Checchi *et al. IZA Journal of European Labor Studies* (2016) 5:15
DOI 10.1186/s40174-016-0065-2

IZA Journal of European Labor Studies

ORIGINAL ARTICLE Open Access

Are changes in the dispersion of hours worked a cause of increased earnings inequality?

Daniele Checchi[1,2,3*], Cecilia García-Peñalosa[4,5] and Lara Vivian[4]

*Correspondence:
daniele.checchi@gmail.com
[1] University of Milan, Milan, Italy
[2] Irvapp-FBK, Trento, Italy
[3] IZA, Bonn, Germany
Full list of author information is available at the end of the article

Abstract
Earnings are the product of wages and hours of work; hence, the dispersion of hours can magnify or dampen a given distribution of wages. This paper examines how earnings inequality is affected by the dispersion of working hours using data for the USA, the UK, Germany, and France over the period 1989–2012. We find that hours dispersion can account for over a third of earnings inequality in some countries and that its contribution has been growing over time. We interpret the expansion in hours inequality in European countries as being the result of weaker union power that led to less successful bargaining concerning working hours.

JEL Classification: D31, J22

Keywords: Earnings inequality, Working hours, Inequality index decomposition

1 Introduction

A vast literature has examined the evolution of wage and earnings inequality over the past three decades and, despite substantial heterogeneity across countries, has identified a major increase in the dispersion of both in many industrial economies.[1] An orthogonal research agenda has focused on the evolution of working hours and in particular on the divergence in working patterns between the USA and Europe since the 1970s.[2] Given such differences across countries, it is conceivable that the hours of work also differ in terms of their dispersion, raising the question of whether hours inequality has contributed to the increase in earnings inequality. Understanding the role and source of hours dispersion is crucial for the design of policies aimed at reducing inequality. On the one hand, policies that try to increase the hours for those with the lowest skills and wages and reduce them for those at the top of the distribution can be alternatives to ex post redistribution. On the other, the source of the dispersion is important for policy as it could be due to imposed constraints or the result of certain groups, such as women with young children, choosing to spend less time at work. This paper represents a first step in trying to understand those questions.

We use data for the USA, the UK, Germany, and France to decompose earnings inequality and assess the roles played by the dispersion of wage and by inequality in hours in explaining cross-country differences and changes over time. By definition, an individual's earnings are the product of her hourly wage rate and her hours of work. Using as our

inequality index the mean log deviation (MLD), an inequality index belonging to the general entropy family, we decompose earnings inequality into the dispersion of hourly wages and a component capturing the contribution of hours. This term has itself two elements, a measure of the inequality of hours of work and a term capturing the correlation between hours and hourly wages. Hours of work can as a result magnify or dampen wage inequality depending on how dispersed hours are and of whether they are positively or negatively correlated with wages.

Our sample covers the period 1989 to 2012 and considers both aggregate behavior as well as that of subgroups defined by gender and skill category. When we look at the distribution of hours, we find a surprising pattern.

Figure 1 plots the distribution of hours worked by employed individuals in our four sample countries. The left-hand panels depict the USA and France, while the right-hand ones present the distributions in the UK and Germany. In order not to focus on a single, potentially unrepresentative, year, the data cover two 5-year periods, 1995–2000 and 2007–2012. The USA and France exhibit fairly concentrated distributions, with about 30 % of individuals declaring to work around 40 h a week in 1995-2000. For the latter period, this fraction falls slightly in the USA, while France exhibits twin peaks due to the introduction of the 35-h week. In sharp contrast, Germany and the UK present fairly dispersed distributions, with much thicker tails at the bottom and, especially, at the top.

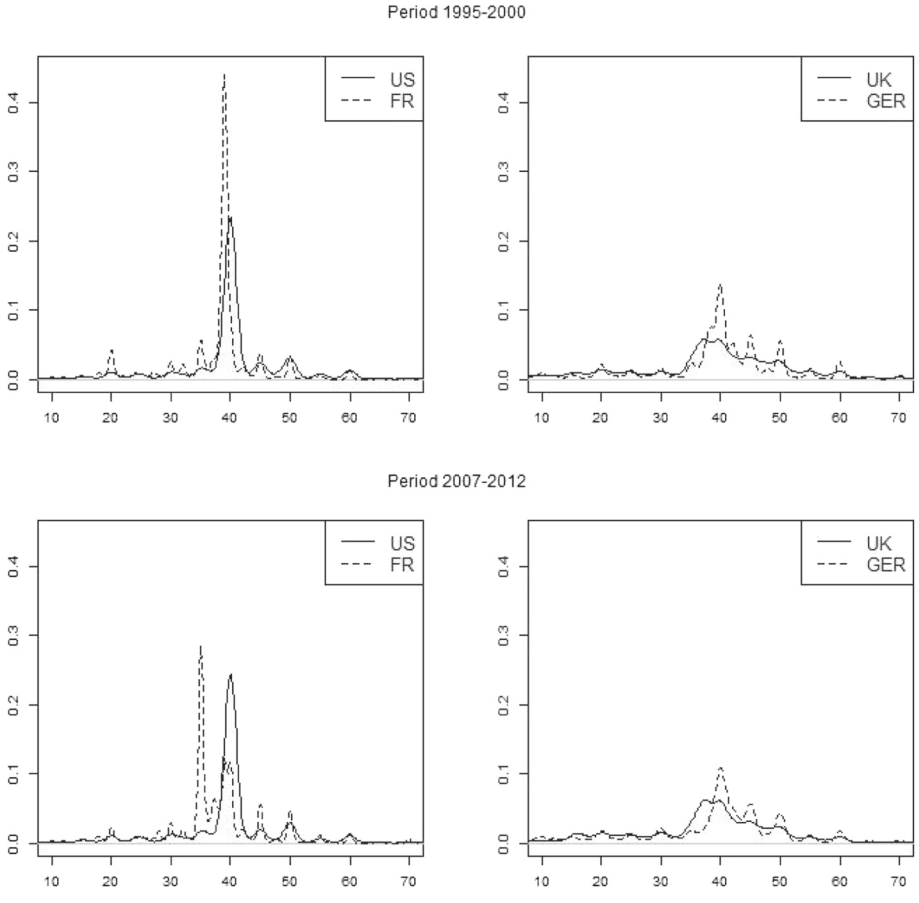

Fig. 1 Distribution of hours worked by country. Source: Authors' calculations; see Section 3 below

These differences in dispersion are reflected in the way in which wages and hours affect the distribution of earnings, as captured by our decomposition of the mean log deviation. Although our results indicate that in all countries the dispersion of working time is an unequalizing factor that increases earnings inequality over and above that implied by wages, differences across countries are substantial. In the USA and France, the overall contribution of hours to earnings inequality is moderate, with wages accounting for at least two thirds of the inequality in earnings. In contrast, hours play a crucial role in the UK and Germany, being responsible for between 28 and 40 % of the dispersion in earnings, respectively.

We pay particular attention to the covariance between wages and hours, which exhibits very different patterns across countries and over time. Wages and hours move together in the Anglo-Saxon economies, while they are negatively correlated in France and Germany at the start of the sample period, implying that part of the dispersion in wages was offset by the fact that those with the lowest earning potential spend more hours at work, the effect being particularly strong in France. These countries exhibit, however, an increase in the covariance over time, and by the end of the period, those with higher wages also work longer hours. In the case of Germany, this change has accounted for half of the increases in earnings inequality; in France, it is the major culprit.

Although some of the differences are related to the skill and gender composition of employment, between-group inequality in hours is only a small part of the story. Observed changes over time are largely due to the behavior of unskilled men and skilled women. Hours inequality has increased for the two groups, and both exhibit a marked increase in the covariance which has gone from being negative at the start of the period to null or positive. As a result, the equalizing force due to those with lower wages working longer hours seems to have been eroded over time.

Our paper contributes to two strands of literature. As mentioned before, there is a substantial literature on cross-country differences in working hours, and we add to this a new dimension by focusing on hours inequality. We also contribute to our understanding of what drives earnings dispersion by focusing on the neglected role of hours. Our paper is closely related to the analysis by Gottschalk and Danzinger (2005) of the relationship between individual wage rate inequality and household income inequality in the USA. They examine the various elements that determine household income inequality and emphasize, among other things, the importance of considering the distribution of hours. As in our results, they find an important role for changes in the hours worked by women. Our analysis has a very different focus as we provide an international comparison rather than the more detailed analysis of a single country that they consider.

Our analysis is also related to Bell and Freeman (2001) and Bowles and Park (2005) who argue that greater wage inequality is associated with higher average hours of work, implying that the increase in wage inequality that occurred over the last decades is likely to have spurred an increase in hours worked. We argue that the impact of this mechanism on overall inequality depends on two channels, how unequal the hours response is and on the correlation of hours worked and hourly wages.

The paper is organized as follows. Section 2 describes our empirical approach and presents the decomposition that we use and is followed by a section describing the data. Section 4 presents our main findings, while we conclude in Section 5.

2 Decomposing earnings inequality

A vast literature has examined the decomposition of inequality indices by factor components.[3] As is well known, the various inequality indices have different merits and drawbacks, and the choice of index is consequently not trivial for the results. Two common measures are the half-squared coefficient of variation (CV), which is particularly tractable, and the Gini coefficient, with the latter providing a less tractable decomposition but being less sensitive to extreme observations than the former.[4] Moreover, recent work, such as Jenkins and van Kerm (2005), proposes density function decompositions which have the advantage of being independent of the choice of inequality index.

These approaches have focused on decompositions over additive terms and are hence easily applicable to income factors. In the case of earnings, we are interested in decomposing total earnings inequality into a term due to wage rate inequality and one capturing hours inequality. Defining the total earnings of individual i as y_i, we have that they are the product of the hourly wage, w_i, and the number of hours worked, h_i. That is,

$$y_i = w_i h_i. \tag{1}$$

Our two terms of interest appear multiplicatively, and as a result, there are few inequality indices that can be satisfactorily decomposed. We have chosen to employ the mean log deviation (MLD), an index belonging to the general entropy (GE) family. The MLD, also called Theil's L index, is the general entropy index for $\alpha = 0$ and shares a number of desirable properties of this class of indices.[5] The parameter α in the GE class of indices captures the weight given to income differences at various parts of the income distribution. For lower values of α, such as $\alpha = 0$, GE is particularly sensitive to changes in the lower tail of the distribution.

The MLD is defined as the difference between the log of the average of a variable and the average of its log and has been shown by Duro and Esteban (1998) to be decomposable. The overall inequality in earnings can hence be expressed as the sum of three components: inequality in hourly wages, inequality in hours worked, and a component capturing the correlation between hours worked and hourly wages. The MLD of earnings is denoted by I_y, which is defined as

$$I_y = \frac{1}{N}\sum_{i=1}^{N} \ln \frac{\bar{y}}{y_i}, \tag{2}$$

where N is the number of observations and $\bar{y}$ is average earnings. We can also define the index for hourly wages and hours worked, namely,

$$I_w = \frac{1}{N}\sum_{i=1}^{N} \ln \frac{\bar{w}}{w_i}, \tag{3}$$

$$I_h = \frac{1}{N}\sum_{i=1}^{N} \ln \frac{\bar{h}}{h_i}, \tag{4}$$

where $\bar{w}$ and $\bar{h}$ denote the average levels of the two variables.

