality at regional level, distribution of income across population percentiles in the West Midlands and initial approaches to understanding the drivers behind income inequality. The main metrics of income inequality throughout the report are calculated using annual gross income at individual level.

Methodology and limitations

The findings of this analysis must be seen in light of some limitations.

The first limitation is that the analysis is based on The Survey of Personal Incomes (SPI) 2016-17 and partially 2017-18 (the most up-to-date available at the time of writing) which is based on information held by Her Majesty's Revenue and Customs (HMRC) on individuals who could be liable to UK income tax. However, not all individuals sampled are taxpayers because the operation of personal reliefs and allowances may remove them from liability.

Where income exceeds the threshold for the operation of PAYE (that is, £11,500 for 2017 to 2018), the SPI provides the most comprehensive and accurate official source of data on personal incomes. However, as HMRC does not hold information for all people with personal incomes below this level, the SPI is not a representative data source for this part of the population and no attempt has been made to estimate the number of cases below the tax threshold or the amount of the incomes.

The second limitation is that SPI provides rather limited number of individuals' characteristics and do not necessarily allow analysis of all social groups of interest. Thus, it does not have data on individuals' marital status, ethnicity, household composition, types of tenure and many other valuable information.

The third limitation is that due to intricacy of links around income inequality and the dynamic interdependency, which is hard to define, this report is focused on key dimensions only and so will not cover all the relevant factors due to the complexity involved.

Key findings

The distribution of gross income in the West Midlands is highly unequal. 72% of people have a total income below the regional average: 7 out of 10 are below the average of £23,200 (the national average is £24,400).

The West Midlands is the 5th most unequal region measured by the GINI index following London, South East, East of England and Scotland.

Median gross income ranges from £2,035 per annum at the bottom 10% of individuals, to £137,430 per annum at the top 10%. Higher incomes tend to be accompanied by higher inequality and bigger gender pay disparity.

Human health and social work activities, Education and Wholesale and retail trade are the top three industries for female employment in the West Midlands.

Men are wealthier than women, but at lower income there is greater equality. Disparity happens at the higher income where 8 out of 10 of the richest people are men. But there is more inequality within the income of men than between genders and inequality between males contributes more to the overall inequality.

People get richer in their middle age and the older people are the more unequal the incomes. But this divergence is set early in life and continues to diverge, suggesting the other income is set by inheritance or differences in individuals' backgrounds early on. Middle-age inequality contributes most to the overall age element of income inequality.

Employment is the main source of income, but for the richest it is other sources of income (financial investments, property and dividends), that makes them rich. Older people rely mainly on occupational pension as their main source of income.

Poorer areas have less inequality and richer areas are more unequal, skewed by very high outliers. Kenilworth and Southam, Stratford on Avon, Bromsgrove, Sutton Coldfield, Warwick and Leamington are the top 5 unequal Parliamentary constituencies in West Midlands where high values of income are accompanied by high inequality.

The sector which people work in is the largest of the four dimensions – source, gender, age, and industry – in terms of the contribution to inequality, with significant inequality within the sectors as well. High employment sectors contribute most to inequality, but some sectors have significant within-sector disparity, often ones dominated by sole traders and entrepreneurs.

Income inequalities have been worsening during the current Covid 19 crisis. Two thirds of the occupations most affected by lockdowns earn lower wages and those occupations were best suited for homeworking are typically on higher wages. It means that those who are on lower income have been hit harder. This will increase existing income inequalities, worsening the current highly skewed pattern of income distribution.

Conclusions

Differences between individuals within each social group – Genders, Age, Main Source of Income, and Sector of Employment – are much greater than differences between social groups, no matter how they were classified. There is scope for skills policy to address some of the issues that particular individuals face. But the scale and entrenched nature of the inequalities highlighted in the analyses highlight the fundamental importance of addressing structural variations that are manifest in place, with labour markets and housing markets sorting individuals into particular regions and local areas. This means that policy needs to tackle demand-side issues relating to the nature of jobs, other opportunities and access to services that underlie some places being worse off than others.

Since most people rely on pay income as their main source of income and it is pay income inequality contributing most to overall inequality, reducing inequality here can go a long way in reducing overall inequality.

Individuals, especially females, who are employed in the most unequal sectors crosscutting with the sectors hit hardest by Covid 19 are particularly disadvantaged in the current crisis and may particularly struggle to recover. These sectors include:

Arts, Entertainment and Recreation

Accommodation and Food Service Activities,

Administrative and Support Services Activities,
Human Health and Social Work Activities, and
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles.

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Introduction

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The analysis is based on The Survey of Personal Incomes (SPI) 2016-17 and partially 2017-18 (the most up to date available at the time of writing) which is based on information held by Her Majesty's Revenue & Customs (HMRC) on individuals who could be liable to UK income tax. It covers individuals liable to UK income tax (taxpayers) and their incomes, and contains information on individual characteristics, such as the industries that individuals work in, the main source of income they rely on, their gender and age etc.

The SPI provides comprehensive and accurate official source of data on personal incomes where income exceeds the threshold for the operation of PAYE (£11,000 for 2016-17). However, as HMRC does not hold information for all people with personal incomes below the tax threshold, the SPI is not a representative data source for this part of the population and no attempt has been made to estimate the numbers of cases below the tax threshold or the amount of their incomes.

The SPI determines types of income covered by this analysis; they include:

- Pay income
- Occupational pension
- Sole trader
- Partnership
- Other incomes
- Claims case

The main metrics of income inequality throughout the report are calculated using Annual gross income at individual level while main types of income disaggregation above used in analysis of income distribution across percentiles and in Theil index decomposition analysis.

Due to complexity of links around income inequality and their dynamic interdependency, which is hard to define, this report is focused on key dimensions only and so will not cover all relevant factors due to the complexity involved. Another tension in the scoping of this analysis is caused by paucity of individuals' characteristics available from the data source used.

1. Why income inequality is important?

Income inequality lies in the heart of many current problem-policies which society is focused on e.g., gender disparities, inclusive growth, social mobility, inequality in opportunities, and has complex relationships and strong associations with many other issues like health inequalities, poverty and unemployment.

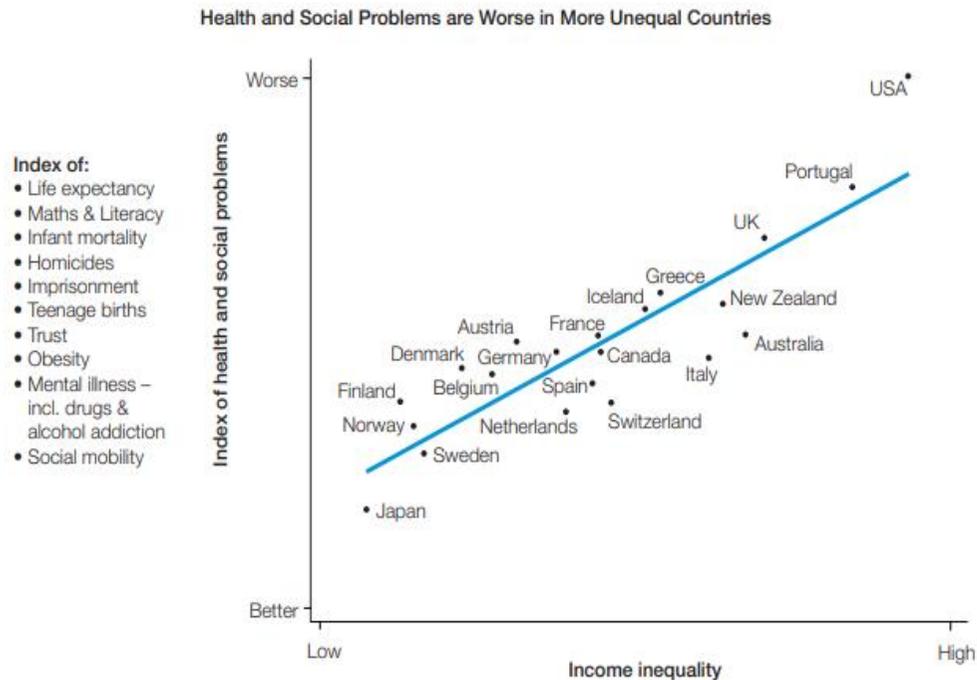
Many of these issues were spotted by Sustainable Development Goals (SDGs) and Inclusive Growth policies which are heavily exploited by national and regional authorities e.g. OECD etc. We list income inequality importance from the perspective of sustainable economic goals listed in the West Midlands Local Industrial Strategy:

1. Income Inequality and Gender Equality.

An [International Monetary Fund' study analysis](#) links between these two phenomena internationally —inequality of income and that of gender. It finds that gender inequality is strongly associated with income inequality across time and countries of all income groups. There are at least three reasons why higher gender inequality is associated with higher income inequality:

- First, inequality of opportunities, such as unequal access to education, health services, and finance are prevalent between men and women, and are strongly associated with income inequality.
- Second, women are more likely to work in the informal sector, in which earnings are lower, which widens the gender earnings gap and exacerbates income inequality.
- Finally, gender wage gaps directly contribute to income inequality, and higher gaps in labour force participation rates between men and women result in inequality of earnings between sexes, thus creating and exacerbating income inequality.

2. Income Inequality and Health Inequalities.



Source: Wilkinson and Pickett, 2009a

Figure 1. Correlation between inequality and index of health and social problems

Rowlingson (2011) examined whether or not there is a link between income inequality and health and social problems by reviewing a number of major studies, including the Whitehall Studies (Marmot, et al., 1978, Marmot and Shipley, 1996 cited by Rowlingson, 2011), alongside major reviews of the social determinants of health (Department of Health and Social Security, 1980; Townsend, et al., 1986 cited by Rowlingson, 2011), which have demonstrated a clear link between socio-economic background (such as income or occupation) and health. The most recent of these, the Marmot Review, found that in England, people living in the poorest neighbourhoods will, on average, die seven years earlier than people living in the richest neighbourhoods. These health inequalities are not just limited to life expectancy but also infant mortality, mental health, physical health and so on.

Wilkinson and Pickett (2009a) in their book *The Spirit Level* brought together a range of research in the field over the past 30 or so years to argue that there is a relationship between income inequality and social problems among countries over a certain income threshold (see below). The argument was, therefore, that even among relatively wealthy societies (i.e. those above this threshold), those with greater levels of income inequality fare worse on a range of social indicators. As well as looking at the impact on different health and social problems individually, Wilkinson and Pickett also formed an index of health and social problems, with each item carrying the same weight. This index showed no correlation with average income in wealthy countries, but a strong correlation with income inequality (see Figure 1). The UK is 3rd most unequal countries with high combined index of health and social problems after USA and Portugal according to this study. The same was also true of US states. They also carried out similar analysis, with similar findings, for UNICEF's index of child well-being.

3. Income Inequality and Poverty

Inequality and poverty affect each other directly and indirectly through their link with economic growth. Growth, if any, has disproportionately benefited higher income groups while lower income households have been left behind. This long-run increase in income inequality not only raises social and political concerns, but also economic ones. It tends to drag down GDP growth, due to the increasing distance of the lower 40% from the rest of society. Lower income people have been prevented from realising their human capital potential, which is bad for the economy as a whole [21].

[The research of LSE, Double Trouble](#), which was commissioned by Oxfam, shows that a positive correlation between income inequality and income poverty in the UK can be clearly established. Statistical analysis found that, on average, during the last 50 years a one-point increase in income inequality - as measured using the Gini coefficient – was associated with an increase in relative poverty of 0.6 percentage points. Such correlation is empowered by many underlying mechanisms such as unequal distribution of economic growth, less social mobility etc.

4. Income Inequality and Unemployment

Income Inequality also affects unemployment, including youth unemployment through underlying mechanisms of passing inequality through generations and less opportunities in education, resulting in children inheriting career paths from their parents.

