

Chapter 2

Inequality and Earnings Distributions

Peasant and noble, worker and factory owner, waiter and banker: each has his or her own unique vantage point and sees important aspects of how other people live and what relations of power and domination exist between social groups, and these observations shape each person's judgment of what is and is not just.

Thomas Piketty (2014)

In this chapter, I put the book into the context of the literature in which it is mainly embedded—namely the literature on income inequality. The chapter is structured as follows: First, I provide a brief sketch of the evolution of the literature on income inequality. This sketchy account is by no means to be seen as comprehensive but only indicative of the broad lines of development. Subsequently, I turn to two particular aspects of income inequality analysis pursued by this book. On the one hand, I consider the nature of incomes considered and the type of data sources used. On the other hand, I consider the measures which are designed to assess attributes of the income distributions specified by the distributional regression techniques proposed later. In the third and last section, I trace the German earnings distribution from 1988 to 2013. This is intended to provide an impression of the wider empirical backdrop for the analyses that ensue, which are first and foremost cross-sectional studies.

2.1 A Brief Glance at the History of Income Inequality Analysis

The classical origins of economics are littered with accounts of income inequalities.¹ Adam Smith remarked in his celebrated *Wealth of Nations* that “pecuniary wages and profit, indeed, are every-where in Europe extremely different” (Smith 1776, Sect. 1.x.2). David Ricardo emphasised the importance of distributional aspects in a letter to Malthus: “Political Economy you think is an enquiry into the nature and causes of wealth—I think it should rather be called an enquiry into the laws which determine the division of the produce of industry amongst the classes who concur in its formation” (Ricardo 2005, p. 278). John Stuart Mill also considered the issue of the distribution of wealth (and income) at length, seeing it as “a matter of human institution solely” (Mill 1848). Arguably the most renowned and most infamous accounts by classical economists are those of Karl Marx. His critique of the unequal distribution of incomes focussed in particular on the class antagonism found therein which Marx sees running through the history of “all hitherto existing society” (Marx and Engels 1998, p. 10).²

A new strand of literature, which we now call neo-classical economics, criticised the notion of homogeneous remuneration of the factors (especially labour) which was prominent throughout the classical literature. Echoing earlier remarks from Léon Walras (see Walras 2003), Alfred Marshall remarked that “there is no such thing in modern civilization as a general rate of wages. Each of a hundred or more groups of workers has its own wage problem, its own special set of causes, natural and artificial, controlling the supply-price, and limiting the number of its members; each has its own demand-price governed by the need that other agents of production have of its services” (Marshall 1920, p. 533). Concerning these specificities, Arthur Pigou (1920) and John Hicks (1932) pointed to the institutions in labour markets, like trade unions. Joan Robinson (1933) famously argued for the imperfect nature of competition, which when applied to labour markets naturally has implications for the distribution of incomes. Following the marginal revolution and its emphasis on subjectivism, less academic attention was paid to the issue of income inequality at large which “professors of economic theory were content to leave to lesser men” (Dalton 1920, p. vii). Rather, the discipline turned to the finer details of inequalities between individuals and the hypothesising of the sources of such differences. Given

¹For brevity, I exclude economic thought prior to the eighteenth century here. But it must be noted that earlier economic thinking should not be overlooked. Evidently, the thoughts of the likes of Aristotle, Ibn Khaldun or Thomas Aquinas and other pre-classical economists entailed ample considerations of inequality (see Lowry 2007; Hosseini 2007; Brewer 2007). I must also confess that my view is rather Eurocentric and only considers accounts of inequality within nations of the *developed world*. The wider dynamics of global inequality, as recently described by Milanović (2016), are left unconsidered.

