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Earnings Inequality

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ABSTRACT

Earnings Inequality

Inequality has increased considerably in many Western countries over the past decades. When dealing with economic inequality as a research subject the question “inequality of what among whom” arises. Analyses of inequality are typically concerned with the distribution of wages, earnings or income and have been performed by different strands in the literature, mainly in public and in labor economics. We summarize these strands with a special focus on earnings which itself is the product of hourly wages and labor supply in terms of hours and weeks worked. In addition to inequality in labor market outcomes, we additionally pay special attention to equality of opportunity.

JEL Classification: D31, D33, D63, J21, J31

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1. Introduction

Inequality has increased considerably in many Western countries over the past decades.¹ The growing gap between rich and poor and the resulting declining middle class has become one of the main issues on the policy agendas around the world. The period of economic crisis in the aftermath of the 2008 financial market collapse in the United States has rendered issues concerning the distribution of economic resources, in general, and questions of the appropriateness of extremely high earnings, in particular, even more urgent (OECD, 2011, p. 17). Austerity measures in the context of the euro crisis have recently triggered social unrest in countries like Greece and Spain where these measures are perceived to affect the poor disproportionately. The Occupy Wallstreet movement, which pressed policy makers for steps against growing social and economic inequality, has popularized the catchphrase “***We are the 99%***”. Interestingly, this slogan directly refers to academic research on the increasing income share of the richest 1% of the U.S. population, which is nowadays back to historically high levels (Piketty and Saez, 2003, 2007). Top income shares are not only increasing in the United States but also in many other countries (Piketty and Saez, 2003; Atkinson and Piketty 2007; Atkinson et al., 2011). These examples especially show that the distribution of economic resources across the population is not just a matter for public debate and policy making. On the contrary, the analysis of distribution is long since “back in from the cold” (Atkinson, 1997) and has turned from “watching the grass grow” (Aaron, 1978) to an active and relevant area of research in economics. In this paper, we summarize the literature with a special focus on earnings. In addition to inequality in labor market outcomes, we pay special attention to equality of opportunity.

Why should economists care about inequality?

Economists should care about inequality, since, even when inequality itself were not of great interest, there are a number of important implications that come with it. For example, many economists argue that inequality is not a bad thing per se. On the contrary, inequalities in relative

¹ For extensive overviews, see Gottschalk and Smeeding (1997); Atkinson and Piketty (2007); OECD (2008, 2011); Atkinson (2008b); Salverda et al. (2009).

factor prices are fundamental to the functioning of market economies – as evidenced by the collapse of real-existing socialist economies. With a special focus on labor markets, Welch (1999) emphasizes that inequalities in wages are “good” since they signal scarcities, provide incentives for investments in human capital and compensate for different job attributes. However, Welch himself states that inequality becomes “destructive” when society does not view effort as worthwhile and upward mobility is perceived unlikely or even impossible. In general, public opinion in market economies shares economists' view that absolute equality in economic outcomes is not desirable and that inequalities are, to a certain degree, not only inevitable but even necessary (Salverda et al., 2009, p. 7). However, if income differences are viewed as insurmountable, social cohesion as well as acceptance of market economy and even democracy are challenged (Stiglitz, 2012). Indeed, preferences for redistribution are systematically correlated with beliefs about the relative importance of effort and luck in the determination of outcomes. Individuals are more willing to accept income differences which are due to individual effort (or laziness) rather than exogenous circumstances or luck (Fong, 2001).

From a welfare economics perspective, a normative reason to be interested in the distribution of income is that one is actually interested in the distribution of *well-being* and that income is widely used as a proxy for well-being (Decancq et al., 2014). However, the adequacy of income as a welfare metric has recently been questioned and there seems to emerge a consensus that well-being has multiple dimensions beyond income that should be considered simultaneously, typically indicators for health, job quality, wealth and many more (see, e.g., Stiglitz et al., 2009, for an overview). Hence, focusing on the distribution of labor earnings, which make up a substantial but not the entire part of income, is even more restrictive in terms of welfare analysis. This has to be taken into account when interpreting results on earnings inequality with respect to their policy implications.

Inequality of what among whom?

When dealing with economic inequality as a research subject the question *“inequality of what among whom”* arises (Atkinson and Bourguignon, 2001; Osberg, 2001; Goldfarb and Leonard, 2005). The answer to the part *“among whom”* is straightforward for economists. The term economics dates back to the ancient Greek word *oikos* which means household. Hence, the essence of the economics discipline is the study of the smallest unit of individuals within an economy jointly carrying out production and consumption activities. Nevertheless, in case of studying earnings inequality, the unit of observation is very often the individual or the tax unit and not the actual household. In case of a single household, all three levels of observation are identical, but this does not hold in general. For example, married couples form one household, but consist of two individuals and, depending on the income tax system, may consist of either one or two tax units. The presence of children (or other family or household members) adds further individuals and/or tax units to the household. Given the trend towards more single persons, lower marriage and higher divorce rates in many Western societies, the congruence between individual, tax unit and household is changing tremendously and this has implications for the measurement of inequality.