[The study, which was carried out by researchers from the Department of Social Science at the Institute of Education \(IOE\)](#) in collaboration with the University of Bath compared the long-term effects of social disadvantage, as captured by growing up in a jobless household, across European countries. The study looked at two large data samples involving over 60,000 people in 16 countries. The study used the commonly used indicator of social exclusion, the experience of a jobless household at age 14/15, to capture the experiences of childhood deprivation. The researchers looked at the link between this and education, worklessness and poverty in adulthood across countries. In the UK, Belgium and Ireland, there appears to be a strong association between childhood deprivation and all three outcomes. In these countries, children who live in a jobless household at 14 are 16 to 25 percent more likely to be at risk of poverty compared to those with an employed parent.

5. Income Inequality and Quality Education

“Socioeconomic achievement gap” — a disparity in scores on tests of academic achievement between students from high- and low-socioeconomic status (SES) backgrounds [A. Chmielewski]

Wealth and income largely define the educational gap today. The growth of the socioeconomic achievement gap appears to be largely because more affluent parents are increasingly investing more time and money in their children’s educational enrichment—and at earlier periods in their children’s lives—than hard-pressed low-income and middle-class families (Kornrich and Furstenberg, 2013). Indeed, surveys show that the amount of time and money parents invest in their children has grown sharply over the past four decades among both affluent and non-affluent parents. But the increase in these investments has been two to three times greater among high-income families. Economists Richard Murnane of Harvard University and Greg Duncan at the University of California-Irvine find that

between 1972 and 2006 the amount high-income families spent on their children's enrichment activities grew by 150 percent, while the amount spent by low-income families grew by 57 percent (Duncan and Murnane, 2012). In part, parents are spending more on their children because they understand that educational success is increasingly important in today's uncertain economic times, a point that sociologist Marianne Cooper at the Clayman Institute makes in her recent book "Cut Adrift." (Cooper, 2014). But low- and middle-income families can't match the resources—both the money and flexible time—of the rich. As a result, rich and poor children score very differently on school readiness tests before they enter kindergarten.

6. Income Inequality and Economic Growth

Over the last decades, a large body of theoretical and empirical research attempted to determine whether inequality is good or bad for growth. Theoretical work has provided mechanisms supporting both possibilities, and the large [empirical literature](#) attempting to discriminate between these mechanisms has been largely inconclusive.

Alternative theories predict that inequality can affect growth in either a positive or negative direction. Greater inequality might reduce growth if:

- a. Greater inequality becomes unacceptable to voters, so they insist on higher taxation and regulation, or no longer trust business, and pro-business policies, all of which may reduce the incentives to invest (Alesina and Perotti, 1993). In extreme cases, inequality may lead to political instability and social unrest, with harmful effects on growth (Knack and Keefer, 2000).
- b. In presence of financial market imperfections, implying that the ability to invest of different individuals depends on their income or wealth level. If this is the case, poor individuals may not be able to afford worthwhile investments. For example, lower-income households may choose to leave full-time education if they cannot afford the fees, even though the rate of return (to both the individual and society) is high. In turn, under-investment by the poor implies that aggregate output would be lower than in the case of perfect financial markets.

The idea that higher inequality may result in under-investment in human capital by the poorer segments of society has also spurred a significant amount of research on the consequences of inequality on social mobility and the allocation of talents across occupations (Banerjee, A.V. and A.F. Newman, A.F., 1993, Fershtman et al., 1996, Checchi, et al., 1999, and Hassler et al., 2007).

On the other hand, greater inequality might increase growth if:

- c. High inequality provides the incentives to work harder invest and undertake risks to take advantage of high rates of return (Mirrlees, 1971; Lazear and Rosen, 1981). For example, if highly educated people are much more productive, then high differences in rates of return may encourage more people to seek education.
- d. Higher inequality fosters aggregate savings, and therefore capital accumulation, because the rich have a lower propensity to consume (Kaldor, 1956; Bourguignon, 1981).

7. Income Inequality and Responsible Consumption

Inequality directly affects consumption behaviour because it makes people want things. As social beings we are constantly rating ourselves against others. When the rich get richer and spend more on luxury items it also ratchets up everybody else's perception of what they need to have in order to gain respect in society, and have self-respect. As one Nobel prize-winning economist put it recently "trickle-down economics may be a chimera, but trickle-down behaviourism is very real." (Stiglitz, 2011). Professor Robert Frank, an economist from Cornell University in the US, has written extensively about how income and wealth at the top have set off "expenditure cascades." In his book, *Falling Behind: How rising inequality harms the middle class*, he explains that when individuals are asked whether they would rather have a 4,000-square-foot house in a neighbourhood of 6,000-square-foot mansions, or a 3,000-square-foot home in a zone of 2,000-square-foot bungalows, most people would rather have a smaller house but be relatively better off than their neighbours (Frank, 2007). Not only does growth in consumerism mean there is less cash in your pocket, it means you save less and get into more debt. The UK has a particularly high debt mountain: total UK personal debt at the end of August 2011 stood at £1,451bn in unsecured and secured loans (Credit Action, 2011). It has been found that the debt/income ratio rose from 45 in 1980 to 91.1 in 1997 and to 156.4 in 2007 (Lansley, 2009). The poorest are particularly vulnerable to debt, with one fifth of the poorest in arrears with one or two bills according to [The Poverty Site](#).

8. Income Inequality and Sustainability of an economy

Income Inequality plays a vital role in how sustainable the economy is as disadvantaged groups of people in the bottom part of income distribution become most vulnerable at any economy shocks or crisis. In the current COVID-19 crisis two thirds of most affected occupations are in the lower wages as ONS data suggest (Figure 2). It means that those who are on lower incomes are being hit harder which will increase existing income inequalities worsening current highly skewed pattern of income distribution.

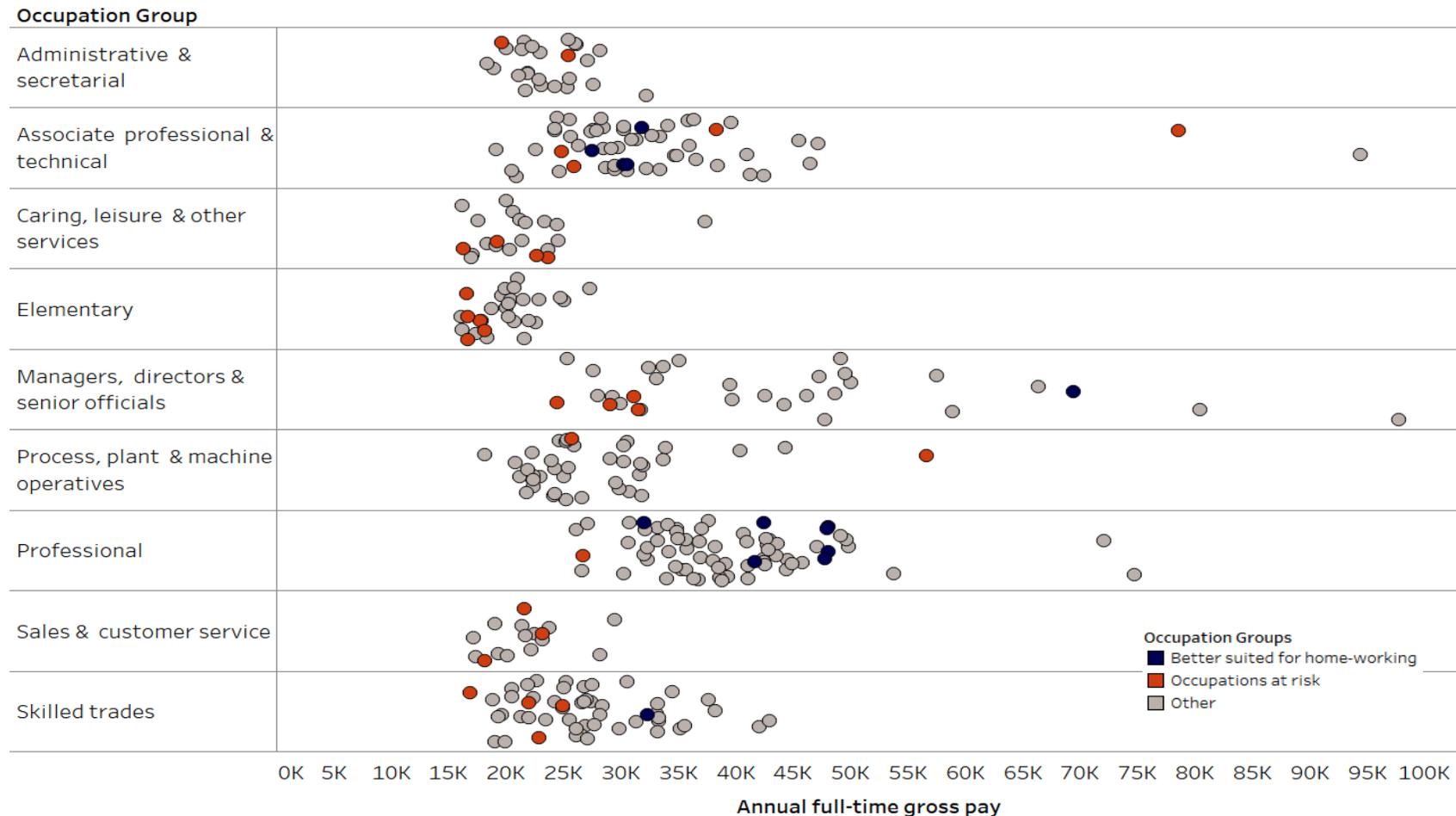


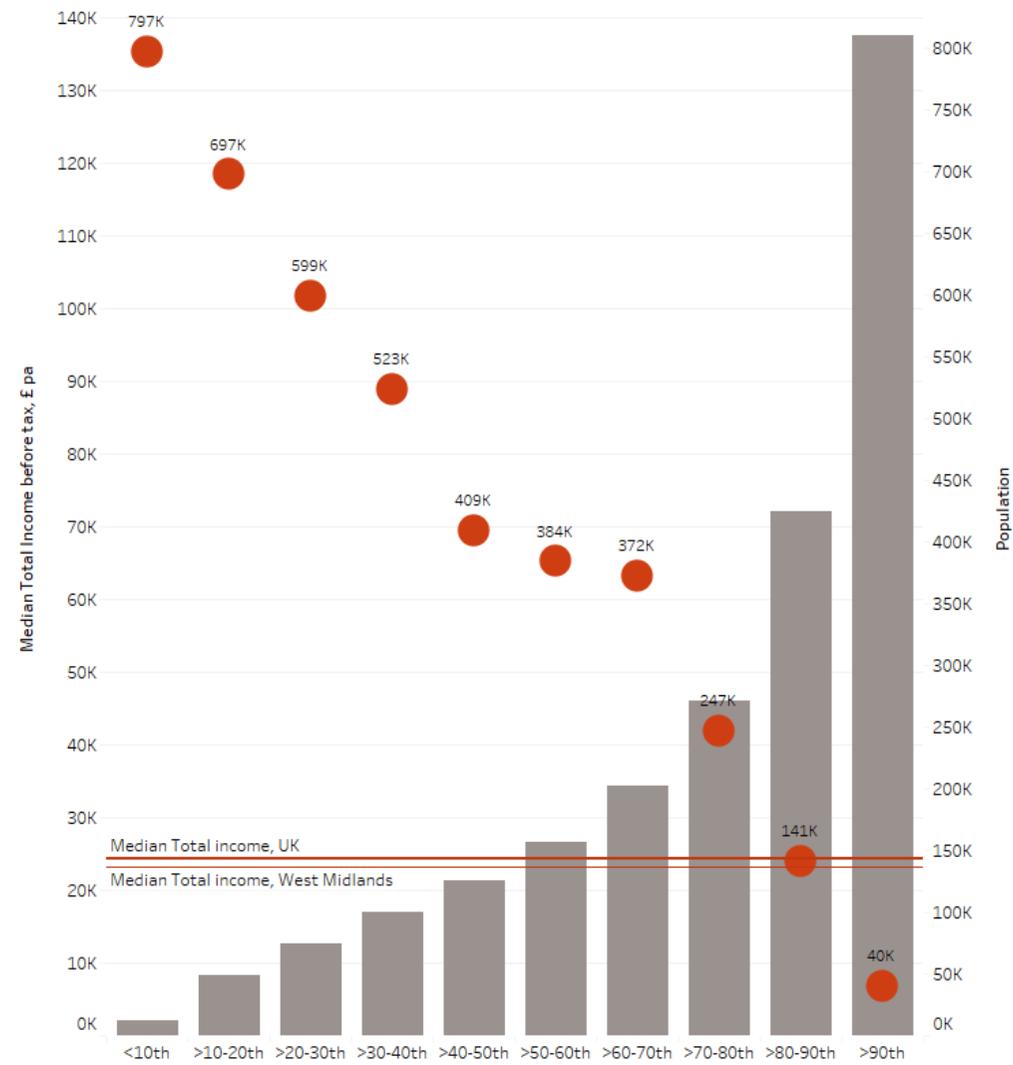
Figure 2. Annual gross pay across 3-digit SOC occupations*