²I believe that empirical evidence is critical, even for theoretical works like Marx’s *Das Kapital*. Thus, it ought to be mentioned that much of Marx’s views rested on the empirical accounts of Friedrich Engels of which the most well known is his *Condition of the Working Class in England* Engels 1848.

the trend at the time of declining national income inequalities in Europe and beyond (see Morrisson 2000), this shift of focus away from the income distribution at large is little surprising.³

After the Second World War, the decline of income inequality continued as was noted by Simon Kuznets on the basis of tax records. Based on the empirical evidence at the time, he proposed a bell-curved relationship between average income and income inequality. Although he himself noted that “[t]he paper is perhaps 5 per cent empirical information and 95 per cent speculation, some of it possibly tainted by wishful thinking” (Kuznets 1955, p. 25) the notion of a Kuznets curve, whereby inequality would rise first but steadily decline subsequently with economic growth seen in industrialised economies, became common ground for many economists. Consequently, the discipline by and largely lost interest in a problem thought to rectify itself with time and a “balanced growth path” (Solow 1956).⁴

However, as the wishful thinking of ever decreasing inequality unravelled, economic research started to rediscover the aspect of inequality. Paying particular focus to the poverty stricken lower parts of the income distribution, Amartya Sen published extensively on the issue of income inequality (as well as other important dimensions of inequality). His seminal book *On Economic Inequality* (Sen 1973) remains an important cornerstone for inequality research in economics to this day. Around the same time, we also see other important publications regarding the measurement of inequality (Theil 1967; Atkinson 1970; Bourguignon 1979, e.g.) that opened the field for an ever increasing number of empirical investigations regarding the level of inequality of income (and other dimensions of importance). After the turn of the century, the momentum of distribution analysis somewhat shifted away from the issue of poverty and towards top incomes (see Atkinson 2007). This work received considerable attention beyond the borders of the discipline, none more so than the book *Capital in the Twenty-First Century* by Thomas Piketty (2014). The book sold over a million copies and catapulted the analysis of income inequality back into the centre of the economic (and political) discussion.

To sum up, it should be noted that the analysis of inequality of incomes has a long and diverse history. The term inequality is and always has been a political and ideological football, being kicked around by the political and ideological powers that be. I would go even further and argue that even the scientific discourse cannot be seen independently from the materialist basis of the time.

³Given that this book is mainly concerned with inequality in Germany, it is worthwhile to note that the German Historical School provided a contrasting perspective to the neo-classical one. Next to methodological differences epitomised in the *Methodenstreit* (see Sect. 3.5), the historical school also emphasised the importance of social and distributive matters to an arguably greater extent than their colleagues west of the Rhine. For example, while Walras hailed the markets’ equilibrium, his contemporary Wilhelm Roscher emphasised the consequences of market outcomes for the poorest individuals in a society (see Roscher 1894).

⁴The few voices of dissent were largely left unnoticed, e.g. the one from Viktor Agartz (see Jünke 2015).

2.2 Preliminaries on the Income Distribution and Inequality Measures

Before I go on to discuss some empirical income distributions, some technical aspects deserve their due discussion. First, I elaborate the definition of income employed in this book and in particular why I predominantly focus on labour earnings. In addition, I discuss why I focus on individuals rather than households and why I choose the Socio-Economic Panel as the principal database over alternative data sources. Second, I present some thoughts on distributional measures like the arithmetic mean and several inequality measures of interest.

2.2.1 *Income Variables, Units and Data*

The Oxford Dictionary defines the word *income* as “money received, especially on a regular basis” which is derived from the Old Norse *innkoma* which means entrance or arrival.⁵ In its habitual use, income thus refers to any (mostly regular) streams of monetary revenue, which is generally thought to have been received for the economic services of an individual.

The established definition of income in economics is slightly different and conceives income not as the general overarching phrase for any regular streams of monetary revenue but rather as the sum of all such streams. Thus, income is defined as the sum of labour-related incomes (such as wages or salaries) and capital-related incomes (such as profit, rent, dividends or interest). If one is not only interested in market income but wants to contemplate transfer payments to and from the state, i.e. taxes and benefits, these are additional components of income.

In the following, I use the former, more habitual meaning of income as it allows a linguistically more lucid formulation when one needs an abstract concept of any form of monetary revenue such as income from labour and/or income from capital. When I need to refer to income in the economic sense of a sum of all income components, I will use *comprehensive income*. Where necessary, I will also differentiate between gross (before taxes and benefits are deduced and added) and net (after taxes and benefits are deduced and added) income.