Using the fact that the covariance between hourly wages and hours worked, cov, can be shown to be given by $\text{cov} = \bar{y} - \overline{w}\overline{h}$, Eq. (2) can be expressed as the sum of (3) and (4)

plus a third term capturing the correlation between hours worked and hourly wages. That is,

$$I_y = I_w + I_h + \underbrace{\ln\left(1 + \frac{\text{cov}}{\bar{w}\bar{h}}\right)}_{\rho} \tag{5}$$

These three terms represent the absolute contributions to inequality of the various elements. The first two terms are simply inequality in hourly wages and hours worked, and both are positive. The third term, denoted ρ, captures the correlation between hours and wages. If the covariance is negative, this term will be negative too, reducing earnings dispersion. The total contribution of hours to overall inequality hence depends on the value of the sum of the dispersion in hours and the correlation term. Whenever this sum is equal to zero, earnings inequality equals the dispersion in the hourly wage rate and hours play no role. If, instead, the sum is positive, then hours magnify the impact of wage inequality on earnings dispersion. When the correlation term is sufficiently negative, $I_h + \rho$ may be negative, implying that hours reduce overall inequality, and the more dispersed hours are, the more they will reduce inequality.

A convenient way of expressing Eq. (5) is to consider the relative contributions of the three terms, obtained when dividing Eq. (5) by I_y, that is,

$$1 = \underbrace{\frac{I_w}{I_y}}_{\text{RC}_w} + \underbrace{\frac{I_h}{I_y}}_{\text{RC}_h} + \underbrace{\frac{\rho}{I_y}}_{\text{RC}_\rho} . \tag{6}$$

The terms RC_w, RC_h, and RC_ρ are the relative contribution of inequality in hourly wages, of the dispersion of hours, and of the correlation term to inequality in earnings, respectively. In other words, they measure the share of earnings dispersion due to each of the three components.

There are two key questions that we want to address that can be framed in terms of these contributions. The first one is how close RC_w is to 1. If the relative contribution of wages is close to 1, it would indicate that most of earnings inequality is due to differences in the hourly wage rates received by individuals and that hours play a small role. In contrast, a small value of RC_w would imply that differences in hours worked magnify the dispersion of wages. Second, note that a high RC_w does not imply that there is little inequality in hours. In fact, it may be due to hours exhibiting little dispersion or to hours being unequally distributed but negatively correlated with hourly wages. In the second case, individuals will be partly offsetting the impact of wage inequality by working more the less well-paid they are. It is in fact possible that, if the correlation is sufficiently negative, the term RC_ρ totally offsets RC_h, implying that hours inequality makes the distribution of earnings less unequal than that of wages.

The MLD index allows us to further decompose Eq. (5) into a term capturing within-group (W) and one measuring between-group (B) inequality. If the total population is divided into J exhaustive groups, with group $j \in \{1, ..., J\}$, then the inequality index for earnings takes the form

$$I_y = \underbrace{\sum_{j=1}^{J} p_j ln(\frac{\bar{y}}{\bar{y}_j})}_{B_y} + \underbrace{\sum_{j=1}^{J} p_j I_{yj}}_{W_y} . \tag{7}$$

where $p_j = \frac{N_j}{N}$ denotes the proportion of individuals belonging to group j, $\bar{y}_j$ is the mean income of group j, and I_{yj} refers to the inequality index computed over the members of group j.

This decomposition can be performed over earnings, wages, and hours; therefore, the correlation term ρ can also be written as a sum of within-group and between-group inequality. Equation (5) implies that both the within-group and the between-group terms of inequality in wages, of hours dispersion, and of the correlation term have to sum up to within and between inequality of earnings, implying that the within and between components of ρ can be calculated as $W_\rho = W_y - W_w - W_h$ and $B_\rho = B_y - B_w - B_h$, respectively. Combining Eqs. (5) and (7) gives a nested decomposition of overall inequality, which takes the form

$$I_y = \underbrace{B_w + B_h + B_\rho}_{B_y} + \underbrace{W_w + W_h + W_\rho}_{W_y}. \tag{8}$$

Using a nested approach allows us to differentiate the contribution of inequality in wages, hours dispersion, and the correlation term to inequality within and between each group.

3 The data

3.1 Databases

The harmonized dataset constructed for this paper is based on different national surveys collected from national statistical institutes. We use household or labor surveys for the USA, the UK, Germany, and France, covering two decades starting around 1990. In particular, we use the *Current Population Survey* for the USA; the *British Household Panel Survey* and, from 2009, *Understanding Society* for the UK; the *German Socio-Economic Panel* for Germany; and the *Enquete Emploi* for France (which becomes the *Enquete Emploi en temps continue* in 2003), all of them surveys that have been widely used in the empirical literature on inequality. For example, CPS data was used by Murphy and Welch (1992) in their seminal paper on wage inequality in the USA, while GSOEP has been employed by Bell and Freeman (2001) and the other three surveys by Blundell et al. (2013) to perform international comparisons of hours of work.

Although the design of the surveys changes over time and across countries, those datasets have a core set of questions that can be harmonized. They are, in fact, the primary source for several projects that provide harmonized data for a number of countries, such as the Luxemburg Income Study (LIS) and the Cross-National Equivalent File (CNEF) dataset.[6] We chose not to use the already-harmonized data provided by these projects as they were not suitable for our purposes. The LIS data are available every 5 years only, and since for several countries they start only about 25 years ago, we would have had only five observations, making it harder to identify time trends. The CNEF dataset, instead, has annual observations but covers a shorter time span than that available in the original data sources. For these reasons, we resorted to using the original surveys.

For the USA, we had the choice between two datasets, CPS and the Panel Study of Income Dynamics (PSID) data. A number of papers have used PSID to examine the evolution of earnings; see, for example, Gottschalk and Moffitt (1994), Moffitt and Gottschalk (2002), and Haider (2001). The PSID data is attractive because of its panel dimension, but its small sample size is a major drawback for our purposes, specially since we intend to

examine time trends for disaggregated workers, implying that results for the subgroups may not be representative. A second reason to prefer CPS is that it asks the same question we find in the European surveys, namely "how many hours do you usually work per week in your current job." PSID had traditionally not included such a question, focusing on annual hours, although the question was included in some recent surveys starting in 2003. Lastly, sample attrition in PSID may have affected its representativeness over time; see Fitzgerald et al. (1998). We hence decided to use CPS data, although a comparison of inequality in hours between the two datasets is provided below.

3.2 Variable definitions

Our two key variables of interest are earnings and hours worked, from which we then compute the hourly wage. We focus on prime-age workers, i.e., those who are at least 25 years old and at most 54, who are (dependent) employees in either the private or the public sector. As is well established, employment patterns for young and for mature workers differ substantially across countries, much more than for prime-age workers. Focusing on this age group allows us to abstract for differences in the education system and in retirement possibilities. Details on sample sizes by country and year are provided in the Appendix.

Both variables are measured at a particular point in time, that is, we use questions referring to the current job of the individual. This contrasts with papers that use annual hours and earnings and compute wages from those. There are good reasons for not pursuing this path, since both unemployment rates and vacation patterns vary substantially across countries and would have a major impact on measured hours. Focusing on a snapshot of weekly hours/earnings implies greater comparability of the data.

3.2.1 Earnings

The measure of earnings that we employ is the usual gross income from labor that the individual receives over a week from the main current job. For employees, this means contractual wages plus overtime pay. This variable is present in all the datasets, yet some important differences need to be highlighted. Our main concern is that income from self-employment is difficult to measure in household surveys, mostly because the self-employed tend to have high non-response and under-reporting rates; in addition, income from self-employment varies considerably over time. For these reasons, the self-employed are not asked about current usual earnings in the CPS, and in the BHPS, over one fifth of self-employed respondents either refuse to give information or do not know how much they earn.[7] We therefore decided to remove the self-employed from our sample.[8]

A second concern is that three countries report gross earnings, while France only provides earnings net of social security contributions (but not of income taxes). However, since such contributions are roughly proportional to gross earnings, this difference should have little effect on measured inequality.[9]

Survey frequency and the period of time covered by the questions also vary across datasets. The USA and France, for instance, collect data monthly and quarterly, respectively, and the questions concern current employment. Instead, the UK and Germany survey once a year, asking questions about current earnings and also about the employment situation during the previous year. Note that although there are differences in survey frequency (monthly, quarterly, and annual), we always use questions concerning the same

reference period—current job—and not questions concerning earnings last year, available in some of the surveys. Therefore, the periodicity over which the survey is conducted does not create comparability problems in terms of the variable we are using.

Our selection rule is to select the month of March or the first quarter of the year, and we do so for the USA and for France. However, in the case of Germany, such a choice implies a small number of observations. Since keeping the largest possible sample is crucial given our intention of decomposing the population by gender and educational groups, we use data for the entire year. For the UK, BHPS data was collected in October/November, and thus, we are forced to use this period. In all cases, we checked that at the aggregate level (i.e., before dividing into population subsamples) annual data and first-quarter/March data gave results that were not significantly different.

Finally, a more technical concern is the different policy of top-coding high incomes across countries. The USA, for instance, top-codes systematically, with a top-coding value of $2885 per week for the most recent years. We decided to follow the recommendation of the LIS project, and we top-code earnings at 10 times the weighted median of earnings. For those observations for which earnings were top-coded, the hourly wage was calculated after the top-coding was performed. Since we are interested in hourly wages, we also consider extreme values for this variable. Whenever hourly wages were above 10 times the weighted median of wages, we removed those observations.[10]

3.2.2 Hours worked

Hours worked can be measured in different ways, capturing contract hours, actual hours, or usual hours. For most of the databases, we use the question concerning "usual hours worked in the main current job." Some databases also ask about the number of hours actually worked during the previous week. Although this variable may have less measurement problems, we were concerned with seasonality and we hence decided against its use.[11]

The harmonization of this variable was not straightforward due to coding problems. First, we had to make sure that it included both contractual hours and overtime. Second, it is a variable that is often truncated. In particular, Germany truncates at 80 h per week and the USA at 99 h. Given the issue we are interested in, this may be a concern as truncation affects the upper tail of the distribution of hours worked. Inspection of the data indicates that this is not the case since we did not find a concentration of observations at the truncation points. Nevertheless, we decided to drop extreme observations and consider only workers that spend between 2 and 90 h a week working on their main job.

3.3 The USA: data sources and definitions

Before proceeding to examine the data for the four countries, we consider in detail data sources for the USA. Figure 1 above presents the distribution of hours of work for the USA, with hours being highly concentrated around 40 and both the upper and lower tails being rather thin. This pattern did not match our expectations, our prior being that the USA would exhibit a fat upper tail capturing the workaholic culture that we often find discussed in the popular press; see Schor (2008). Our results raise the question of whether the data we are using is the most suitable one and if other variable definitions or data sources would yield a different picture.