Source: Author's elaboration of ONS data

***Occupations at risk** include those who are at risk of furlough or belong to directly affected sectors e.g. Air transport operatives, Air travel assistants, Aircraft pilots and flight engineers, Arts officers, producers and directors, Catering and bar managers, Chefs, Cooks, Customer service occupations n. e. c., Elementary sales occupations n.e.c., Hairdressers and barbers, Hairdressing and beauty salon managers and proprietors, Kitchen and catering assistants, Leisure sports managers, Leisure and theme park attendants, Librarians, Library clerks and assistants, Managers and directors in retail and wholesale, Other elementary services occupations n.e.c., Painters and decorators, Photographers, audio-visual and broadcasting equipment operators, Sales and retail assistants, Sales -related occupations n.e.c., Sports and leisure assistants, Sports coaches, instructors and officials, Train and tram drivers, Transport and distribution clerks and assistants, Waiters and waitresses

Better suited for home-working occupations: Authors, writers and translators, Graphic designers, Information technology and telecommunications directors, Information technology and telecommunications professionals n.e.c., IT business analysts, architects and systems designers, IT engineers, IT operations technicians, IT project and programme managers, IT specialist managers, IT user support technicians, Management consultants and business analysts, Research and development managers, Web design and development professionals

2. Analysis of Income Inequality in West Midlands



percentiles

Figure 3. Distribution of Total incomes and population across

Average Total income and population across percentiles

Most individuals (72%) in the West Midlands have total income below the average regional income (£23,200 pa as of Survey of personal income 2017-18 by HMRC¹). This means that 7 out of 10 individuals in West Midlands have total individual income below the regional average.

There are almost 800K people in the first percentile and only 40K people in the last one. Individuals in the bottom 10% of the population had on average a total personal income of £2,035 pa, whilst the top 10% residents had on average £137,430 pa.

The national average is slightly above the regional one accounting for £24,400 pa. and West Midlands follows a very skewed national distribution pattern due to the occurrence of some very high-income values.

This is also reflected by the substantial difference between the means and medians, which is a telling sign of skewed data distributions. While the mean is average income of individuals, the median is the income of an average individual – because the median is centred towards the middle of distribution and not as sensitive to outliers as the mean is.

Higher incomes tend to be accompanied by higher inequality as mean and medians data across Parliamentary Constituencies illustrate. The gap between median and mean income tends to magnify as the values of income increase across Parliamentary Constituencies of West Midlands, indicating there are really wealthy people in these areas whose high incomes the mean average is so sensitive to.

¹ Source: Survey of personal income 2017-18 by HMRC. The rest of estimates in this report produced on Survey of personal income 2016-17 data by HMRC unless otherwise is stated.

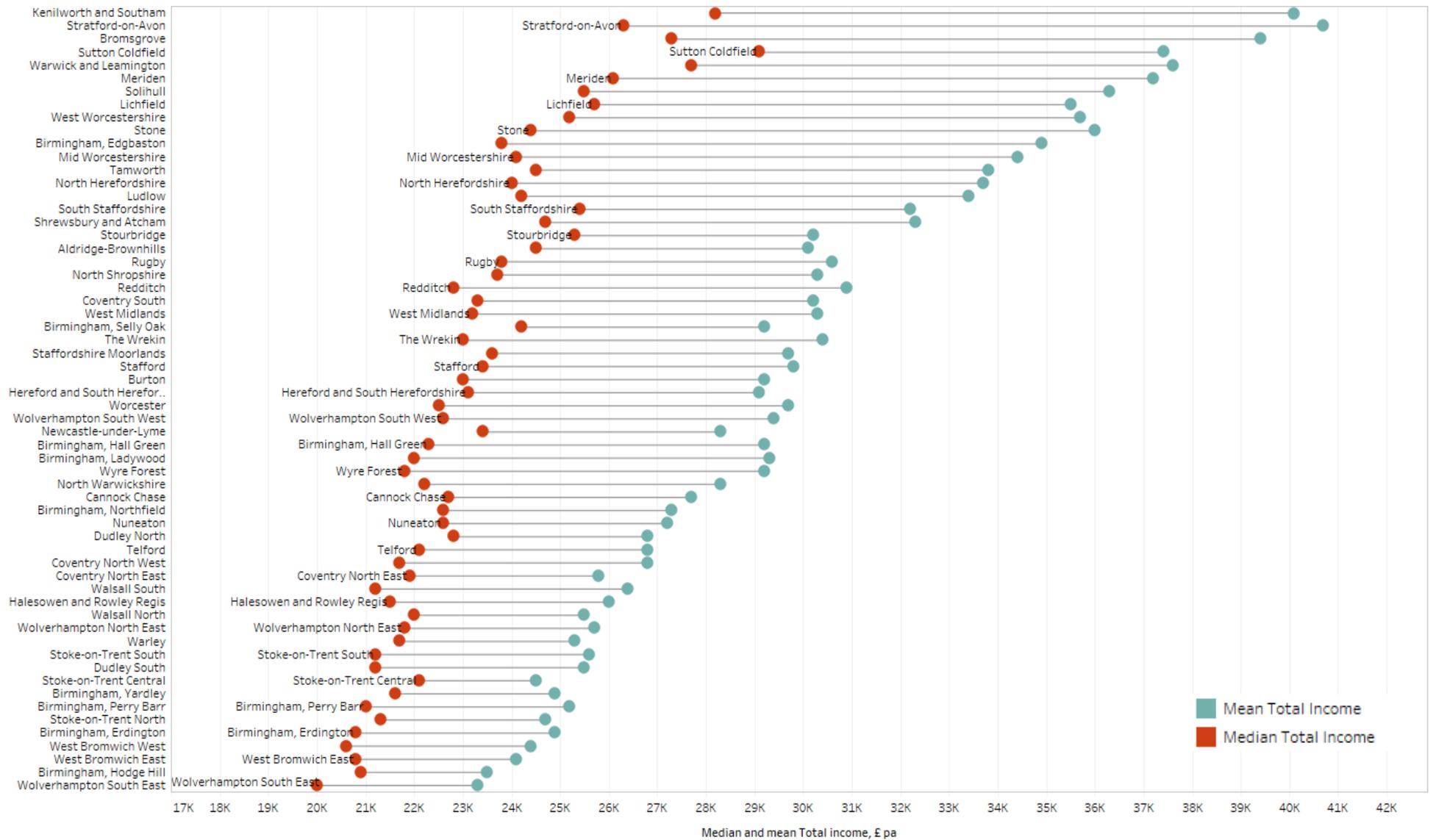


Figure 4. Median and mean Total income by Parliamentary constituency²³

² Source: Survey of Personal Incomes 2017-18 by HMRC

³ Incomes are allocated to parliamentary constituency according to the residence of the recipient.

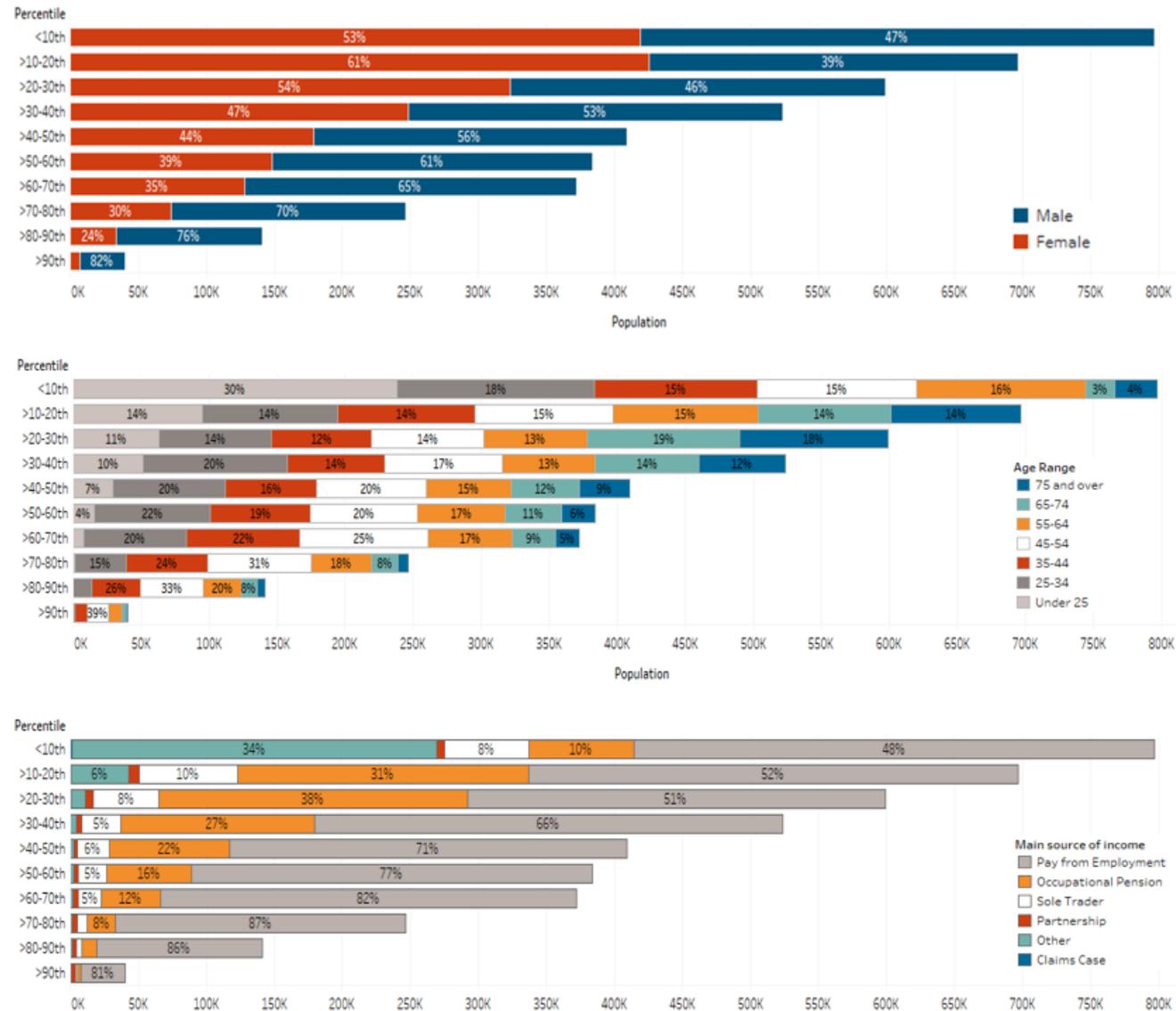


Figure 5 Percentiles' profiles by age, gender and main source of income

The graphs indicate that:

Men tend to be wealthier than women. There are almost equal shares of men and women in bottom percentiles with women numbering slightly more than men. The number of men increased from 39% in second percentile and grew steadily reaching 82% in last tenth percentile, meaning that 8 out of 10 individuals among the richest people in West Midlands are males.