2.2.1.1 The Labour Earnings Rate

In the following, the main focus will be on income from labour, which I refer to as *labour earnings rate* or just *earnings*. This includes income from wages, salaries and

⁵See <http://www.oxforddictionaries.com/definition/english/income>.

self-employment over a given period of time, mostly a month or one year.⁶ This focus is thus narrowed to evade the complex relation between income and capital. Barrels of ink have been put to paper to describe this relation which is paramount to any understanding of comprehensive income inequality at large. Although I believe that income inequality research is obliged to consider comprehensive income inequality, I choose to focus on earnings inequality mainly for the following three reasons:

- The primary focus of inequality analysis is one of relation. The semantics of the word itself implies the comparison between at least two incomes and to what extent they are equal or not. However, there is also an absolute, non-relational aspect to inequality. Irrespective of how much other people (with capital income) earn, it is worthwhile to consider how much a person without any other revenue than that of his own labour is likely to earn. By considering only earnings, we thus shift the perspective somewhat away from the wealthy elite, and their relation to the rest and towards those 99% (or even 99.9%) who receive their income predominantly on the merit of their own labour (see Piketty 2014).
- The classical school of economics argues that value is generated from labour (see Smith 1776; Ricardo 1817; Marx 1962). Even if this school of thought is considered “dead and buried” (Schumpeter 2008, p. 25) the view that labour and its remuneration lies at the heart of the economic process is still true today. Even if wider discrepancies found for comprehensive income inequality are left aside, especially the role of capital, the inequalities found in earnings are therefore critical for the understanding of comprehensive income inequality.
- The last and arguably most important reason is data availability. It remains a sad fact that even in the twenty-first century, the necessary data to compile comprehensive income distributions is simply not available. The main reason for this is the political lack of will to collect data—on capital income in particular—effectively, despite the apparent scientific (and fiscal) use such data would have. This problem is even graver when basing the analysis on survey data, as I do in this research endeavour. Surveys suffer from higher non-response rates for top incomes (both from capital and labour), unwillingness to provide accurate data as well as technical and legislative constraints (see UNECE 2011, pp. 93–94).

I hence focus on earnings inequality in the following. More specifically, I mainly consider gross market earnings, i.e. earnings prior to taxes and social security contributions as well as state transfers such as pensions, unemployment benefits. The focus is thus directed not at the consumptive capacity of people but rather at their toils’ value as decided by the labour markets. It is thus concerned with issues of *pre-distribution* and not *redistribution* to use political terminology (see Lansley 2014).

⁶This short period may be criticised on the basis of the Permanent Income Hypothesis (see Friedman 1963). However, I take the view that the horizon of individuals on the assessment of their income is very finite and for gross income assessment the smoothing of income shocks is not as adequate as it may be for the assessment of net income. In addition, it must be noted that despite the much-improved data available it has to be conceded that looking at lifetime incomes is frankly still largely infeasible at the moment.

However, many of the statistical models applied in this book can also be applied to different income components (net or gross) and/or a wider comprehensive income concept. Additionally, it may be assumed that many of the empirical findings discussed in the latter can also be extended to different income components and/or a comprehensive income concept.

2.2.1.2 An Individualistic Perspective

A second principal choice I made concerns the principal unit of analysis. Although it runs counter to the etymology of economics, I will consider the individual and not the household as the principal unit of analysis.⁷ The reason for this choice is twofold:

- As pointed out above, the analyses in this book are first and foremost concerned with the remuneration of labour effort. As this labour effort is committed by individuals rather than the household, I focus on the individuals' remuneration at the individual level.
- Secondly, there are important problems with the assumptions required for considering the household as the principal unit of analysis. If one considers the household as the atomic structure of the analysis, i.e. as if it were one and indivisible, one needs to assume that attributes and preference of the individuals would need to converge to a joint consensual attribute and preference set. This assumption is highly questionable given the wide possibilities of intra-household differences. Moreover, as Folbre (1986) points out, a household-based perspective induces a paradox of "individuals who are entirely selfish in the market [but] entirely selfless' within the family". As numerous studies on gender inequality have shown, usually male household heads are far from selfless and attributes of the household, like individual consumption possibilities, are far from consensual or equitable (see Ponthieux and Meurs 2015).