Indeed, Armour et al. (2013) document the sensitivity of different income measures in capturing income trends. The unit of analysis (individual or tax unit vs. household) and also the income concept, i.e., looking at pre-tax pre-transfer income vs. post-tax post-transfer-income, yield different results and trends. Especially, whether and how capital gains are included in a measure of market income matters a lot both for inequality levels and trends. This is related to the question of *“what”*, the underlying concept of economic resources, which is much more complex. Analyses of inequality are typically concerned with the distribution of wages, earnings or income and have been performed by different strands in the literature, mainly in public and in labor economics. However, there are *“several steps between relative factor prices and [...] disposable income among households”* (Atkinson, 2003a, p. 23). The most important steps in this process are the creation of gross market income from various sources and all household members, the design of the government's tax and transfer system as well as patterns of household formation and composition.

Firstly, gross labor earnings make up the largest share of total household incomes and are an important driver of income inequality (Atkinson, 2008b). A vast literature in labor economics deals with rising wage and earnings dispersion, especially for the U.S. (see Katz and Autor, 1999, for an overview). Common explanations are changes in the supply and demand for skills and tasks as well as changing labor market institutions and policies. Autor et al. (1998, 2008) argue that skill-biased technological change (computerization) within industries has led to “skill-upgrading” and, hence, increased relative demand for college-educated workers. At the same time, skill-biased technological change may not only have complemented high-education tasks but also substituted for middle-education routine tasks. Card and Lemieux (2001) point to shifts in the composition of the workforce with respect to education and show that a slowdown in educational attainment among younger cohorts has increased the college-high school wage gap for men due to shifts in relative supply of highly educated men. Goldin and Katz (2008) take a longer perspective and emphasize the importance of supply and demand of human capital in forming the distribution of earnings over the 20th century in the United States. Acemoglu and Autor (2011, 2012) analyze the interactions among worker skills, job tasks, evolving technologies, and shifting trading opportunities.

Another strand in the labor economics literature argues that the skill-biased technological change hypothesis put forward does not explain the evolution of other dimensions of wage inequality, including the gender and racial wage gaps and the age gradient in the return to education (Card and DiNardo, 2002). In addition to explanations referring to the supply and demand of skills many studies have analyzed the role of labor market policies and institutions. DiNardo et al. (1996) highlight the importance of the decreasing real value of federal minimum wage as well as the importance of de-unionization in addition to labor market considerations. Fortin and Lemieux (1997) analyze the role of the decline in the real value of the minimum wage, de-unionization, and economic deregulation and find that a large share of increasing wage inequality is related to these institutional changes. Lemieux (2006) shows that the magnitude and timing of growth in residual wage inequality provide little evidence of an increase in the demand for skill due to skill-biased technological change, but that this

rather due to composition effects associated with higher within-group dispersion. In addition, differences in wages and earnings are affected by pay differentials across gender, race, occupations or sectors. See Altonji and Blank (1999) for an overview of gender and racial pay gaps. Blau and Kahn (2000, 2006) provide overviews of the development gender pay differential and analyze different driving forces behind the extent and speed of reductions in the gender wage gap. Kunze (2005) analyzes the gender wage gap over different career stages in Germany. Arulampalam et al. (2007) analyze the wage gap over the entire wage distribution for European countries.

Secondly, other determinants of (wage or earnings) inequality are the tax-transfer system and patterns of household formation and composition (see Lam, 2001 and Pestel, 2013, for overviews). For instance, Peichl et al. (2012) quantify how the trend towards smaller households has influenced the change in income distribution in Germany using decomposition methods for measures of inequality, poverty and richness. The results show that the income gap would also have increased without the demographic trend. But its level would be lower than it actually is. In addition, the demographic effect turns out to be larger for incomes before taxes and benefits showing that there is an interaction between tax policy and household composition. Bargain et al. (2014) analyze the effect of U.S. tax policy on inequality over the period 1979-2007. The challenge in analyzing such a question lies in the fact that both taxation and pre-tax income distribution influence income redistribution. For instance, a progressive tax system – one in which the tax rate increases with the taxable base – has a greater effect on income redistribution the more unequally a society's gross income is distributed. In the extreme case that all taxpayers earn the same income, even a very progressive system cannot redistribute income among taxpayers. To distinguish between effects that result from taxation and those that result from changes in pre-tax income distribution, the authors conduct detailed counterfactual calculations holding constant the income distribution of one year and applying the tax system of another year. The results show that American tax policy has done little to curb inequality in the period under investigation. The authors explain this with partisan tax policy: In years with a Democratic President in the White House, tax policy reduced inequality for the most part; when a

Republican was in charge, taxes on the high-income taxpayers fell, promoting growing inequality in American society.

Finally, total disposable household income depends on the household context, i.e., the number, composition and characteristics of individuals actually forming households. For given wages and labor market conditions, gross earnings depend on the number of hours worked. Hence, the household context, which has changed tremendously over the past decades, determines the distribution of resources both within and across households in the economy. See, for example, Jenkins (1995), who analyzes various sources of the trend in income inequality in the U.K. during the 1970s and 1980s, among others, employment, earnings and household composition. Cancian and Reed (1998, 1999) study the role of female earnings on inequality and find an equalizing effect of increasing female labor force attachment. Burtless (1999, 2009) find that the increasing correlation between husbands' and wives' earnings as well as the increasing share of single-person households has contributed to more inequality. Hyslop and Mare (2005) also find that increasing inequality in New Zealand is to a large extent driven by changes in household structure and attributes. Daly and Valletta (2006) and Martin (2006) find similar results and trends for the U.S. and Schwartz (2010) addresses the increasing association between spouses' earnings as an important driver of overall inequality.