People tend to get richer in their middle ages. Age ranges represented almost ideally equally in bottom percentiles with middle ages of 45-54 years dominating among tops with smaller shares of people younger 35 years and older 65 years.

Employment is the main source of income for people across all percentiles followed by 'Other' source of income for the poorest, 'Partnership' for the richest and 'Occupational pension' for the rest of people in the region.

Income Inequality across regions: Gini Index, Lorenz Curve and Theil Index

The West Midlands ranks number 5 for most unequal UK regions for Gini Index following London, South East, Scotland and Eastern. Gini Index is the most common measure of inequality. Inequality on the Gini scale is measured between 0, where everybody is equal, and 1, where all the country's income is earned by a single person and Gini Index is calculated from Lorenz Curve which graphically describes inequality. The higher the Gini Index is and the curlier the Lorenz curve is the more inequality present in society.

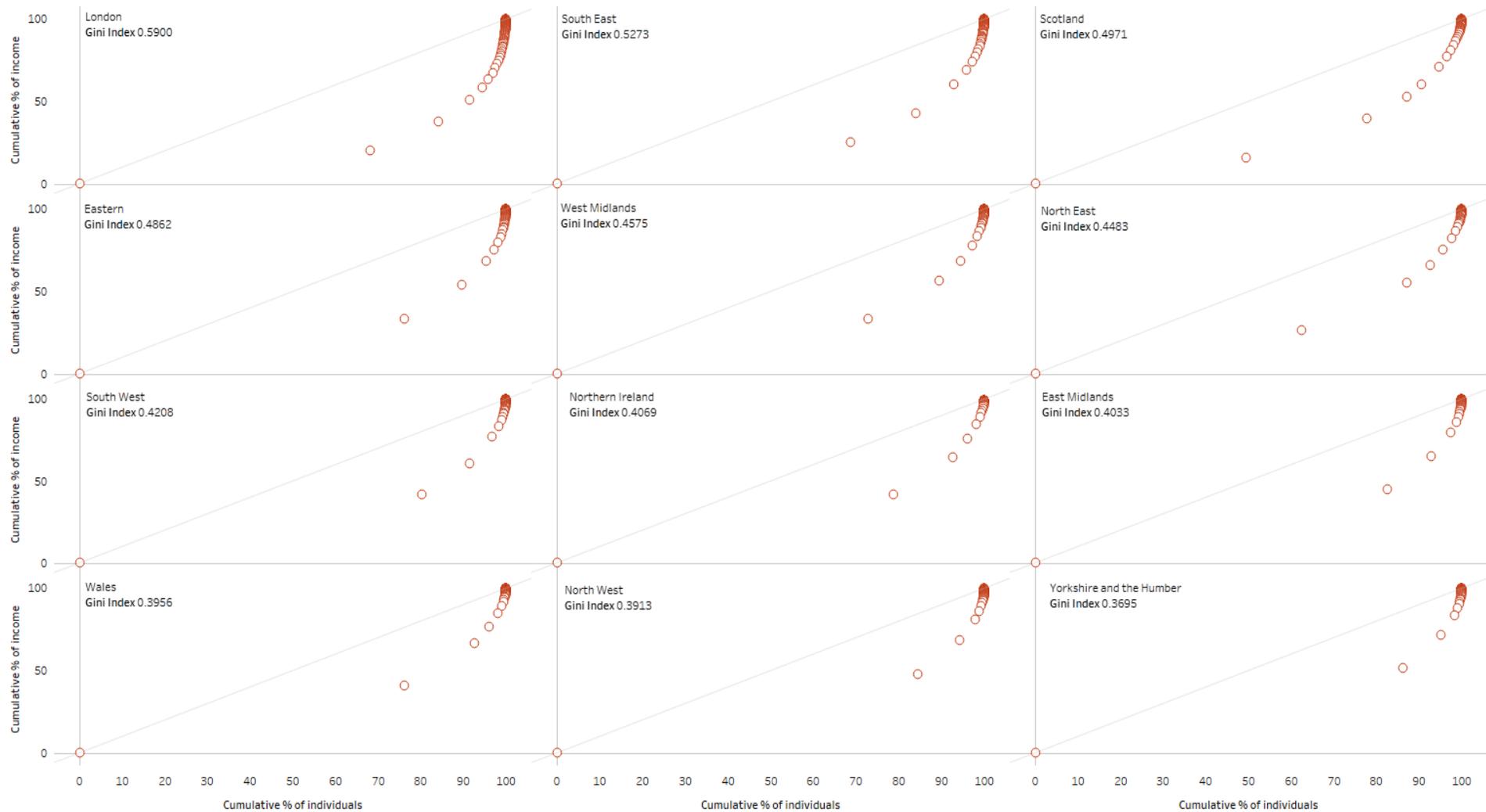


Figure 6 Gini Index and Lorenz Curve across regions

The Theil Index measures inequality by the extent to which an actual society deviates from perfect equality and is based on computing for everyone the ratio of their income share to their population share. The Theil Index ranks West Midlands at the same 5th place and unlike Gini Index allows us to decompose inequality to inequality within population groups, and between population groups, and helps answer questions about possible drivers behind inequality. Differences in ranking between the Gini and Theil Indices are explained by nuances of each metric e.g. sensitivity to outliers.

London	South East	Scotland	Eastern	West Midlands	North East	South West	Northern Ireland	East Midlands	Wales	North West	Yorkshire and the Humber	London	South East	Eastern	North West	West Midlands	South West	Yorkshire and the Humber	East Midlands	Scotland	Northern Ireland	North East	Wales
0.5900	0.5273	0.4971	0.4862	0.4575	0.4483	0.4208	0.4069	0.4033	0.3956	0.3913	0.3695	0.9277	0.7446	0.7105	0.6308	0.6103	0.6038	0.5941	0.5938	0.5597	0.5551	0.5347	0.5172

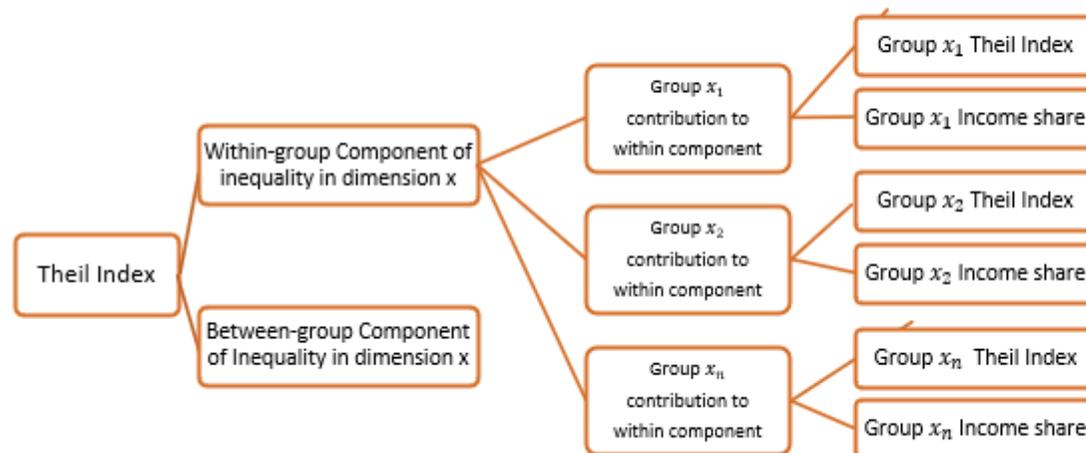
a. Gini Index

b. Theil Index

Figure 7 Gini Index and Theil Index across regions

Understanding factors behind inequality in West Midlands

Understanding factors behind inequality in West Midlands



Theil Index decomposition schema

If the population is divided into several groups such that everyone belongs to one and only one group, the property of decomposability is that the overall inequality can be expressed as a sum of two terms capturing within and between group inequality. The former (Within-component) indicates how much inequality is due to variations between individuals in each of these groups. The latter (Between-component) quantifies how much inequality is due to differences in the average incomes of each group.

Theil index decomposition was performed by four dimensions in this analysis (Figure 9). These dimensions are socio – demographic characteristics available in the Survey of Personal Income:

- o Sex

- Age
- Main source of income
- Industry

Theil Index decomposition attests that (more at Figure 8):

- The lowest inequality (4.3% of overall inequality) is explained by differences between genders and maximum inequality (10.4% of overall inequality) caused by differences between industries.
- Although some groups are more unequal, they contribute less to overall inequality because group contribution also depends on income share which in turn is product of group total income and the number of individuals in this group.
- Industries which are directly hit by Covid-19 lockdown are among the most unequal ones

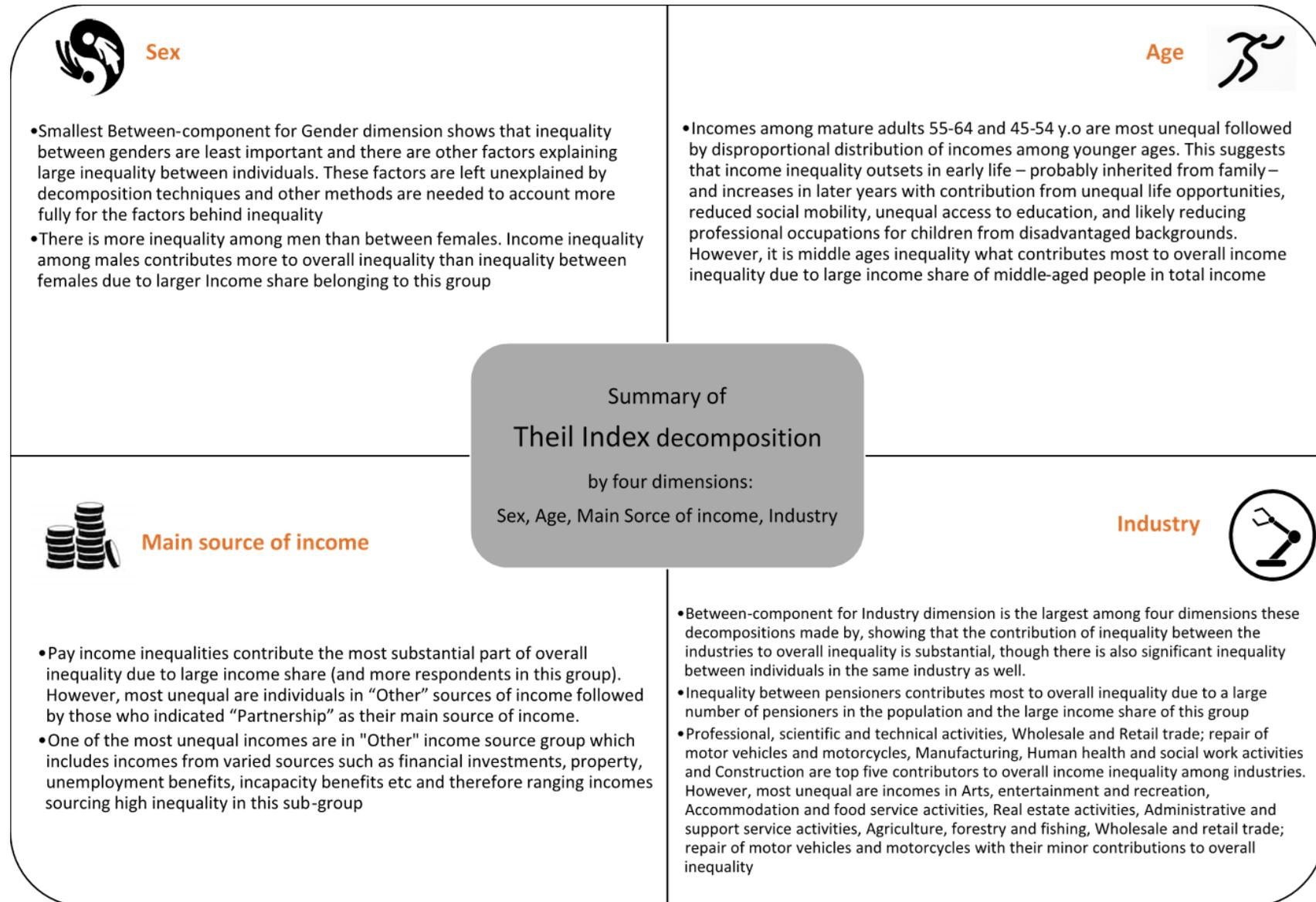


Figure 8 Summary of Theil Index decomposition

Sex	Group Theil Index	Group Contribution to Within component
Male	0.6454	0.4292
Female	0.4621	0.1548
Within-group component		0.5840
% contribution		95.7%
Between-group component		0.0263
% contribution		4.3%
Theil Index		0.6103