2.2.1.3 Data Sources

Concerning the data used for the analysis, the principal source used throughout the analyses that ensue will be the German Socio-Economic Panel (SOEP) provided by the German Institute for Economic Research (DIW). This choice is based on the following data considerations when applying distributional regression.

- The first and most obvious concern is the sample size. The SOEP contains on around 10,000 households and 30,000 individuals living therein (see Wagner et al. 2007). Given the complex estimation of whole conditional distributions given a

⁷Economics is derived from the Greek words *oikos* (house) and *nomos* (law). Following the meaning literally, an analysis of inequality should probably therefore be concerned with the household as the principal unit of analysis. However, since the times of ancient Greece many households' individuals (especially the women) have gained much more independence which warrants an individual perspective.

usual set of covariates used in economic analysis such sample sizes actually constitute the minimum requirement for stable and reliable estimation. Smaller-sized databases featuring significantly fewer than 10,000 observations may well suffice for conventional mean-based analysis but will in all likelihood be insufficient for comprehensive distributional regression analysis.

- Next to the width of the database in terms of the sample size, the SOEP also features considerable depth in the sense that it offers a host of information on income and income-related aspects. Little surprisingly, the SOEP is therefore the central source of data on matters of income inequality in Germany as Corneo (2015) points out. As discussed later, the exploitation of this wealth of data must be measured though as parsimonious model specification is required given the finite sample sizes that one is confronted with. Nonetheless, the use of a deep database naturally broadens the scope of the economic analysis in general and is therefore always desirable.
- A third reason for the selection of the SOEP is the relatively high reliability of the data. Although the SOEP is survey based and other data sources like the IAB Employment Sample (abbreviated IABS for *IAB-Beschäftigtenstichprobe*) by the German Federal Employment Agency and the German Microcensus (abbr. MZ for *Mikrozensus*) by the German Federal Statistical Office provide arguably more reliable data due to their legally binding answers, the SOEP is generally found to provide reliable information up to the top 1% of the income distribution, with the problems thereafter mostly associated with under-sampling than false responses (see Bach et al. 2009). In addition, the SOEP does not feature major problems with top censoring like the IABS where major parts of the sample can be top censored. Although work is currently being done, the issue of top coding for the modelling of full conditional distributions proves to be problematic, so that to date the user is advised to concentrate on data without censoring, if possible.
- A last advantage which comes to mind is the panel structure of the SOEP. Despite the intuitive appeal that this additional source of information does provide, we do not exploit the panel dimension here, as discussed in more detail in Sect. 3.4.

2.2.2 Distributional Measures and Informational Complexity

Before talking about specific distributional measures, one general remark on the nature of one-dimensional measures shall be made. Distributional measures (measures of moments, inequality measures, etc.) are constructed on the basis of an underlying distribution, indicated in the name. While these measures can be highly informative, derivations of a one-dimensional distributional measure from an income distribution generally constitutes a loss of information. The nature of this informational loss can be illustrated by representing a distribution in form of a histogram as displayed in Fig. 2.1.

In the portrayed histogram, I have divided the observed earnings range from 0€ to 25,000€ into 100 equidistant intervals. For each interval, we assign a probability of an individual's earning to fall into that interval. The earnings distribution can

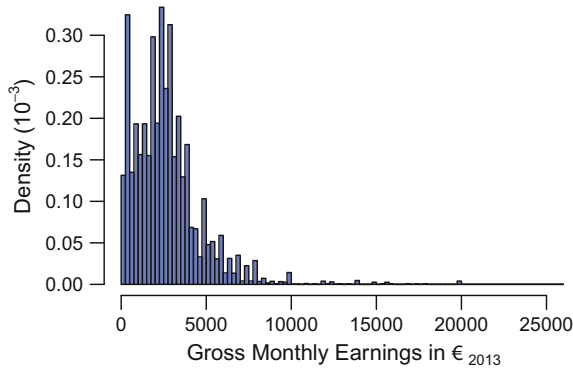


Fig. 2.1 Earning distribution in 2013

thus be represented by a vector of 100 elements each assigned to be the probability mass (or density) for one earnings interval. In this set-up, the distribution can thus be understood as a 100-dimensional measure, with a rougher/finer resolution increasing/decreasing the dimension accordingly.