The observed distribution of disposable income is, however, not simply a matter of mechanically applying the tax and transfer schedule to gross incomes for a given household composition, but the result of complex interactions between the market production of gross income (joint decisions on labor supply and savings) and the formation of households (marriage, cohabitation and fertility decisions, ageing and retirement). Therefore, it is an enormous challenge to formulate "*models of the household income distribution, incorporating not only models of labour market earnings [...] and the demographic factors affecting who lives with whom*" (Jenkins and Micklewright, 2007a, p. 19). This issue is, however, beyond the scope of this paper.

2. Labor Earnings Inequality

a. Evidence for the U.S.

There are various measures of inequality with very different features and it is upon the researcher to decide on which measure is most appropriate with regard to the research question under consideration. We do not discuss different measures here and refer to the literature (Osberg, 2001; Cowell, 2008). Instead, we follow a recent strand in the literature dealing with the contribution of top incomes to overall inequality and showing that large shares of total pre-tax (wage) income are increasingly concentrated among the rich (Piketty and Saez, 2003; Atkinson and Piketty, 2007; Atkinson et al., 2011). Top income shares are fairly simple and straightforward measures of inequality and easy to interpret. Although they focus by definition on small shares of the population, say the top 10%, the top 1% or even smaller fractiles of the distribution, they have been found to be very informative about overall inequality, since trends over time match very well with other inequality measures (see Leigh, 2007).

Figure 1 shows the top 1% income share for various OECD countries in 1980 and 2009. Inequality increased in all countries. Both the share in 2009 and the increase from 1980 are largest in the United States. The lowest level of inequality can be found in the Nordic countries Norway and Sweden. Only in a few countries the increase is found to be fairly small (like Spain, France, Germany and the Netherlands). Nevertheless, increasing inequality, especially at the top of the distribution, can be observed globally and is, therefore, an issue for researchers and policy-makers in various institutional contexts.