In order to address this concern, we consider a number of additional measures. First, we consider the CPS data and our core variable of weekly hours but do not restrict our sample

by age and compute the distribution of hours for this group. Second, we consider PSID as an alternative dataset. In order to assess the accuracy of our chosen data, we compute measures of hours inequality for both CPS and PSID for the years 2003, 2005, and 2007. These are the only 3 years for which we have data for the question "how many hours do you work per week in your current or most recent job" in PSID.[12] We use two measures of hours. The first are hours worked the previous week, i.e., the most comparable measure to the one in CPS, denoted *J*1 in the survey. We also use the variable Hann which is the total annual hours worked during the previous year. We divide the data by 50 weeks (the modal working weeks in a year in the USA) in order to get a measure comparable with the others.

Table 1 reports the key magnitudes of the resulting four measures for 3 years, while Fig. 2 depicts their distributions in 2007. The first panel of Table 1 presents the CPS data that we will be using. Mean and median working hours are almost identical, roughly 40 h per week, the standard deviation fluctuates around 9.35, and the mean log deviation is 0.04. When we consider the entire CPS sample, we find the same median but the mean is almost 2 h lower, probably reflecting the fact that very young individuals work less. We find a substantially higher degree of inequality, as captured by the two measures of dispersion. In particular, I_h goes from 0.04 to 0.07, probably due to the low working hours of young individuals (notably, students).

The top panel of Fig. 2 plots the two distributions. Two features are noteworthy. First, there is greater weight in the tails, at the bottom due to a number of very dense points, at the top because there are now individuals that work a very high number of hours, mainly the self-employed. Second, hours seem to concentrate more around certain numbers. The fraction of individuals working 40 h is now very large, 40 % of the sample, while observations seem to concentrate around certain focal values such as 20, 45, 50, and 60 h.

The bottom two panels of Table 1 present the results obtained with PSID, where in both cases the sample has been restricted to the 25–55 age group. For weekly hours, the

Table 1 Comparing US data across surveys and definitions

	Variable	2003	2005	2007
CPS selected	Mean	40.24	40.04	40.22
	Median	40.00	40.00	40.00
	s.d.	9.35	9.38	9.33
	Ih	0.04	0.04	0.04
CPS entire	Mean	38.66	38.54	38.71
	Median	40.00	40.00	40.00
	s.d.	11.84	11.74	11.66
	Ih	0.07	0.07	0.07
PSID J1 selected	Mean	41.61	41.66	41.64
	Median	40.00	40.00	40.00
	s.d.	10.66	10.94	11.20
	Ih	0.05	0.05	0.05
PSID Hann/50 selected	Mean	40.19	40.59	40.23
	Median	40.64	40.80	40.80
	s.d.	13.43	13.31	13.55
	Ih	0.08	0.08	0.09

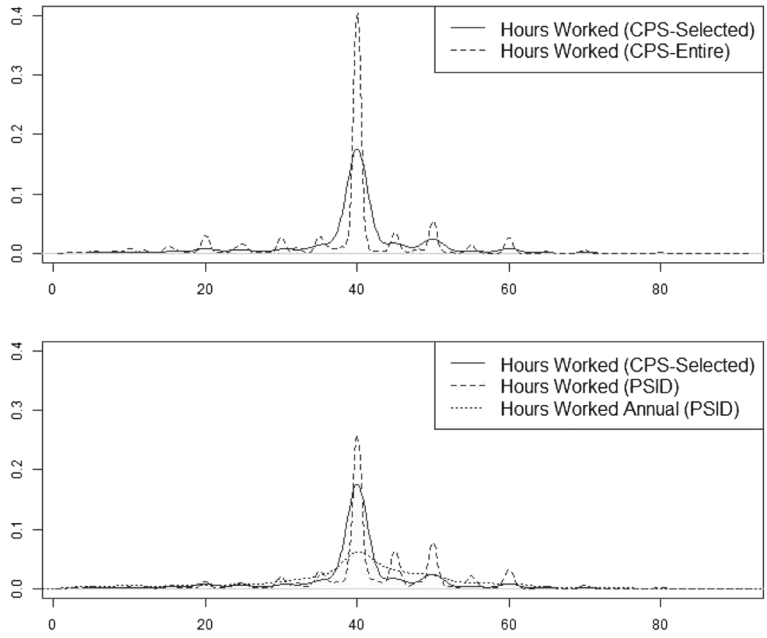

Fig. 2 Distribution of hours worked: USA, 2007

results are extremely close to those obtained with the CPS sample: an identical median, the means and standard deviation are 1 h higher, while I_h goes from 0.04 to 0.05. When we compare the distributions depicted in Fig. 2, we can see that, for weekly hours, the distributions implied by PSID and CPS are relatively similar, the latter being somewhat smoother and the former implying greater concentration around focal points (20, 40, 45, 50...). Clearly, the PSID data imply that American workers are highly concentrated around certain working hours, and the similarities between this pattern and that found for the CPS indicate that our sample choice is representative and well suited to our purposes.

In contrast, a very different picture is obtained when we look at annual hours worked (the variable Hann divided by 50), which are reported in the bottom panel of Table 1. A major problem of this measure is that individuals may have unemployment spells and/or may have had several jobs during the year, yet we have no information of how the hours were split between the various jobs. As a result, a low value of Hann can be due to a short working week for the whole year or to a long working week when employed and periods of unemployment. The bottom panel of Fig. 2 depicts the distribution of this variable, and we can see that it is much more dispersed and much smoother than any of our other series. Mean working hours are somewhat lower than for weekly data (1.5 h less) and the median is slightly higher, while dispersion is substantially increased. The standard deviation for 2007 is 13.54, compared to 11.20 and 9.33 for the weekly data from PSID and CPS, respectively. The MLD is almost twice as large as for weekly data.

These differences raise a fundamental question about which is the most suitable data to use. The US labor market implies much more frequent flows into and out of employment as well as more job-to-job transitions than European ones; as a result, comparing annual working hours across countries implies allowing for the fact that some of the observed differences are due to distinct patterns of employment. This problem is particularly acute in our context since we are interested in inequality in hours worked, and the much larger

dispersion of annual hours implies that if we were to use this measure we would be comparing differences in earnings inequality caused by unemployment spells rather than those due to different choices of regular working hours. We have hence chosen to employ the measure of hours based on reported weekly hours. This measure ignores a difference between the USA and Europe, namely the fact that Europeans tend to take more weeks of paid holiday. Note, however, that weeks of holiday are paid at the same rate as weeks of work; consequently, if all workers are taking their mandatory holiday, this should affect the difference in mean hours worked across the continents but not their dispersion or that of earnings.

3.4 Key magnitudes

Table 2 presents the values of several inequality indices for earnings, hourly wages, and hours worked. We report the index that we employ in our analysis, the mean log deviation, and some common inequality measures often used in the literature. The dispersion in earnings is often measured by the Gini coefficient, while for wage inequality we compute the standard deviation of the log of wages.[13] For hours, we compute for each year average hours and the MLD and report the highest and the lowest value of each for each country.

As is well established, earnings inequality measured by the Gini index is highest in the USA and the UK, followed by Germany and France. Interestingly, the range of the Gini coefficient for the period 1990–2012 is largest for the USA and for Germany, indicating that both countries have experienced substantial changes during our period of study. The MLD gives a slightly different picture, with the UK exhibiting the greatest earnings inequality and the USA being somewhere in between the UK and Germany, while France lags well behind. Behind this pattern lies the fact that the MLD is particularly sensitive to inequality at the bottom of the distribution and less so to that at the top and that a substantial fraction of inequality in the USA has been driven by the behavior of top incomes.[14] In terms of hourly wages, the USA and the UK are the most unequal countries, with the MLD ranging between 0.11 and 0.19, while France exhibits the lowest degree of wage dispersion, with a minimum of 0.08 and a maximum of 0.11.

We report average hours worked by country, which have been widely discussed in the literature. North Americans work more than the individuals in the other countries, and France exhibits the shortest working week, with the minimum and maximum being about 3 h less than the figures for the USA. Average hours have increased slightly in all countries, by about 2 h per week. The dispersion of hours is lower than that of wages, as expected, with the MLD ranging between 0.03 and 0.10, roughly half of the dispersion we observe for wages. In France and the USA, hours dispersion is low and relatively stable over the period, fluctuating between 0.03 and 0.04 in both countries. In contrast, hours inequality in Germany and the UK is substantially higher and has changed markedly over time, with the MLD of hours peaking at 0.082 and 0.94, respectively, figures that are comparable to the dispersion of hourly wages.

The evolution over the past decades of earnings and wage inequality are by now well known. Figure 3 depicts the time trends of both average hours worked and hours inequality in the four countries, where both variables are an index relative to the country's value in 1991. Before we discuss these trends, it is important to note that there have been important changes in some of the surveys over the period. Table 5 in the Appendix reports a number of descriptive statistics for each annual survey. For three of the countries, the

Table 2 Key magnitudes for earnings, wages, and hours worked

	Earnings				Wages				Hours			
	MLD		Gini		MLD		SDlog		MLD		Mean	
Country	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
USA	0.169	0.247	0.305	0.367	0.108	0.188	0.465	0.666	0.033	0.045	38.565	40.595
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.004)	(0.005)	(0.024)	(0.001)	(0.002)	(0.147)	(0.102)
UK	0.217	0.268	0.337	0.368	0.124	0.159	0.487	0.586	0.064	0.097	37.394	39.199
	(0.007)	(0.008)	(0.005)	(0.003)	(0.004)	(0.003)	(0.007)	(0.011)	(0.003)	(0.004)	(0.113)	(0.240)
DE	0.140	0.235	0.262	0.327	0.090	0.129	0.412	0.547	0.052	0.082	37.841	39.695
	(0.005)	(0.007)	(0.005)	(0.004)	(0.003)	(0.005)	(0.006)	(0.011)	(0.002)	(0.003)	(0.186)	(0.155)
FR	0.116	0.149	0.245	0.284	0.079	0.112	0.383	0.523	0.034	0.043	35.417	37.704
	(0.002)	(0.005)	(0.002)	(0.005)	(0.002)	(0.002)	(0.005)	(0.013)	(0.001)	(0.002)	(0.043)	(0.046)

Note: MLD stands for mean log deviation, SDlog for the s.d. of the log of hourly wages, and Gini for the Gini coefficient. All inequality measures are computed for each country, each year, and "Min" and "Max" report the lowest and highest values observed for each country over the sample period, respectively. Standard errors obtained through boot-strapping in *brackets*