For the distribution, represented by the histogram, we can easily compute various income measures, like the mean, the standard deviation, the Gini coefficient or the Atkinson index, which are discussed in more detail below. The point I want to stress here is that this computation amounts to the mapping of a 100-dimensional space (of the histogram) onto a one-dimensional space (of the inequality measure). Naturally, this mapping is no bijection and hence must impose a reduction of information, i.e. one can deduce the inequality measure from the distribution but not the distribution of the inequality measure. Of course, this reduction of information is not only true for inequality measures but is also true for other measures thought to portray information on the distribution, like the mean. Each of these measures reduces the informational complexity contained in the full distribution. Indeed, the reduction of complexity is primary motivation of most scalar measures. After all, we strive for simplicity to allow for comprehension given our finite cognitive capacities as humans.⁸

In the following, I will discuss ten distribution measures that may be used for distributional analysis. After starting off with four statistical moments (mean, standard deviation, skewness and kurtosis), I consider three comprehensive inequality measures (Gini coefficient, generalised entropy measures and Atkinson index), two quantile-based inequality measures (quantile differences and top income shares) and one threshold-based inequality measure (the poverty rate).

⁸Regarding the cognitive capacities of humans, it should be remarked that often one may underestimate the capacity of humans to grasp complex phenomena. As popular sayings like “A picture says more than a thousand words” or “A picture is worth a thousand numbers” indicate, analysis is often not first and foremost constrained by the limits of our cognitive abilities but rather by the need to describe findings in few words and/or numbers. I would argue that often observers understand the complex nature of one or several distributions if inspecting them visually but struggle to make this understanding explicit, by using moments, inequality measures, etc.

The most popular reduction is the focus on the expectation of a distribution or its arithmetic mean. It is often said that statisticians “are mean lovers” Friedman et al. 2002. The reason why arithmetic means, or other average concepts like the mode and median, are so popular is presumably that they seek to portray the most “typical” outcome from that distribution, which can be seen to represent the distribution.

In economics, this measure is used heavily, as I discuss in more detail in Sect. 4.1. However, it should be pointed out already that the old famous warning by historian Thomas B. Macaulay concerning truthful history also applies to economic inference based solely on means. He states that “[a] history in which every particular incident may be true, may on the whole be false” (Macaulay 1852, p. 64). With respect to statistical analysis, one can deduce from that quote even if averages may portray only truthful details they may nonetheless tell a misleading story at large, as they fail to mention vital other elements of the story.

In addition to the mean, one also often contemplates measures of spread. While the mean can be pictured as the location of the centre of the distribution, measures of spread are closely connected to the width of the distribution. The most popular measures are the standard deviation and the variance. In economics, quantile differences have recently enjoyed increasing popularity, which I will discuss in more detail below. Next to these measures of spread, additional measures like skewness and kurtosis exist which like the arithmetic mean and the variance can be classified within the mathematical concept of moments. As most of these moments are not easily interpreted, their direct application for the economic analysis of incomes is limited. More popular and important for our purposes are measures of inequality, which generally entail information from several moments of a distribution.

Over the course of statistical and economic research, numerous inequality measures have been devised. Figure 2.2 displays the long-run development of the Gini coefficient, the income share of the top 1% and the poverty rate as provided in the diligent work by Atkinson et al. (2017), displays some of the most popular inequality measures and their evolution for Germany. As can be observed, practically all inequality measures in Germany portray a general decline over the course of the twentieth century with a U-turn in the inequality development towards the very end of the century which has yet to be reversed in the twenty-first century. As Sen (1999) remarks, especially the past decades have seen considerable interest in concepts of the measurement of inequality. The measures which we will concentrate on mainly in this book are of the following three types:

When considering inequality as a measure thought to represent discontent due to the observable inter-group differences we will use the Gini coefficient, which remains the most popular income inequality index Cowell (2000). This view is based on the representation of the Gini coefficient as the “average distance” between incomes in the distribution.⁹ Next to the conventional Gini coefficient, we will also consider the

⁹The Gini coefficient can be defined as $I_{Gini}(F) := \frac{1}{2\mu(F)} \int \int |x - x'| dF(x)dF(x')$. See Cowell (2000) for details.