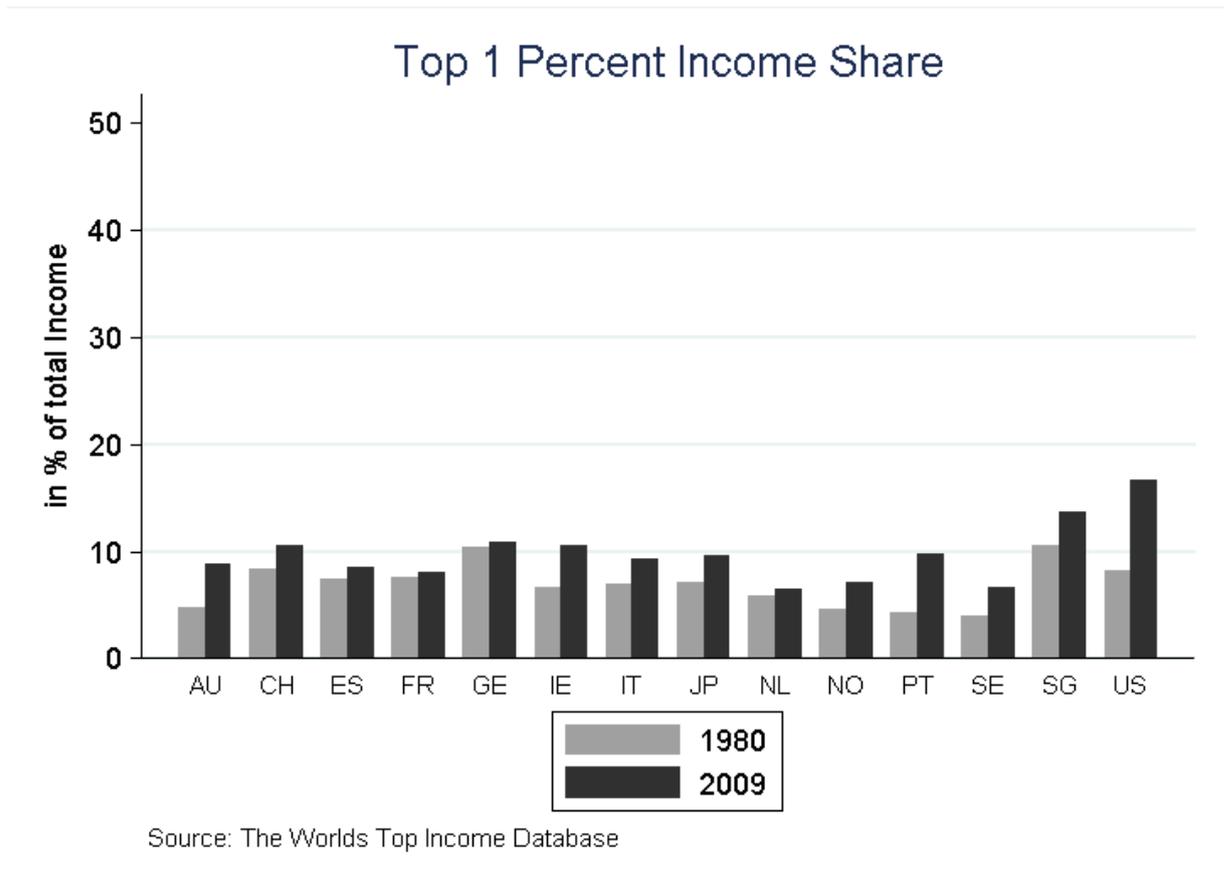
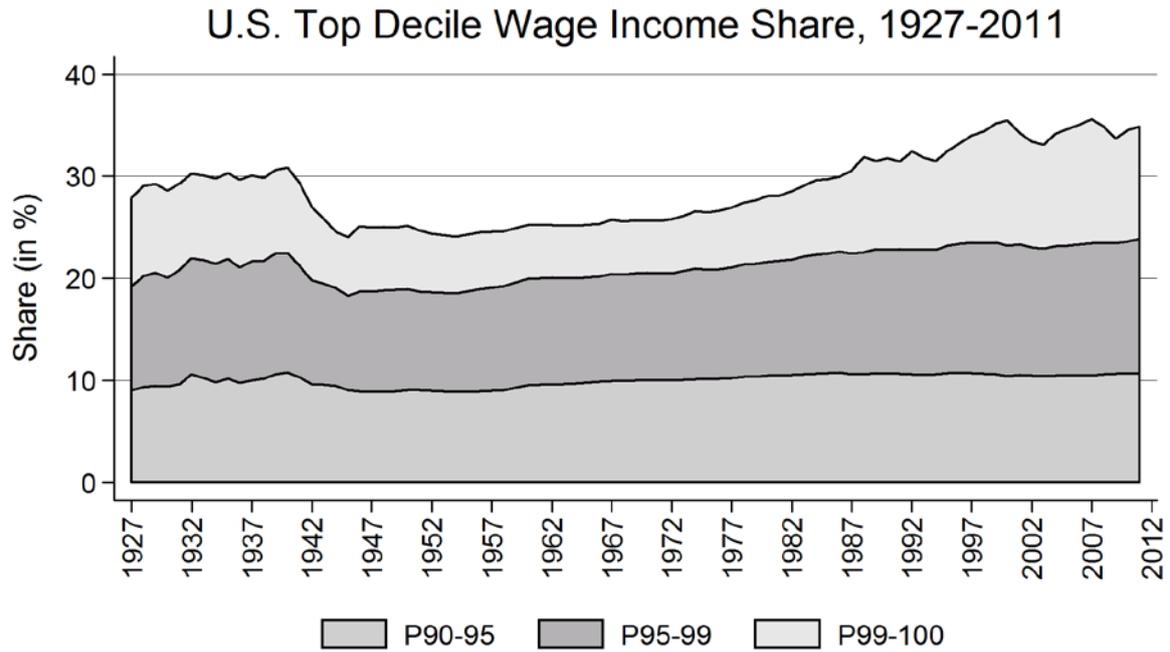


Figure 1: Top 1% income shares in various OECD countries (1980 and 2009).

Figure 2 shows the development of the wage income share of the top 10% in the U.S. starting in the 1920s, broken down into fractiles within the top decile. Before the World War II (WWII) period the share of pre-tax wage income earned by the richest decile of the population was around 30%, while 8-9% was accounted by the top 1% only. During the WWII period, the top decile share dropped to around 25% (top 1%: 5-6%) and remained fairly constant until the late 1970s and early 1980s. Since then, one can observe a strong increase to almost more than 35% and, hence, exceeding the historical pre-WWII levels. Remarkable is the contribution of the top 1% to this trend, which is nowadays up to around 11%, while the share of the top decile except for the top 1% (P90-P99) has only slightly increased over this period. This highlights the importance of (gross) labor income as an important driver of overall inequality, also at the very top of the U.S. income distribution.



Source:
Piketty & Saez (2003, 2007) updated to 2012: <http://elsa.berkeley.edu/~saez/TabFig2012prel.xls>
Wage income includes bonuses, and profits from exercised stockoptions.

Figure 2: Top 10% wage income share in the U.S. (1927-2011).

b. Components of earnings inequality

The overall distribution of labor earnings within a given time period, a given country and for a specific population subgroup is determined by various factors. Typically, research on earnings inequality is concerned with a measure on an annual (sometimes monthly or weekly) basis. Overall earnings can be decomposed into several elements, since they are simply the product of the hourly wage rate, the number of hours worked per week and the number of weeks worked per year:

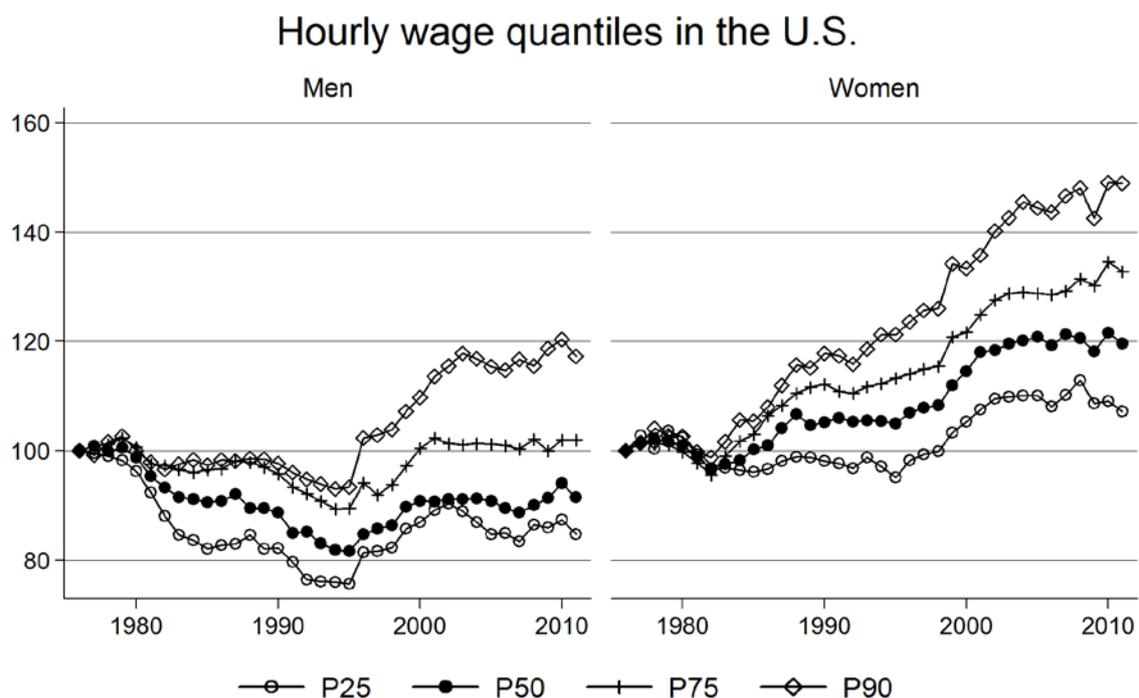
$$annual\ earnings = \frac{wage}{hour} * \frac{hours}{week} * \frac{weeks\ worked}{year}$$

Hence, the distribution of earnings is potentially affected by all of these components and their underlying subcomponents.

First, the wage rate reflects the conditions of the respective labor market. On the one hand, relative supply and demand for different levels of skills play an important role, especially trends of skill-biased

technological change and globalization affecting the demand for low-skilled work and routine jobs. On the other hand, labor market policies and wage-setting institutions, such as minimum wage policies and unionization determine the extent of wage compression for given labor supply.

Figure 3 shows the trend in real hourly wage rates for men and women from 1976-2011. For men, only the wages of the top 10% of the earnings distribution increased while the real wages of the bottom 50% decreased. For women, in contrast, the wages for all groups increased – resulting in a declining gender wage gap. Yet, the increases were stronger at the top of the distribution. This means that the labor market has become more polarized in the U.S. for both men and women. Since labor earnings account for a large part of incomes, this is an important driver of increasing levels of total income inequality.



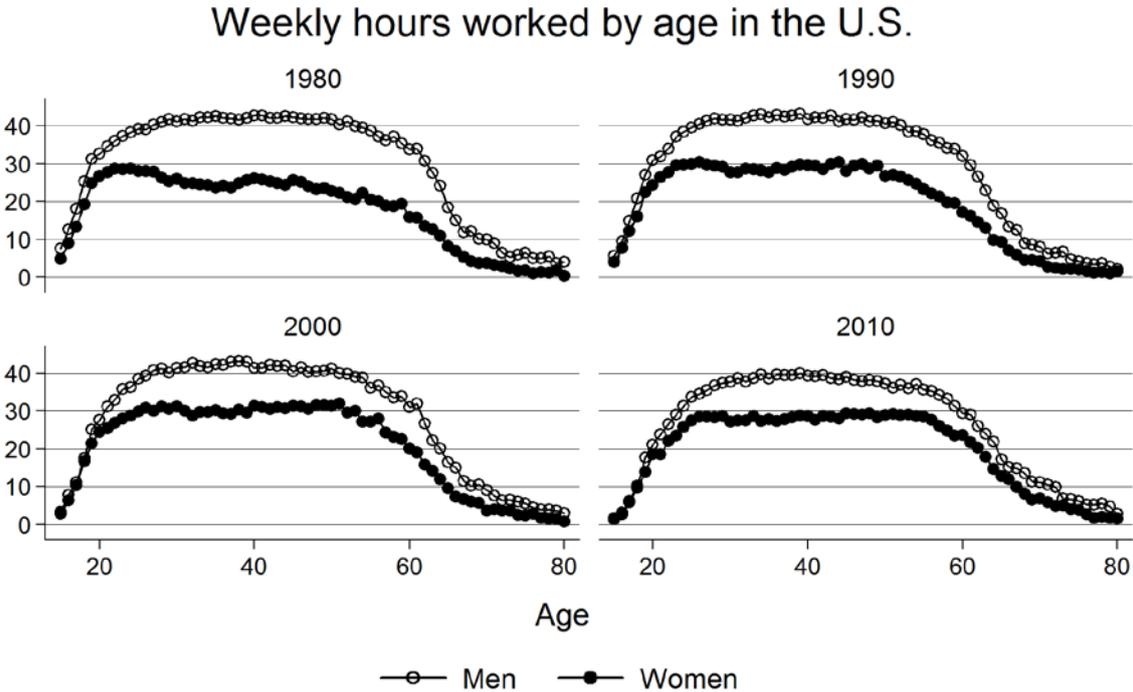
Source: March CPS 1976-2011, own calculations. Population aged 21-65. Base year 1976=100.