AGE	Group Theil Index	Group Contribution to Within component
under 25	0.4807	0.0108
25-34	0.5119	0.0563
35-44	0.4833	0.0987
45-54	0.5922	0.1803
55-64	0.6552	0.1297
65-74	0.5212	0.0535
over 75	0.4399	0.0256
Within-group component		0.5549
% contribution		90.9%
Between-group component		0.0554
% contribution		9.1%
Theil Index		0.6103

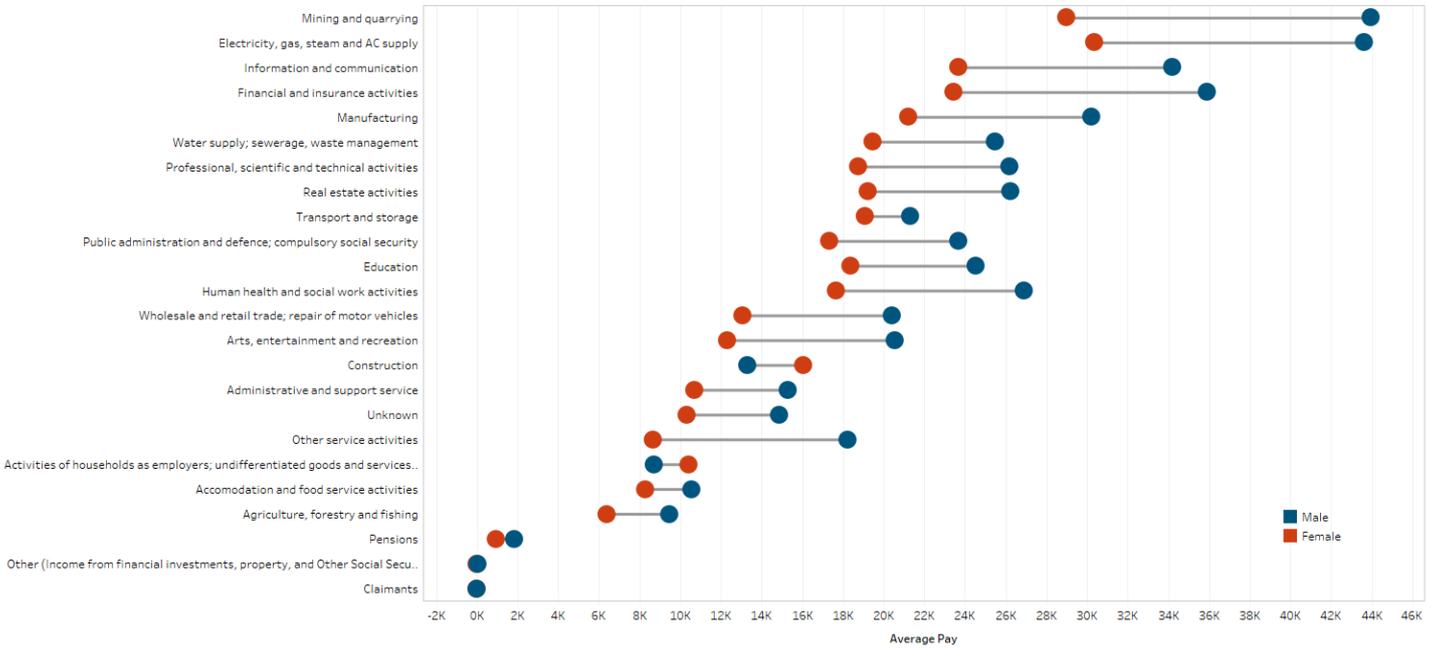
Main Source of Income	Group Theil Index	Group Contribution to Within component
Pay	0.5646	0.4280
Occupational Pension	0.3570	0.0433
Sole Trader	0.4954	0.0300
Other	1.3542	0.0167
Partnership	0.7711	0.0364
Claims Case	0.3026	0.0003
Within-group component		0.5546
% contribution		90.9%
Between-group component		0.0558
% contribution		9.1%
Theil Index		0.6103

Industry	Group Theil Index	Group Contribution to Within component
Income from pensions	0.5445	0.1084
Professional, scientific and technical activities	0.6154	0.0590
Wholesale and retail trade; repair of motor vehicles and motor cycles	0.6319	0.0578
Manufacturing	0.4860	0.0489
Human health and social work activities	0.4279	0.0412
Construction	0.5437	0.0349
Administrative and support service activities	0.6701	0.0281
Arts, entertainment and recreation	1.5917	0.0243
Unknown	0.7220	0.0212
Financial and insurance activities	0.5028	0.0211
Information and communication	0.3783	0.0188
Education	0.2809	0.0165
Transport and storage	0.4653	0.0141
Accommodation and food service activities	0.8100	0.0120
Other (income from financial investments, property, unemployment benefit, incapacity benefit, and Other Social Security benefits)	1.5309	0.0118
Real estate activities	0.6868	0.0078
Other service activities	0.5960	0.0069
Public administration and defence; compulsory social security	0.3194	0.0067
Agriculture, forestry and fishing	0.6345	0.0038
Electricity, gas, steam and air conditioning supply	0.2562	0.0019
Water supply; sewerage, waste management and remediation activities	0.3679	0.0014
Mining and quarrying	0.4100	0.0004
Claimants	0.4278	0.0001
Activities of households as employers; undifferentiated goods and services-producing activities of households for own use	0.2794	0.0001
Within-group component		0.5471
% contribution		89.6%
Between-group component		0.0632
% contribution		10.4%
Theil Index		0.6103

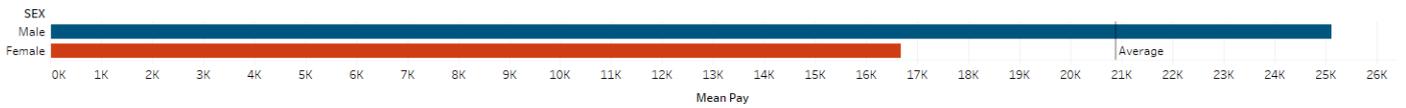
Figure 9. Decomposition of Theil Index of West Midlands for pre-tax total personal income by four dimensions: Sex, Age, Main source of Income and Industry

Gender income disparities

Gender Pay Gap across Industries



Gender vs Average Pay



Industries where females are employed

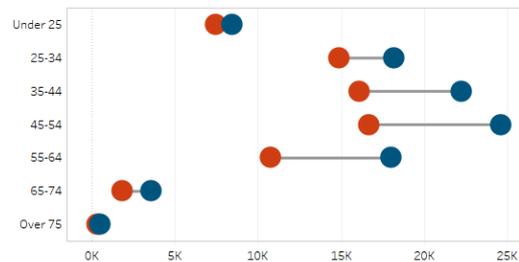
Females' salaries are lower than males' across all industries except Construction and Activities of households as employers; undifferentiated goods and services-producing activities of households for own use. The biggest Pay gap are in Mining and quarrying, Electricity, gas, steam and AC supply, Financial and insurance activities, Information and communication, Other service activities and Human health and social work activities



There is more Gender Pay disparity at higher income level compared to bottom level: gender pay gap of £14,960 for Mining and quarrying, £13,269 for Electricity, gas, steam and AC supply and £3,066 for Agriculture, forestry and fishing, £2,273 for Accommodation and food service activities

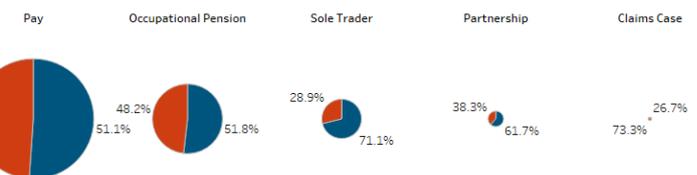
Top three industries for females employment are Human health and social work activities, Education, and Wholesale and retail trade; repair of motor vehicles.

Gender Pay Gap across Ages



Pay gap expanding within age - after 25-34 y.o. Gender Pay Gap amplifies at every subsequent age range and abridges only after 55 y.o. Given that the average age of first-time motherhood for women is 29 y.o. (according to ONS), does increasing pay gap reflects women' loss for maternity due to possibly losing skills & wages and slowing down in career ladder?

Main Source of Income



Of all people who rely on occupational pension as a main source of income, 48% are women and 52% are men. Among business people there are 38% of women receiving income from Partnerships, and there are 29% of women who have Sole Trader income as a main source of their income. These proportions might reflect less economic activity of women or their inclination to demote risks. There are 73% of women who rely on benefits as their main source of income.

3. Understanding drivers behind income inequality: Causal Loop Diagram

The Causal Loop diagram illustrates interrelationships around Income Inequality and its main satellites (Figure 11).

There are six main nodes in the diagram, which are Income Inequality, Poverty, Economic Growth, Government Interventions and Crimes. The reasons for the above nodes to be included into consideration are

1. Economic Growth is the outcome of economy and it is the means we can improve quality of life and standards of life. It is important therefore to understand how income inequality effects economic growth.
2. Government Interventions are one way how income inequality can be reduced.
3. Labour market drivers were included as employment and pay income were spotted in the previous analysis as one of the influential drivers of income inequality with pay inequality significantly contributing to overall income inequality.
4. Poverty. As income inequality might be reduced by increasing the incomes of the poorest, poverty and its relationships with income inequality is worth to be analysed.
5. Crime – this was included into the diagram for explanatory purposes.

The relationships between them pictured in the diagram are extracted from previous research papers, empirical estimations and theoretical foundations of these relationships. However, the relationships pictured in the diagram are extremely simplified and provide only rough interrelationships streams between variables due to very high complexity and multifaceted links between them.

Economic Growth

The relationships between **Income Inequality and Economic Growth** are complex and dynamic and the link between them doesn't appear to be direct (Keeley, B., 2015). Economist Richard Freeman (Freeman, R. B., 2012) argues that inequality is good for economic growth – up to a point. But after that point, rising inequality means falling growth: “The few people with the skills or background to compete for the top jobs work hard”, according to Prof Freeman, “while everyone else coasts because they have little or no chance of reaching the top”. This argument makes the case for “optimal” inequality or, what some have called, “just right inequality” – not too little, not too much. Arguments like this underline the complexity of the link between inequality and growth. Not only is it a dynamic relationship, it's also – according to many economists – determined by the particular “shape” of inequality in each society. Thus, inequality can take different forms. Some societies may be divided between a rich elite and everyone else. Others may have relatively small numbers of rich and poor and a large middle class. These variations may determine the relationships between inequality and growth for two main reasons, according to researcher Sarah Voitchovsky (Voitchovsky, S., 2009). First, inequality may affect how different income groups *behave*. Second, it may affect how different social groups *interact*.

However, the idea that income inequality spurs economic growth through creating incentives is massively criticised as more research and empirical studies emerge.