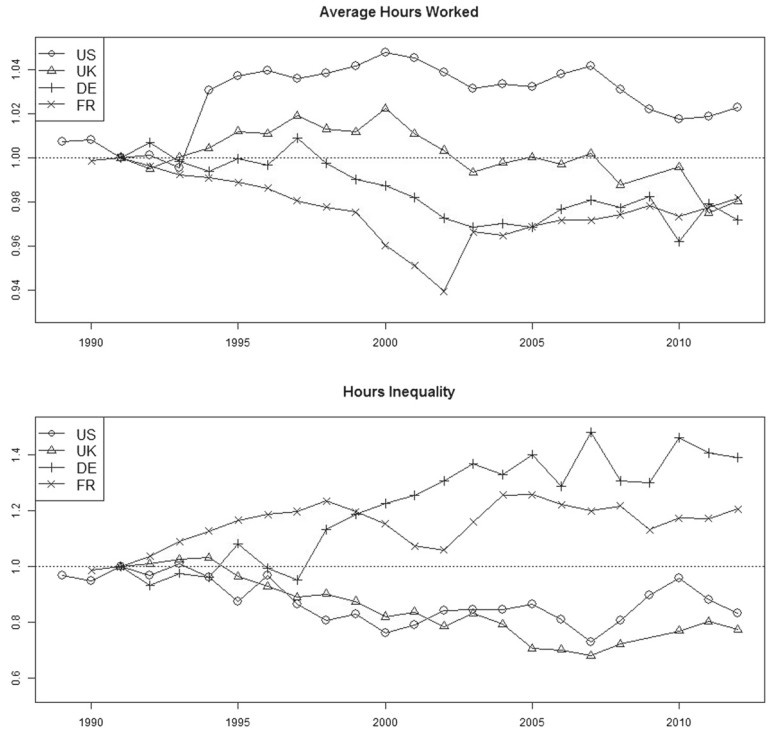

Fig. 3 Time trends in hours inequality and average hours worked. Note: For both variables, we report an index with the year 1991 taking the value 1. Inequality is measured by the MLD

USA, the UK, and France, there has been one substantial change that implied a major jump in sample size. In the UK, this occurs between 2008 and 2009 (no data are available for 2009 as observations for 2009 were collected together with those for 2010), with the sample size going from around 3000 individuals to over 16,000. Inspection of the data does not indicate any break in the time series. For France, sample sizes change between 2002 and 2003, with the sample size becoming about a quarter of the original one, although the sample remains large, between 7000 and 10,000 individuals. Average hours worked increase by 1 h, a change that is somewhat larger than any of the other year-to-year changes we observe, which are usually of the order of 0.5 h. The standard deviation also exhibits the largest year-to-year increase, although this is only slightly larger than the other substantial changes we observe during the period (0.58 of an hour, with the standard deviation increase by 0.36 of an hour the year after the change in sample size).[15]

In the case of the USA, survey changes seem to have had a more substantial impact.[16] Between 1993 and 1994, the size of the sample doubles, and more importantly, the share of high-skilled workers in the sample rises substantially, from 41 % of the sample to 57 % (see Fig. 12 in the Appendix). This change seems to have had major implications for our variables of interest, with mean working time increasing by 2.3 h per week and the standard deviation by almost 2 h. These changes are apparent in Fig. 3 where both average hours worked and the MLD of hours exhibit a jump. Unfortunately, there is no way to deal with this change in sample composition. In what follows, we will report figures for the entire period for which we have data for the USA, 1989 to 2012, but the reader should bear in mind that comparisons with the pre-1993 data are to be interpreted with great care.

4 Time trends and compositional effects

4.1 General trends

To understand the broad patterns described above, we consider in detail the evolution of the various magnitudes, as well as differences across groups defined by gender and skill. We start with the general time trends of hours worked and hours inequality in our sample period.

Going back to Fig. 3, we can see that over the last two decades average working hours have changed little, in a range ± 5 % with respect to the beginning of the period (top panel). But almost constant means have been accompanied by significant changes in dispersion. The data show a distinctive pattern, contrasting the Anglo-Saxon countries against the experience of the continental economies. Inequality has declined in the USA and the UK, and despite an increase in dispersion since 2007, hours inequality is below its value in the early 1990s. In contrast, France and Germany have witnessed a steady increase in the MLD of hours, with the hour inequality index being about 20 and 40 % higher in 2012 than in 1991, respectively. In the case of France, this is the direct outcome of the forced reduction of weekly working hours introduced in 2000, as can be seen when comparing the top and bottom panels in Fig. 1;[17] however, for Germany, the increased dispersion seems to be the result of a thickening of both tails of the distribution.

Turning to the decomposition of the MLD of weekly earnings, Fig. 4 plots the evolution over time of earnings inequality as well as of its three components, while Table 3 presents the corresponding figures for selected years.

The top left panel shows the evolution of the level of inequality in earnings, with high levels of overall inequality in the UK and the USA (the MLD index ranges between 0.18 and 0.25), with Germany catching up and France lagging behind.[18] When considering the decomposition between wages and hours, the USA and the UK behave differently: the USA records the highest wage inequality, with a slightly increasing value of the MLD, around 0.17; on the contrary, the UK remains constant at 0.15 for most of the period. As a consequence, in the USA, hourly wages explain a large fraction of inequality in earnings, reaching 75 %, while in the UK, it only represents half of it. Germany exhibits an upward trend in wage inequality, although the increase is smaller than that observed for earnings inequality. France is the least unequal country; its dispersion in hourly wages falls and reaches values below 0.10, with the corresponding contribution to earnings inequality falling from 75 to 60 %.

The middle graphs of Fig. 4 depict the absolute contribution of the dispersion of hours worked and of the correlation between hours and hourly wages, respectively. Hours inequality increase markedly in both France and Germany. Concerning the contribution to earnings inequality of the correlation between hours and wages, we identify two different patterns: the Anglo-Saxon countries exhibit a mildly positive correlation, constant over time, explaining 10 % of the overall inequality in those countries; Germany and France both exhibit negative/nil values in the 1990s and positive values after the year 2000. The bottom panels, included as a robustness check, report hours inequality as measured by the Gini coefficient and the covariance between hours and wages. We can see that the Gini delivers the same evolution of hours that we obtained with the MLD and that the coefficient of correlation for France and Germany exhibits sharp changes, which in turn are the main effect behind changes in ρ.

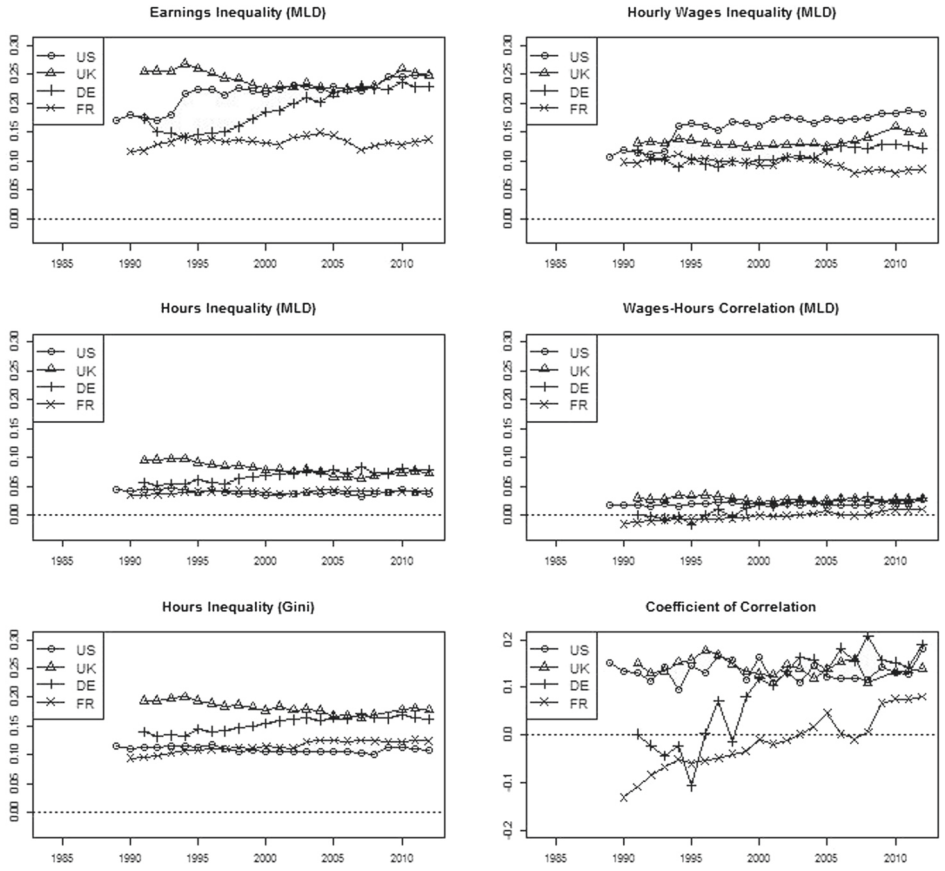

Fig. 4 Decomposition of earnings inequality

The overall evolution of these four countries is summarized in Fig. 5, where we report inequality in wages and inequality in hours for the years reported in Table 3. It can be clearly seen that each country follows a specific pattern: the UK with the highest inequality in hours vis-à-vis the USA with the highest inequality in wages, France with the lowest inequality along both dimensions, and Germany moving from the French "model" of labor market to the British one over the two decades.

4.2 Differences in hours worked across skill and gender groups

The different dynamics that we observe in the four countries may reflect compositional effects. For example, if part-time employment is a major source of hours dispersion and if this type of employment concerns mainly women, then observed cross-country differences could be the result of differences in the proportions of working women. Similarly, long-working weeks may concern only high-skilled males (the workaholic trader we find in the popular press), and consequently, the share of skilled employment may be an important determinant of hours dispersion. To address these issues, we decompose earnings inequality for four population subgroups, dividing the sample by gender and educational levels, low-skilled and high-skilled, the threshold being having at least some university education. In all countries but the USA, the share of low-skilled men declines and the share of high-skilled women is on the rise during our sample period. For France and Germany, the former group remains the largest (reaching a slightly less than 40 % at the

Table 3 Decomposition of earnings dispersion: absolute and relative contributions

Year	Country	I_y	I_w	I_h	ρ	RC_w	RC_h	RC_ρ
1991	USA	0.175	0.114	0.045	0.017	0.649	0.256	0.095
		(0.004)	(0.002)	(0.002)	(0.002)			
	UK	0.255	0.131	0.094	0.030	0.514	0.370	0.116
		(0.007)	(0.004)	(0.004)	(0.005)			
	DE	0.174	0.118	0.055	0.000	0.680	0.319	0.001
		(0.004)	(0.003)	(0.002)	(0.003)			
	FR	0.118	0.096	0.034	−0.013	0.818	0.292	−0.109
		(0.002)	(0.001)	(0.001)	(0.001)			
1995	USA	0.225	0.165	0.039	0.021	0.734	0.174	0.092
		(0.004)	(0.003)	(0.001)	(0.002)			
	UK	0.260	0.136	0.091	0.033	0.524	0.350	0.126
		(0.009)	(0.005)	(0.004)	(0.005)			
	DE	0.147	0.103	0.060	−0.016	0.702	0.409	−0.111
		(0.004)	(0.004)	(0.002)	(0.004)			
	FR	0.133	0.101	0.040	−0.008	0.759	0.300	−0.060
		(0.002)	(0.001)	(0.001)	(0.001)			
2000	USA	0.218	0.161	0.034	0.022	0.742	0.156	0.102
		(0.004)	(0.003)	(0.001)	(0.002)			
	UK	0.226	0.125	0.077	0.023	0.554	0.343	0.103
		(0.007)	(0.005)	(0.004)	(0.004)			
	DE	0.185	0.101	0.068	0.017	0.543	0.367	0.090
		(0.004)	(0.002)	(0.002)	(0.002)			
	FR	0.131	0.093	0.040	−0.001	0.707	0.302	−0.009
		(0.002)	(0.001)	(0.001)	(0.001)			
2007	USA	0.223	0.173	0.033	0.017	0.778	0.147	0.075
		(0.004)	(0.004)	(0.001)	(0.002)			
	UK	0.227	0.134	0.064	0.029	0.592	0.282	0.126
		(0.009)	(0.006)	(0.003)	(0.004)			
	DE	0.230	0.123	0.082	0.025	0.535	0.358	0.107
		(0.006)	(0.003)	(0.003)	(0.003)			
	FR	0.119	0.079	0.041	−0.001	0.664	0.346	−0.010
		(0.003)	(0.002)	(0.002)	(0.003)			
2012	USA	0.247	0.183	0.037	0.027	0.741	0.151	0.109
		(0.005)	(0.004)	(0.001)	(0.002)			
	UK	0.248	0.147	0.073	0.028	0.593	0.294	0.112
		(0.004)	(0.003)	(0.001)	(0.002)			
	DE	0.229	0.122	0.077	0.030	0.534	0.337	0.129
		(0.006)	(0.004)	(0.003)	(0.003)			
	FR	0.137	0.086	0.042	0.010	0.626	0.303	0.071
		(0.004)	(0.002)	(0.001)	(0.002)			