Figure 3: Hourly wage rates in the U.S. for men and women (1976-2011).

Second, annual earnings are affected by individuals' decisions of how many hours per week to supply on the labor market. Patterns of labor supply have considerably changed over the past decades. This is especially true for women, who have substantially increased their educational attainment and are

therefore much more attached to the labor market. In addition, in many countries the increase of female labor force participation, both at the extensive and intensive margin, has been more concentrated at the top of the distribution, which increases the gap in total household earnings between “rich” and “poor” couples.

Figure 4 shows the average weekly working hours for men and women of different ages for the years 1980, 1990, 2000 and 2010 in the United States. Several observations can be made. First, prime-aged males always work 40 hours per week and more. Second, women increased both the average weekly hours as well as their retirement age. Hence, while the pattern of labor supply behavior of men has remained almost unchanged over the 30 year-period, the pattern for women changed remarkably has become much more similar to that of men.



Source: March CPS, own calculations.

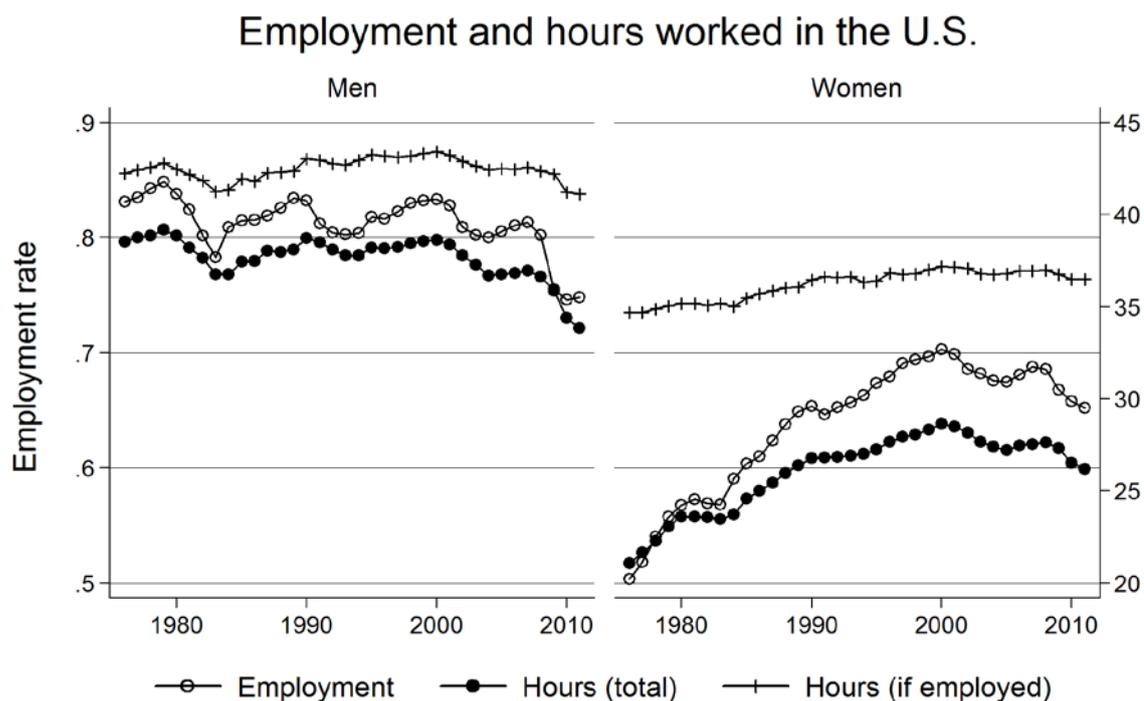
Figure 4: Weekly working hours for men and women by age (1980-2010).

This is also related to patterns of increasingly assortative mating (“Doctors marrying doctors, rather than nurses.”, OECD, 2011) and increasing correlation of labor earnings and hours worked among couples. More generally, patterns of household formation and composition have changed

tremendously in many Western countries and are related to increasing inequality (see, e.g., Peichl et al., 2012, for an analysis on Germany).

Finally, the number of weeks worked per year reflects fluctuations in employment which are related to unemployment fluctuations over business cycles. This makes the distribution of gross earnings more unequal when the risk of layoff during an economic downturn is more concentrated at the bottom of the wage distribution, such that unemployment rates and earnings inequality are positively correlated.