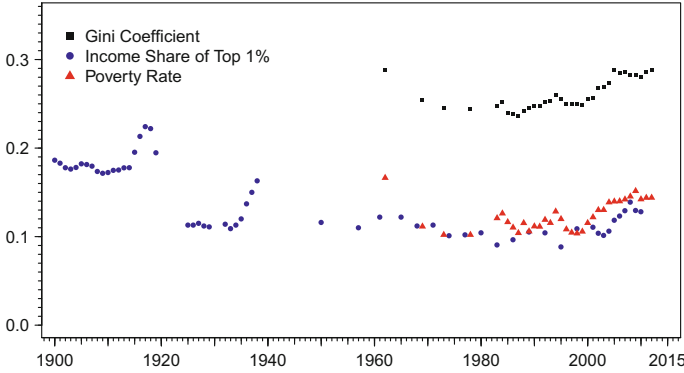


Fig. 2.2 Three inequality measures based on work from Atkinson et al. (2017)

generalised Gini coefficient, which is based on the representation of the Gini as a weighted mean of incomes.¹⁰

When considering inequality as a measure thought to represent an individual’s diminishing utility due to the uncertainty inherent in a stochastic distribution, we use the Atkinson index, proposed by Atkinson (1970). As is nicely illustrated in Atkinson (1975), this measure can be viewed through a decision theoretic framework and thus allows an interpretation in a framework of individual preferences and supposed underlying utilities.

When considering inequality in an exercise of inequality decomposition, we turn to the entropy concepts put forwards by Theil (1967). From the wider family of generalised entropy measures, we will predominantly consider the Theil index this measure allows a straightforward decomposition into “within-group inequality”, i.e. the inequality stemming from income differences within the groups defined by a set of covariates, and “between-group” inequality, i.e. the inequality stemming from differences in the representative income of the groups Cowell 2000. Additionally, we also consider the mean logarithmic deviation (MLD), which puts more weight at inequality at the lower end of the distribution than the Theil index.

Next to these measures, we will also touch upon quantile-based measures, like quantile differences, and threshold-based measures, like poverty rates, for sake of comparison.

¹⁰The Gini coefficient can also be put as $I_{Gini}(F) := \int x\kappa(x)dF(x)$, with weight $\kappa(x)$ depending on the rank of x in the distribution. See Cowell (2000) for details.

2.3 The Development of German Earnings Distributions, 1988–2013

The quote from Thomas Piketty (2013) at the outset of this chapter describes how ideas and perceptions depend on one’s materialistic surroundings. As pointed out in the first chapter, this book was written in the midst of turbulent times that have seen a sharp upturn of inequalities around the globe. In Germany, which the empirical applications of this book focus on, inequality has always been seen to rise in the last decades in various dimensions. Therefore, I deem it to broadly sketch out the larger developments of earnings inequality in Germany over the past decades which embed the finer analyses using distributional regression which follow.

Figure 2.3 displays the distributions of gross monthly earnings (in real terms at the 2013 price level) as provided in the SOEP for the years 1988 and 2013. For comparability, I consider only observations from West Germany (excluding West Berlin). In addition, I only consider those individuals with positive earnings are considered for the moment for sake of simplicity. Hence, we exclude all unemployed people and focus only on those in employment. We will return to this problematic narrowing of the focus in Sect. 3.2.3. The distributions are transparent and laid over one another to facilitate the visualisation of the change.

As can be observed the empirical distribution has changed markedly, with much probability mass concentrated around 1,000 €₂₀₁₃ in 1988 and spread more widely around 2,000 €₂₀₁₃ in 2013. As discussed above, the nature of the change is highly complex and an in-depth discussion could by itself fill pages. In the pursuit of brevity, I simply want to point to two aspects: The change roughly seems to resemble a rescaling, rather than a relocation, i.e. the distribution’s quantiles increased in a multiplicative manner rather than an additive manner. Therefore, top earnings seem to have benefited the most in absolute terms and even in relative terms.