Note: Inequality in earnings, wages, and hours is measured by the MLD and denoted by I_y, I_w, and I_h, respectively. ρ denotes the correlation term, while RC_i is the relative distribution of wages, hours, and the correlation term

end of the sample period), while neither of the two groups of high-skilled groups do pass the threshold of 20 % each (see Fig. 12 in the Appendix).

Figure 6 depicts inequality in earnings computed for each subgroup, while Figs. 7, 8, and 9 repeat the exercise for wages, hours, and the wage-hour covariance (the corresponding figures for selected years are reported in Tables 7 to 11 in the Appendix),

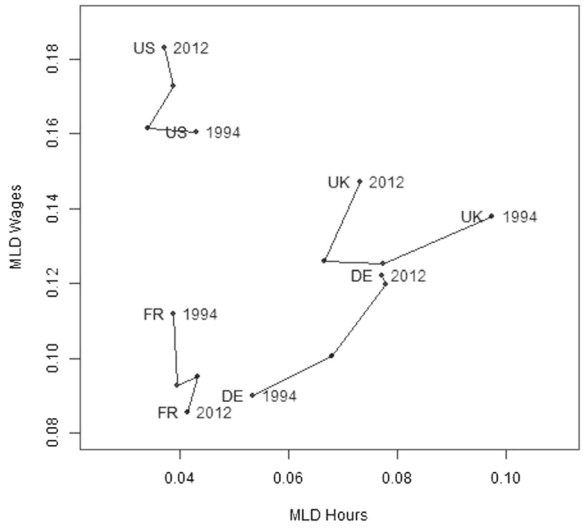

Fig. 5 Wage inequality versus hours inequality. Note: The years reported are 1994, 2000, 2005, and 2012

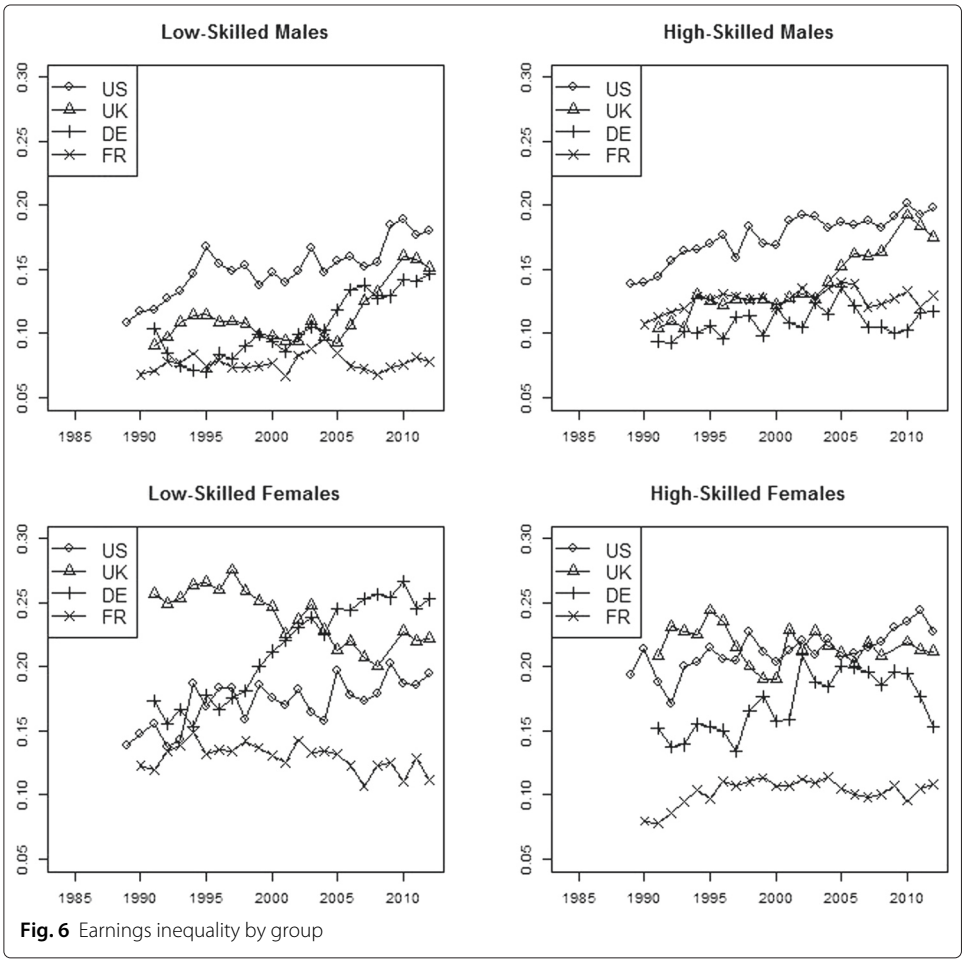

Fig. 6 Earnings inequality by group

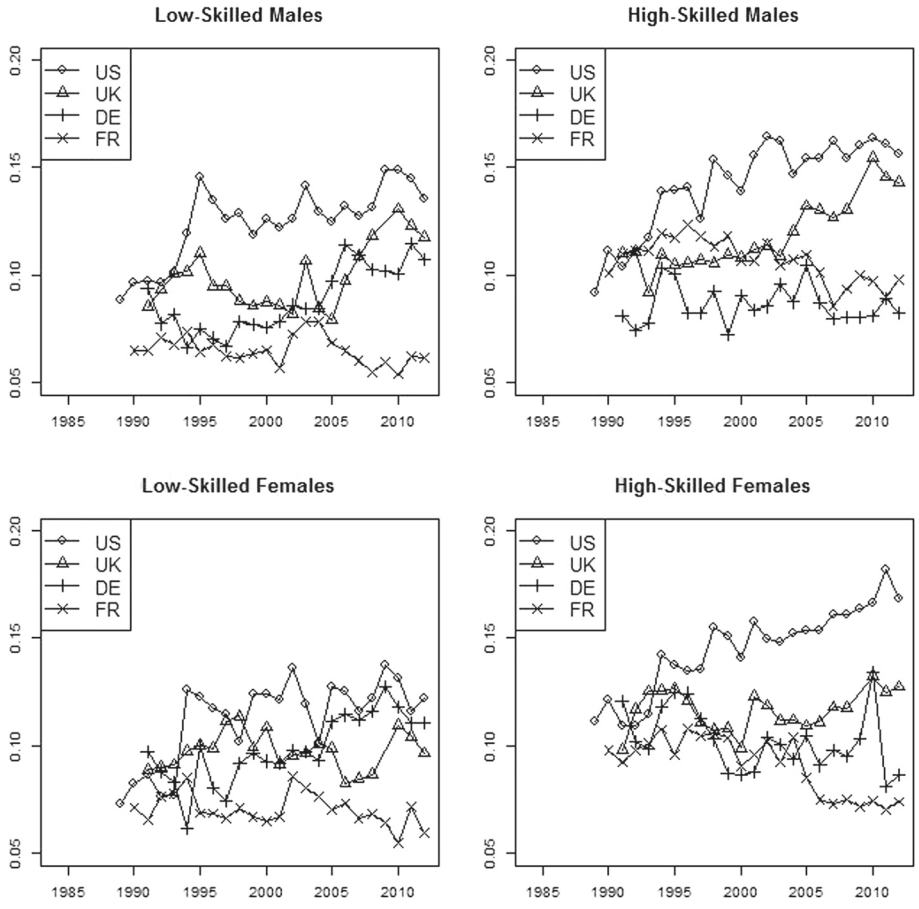

Fig. 7 Wage inequality by group

respectively. It is interesting to observe that US inequality is pulled by the male component, while in the UK it is women that exhibit the highest dispersion. Note also that the rise of inequality in Germany is mainly attributable to low-skilled workers, with inequality among high-skilled men remaining constant and that among high-skilled women exhibiting an inverse U-shaped pattern. Lastly, for all countries and for both skill levels, the female component is characterized by higher inequality when compared to its male counterpart.

Figure 7 suggests that inequality in wages remains rather constant in each subgroup over the two decades, with the exception of high-skilled workers in the USA, who experienced a rising trend in the returns to education.[19]

Our main interest lies in Figs. 8 and 9, depicting the evolution of inequality in hours and of the covariance term. Figure 8 highlights gender differences in working hours: while male groups experience constant patterns of hours, likely centered on full-time employment, female working hours are much more dispersed, especially in the UK and gradually also in Germany.