Many research studies evidence negative impacts of inequality on economic growth, for instance econometric analysis based on harmonised data covering the OECD countries over the past thirty years (Cingano, F., 2014) suggests that income inequality has a sizeable and statistically significant negative impact on growth, and that redistributive policies achieving greater equality in disposable income has no adverse growth consequences. Moreover, it suggests that it is inequality at the bottom of the distribution that hampers growth. Additional analysis based on OECD Adults Skills Survey (PIAAC in French) data suggests that one key channel through which inequality negatively affects economic performance is through lowering investment opportunities (particularly in education) of the poorer segments of the population.

Felix Naschold (Naschold, F., 2002) highlights a few explanations on how inequality reduces economic growth:

Political economy. Inequality can be thought of as the difference between the mean and the median voter. The median voter will lobby for higher taxes on the rich, leading to a disincentive to save and invest, and thus reduce growth. This earlier political economy line of argument, while commonly cited, is not well supported through evidence. A more recent argument suggests that inequality creates political instability which leads to lower investment (Alesina, A. and Perotti, R., 1993) and more resources being wasted bargaining over the distribution of rents (Rodrik, D., 1997). Instability also reduces government's ability to react to shocks, and - in its more extreme form - leads to direct and opportunity costs due to violence (Bourguignon, F., 1998).

Economic factors. Economic factors of why inequality reduces growth centre around capital market imperfections and on the role of the poor, not only as beneficiaries but also as contributors to economic growth. Due to credit rationing, the poor often cannot afford the minimum initial investment in education or other investments, or cannot get insurance for their investments, even if they are profitable, since they lack collateral. Initial asset distribution has a negative effect on subsequent economic growth. According to (Birdsall et al, 1996) the poor's savings rate is exceptionally high if they can expect higher returns for their labour and investment. If the poor face greater incentives to invest/work their income will rise, national income will increase, and inequality will fall.

Social factors. Social inequality may create self-fulfilling expectational equilibria with lower growth. If workers are paid according to social class, gender or ethnicity, rather than by what they achieve, this reduces the incentive to work/earn more (Bourguignon, F., 1999).

Labour market and Poverty

Higher economic growth leads to an expansion in the demand for labour and in the creation of new opportunities in small and medium-sized firms and in the informal private sector. Hence, it could benefit the poor through the creation of more employment opportunities, but it could also benefit entrepreneurs generating a higher profit margin. Growth also implies a reduction in the wage differentials between skilled and unskilled labour. Higher growth results in higher tax revenues that allow the government to allocate more fiscal resources on social spending. Overall, high economic growth means capital accumulation that generates greater availability of funds for the poor for investment purposes, in particular human capital investment (Banerjee, A.V. and A.F. Newman, 1993, Aghion, P. and P. Bolton, 1997, Galor, O. and J. Zeira, 1993, Townsend, R.M. and Ueda, K., 2006).

Given that the evidence does suggest that higher inequality is often associated with higher poverty. Hill et al, 2019 examine why there should be such a relationship and find a variety of proposed mechanisms, which they explore under seven headings:

- a. Linked drivers: especially in the labour market, including discrimination: the same factors may lead to both poverty and inequality, even though the relationship is not causal.
- b. Inequality at one time – and especially in one generation – may reinforce both inequality and poverty in the next, as unequal life chances make it harder for some to build their livelihoods than others. If higher income inequality leads to lower income mobility, poverty becomes more entrenched and persistent.
- c. Limits to redistribution: even if market incomes, before state transfers, are unequal, tax-financed welfare states can break the link between that and poverty, but there may be limits to what redistribution can achieve.
- d. Perceptions and attitudes: what drives policy responses to poverty and inequality will ultimately depend on the public's perceptions and knowledge of them. If inequality is associated with less knowledge of how others live, popular demands for something to be done about poverty may be reduced.
- e. Geographical polarisation may reinforce all of the previous mechanisms. Opportunities for poor people will be reduced, if they are distant from work or have access to lower-quality education. Local resources in part determine the quality of local public services, and the more so as national equalisation systems are reduced. Geographical polarisation or even segregation between groups will further limit knowledge of how others are living, increasing stigma and reducing empathy.
- f. Politics and the influence of the affluent: both media control and political party funding are often dominated by those with the greatest resources; the greater the resources of the richest, the more the political agenda may reflect their interests, acting against effective action to reduce poverty. High inequality and feelings of lack of involvement and connection may lead to lower turnout amongst those who have most to gain from redistributive policies. Also, important will be who sets the agenda for the legal institutions that constrain markets, and people's ability to exercise the rights that such institutions give them.
- g. Crime, punishment and criminal justice have also been put forward as routes through which inequality may worsen problems of poverty and its persistence. Increased inequality affects incentives to commit crimes, and punitive preferences of the public and politicians, with reduced resources for rehabilitation.

The range of potential drivers of the observed relationship imply that public policies matter and that this is not just the obvious ones, such as social security, taxation and within the labour market including anti-discrimination legislation. What happens across education, housing, regional investment, policy rhetoric, and factors that affect culture and social norms, and democratic safeguards will also be important. However, the relative importance of different items within such an agenda for tackling poverty would reflect what we have seen empirically, notably the apparent importance of inequalities across the income distribution as a whole, rather than specifically inequalities right at the top (although there may, of course, be other reasons for worrying about them).

Government Interventions

Government policy can respond to rising income inequality in many different areas, with a particular focus on three policy areas – education, jobs and taxes and transfers.

[According to the OECD](#), education is the most important policy area and is a key to determining everyone's life chances. That's why education policy needs to address the needs of young people from pre-school to university, ensuring they get the best start in life and the support they need throughout their education. Education is closely tied to skills and training, and these, in turn, increasingly determine people's ability to earn a decent living. That's why policy must work to ensure workers have the training they need and that workers can make the best use of their talents in the workforce.

Work is also key to reducing inequality and to ensuring that families don't get trapped in poverty – an issue that has become a focus of serious concern in many OECD countries since the financial crisis. As well as building the economic conditions for job creation, policy needs to aim to get people into the workforce, especially women and young people.

A final area of policy focus is taxes and transfers, or the money that the state gives and takes. In developed economies, taxes and transfers do much to reduce inequality, although there is room in many countries to improve their performance. That may mean better focusing assistance on those who need it most and limiting tax breaks and allowances that disproportionately benefit high earners.

However, the political agenda may reflect the interests of rich and the greater their resources the more influence they have (Hill, et al., 2019).

Since the 1980s, labour markets in many OECD countries have been subject to major structural changes: the employment protection legislation (EPL) became less strict in countries where protection had been relatively strong to start with, while countries where the strictness of the EPL was below average in 1985 tended to stick with a similar policy in the late 2000s (OECD, 2015). Alongside these institutional changes, demographic and social developments – ageing and higher female labour market participation – have also profoundly modified the labour force. Finally, structural changes in employment due to growth in services and knowledge jobs, a greater use of ICTs and just-in-time delivery have all had implications for the supply and demand drivers of atypical forms of work (temporary, part-time and self-employed jobs). As non-standard work is often portrayed as being associated with lower earnings and with job-insecurity, this has drawn attention to its potentially adverse impact on the distribution of individual earnings as well as household's income more generally.

Evidence from OECD has shown the impact of NSW on the level of overall earnings inequality: adding the earnings of part-time workers to the distribution of full-time employees increased earnings inequality by almost 20%, and adding self-employed workers increased inequality by a further 5%. In addition, policy reforms such as weaker employment protection for temporary contracts have tended to increase employment opportunities but were associated with wider wage inequality.

Crimes

Crimes is affected by Economic Growth, Income Inequality and Poverty according to Kelly (2000) who investigated the relationship between income inequality (INC_INEQ) and urban crime, and found that Income Inequality is the strong predictor to influence violent crime rather than property crime, while poverty (POV) and economic growth (EG) significantly impact on property crime rather than violent crime.

Crime, punishment and criminal justice have also been put forward as routes through which inequality may worsen problems of poverty and its persistence by Hill, et al., (2019). Increased inequality affects incentives to commit crimes, and punitive preferences of the public and politicians, with reduced resources for rehabilitation.

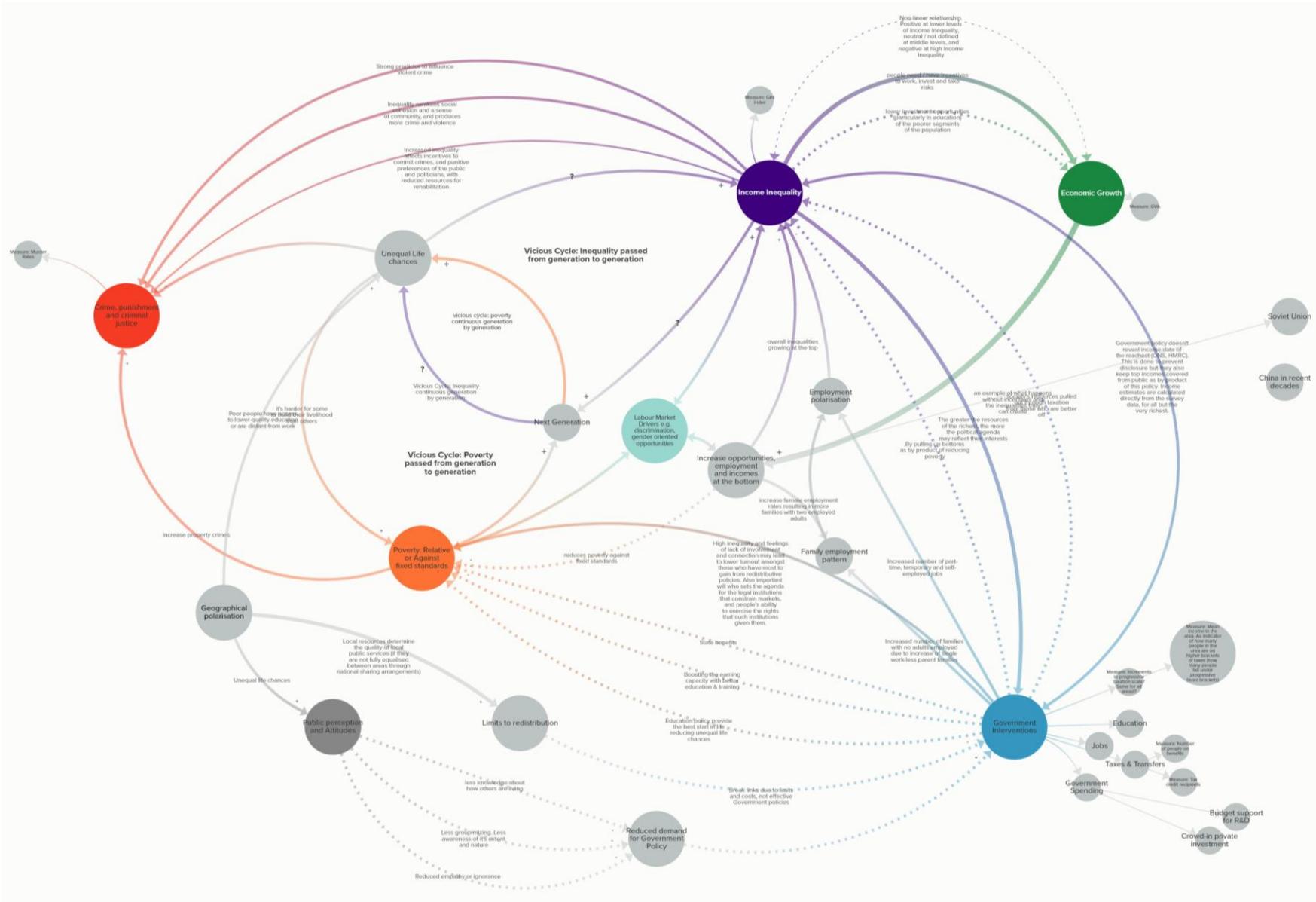


Figure 11 Causal Loop diagram: relationships around income inequality

*Readable / Zoomable version available [here](#)

4. Data Sources on Income and earnings

ONS has completed a comprehensive review of data sources on incomes available at

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours>

The table below provides a brief summary of this review.