Historically, income distributions were categorised into pyramid-like and diamond-shaped, with the latter attributed to the more advanced economies (see Barber 1968). If one wants to entertain such metaphors, it may be noted that the observed distrib-

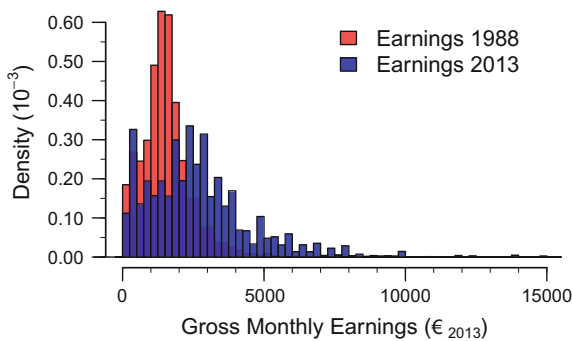


Fig. 2.3 Earning distributions in 1988 and 2013

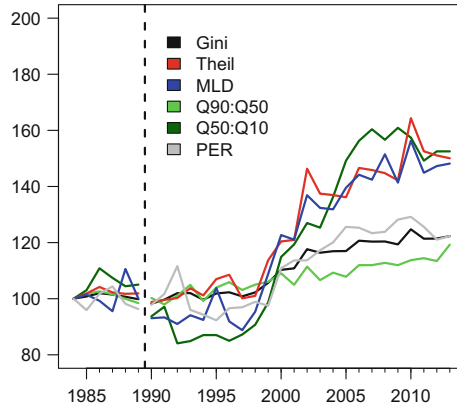


Fig. 2.4 Index of inequality developments between 1984 and 2013

ution is no longer a pyramid but equally far from a symmetric diamond. It is bottom heavy, with time seemingly chiselling away at the centre, adding graphite layers at the bottom and sharpening the already pointed spike at the top of the diamond.

Considering some of the distribution measures discussed above, the expectation for earnings shifted from 1530€₂₀₁₃ to 2750€₂₀₁₃, an increase of roughly 80% over the 25 years equating to a geometric mean of 2.3% per annum. The inequality, as measured by the Gini coefficient increased from 0.32 to 0.39, an increase of 23%. The Theil index rose from 0.17 to 0.26, i.e., by 54%. Considering the ratio between the 90th percentile and the 10th percentile, the change is even slightly larger, rising from 6.0 to 9.8 (+64%). By all three measures, inequality has thus increased dramatically. Let us turn to the development of inequality in a little more detail now.

Figure 2.4 displays several inequality indices. Again, I consider those individuals' gross labour earnings from the previous months who have positive earnings. The base is set to 1984, the first year that data is available from the SOEP. Prior to the reunion in 1989/1990, I only consider incomes in West Germany (excluding West Berlin). From 1990 onwards, I consider all 16 federal states. I consider five inequality measures: the Gini Coefficient, the Theil index, the MLD, as well as two quantile ratios—the ratio between the 90th percentile and the median (Q90:Q50), i.e. inequality from the upper part of the distribution, as well as ratio between median and the 10th percentile (Q50:Q10), i.e. inequality from the lower part of the distribution. Lastly, I consider a threshold measure akin to the poverty rate with the threshold set at 60% of the median earnings, which one may term poor earnings rate (PER).