The picture is completed by Fig. 9 reporting the covariance contribution to earnings inequality. Various comments are in order. There are striking differences between the high- and the low-skilled, with the latter exhibiting a smaller covariance term. In some

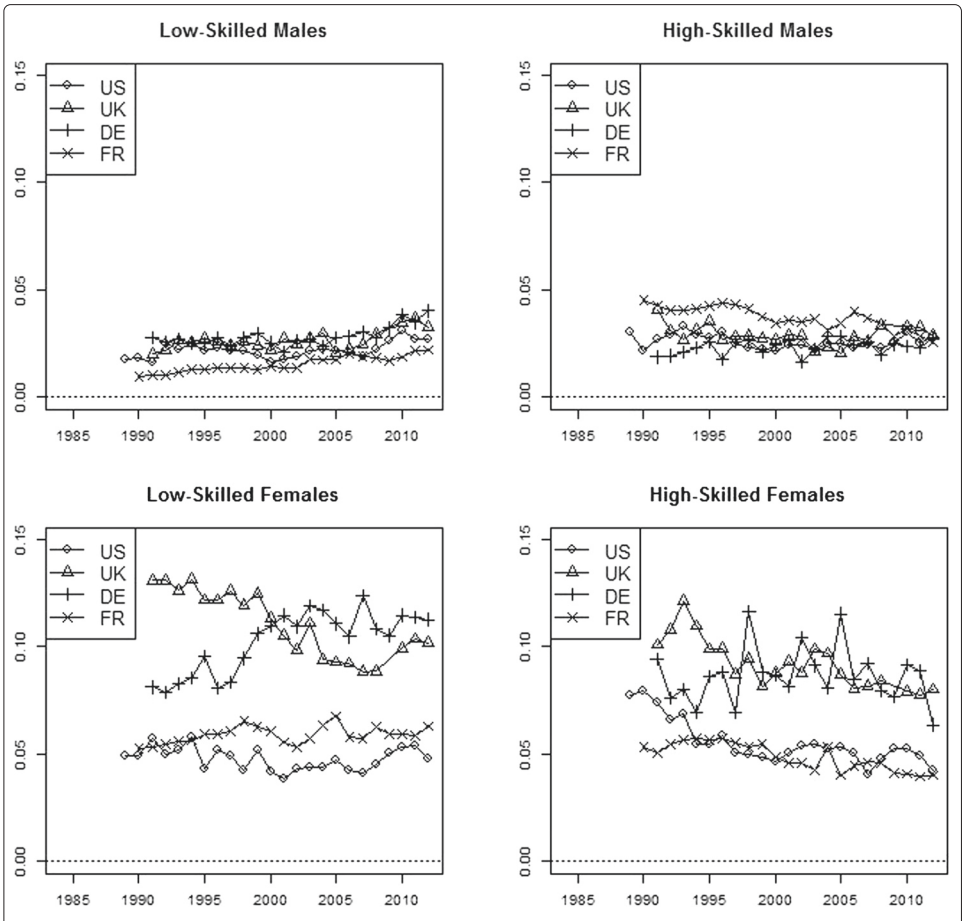

Fig. 8 Hours inequality by group

groups (low-skilled men in the USA and France), hours are likely to be fixed and therefore independent from wages. When deviating from zero, the covariance between hours and wages of the low-skilled tends to be negative for males and positive for females, although, for low-skilled males, both the UK and Germany exhibit a substantial negative correlation at the start of our sample period that disappears over time. The changes for the high-skilled are striking: in both gender groups, we find a move from highly negative covariance terms to nil or positive ones, with the exception of the USA where the term is positive throughout the period. Concerning high-skilled males in the UK and France, a highly negative term reaches the same (positive) level as in the USA by the end of the period. This implies that the equalizing effect stemming from the fact that those with lower wages worked more hours has been eroded over the past two decades.

The case of Germany is particularly interesting, with the transition from low to high earnings inequality being in part driven by low-skilled workers: the equalizing negative correlation that used to be apparent for men disappears while women become more and more responsive to the labor market, moving from a zero covariance to a positive one, i.e., working more hours for higher wages. Skilled individuals experienced also a substantial change in the covariance term that was particularly marked for women.

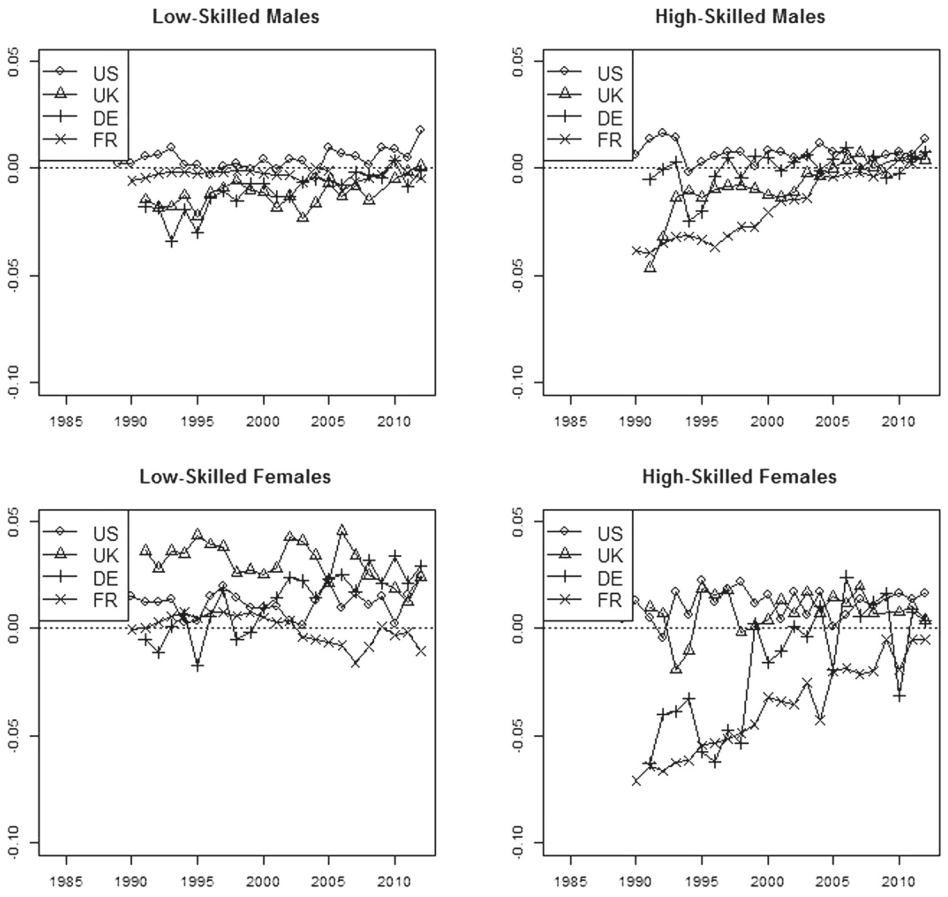

Fig. 9 The covariance term by group

These observations are confirmed by Table 4 where we propose a standard between-within decomposition of each variable under analysis (earnings, wages, hours, and covariance among the last two). Equation (8) is divided by the inequality index, which yields the relative contributions of the within-group and between-group components that are reported in the table. The table hence has a double reading. The between-group and within-group components of earnings inequality add up to one, while the between-group (within-group) components of wages, hours, and the covariance reported add up to the between-group (within-group) components of earnings. Not surprisingly, the largest share of earnings inequality is attributable to within-group differences, with the between-group component ranging between 15 and 27 %. Note, also, that as far as hours are concerned, between-group inequality is particularly small, accounting for only around 10 % of overall inequality in hours. This indicates that attributing the dispersion of hours to, say, female part-time employment ignores most of the sources of variation. When we consider the covariance term, its between-group component exhibits different patterns across countries, increasing substantially in France, falling in the UK, and fluctuating slightly in the USA and Germany, while the within-group component is substantially larger at the end than at the start of the period for all four countries.

Table 4 Within- and between-group decomposition

		Between				Within			
Year	Country	Y	W	H	ρ	Y	W	H	ρ
1991	USA	15.20	9.28	1.61	4.30	84.80	55.66	23.97	5.17
	UK	34.69	15.16	8.34	11.19	65.31	36.22	28.69	0.40
	DE	25.25	13.44	3.58	8.23	74.75	54.55	28.33	−8.12
	FR	21.68	21.11	1.82	−1.25	78.32	60.64	27.37	−9.69
1995	USA	19.28	12.50	1.28	5.50	80.72	60.88	16.14	3.70
	UK	26.83	10.62	6.98	9.24	73.17	41.82	28.03	3.32
	DE	20.47	8.94	4.64	6.88	79.53	61.27	36.23	−17.97
	FR	23.18	20.07	2.10	1.01	76.82	55.83	27.95	−6.96
2000	USA	19.21	12.53	1.15	5.53	80.79	61.63	14.49	4.67
	UK	26.56	10.91	6.40	9.25	73.44	44.54	27.88	1.01
	DE	23.40	8.89	5.08	9.44	76.60	45.40	31.64	−0.44
	FR	20.73	15.09	2.03	3.61	79.27	55.60	28.18	−4.52
2007	USA	16.44	11.97	0.85	3.62	83.56	65.87	13.84	3.85
	UK	22.27	11.48	3.99	6.80	77.73	47.67	24.23	5.82
	DE	21.00	7.69	5.34	7.97	79.00	45.84	30.43	2.73
	FR	20.96	9.76	2.72	8.48	79.04	56.63	31.88	−9.48
2012	USA	17.68	12.95	0.72	4.01	82.32	61.11	14.34	6.88
	UK	23.26	11.04	4.51	7.71	76.74	48.30	24.93	3.51
	DE	20.29	8.57	3.97	7.75	79.71	44.82	29.75	5.14
	FR	24.91	11.93	2.48	10.50	75.09	50.63	27.83	−3.38

Note: The within-between index decomposition for each component is reported as a percentage of inequality in earnings

4.3 Discussion

Our results indicate that the overall contribution of hours worked to earnings inequality can be substantial, accounting for over a third of overall dispersion in some instances. Moreover, if we consider together the dispersion of hours worked and the covariance between wages and hours, they are responsible, in some countries, for half of the overall earnings dispersion. Inequality in the hours of work seems to be largely driven by the female component of employment, possibly by part-time working regimes. In the two countries with the highest inequality, the UK and Germany, women account for at least 40 % of employment and both countries are characterized by substantial part-time employment. Nevertheless, our within-between group decomposition indicates that this is only part of the story, with those two countries also exhibiting very substantial inequality in hours within groups.

The changing position of Germany in cross-country comparisons of earnings inequality points to the importance of changes in the covariance between hours and wages. From a labor supply point of view, it can be read as an increasing elasticity of hours to wages (which would be consistent with a higher share of women in employment); from a labor demand point of view, it may represent a prevailing intensive margin over the extensive margin. The overall result is that some countries went from a situation in which the least-paid workers had the longest working hours to one where the best-paid also work hardest.[20]

The immediate question that arises from our analysis is to what extent the observed time patterns are correlated with institutional changes within each country. Consider union density as a global measure of the institutionalization of the labor market.[21] Figure 10 plots union density against our measure of the covariance term and indicates the well-established gradual weakening of labor standards over the past few decades which has been largely driven by the increased labor market participation of women and the up-skilling of the labor force.

The figure indicates that this weakening has affected differently continental Europe (France and Germany) and the Anglo-Saxon countries (UK and USA). When unions were strong, the dominant membership of unions consisted of full-time low-skilled male workers, and this was associated with limited variation in hours and reduced inequality in wages. In the UK and USA, weaker unions led to an increase in wage inequality, while in the other two European countries, they seem to have resulted in a change in the role of hours inequality, captured by the dynamics of the correlation between hours and wages. As we can see in Fig. 10, this term is negatively correlated with union density for France and Germany but does not display a clear association in the case of the UK and USA.