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
Wages and Earnings					
Monthly Wages and Salaries Survey (MWSS)	<ul style="list-style-type: none"> the levels of average weekly earnings broken down into: regular pay (excluding bonuses), total pay (including bonuses), and bonus pay average weekly earnings by sector (public and private) average weekly earnings by industry real average weekly earnings by sector (AWE adjusted for inflation) wage and employment contributions 	Great Britain	Monthly	Capturing bonus payments Frequency	Doesn't cover self-employed, HM Armed Forces or government supported trainee No information on individual employee's characteristics so no analysis beyond sector Excludes businesses with fewer than 20 employees
Annual Survey of Hours and Earnings (ASHE) are split into three bulletins: Employee earnings in the UK Low and high pay in the UK Gender pay Gap in the UK	<p>Employee earnings in the UK covers:</p> <ul style="list-style-type: none"> weekly and annual earnings earnings trends (that is, changes over time) public sector compared with private sector earnings by region, age, occupation and industry the components of earnings (such as overtime and incentive pay) paid hours worked <p>Low and high pay in the UK focuses on the distribution of earnings of high- and low-paid jobs and jobs paid below the National Minimum Wage</p> <p>Gender pay Gap in the UK focuses on the differences in pay between men and women.</p>	<p>Microdata Secure Access</p> <p>Spatial Units: LSOA, MSOA, LAD, LEP, NUTS1,2,3,4, Postcodes and many others</p>	Annually	<p>Accurate source of information on earnings as the information is provided by employers rather than being self-reported by employees</p> <p>Large sample size</p> <p>Sampling same employees over time</p>	<p>Six to seven months' time lag</p> <p>Only covers employees and exclude self-employed</p> <p>Limited selection of personal characteristics</p> <p>No information on what individuals are doing when they are not present in the survey</p> <p>Coverage issues with data on bonus and incentive payments as this data is not available to respondents at the time when they required to provide the information to ONS</p> <p>Discontinuities due to changes in coverage, methodology etc where data may not be comparable between any given pair of years</p>
Labour Force Survey (LFS)	<p>LFS is a rolling survey of households, which has taken place on a quarterly basis since 1992. The "labour market" covers all aspects of people's work, including the education and training needed to equip them for work, the jobs themselves, job-search for those out of work, and income from work and benefits.</p> <p>both gross earnings (hourly and weekly) and take-home pay after deductions.</p>	<p>Microdata available via UKDA under standard End User Licence</p> <p>Spatial Units:</p>	Quarterly	<p>Rich selection of classificatory variables (education, ethnicity, disability etc)</p> <p>Longitudinal element as earnings data captured in both waves 1 and 5 of the survey</p>	<p>Lower quality data compared to ASHE as LFS information is self-reported e.g. may be subject of recall error, may be given by proxy (by other individuals living in the same household)</p> <p>Excludes self-employed</p> <p>Falling response rated over recent years</p> <p>Large percentage of non-response to the specific earnings questions (only around 10% of respondents answer these questions)</p>

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
	<p>gross weekly earnings of full-time employees by region, occupation and industry</p> <p>the distribution of gross hourly earnings of employees</p> <p>age, sex, qualifications, ethnicity, disability</p> <p>employment status: full-time or part-time, public or private, and permanent or temporary</p>	<p>Government Office Regions, Standard Statistical Regions under Safeguarded Access</p> <p>More detailed microdata available as Secure Access File</p>		<p>Ease of access by UK Data Archive</p>	<p>Repeated changes to some classifications and year-specific variable names</p>
<p>Labour Costs</p> <p>Labour costs typically refer to the gross earnings paid by a business (wage costs), plus several non-wage related costs such as employer National Insurance contributions, employer pension contributions and benefits in kind provided by the employer.</p>					
<p>Index of Labour Costs per Hour (ILCH)</p>	<p>The Index of Labour Costs per Hour (ILCH) is a measure of the cost of having an employee for an hour of work. ILCH was first published in 2005 and is published quarterly. It reflects changes in wages and salaries, non-wage costs and the quantity of hours worked over the quarter and is important for monitoring inflationary pressures in the labour market.</p> <p>The main publication of ILCH provides both index numbers and growth rates and covers:</p> <p>the most recent labour costs data broken down by: wage costs, non-wage costs, and labour costs excluding bonuses and arrears</p> <p>ILCH by industry (Standard Industrial Classification 2007: SIC 2007 A to S)</p> <p>ILCH by sector (including public and private)</p> <p>ILCH before and after seasonal adjustment</p>	<p>ILCH microdata are not publicly available.</p>	<p>Quarterly</p>	<p>It is the only short-term earnings per hour indicator in the UK and can be used as an early gauge of economic performance.</p>	<p>The main limitation of ILCH is that only index numbers are published quarterly with no monetary values, though Eurostat derive annual data on hourly labour costs, which are published on the Eurostat website. This then also means that ILCH cannot be used to investigate the distribution of labour costs.</p> <p>Revisions to the data series are frequent; this is due to the number of data sources used as an input in ILCH and the need to revise these when new data become available.</p> <p>Furthermore, ILCH can be volatile when observing low-level industry aggregates where individual firms can have a larger impact on the data.</p> <p>Given that the MWSS is a survey of employers, ILCH refers only to employees and therefore excludes the self-employed.</p>
<p>Unit Labour Costs (ULC)</p>	<p>Unit labour costs (ULCs) measure the cost of labour input per unit of real (inflation-adjusted) economic output. This is calculated by dividing total labour costs by output.</p>	<p>Publicly available as part of Labour Productivity</p>	<p>Quarterly</p>	<p>Since labour costs account for around two-thirds of the cost of production of UK economic output, unit</p>	<p>ULC measures deal exclusively with the cost of labour, which though important, should also be considered in relation to changes in the cost of</p>

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
	<p>Within this dataset are sectional ULCs, broken down by industry, in both index levels and percentage changes on the previous quarter and on the previous year.</p>	<p>statistical bulletin</p> <p>UK level only</p>		<p>labour costs provide an indication of inflationary pressures in the economy.</p> <p>Movements in ULCs can be decomposed into movements in costs per unit of labour (which can be approximated by an index of earnings) minus the movement in labour productivity. Thus, other things equal, increases in labour productivity will tend to reduce ULCs.</p> <p>ULCs also have the benefit of being fully consistent with both the output and income presentations of the national accounts.</p>	<p>capital. This consideration is more relevant in capital-intensive economies.</p>
Household Income					
<p>Family Resources Survey</p>	<p>information on the incomes and circumstances of private households in the UK</p> <p>annual cross-sectional survey.</p> <p>The FRS covers:</p> <ul style="list-style-type: none"> • income and state support receipt • tenure • disability • carers • pension participation 	<p>an individual, benefit unit or household level</p> <p>Microdata available at UKDA under standard End User Licence</p> <p>More detailed microdata available as Secure Access File</p>	<p>Annually</p>	<p>the best source for looking at cash benefit and tax credit receipt by characteristics not captured on administrative sources</p> <p>captures more detail on different income sources compared with most other household surveys.</p> <p>collects a lot of contextual information on the household and individual circumstances, such as employment, education level and impairment.</p>	<p>measurement error – in particular, the FRS is known to under-report benefit receipt</p> <p>non-response error – the FRS response rate in the recent years has tended to be between 50% and 55%; to correct for differential response rates, estimates are weighted using population totals</p> <p>survey coverage – the FRS covers private households in the UK and so individuals in nursing or retirement homes, for example, will not be included</p> <p>survey design – the FRS uses a stratified clustered sample designed to produce robust estimates at region level; the FRS is therefore not suitable for analysis below region level</p> <p>sample size – although the FRS has a relatively large sample size for a household survey, small sample sizes may require several years of data to be</p>

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
					combined; estimates by ethnic group are published using three-year averages
Households below average income	<p>Uses data from FRS</p> <ul style="list-style-type: none"> relative low income absolute low income income inequality, for example, Gini coefficient household income distributions and averages before and after housing costs income components including income from wages, self-employment and benefits 	<p>Microdata available at UKDA under standard End User Licence (NUTS1 geo level)</p> <p>More detailed microdata available as Secure Access File</p>	Annually	main source of data and information about household income, income poverty and inequality	Same like FRS
Income Dynamics	<p>Based on the Understanding Society (USoc) survey; this is a longitudinal survey carried out over a two-calendar-year period, with each individual being interviewed on a yearly basis.</p> <p>Income Dynamics focuses on the persistence of relative low incomes; an individual is described as being in persistent low income if they are in relative low income in at least three out of four consecutive years. The report also looks at mobility across the income distribution. These statistics have been produced since 2017</p> <p>persistent low-income trends and the characteristics of individuals in persistent low income, including children, working-age adults and pensioners, both before housing costs (BHC) and after housing costs (AHC).</p>	microdata are not publicly available	Annually	<p>longitudinal perspective on low incomes and how the duration of low incomes differs for different groups and characteristics</p> <p>Longitudinal analysis also allows the calculation of rates of entry into and exits from persistent low income as well as analysis of movements within the income distribution overall.</p>	<p>Attrition reduces the USoc sample size as individuals who don't respond to the survey for all four consecutive waves are excluded from the analysis</p> <p>Missing data for many variables</p> <p>USoc produces weighting factors rather than grossing factors, so estimates of the numbers of individuals in low income are not produced.</p> <p>Covers private households only</p>
Effects of taxes and benefits (ETB) on household income and Living Costs and Food Survey (LCF)	<p>has been produced each year since 1961 estimates of household incomes, including the average amount of taxes that households pay and also the value of benefits that they receive.</p> <p>The ETB analysis uses five main measures of household income:</p>	ETB and LCF microdata are available at various levels of detail under different user agreements.	Annually	These statistics allow for analysis of the distributional impact of government policy on taxes and benefits. They are the only statistics available that are able to give such a complete picture	

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
	<ul style="list-style-type: none"> • the starting point of the analysis is original income: this is the annualised income in cash of all members of the household before the deduction of taxes or the addition of any state benefits; it includes income from employment, self-employment, investment income, private pensions and annuities, which include all workplace pensions, individual personal pensions and annuities • the next stage of the analysis is to add cash benefits and tax credits to original income to obtain gross income • Income Tax, Council Tax and Northern Ireland rates, and employee’s and self-employed National Insurance contributions are then deducted to give disposable income • the next step is to deduct indirect taxes (such as Value Added Tax (VAT), and fuel and alcohol duties) to give post-tax income • adds benefits that are provided “in kind” to households by government for which there is a reasonable basis for allocation to households to obtain final income; these “in kind” benefits include the provision of education, health services and subsidised travel and housing. <p>ETB data are published in both an annual statistical bulletin and a supplementary analysis and methodology paper. The bulletin provides analysis of each stage of the redistribution process from original income through to final income, looking at the impact of taxes and benefits on income inequality. The bulletin and tables also look at:</p> <p>long-term trends in household income for income quintiles deciles, with detailed breakdowns by income component (including individual taxes and benefits)</p> <p>income for quintiles or deciles of retired and non-retired households, again with detailed breakdowns by income component</p>			<p>of the distribution of income including indirect taxes and benefits in kind.</p> <p>This data allows joint analysis of income and expenditure.</p> <p>Household disposable income and inequality (HDII) bulletin published from 2016 includes measures such as median disposable income, inequality measures such as the Gini coefficient² and breakdowns of the components of disposable income by quintile and decile groups.</p>	