Figure 5 shows the employment rate (left scale) and average weekly working hours (right scale) for U.S. men and women over time. While the male employment rate is relatively stable around 80%, total working hours show some variation over the business cycle and hours worked conditional on being employed are stable and on average above 40 hours per week. For women, the number of hours worked conditional on employment only marginally increased around the level of 35 hours, while total weekly hours increased substantially from 20 to 25 hours along with the employment rate from 50% in the mid-1970s to around 70% in recent periods. While long-run trends as well as short-run business cycle fluctuations in labor force participation and employment are of primary concern for labor market policies, they have also important implications for the distribution of labor earnings, since the underlying working force's composition crucially shapes the distribution for given labor market conditions.



Source: March CPS 1976-2011, own calculations. Population aged 21-65.

Figure 5: Employment rates and hours worked by men and women (1976-2011).

3. Equality of Opportunity

The literature on earnings inequality deals, by definition, with inequalities in (labor market) outcomes. However, theories of distributive justice distinguish ethically acceptable inequalities (e.g. due to differences in effort) from unfair inequalities (e.g. due to endowed characteristics). The concept of equality of opportunity in contrast to equality of outcomes has received considerable attention since the seminal contributions of Roemer (1993, 1998), Van de gaer (1993) and Fleurbaey (1995).² While the traditional notion of equality of outcomes refers to an equal distribution of economic outcomes (e.g. well-being, consumption or income) across the population, the equality of opportunity theory, in contrast, is interested in the sources of inequality and separates the influences on the outcomes of an individual into circumstances and effort. Circumstances are defined as all factors beyond the sphere of individual control, for which society deems individuals should not be held responsible, such as parental education, gender or ethnic origin. Effort, on the other hand,

² See, e.g., Ramos and Van de gaer (2012) and Roemer and Trannoy (2013) for overviews of the equality of opportunity literature.

comprises all actions and choices within individual responsibility for which society holds the individual (partially) accountable, e.g. schooling or labor supply decisions. Inequalities (in income) due to differences in effort are deemed equitable, whereas inequalities due to endowed circumstances are not.

This is related to the literature on wage discrimination (see, e.g., Altonji and Blank, 1999, for an overview). However, a fundamental difference exists between the two fields. Labor economists studying discrimination are usually interested in estimating the direct effect of endowed characteristics (e.g. race, gender) on income and try to separate it from confounding effects due to between-group differences in effort. In contrast, the equality of opportunity literature believes that the confounding indirect effect is also a source of unfair inequalities, i.e. a circumstance, itself that should not be separated from the direct effect of circumstances on income (see, e.g., the discussion in Roemer, 1998). Therefore, inequality of opportunity is related to wage discrimination, but it is not the same. Unfair income differences in the inequality of opportunity framework can be indeed caused by discrimination, but they could also be due to between-group differences in productivity or preferences. Therefore, the two approaches imply different normative choices about the compensation of the indirect (confounding) effect.

Niehues and Peichl (2013) analyze inequality of opportunity for Germany and the U.S. Figure 6 presents the range for inequality of opportunity shares, i.e., the inequality of opportunity level divided by the level of outcome inequality (between group inequality as a fraction of total inequality). The upper (lower) line corresponds to the upper (lower) bound share. Results are presented both for periodical (permanent) incomes in the upper (lower) panel both for the U.S. and Germany for the full sample as well as separated by gender for gross (left, darker bar) and net (right, lighter bar) earnings.