One way to rationalize this evidence is the distinction between intensive and extensive margins. When unions are strong, they typically oppose the use (and abuse) of intensive margins by employers, on the expectation of expanding employment opportunities (extensive margins) and increasing their bargaining power. This compresses the distribution of hours around the contractual/legal duration and leaves wages to do the adjustment to excess demand/supply. As union strength declines, employers become free to choose which margin they prefer to adjust, a decision that will depend on the relative adjustment costs per hour and per head, as well as on their expectations concerning demand. As a consequence, hours become more dispersed, the labor supply elasticity becomes positive, and the residual correlation moves from nil to positive. Although more rigorous statistical tests would be required to prove our interpretation, our hypothesis implies that earnings

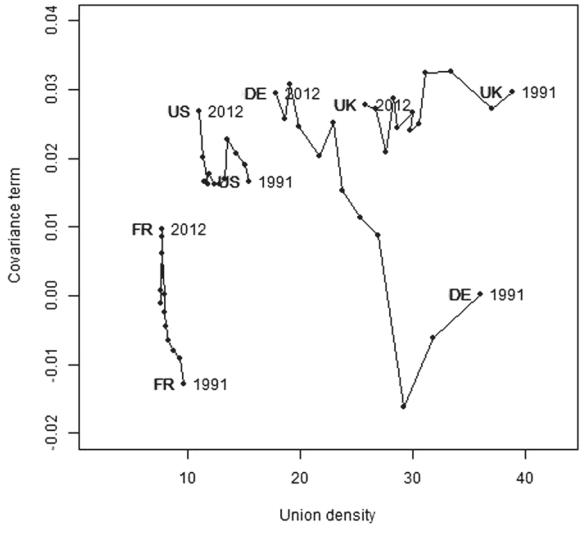

Fig. 10 Covariance term versus union density. Note: The years reported are the odd ones except for 2008, 2010, and 2012

inequality could be attenuated by union presence which would tend to reduce both wage inequality and the positive correlation between hours and wages.

The decline of unions and more generally of labor standards could represent only part of the story. The main drivers of the changes we have described consist of increased female participation and up-skilling of the labor force, both taking place at different speeds and points of time in different countries. Unions in particular have not always been able to accommodate a demand for more flexible hours arrangements, which are often expressed by the marginal segment of the labor force. We are agnostic on whether the countries under analysis have achieved "excessive" flexibility in hours, especially because we do not have information on whether the increased covariance is voluntarily accepted or imposed onto them. More careful analysis of individual answers on survey questions about the perception of working regimes could help us in better interpreting the described changes.

A second question raised by our analysis concerns the population we examine, in particular when non-employment increases, as is the case during the Great Recession. Lower inequality among the employed can be the result of labor shedding at the bottom of the distribution and hence be associated with greater inequality in earnings when we consider the entire population, i.e., including those with zero earnings. We have examined the evolution of earnings and hours inequality for the entire population and report in Fig. 11 the evolution of earnings, wage, and hours inequality as well as the share of the

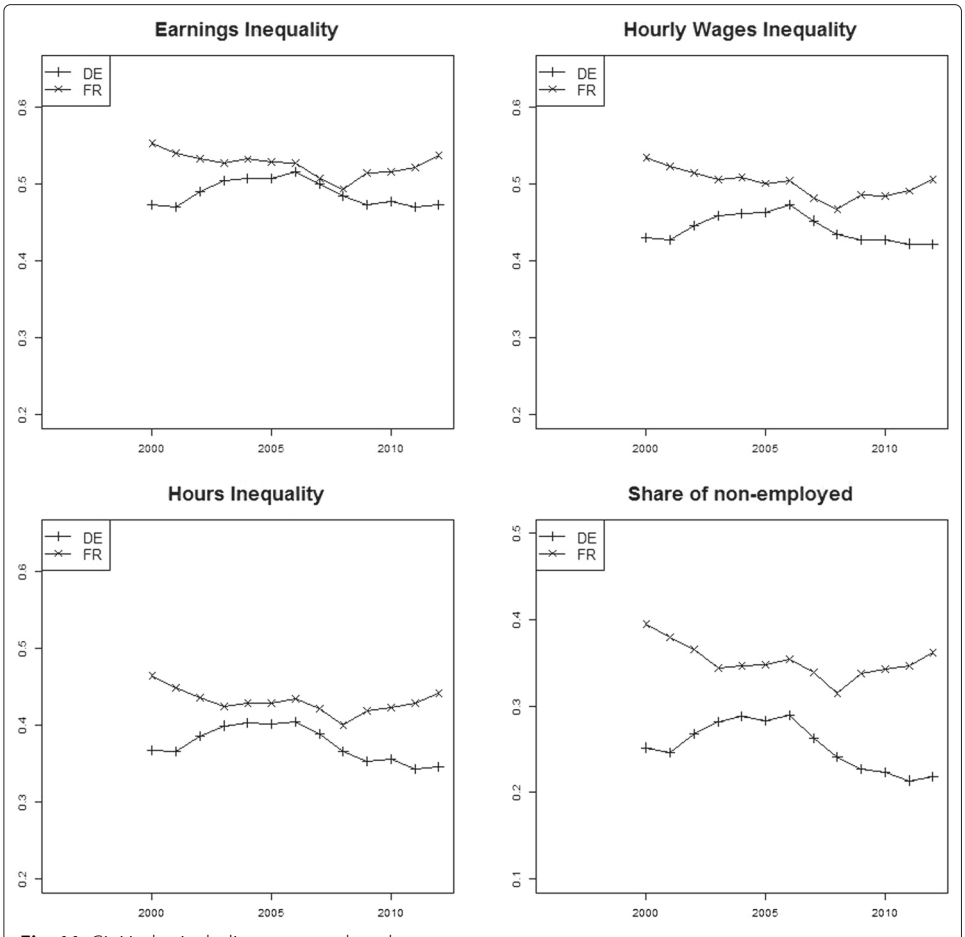

Fig. 11 Gini index including non-employed

non-employed for France and Germany. In the case of France, earnings and hours dispersion behave in a similar way as when we consider only those who are employed. For example, between 2000 and 2012, earnings inequality among the employed went from 0.131 to 0.137 and from 0.551 to 0.533 for the entire population. Similarly, we found little difference for the USA and the UK (not reported in Fig. 11). In contrast, Germany exhibits a particular feature: earnings dispersion increased among the employed (from 0.185 to 0.229 over the period 2000–12) but fell for the population as a whole (from 0.474 to 0.469). These patterns are clearly the result of the mini jobs that implied an increase in inequality among the employed, but since they substantially reduced the share of non-employed individuals (from 0.25 to 0.21 over 2000–2012), they led to lower earnings inequality among the population as a whole. This example illustrates the difficulty of designing policies aimed at reducing inequality as they are likely to be very sensitive to the question "inequality of what among whom?"

5 Conclusions

Our paper contributes to the literature on earnings inequality by considering the role of hours worked and not only that of hourly wages, in order to address the question of whether, for a given distribution of wages, the dispersion of working time tends to dampen or magnify initial inequalities. To do so, we decompose our inequality index to quantify the contribution of inequality in hourly wages and the dispersion in hours worked to overall inequality in earnings. Hours dispersion affects overall inequality through two mechanisms, inequality in hours and the correlation between hours worked and hourly wages. As a result, if the latter term is negative (i.e., if poorly paid workers are those that work most), hours inequality may have a substantial equalizing impact.

Our results uncover a number of surprising patterns. First, we find that hours inequality is moderate in the USA and France and much larger in the UK and Germany, with the distributions presenting fat tails both at the bottom (probably associated with female part-time and "mini jobs") and at the top. Second, the contribution of hours to inequality is always positive but varies substantially across countries and over time. In 2012, it accounted for only 15 % of earnings inequality in the USA, 29 % in the UK, 30 % in France, and 34 % in Germany.

In the three European countries, we find that there is a substantial change in the covariance between wages and hours, and in some cases, notably Germany, this has been a major force behind the change in the overall contribution of hours. For several groups, mainly low-skilled males and high-skilled females, the covariance was negative at the start of the period and becomes zero or positive over time. In the case of the UK, a similar pattern is observed for high-skilled males. As a result, an important equalizing force, the longer hours worked by those with the lowest pay, seems to have disappeared, with important implications for earnings inequality. The USA presents a rather stable contribution of wages, hours, and the covariance, while Germany has witnessed major changes. Between 1991 and 2012, earnings inequality moved from being par to that of France to being close to the one observed in the USA, and this was driven by a change in the contribution of hours and, especially, of the covariance which increased by 13 percentage points.

Our paper indicates that the so-far neglected question of hours inequality can help us understand the evolution of earnings dispersion in certain countries. At the same time,

it raises as many questions as it answers. First, we need to understand what drives the broad cross-country patterns that we have uncovered. The fact that the USA shares a distribution similar to that of France indicates that institutional features are unlikely to be the answer. Second, it is important to examine what lies behind the erosion of the negative covariance of hours and wages. Is it the result of individual choices, with rising income levels changing the relative sizes of income and substitution effects in labor supply decisions? Has the erosion of union power unions played a role? Or are we witnessing a change in the types of jobs proposed to certain individuals, notably the least skilled, that forces them to accept both low wages and low hours? These questions constitute, in our view, an important research agenda.

Endnotes

[1] See, for instance, Juhn et al. (1993).

[2] See, for instance, Prescott (2004), Bell and Freeman (2001), Alesina et al. (2006), and Blundell et al. (2013).

[3] See, for example, Fei et al. (1978), Bourguignon (1979), Pyatt et al. (1980), Shorrocks (1982), Lerman and Yitzhaki (1985), and Fournier (2001).

[4] See, for instance, Jenkins (1995) and García-Peñalosa and Orgiazzi (2013) for decompositions of the CV and Lerman and Yitzhaki (1985), Garner (1993) and Podder (1993) on Gini decompositions.

[5] See Atkinson (1983).

[6] CNEF uses the SOEP and BHPS data but not the other two surveys, the reason being that the project is interested in providing comparable panel data which neither CPS nor the Enquete Emploi provide. For the USA, CNEF uses PSID, while France is not in their sample.

[7] See Bardasi et al. (1999) for further discussion.

[8] The results including the self-employed can be obtained from the authors.

[9] The current social contributions stand at an average of 23 % of the gross salary, and vary over a range of 20 to 26 %, the main difference stemming from complementary pensions. Inequality in earnings net of these contributions will hence be slightly lower than in gross earnings.

[10] Robustness checks do not indicate sensitivity to this procedure.

[11] Actual hours was used to complement usual hours in the USA if respondents answered that usual hours vary, since this option is not given in the other surveys.

[12] The question is also asked in 2009 and 2011, but the response rate is extremely low.

[13] A common measure of wage inequality is the standard deviation of log wages; see, for example, Juhn et al. (1993) and Lemieux (2008).

[14] See Piketty and Saez (2003) on top incomes in the USA.

[15] These results are consistent with the evidence that shows that the change in survey design had little impact on the data; see Guivord (2003).

[16] See Dippo et al. (1994) and Van den Brakel et al. (2010).

[17] Askenazy (2013) argues that the 35-h working week regulation opened up a thorough reform of working hours regimes in the country.

[18] Changes in sampling are clearly visible for the USA in 1994, for Germany in 2003, and for France in 2008. See Table 6 in the Appendix and the earlier discussion.

[19] This is a well-documented fact which is discussed, among others, by Acemoglu and Autor (2011).

[20] This is consistent with the arguments in Bell and Freeman (2001).

[21] Data from https://stats.oecd.org/Index.aspx?DataSetCode=UN_DEN. Alternative institutional measures such as the employment protection legislation index could be used, although they display limited time variation.