All inequality indices show a clear trend of a rise of inequality. Generally, one can observe two phases. In the first phase leading up to the late 1990s, earnings inequality was relatively stable. Some inequality indices even decreased, most notably the Q90:Q50 measure but also the MLD. This development which also mirrored the development of comprehensive income inequality stood in contrast to the contemporary developments in other countries in the world, most notably the USA. There,

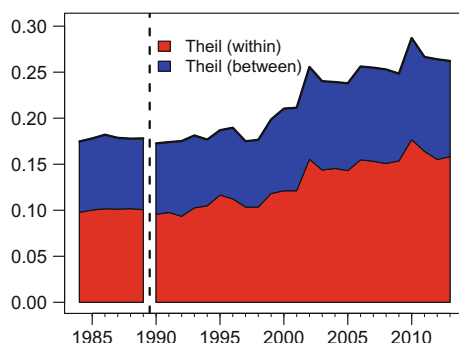


Fig. 2.5 Decomposition of Theil inequality 1984 and 2013

inequality had already risen significantly since the 80s. At the time, Germany was thus regarded as a bastion of relative equality in a world with dramatically increasing inequality in many other developed countries. However, towards the end of the last decade of the century, the situation of seemingly stable inequality started to unravel, with practically all inequality measures picking up. Most of the increase in inequality noted above thus occurred since around 1998. Concerning the differences between the indices, it is sufficient to note that the development is more drastic for the lower quantile ratio (Q50:Q10), the Theil index and the MLD while the development of the Gini coefficient, the lower quantile ratio (Q90:Q50) and the PER is less pronounced.

Much has been written about possible causes of this rise of inequality in earnings in Germany and beyond. The arguably most prominent hypotheses propagate the pivotal role of education in form of “skill-biased technological change” Acemoglu 2002 or a “race between education and technology” Goldin and Katz 2008. Or to put it in the words of Krugman (1994): “It is surely hard not to suspect that the dramatic progress in information and communication technology over the past two decades has somehow played a central role in the increased premium on skill”. Clearly the effect of technology was not only felt across the Atlantic but also in Germany where the growth in expected earnings of highly qualified individuals heavily outstripped the growth of earnings for those without adequate qualification. However, if we consider a decomposition of inequality as measured by the Theil index, one gets the following picture. Figure 2.5 portrays the Theil decomposition dividing the population into 120 groups.¹¹ The Theil components are stacked in the graphic so that the overall Theil is given by the black line above the blue area indicating the between-group inequality over the 25 years. While education may go some way to explain the increase in the between-group inequality, it is obvious that the change in between-group inequality only explains part of the overall change in earnings inequality as depicted in Fig. 2.5. Both in absolute terms (0.062 increase

¹¹I use five age groups (18–30, 31–40, 41–50, 51–60 and 61–65), six education groups (all available ISCED education levels recorded in the SOEP) as well as binary distinctions of region (former East and West Germany) and gender (male and female).

from within-group inequality vs. 0.032 from between-group inequality) and relative terms (62% vs. 43%), the rise of within-group inequality is greater than the rise of between-group inequality. As Atkinson and Brandolini (2006) point out, the standard education- and technology-based explanations fail to adequately account for this phenomenon of rising within-group inequality, which is not restricted to Germany. It is hence residual inequality which this book focusses on.

To avoid false expectations at the outset, it should be noted here already that this book does not vanquish the daunting challenge of identifying any causal drivers of this rise of within-group inequality, let alone quantifying their contribution. Rather this book aims to provide some new methodological approaches to provide further descriptive evidence on the nature of the within-group inequality in Germany. The evidence provided in this book thus will not provide full illumination regarding the riddle of inequality. Much in the spirit of postmodernism, which engulfs my generation, I simply aim to shed some light on aspects hitherto largely left in the dark by the literature. One may criticise this work to be vapidly descriptive with no meaningful (as not causal) inference. Nonetheless, I firmly believe that simple descriptive statistics often have more to offer than the most elaborate econometric procedure identifying significant effects of one variable or another, especially if they are used in conjunction with other information, some of which cannot be pressed into numbers.¹² Therefore, my hope is on the reader to combine the descriptive insights provided in this book with their own knowledge, to yield a grander narrative than this short book is able to deliver.

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¹²One may even follow Arthur Schopenhauer's critique of researchers aiming to understand causality by quantitative analysis alone: "Während einer nur Zahlen und Zeichen im Kopf hat, kann er nicht dem Kausalzusammenhang auf die Spur kommen" (cited from Krämer 2008, p. 165). Following this line of critique, I believe that a wide mix of methods is needed to identify causal effects, which includes descriptive statistics.

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