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
	<p>long-term trends in income inequality, measured through the Gini coefficient² and S80/S203 and P90/P104 ratios</p> <p>average incomes, taxes and benefits by household type, tenure status and region</p> <p>taxes paid (direct and indirect) as a proportion of income and expenditure</p> <p>households receiving more in benefits than paid in taxes</p> <p>characteristics of income quintile or decile groups (including number of adults or children, household type, tenure, age or employment status of chief economic supporter)</p>				
Other Income					
The sources covered in this section again refer to income. However, unlike the sources listed in the previous section, income may not be the sole focus of the source or the source may only cover a very specific measure of income.					
<p>European Union Statistics on Income and Living Conditions (EU-SILC)</p>	<p>The main topics covered by the EU-SILC microdata are: Income, poverty, material deprivation, housing, labour, education, health</p> <p>It provides two types of annual data for the 28 European Union countries as well as Iceland, Norway, Switzerland and Turkey:</p> <ul style="list-style-type: none"> • cross-sectional data pertaining to a given time or a certain time period with variables on income, poverty, social exclusion and other living conditions • longitudinal data pertaining to individual-level changes over time, observed periodically over a four-year period <p>Published indicators cover the following areas:</p> <ul style="list-style-type: none"> • relative low income • material deprivation 	<p>EU-SILC microdata are also available to researchers through Eurostat's User Database (UDB).</p> <p>UK level geography</p>	<p>Annually</p>	<p>the consistency of the variables and concepts across countries, which allows for meaningful comparative analysis across the EU</p> <p>The longitudinal component of EU-SILC allows the measurement of persistent relative low income as a driver of damaging life chances</p>	<p>Same limitations as HBAI and ETB as a survey-based source</p> <p>some limitations relating to the international dimension of EU-SILC as data collection concepts are more loosely specified across countries.</p>

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
	<ul style="list-style-type: none"> low work intensity income inequality (including Gini and S80/20 ratios) housing deprivation, overcrowding and housing cost overburden persistent at-risk-of-poverty (relative low income in current year and at least of two preceding years) labour market and pay transitions Many of these indicators are broken down by age, sex, employment status, level of education, housing tenure, country of birth, and citizenship. 				
Pensioners' incomes (PI) series	<p>The series includes information about gross and net income, both before and after housing costs.</p> <p>The publication is based on two household surveys: the Family Expenditure Survey (FES) and the Family Resources Survey (FRS). The latest information comes solely from the Family Resources Survey.</p> <p>The annual Pensioners' incomes publication covers the following:</p> <ul style="list-style-type: none"> income for different groups of pensioners by age, for singles and couples, and broken down by region detailed look at various sources of income, including the proportion of pensioners who receive income from these different sources <ul style="list-style-type: none"> the distribution of pensioners' incomes, both within the pensioner population and within the household population overall additional analysis, including couples where one member is above State Pension age and the other below, married and cohabiting couples and results for ethnic groups 	<p>Anonymised microdata are made available on the UK Data Service website.</p> <p>The datasets are also deposited with the UK Data Archive post-publication, to allow researchers to conduct their own analysis. These datasets have adjustments made to ensure anonymisation of the data, such as rounding all incomes to the nearest pound and "top-coding" ages at 80 years.</p>	Annually	long time series available for assessing trends going back to the financial year ending 1995 on the FRS – and further with the FES.	<p>Same caveats that apply to FRS</p> <p>Pensioners' incomes is based on survey data, hence is subject to sampling variation and other forms of error associated with a sample survey. As such, it is often difficult to draw conclusions about significant changes in incomes from one year to the next.</p> <p>People living in institutions (nursing homes etc) are not covered</p> <p>analysis is at a household level, and incomes are not equivalised (unlike in HBAI).</p> <p>Some analysis of pensioners' incomes looking at small subgroups may need to pool years of data to produce large enough samples</p>

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
<p>Survey of Personal Incomes (SPI)</p>	<p>The SPI is an administrative dataset based on information held by HMRC on individuals who could be liable to UK tax</p> <p>The dataset contains a range of variables about personal incomes arising from employment, self-employment, pension, taxable benefits, property, savings, investments and other income sources. The dataset also contains variables about tax allowances, deductions and reliefs, which people might be due.</p>	<p>Survey of Personal Incomes (SPI) Public Use Tape (PUT) microdata are available on the UK Data Service website for 1985 to 1986 and 1995 to 1996 onwards (data for 2008 to 2009 are currently unavailable).</p> <p>GOR geographical level</p>	<p>Annually</p>	<p>The SPI is an individual-level survey based on administrative records</p> <p>Where income exceeds the threshold for the operation of PAYE (that is, £11,500 for 2017 to 2018), the SPI provides the most comprehensive and accurate official source of data on personal incomes.</p>	<p>only cover individuals liable to UK Income Tax (taxpayers) and their incomes</p> <p>With regards to benefits, the SPI covers only taxable benefits (or benefits in kind). This means that it does not capture benefits like Jobseeker's Allowance or housing benefits. It therefore cannot provide a complete picture of income.</p> <p>As with all sample surveys, estimates from the SPI have a sampling error attached to them.</p>
<p>Wealth and Assets Survey (WAS)</p>	<p>WAS collects information concerning all forms of personal assets held by individuals within private households, including their financial wealth, property wealth, physical wealth and private pension wealth.</p> <p>Commenced in 2006</p> <p>The income data are all self-reported, regular income is available as both net and gross annual measures and covers:</p> <ul style="list-style-type: none"> • earned income from employees and self-employed (main and second or other jobs) • income from benefits (including State Pensions) • income from private pensions (including occupational and personal pensions) • income from investments • other regular income 	<p>accessible only via an End User Licence (EUL) sent to the UKDA and a less anonymised version via the Secure Research Service (formerly the Virtual Microdata Library), which is onsite access to ONS data. This contains data at a very low level, so specific permission has to be granted for access. The EUL dataset is</p>		<p>The efficiency of the sample is therefore improved by over-sampling addresses likely to be in the wealthiest 10% of households (established using data from HM Revenue and Customs (HMRC)).</p> <p>WAS allows consideration of factors other than income when considering an individual's or a household's economic well-being.</p> <p>Longitudinal design of the survey means that the impact of specific life events (for example, from working life to retirement) can be analysed, as can general life cycle effects.</p>	<p>The focus of WAS is the estimation of household and individual wealth. Income measures are only designed to provide classificatory variables, for example, used to divide the population into income groups to analyse wealth by income grouping.</p>

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
		<p>much easier to access as all geographical data have been removed, except region – age has been top coded only for those over the age of 85 years and some detail of non-wealth related variables has been removed.</p>			
<p>National accounts estimates of gross disposable household income</p>	<p>Household sector accounts use the following process to derive gross disposable income:</p> <ul style="list-style-type: none"> total household income equals gross operating surplus plus mixed income plus compensation of employees plus property income plus pension income plus Social Security benefits received (other than pensions) plus miscellaneous transfers and insurance claims received total uses equals taxes paid plus social contributions paid plus property expenditures plus miscellaneous transfers and insurance premiums paid gross disposable household income (GDHI) equals total household income minus total uses 	<p>National accounts estimates of gross disposable household income are available here.</p> <p>NUTS1,2,3 geo levels</p>	<p>Quarterly and annual basis</p>	<p>includes the income of institutional households that are often excluded from other survey sources of income.</p> <p>offer a long time series, with data going back to 1948 (1955 on a quarterly basis).</p> <p>the more recent data are also widely comparable on an international basis as it follows the ESA 2010 and SNA 2008 regulations on national accounts</p>	<p>Due to compliance with national accounts concepts, such as the inclusion of imputed rental of owner-occupiers as income, estimates may not match specific user requirements.</p>
<p>Regional accounts estimates of gross disposable household income</p>	<p>The components of income are as follows.</p> <p>Allocation of primary income account:</p> <ul style="list-style-type: none"> resources: operating surplus, mixed income, compensation of employees and property income received uses: property income paid <p>Balance of primary income equals primary resources minus primary uses.</p>	<p>Data are available in Excel datasets or via NOMIS.</p> <p>NUTS1,2,3 and LAU1 geo levels</p>	<p>Annually in the spring</p>	<p>includes the income of institutional households</p> <p>estimates for GDHI have been produced for the households sector only.</p> <p>Estimates are published at NUTS1, NUTS2, NUTS3 and local authority levels allowing for comparison</p>	<p>Regional GDHI estimates are produced in current prices (which include the effects of inflation). Constant price estimates of regional GDHI cannot be produced due to the lack of appropriate regional deflators.</p> <p>Regional GDHI does not take account of mortgage capital repayments or payments of rent.</p>

Data Source	Data Available	Access and Disaggregation	Update	Strengths	Limitations
	<p>Secondary distribution of income account:</p> <ul style="list-style-type: none"> resources: social benefits and other current transfers received uses: current taxes on income and wealth, social contributions and other current transfers paid <p>Balance of secondary income equals secondary resources minus secondary uses.</p> <p>The balancing items of these two accounts then allow us to calculate GDHI as:</p> <ul style="list-style-type: none"> GDHI equals balance of primary income plus balance of secondary income 			<p>across UK and EU areas. Regional GDHI is considered valuable as a measure of relative wealth between regions.</p> <p>Regional GDHI estimates provide an overview of economic diversity and social welfare at regional, sub-regional and local area levels.</p>	
<p>Small area income estimates</p>	<p>The estimates provide the average household income for small areas within England and Wales. It is the income a household receives from wages and salaries, self-employment, benefits, pensions, plus any other source of income.</p> <p>The technique used to produce small area income estimates is a multiple linear regression modelling technique with synthetic estimation</p> <p>The small area income estimates are produced for four different income types:</p> <ul style="list-style-type: none"> average weekly household total income (unequalised) average weekly household net income (unequalised) average weekly household net income before housing costs (equalised) average weekly household net income after housing costs (equalised) 	<p>The latest Small area income estimates are available. For more information about these estimates, please contact hie@ons.gov.uk.</p> <p>MSOA geo level</p>		<p>The main strength of small area income estimates is the low level of geography that the data are provided at.</p>	<p>A limitation of the small area income estimates is the measure of central tendency produced by the models, which is the mean household income. This measure does not provide an indication of the distribution of income within or between areas, which is a limitation because some areas have a more skewed distribution (with a small number of households having very high income) than others.</p> <p>In some areas, slight inconsistencies may occur between the income types for a particular MSOA, for example, a MSOA may have a larger estimate for net income when compared with total income</p> <p>These estimates do not enable direct comparisons of income over time. Each time a new set of estimates is produced, a different model is used, which means any two sets of estimates do not form a time series as such.</p>

5. Further Steps

Descriptive analysis based on Annual Population Survey and Business Register Employment Survey. The purpose of descriptive analysis is to portray social profiles of people in different percentiles of income / Income inequality and also map income inequality across areas of West Midlands in the context of other regions, and sectors of employment to identify vulnerable groups of community and spot disadvantageous areas within the region.

Understanding drivers behind Income Inequality. Analysis of relationships between income inequality, economic growth, poverty, crimes and labour market indicators. This stage will employ regression analysis between Gini Index (as dependant variable) and poverty metrics (these two will be calculated on Annual Population Survey (APS) and Annual Survey of Hours and Earnings (ASHE)), GVA per head, unemployment rate, healthy life expectancy and other (other independent variables will be used from open data sources). The data from different sources will be matched by spatial unit level they are available at in common.

According to previous research, income inequality was found to have some connection to economic growth. However, this connection is different for different levels of income inequality: bottom end inequality had negative effect on economic growth and top end inequality positively affected economic growth. Based on these findings we expect that other dependant variables might relate differently to top end and bottom end income inequality and plan therefore to distinguish them. This stage is also aiming to evaluate the impact of Inclusive Growth policies.

Analysis of Inclusive Growth policies effects. This will employ Pooled Cross Sections econometric analysis on APS data. Within this analysis two cross sectional dataset will be collected before and after occurrence of the change in policy. All data will then be split into control group and treatment group. The control and treatment group will arise from the chosen policy change. To control for systematic differences between the control and treatment groups, two years of data will be used, one before the policy change and one after the change. Thus, the sample will be usefully broken down into four groups: the control group before the change, the control group after the change, the treatment group before the change, and the treatment group after the change. This data will be used to feed econometric model.

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