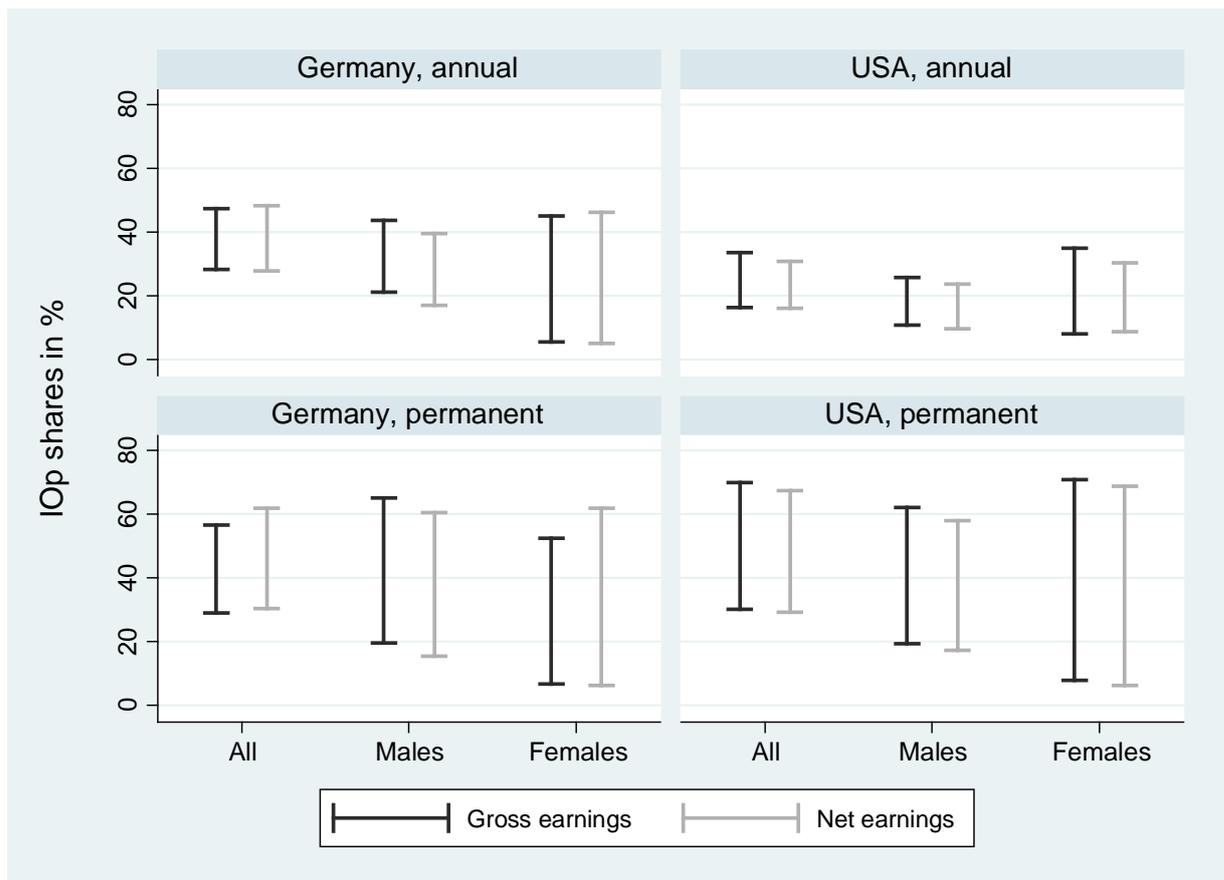


Figure 6: Inequality of opportunity shares in outcome inequality. Source: Niehues and Peichl (2013) based on SOEP and PSID. The two graphs on the top illustrate Inequality of opportunity shares in annual incomes (2009 for Germany, 2007 for the US); the graphs at the bottom Inequality of opportunity shares in permanent incomes.

The inequality of opportunity shares are significantly higher for Germany than for the U.S. for annual incomes, which is due to lower absolute levels of outcome inequality while having similar values of inequality of opportunity – which is in line with the findings of Almas (2008). The lower bound shares equal 30% in Germany and 16% in the U.S. – the latter is comparable to previous findings (Pistolesi, 2009). Based on these results, it would be possible to deduce that individual earnings are mainly driven by individual's effort choices and only to a lesser extent by circumstances. The upper bound estimates, however, suggest that earnings are to a larger extent pre-determined by exogenous circumstances. Niehues and Peichl (2013) find upper bounds of inequality of opportunity of around 50% in Germany and 35% in the U.S. The differences are statistically significant.

Thus, it seems that there is substantially less inequality of opportunity in the U.S. compared to Germany, i.e., one could conclude that equality of opportunity is higher in the "land of opportunities". However, using permanent instead of annual incomes matters for inequality levels, especially in the U.S., where inequality of opportunity levels are much higher for permanent incomes (comparable to the findings of Pistoiesi, 2009). In Germany, the difference between inequality levels for the two income concepts is much smaller. Therefore, inequality levels (and hence the inequality of opportunity shares) are similar for both income concepts. Hence, the inequality of opportunity shares for permanent incomes are higher in the U.S. than in Germany.

The lower bound inequality of opportunity shares are substantially smaller when looking at the female and male samples separately. This hints at gender as an important source of inequality of opportunity (due to gender wage gaps and differences in labor force participation). However, the effect is not as strong for the upper bounds based on the unit-effect as circumstance variable. This indicates that a large share of the inequality in outcomes can be explained by unobserved heterogeneity of individuals.

The differences between gross and net income inequality, i.e., the redistributive effects of the tax benefit systems, are rather similar between Germany and the US. This might be surprising at a first glance, since European welfare states are usually said to be more redistributive. But in the present case which focuses on the working age population, this is not the case. The main difference in redistribution between Germany and the U.S. is due to benefits (especially for the unemployed) and not due to the progressivity of the income tax which is rather similar in both countries. In our sample, we focus on individuals who are working. They pay taxes and receive almost no benefits – except for child credits which are comparable between both countries. Hence, the redistributive effects for this subgroup of the population are rather similar between Germany and the U.S.

4. Conclusions

In this paper, we have discussed the topic of earnings inequality and reviewed the existing literature. Inequality is not a bad thing per se. In fact, it is necessary for the functioning of a market economy. Nevertheless, the rapidly growing levels of inequality provide concerns for the social stability of Western societies. When talking about inequality, the question of inequality of what among whom arises immediately – and the different choices have different implications for the results. Hence, results from different studies have to be interpreted with caution. From a normative point of view, an interesting question is whether we should care about inequality in outcomes or rather about inequality of opportunity.

Our descriptive review of some core facts with respect to U.S. earnings inequality has shown that there is not the one explanation for long-run trends in (increasing) inequality, but rather many. Core labor market conditions as well as changes in the composition of the population, and hence workforce, play an important role. In addition, the tax-benefit system, although not directly affecting gross earnings levels, affects incentives to take up work and also the formation of families and households.

Our discussion has shown that despite the enormous and ever growing literature on inequality, a lot of issues are still left for future research. It would be important to develop a comprehensive model of the household income distribution, incorporating different income sources such as labor earnings, capital and business income as well as for taxes and social benefits and accounting for demographic factors such as household formation and composition.

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