Appendix

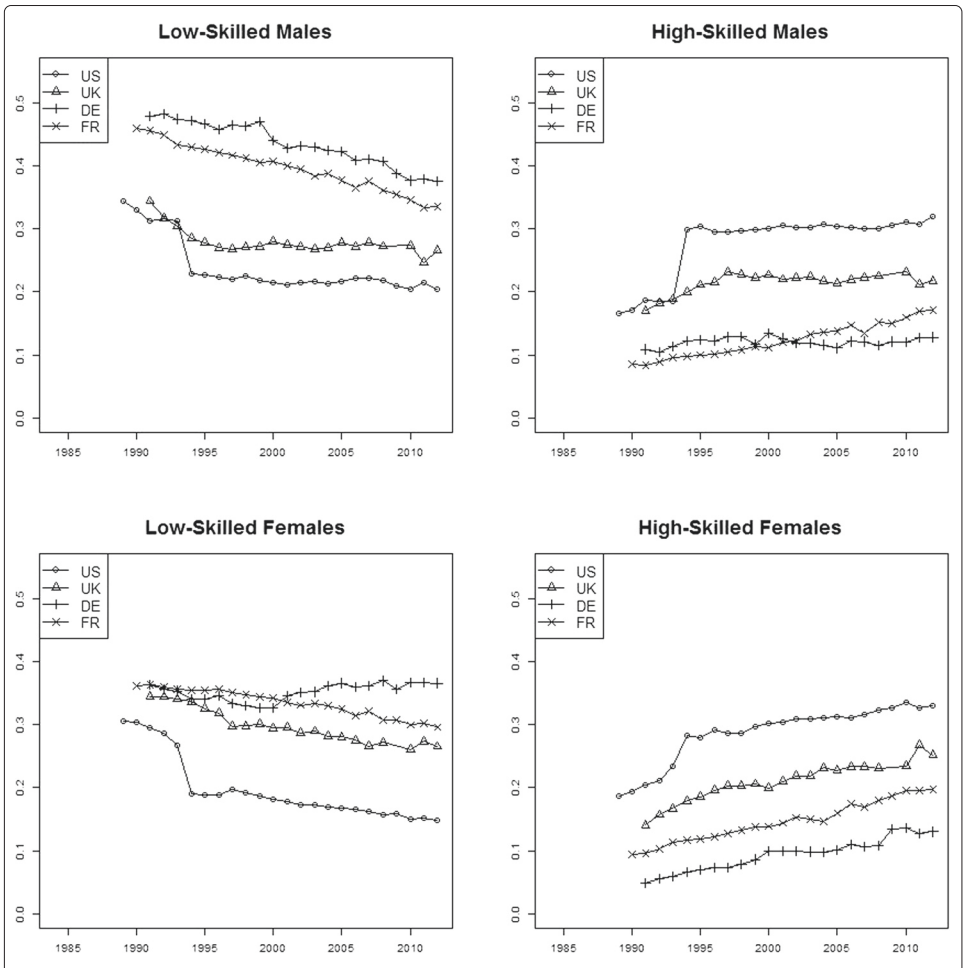

Fig. 12 Employment by group. Note: share in total employment of each gender-skill group

Table 5 Descriptive statistics

		Y		W		H		
Year	Country	Mean	SD	Mean	SD	Mean	SD	Nobs
1991	USA	384.14	222.98	9.75	4.95	38.75	9.85	5837
		(3.47)	(4.35)	(0.08)	(0.11)	(0.14)	(0.18)	
	UK	244.87	164.78	6.20	3.49	38.35	13.72	3583
		(2.77)	(5.15)	(0.06)	(0.14)	(0.24)	(0.19)	
	DE	374.23	214.60	9.51	4.87	39.34	10.95	7032
		(3.16)	(5.93)	(0.07)	(0.15)	(0.17)	(0.17)	
	FR	255.05	137.91	6.85	3.66	37.70	8.26	33,152
		(0.76)	(2.47)	(0.02)	(0.06)	(0.05)	(0.06)	
1995	USA	556.17	367.36	13.56	8.11	40.18	9.71	10,380
		(4.11)	(4.31)	(0.09)	(0.14)	(0.11)	(0.12)	
	UK	290.83	211.36	7.25	4.29	38.81	13.86	3314
		(4.03)	(10.74)	(0.08)	(0.19)	(0.26)	(0.21)	
	DE	470.98	241.72	12.17	6.45	39.32	11.13	8436
		(3.84)	(6.19)	(0.10)	(0.31)	(0.16)	(0.15)	
	FR	281.37	162.20	7.61	4.21	37.28	8.81	42,934
		(0.83)	(2.61)	(0.02)	(0.07)	(0.04)	(0.05)	
2000	USA	678.70	465.66	16.35	9.93	40.60	9.23	9632
		(5.26)	(6.96)	(0.11)	(0.14)	(0.10)	(0.13)	
	UK	356.85	235.56	8.89	4.96	39.20	12.84	5636
		(4.48)	(7.21)	(0.10)	(0.20)	(0.24)	(0.21)	
	DE	516.47	301.72	13.08	6.19	38.84	11.63	12,924
		(3.81)	(8.04)	(0.08)	(0.14)	(0.13)	(0.12)	
	FR	296.43	168.94	8.20	4.26	36.20	8.55	41,356
		(0.89)	(2.84)	(0.02)	(0.07)	(0.04)	(0.05)	
2007	USA	830.46	561.06	20.24	12.57	40.35	9.12	9788
		(6.24)	(6.87)	(0.14)	(0.19)	(0.10)	(0.13)	
	UK	472.62	338.68	11.95	7.17	38.42	11.69	5038
		(6.77)	(17.00)	(0.15)	(0.37)	(0.23)	(0.20)	
	DE	546.31	334.58	13.82	6.88	38.58	12.44	12,611
		(4.26)	(5.69)	(0.09)	(0.20)	(0.17)	(0.15)	
	FR	384.61	207.75	10.51	4.96	36.63	9.22	8292
		(2.65)	(6.12)	(0.06)	(0.17)	(0.12)	(0.15)	
2012	USA	898.47	629.36	22.07	13.96	39.63	9.44	8997
		(7.80)	(7.40)	(0.17)	(0.20)	(0.11)	(0.14)	
	UK	495.20	365.06	12.81	7.92	37.59	12.27	15,886
		(3.43)	(6.74)	(0.07)	(0.16)	(0.12)	(0.09)	
	DE	600.69	373.17	15.26	7.77	38.23	11.86	10,893
		(5.06)	(7.64)	(0.11)	(0.32)	(0.16)	(0.15)	
	FR	441.56	267.26	11.81	5.80	37.01	9.23	11,670
		(3.11)	(9.73)	(0.06)	(0.17)	(0.10)	(0.11)	

Table 6 Descriptive statistics

	US			UK			DE			FR		
Year	H mean	H SD	Nobs	H mean	H SD	Nobs	H mean	H SD	Nobs	H mean	H SD	Nobs
1989	39.03	9.86	5337									
1990	39.06	9.63	5838							37.65	8.12	33,982
1991	38.75	9.85	5837	38.35	13.72	3583	39.34	10.95	7032	37.70	8.26	33,152
1992	38.79	9.71	5776	38.16	13.65	3415	39.61	10.44	7189	37.56	8.33	35,726
1993	38.57	9.83	5769	38.36	13.94	3284	39.26	10.61	7368	37.41	8.58	40,796
1994	39.93	9.85	10,472	38.52	14.15	3348	39.10	10.39	7830	37.36	8.73	43,022
1995	40.18	9.71	10,380	38.81	13.86	3314	39.32	11.13	8436	37.28	8.81	42,934
1996	40.27	10.06	9036	38.77	13.48	3492	39.20	10.75	8558	37.18	8.82	43,130
1997	40.13	9.54	9257	39.08	13.25	4038	39.69	10.86	8653	36.97	8.80	42,004
1998	40.22	9.26	9434	38.85	13.34	4027	39.24	11.14	9032	36.86	8.89	42,006
1999	40.36	9.40	9649	38.80	13.09	5626	38.95	11.37	9458	36.77	8.71	41,262
2000	40.60	9.23	9632	39.20	12.84	5636	38.84	11.63	12,924	36.20	8.55	41,356
2001	40.50	9.30	9275	38.76	13.18	6640	38.64	11.71	12,578	35.85	8.30	40,981
2002	40.24	9.35	10,947	38.47	12.54	5839	38.27	11.79	13,108	35.42	8.25	41,088
2003	39.96	9.34	10,837	38.09	12.63	5670	38.10	11.90	12,684	36.44	9.05	8137
2004	40.04	9.38	10,518	38.26	12.48	5470	38.16	11.77	12,597	36.38	9.18	8453
2005	39.99	9.35	10,092	38.35	11.88	5327	38.10	12.02	12,429	36.53	9.22	8022
2006	40.22	9.33	9889	38.24	11.93	5221	38.42	11.82	12,717	36.63	9.19	8039
2007	40.35	9.12	9788	38.42	11.69	5038	38.58	12.44	12,611	36.63	9.22	8292
2008	39.95	9.04	9764	37.88	11.92	4818	38.44	11.94	12,114	36.73	9.20	8311
2009	39.59	9.63	9283				38.64	11.93	11,838	36.88	9.02	10,149
2010	39.43	9.66	9183	38.18	12.57	16,510	37.84	12.13	10,784	36.69	8.96	9529
2011	39.47	9.45	9133	37.39	12.41	17,685	38.52	12.05	11,255	36.85	9.19	11,435
2012	39.63	9.44	8997	37.59	12.27	15,886	38.23	11.86	10,893	37.01	9.23	11,670

Table 7 Decomposition of earnings dispersion by skill-gender groups: absolute and relative contributions, 1991

Group	Country	I_y	I_w	I_h	ρ	RC_w	RC_h	RC_ρ
Low-skilled males	USA	0.119	0.097	0.016	0.006	0.815	0.135	0.050
		(0.005)	(0.003)	(0.002)	(0.002)			
	UK	0.090	0.085	0.020	−0.015	0.943	0.220	−0.163
		(0.005)	(0.004)	(0.001)	(0.003)			
	DE	0.103	0.094	0.028	−0.018	0.908	0.266	−0.175
		(0.004)	(0.004)	(0.003)	(0.003)			
	FR	0.070	0.065	0.010	−0.004	0.921	0.140	−0.061
		(0.002)	(0.002)	(0.000)	(0.001)			
High-skilled males	USA	0.144	0.104	0.027	0.014	0.719	0.184	0.097
		(0.008)	(0.006)	(0.003)	(0.004)			
	UK	0.104	0.110	0.040	−0.047	1.059	0.389	−0.449
		(0.010)	(0.010)	(0.009)	(0.013)			
	DE	0.094	0.081	0.018	−0.005	0.859	0.195	−0.054
		(0.008)	(0.007)	(0.002)	(0.004)			
	FR	0.113	0.110	0.043	−0.039	0.973	0.377	−0.349
		(0.005)	(0.005)	(0.002)	(0.004)			
Low-skilled females	USA	0.156	0.086	0.057	0.012	0.554	0.368	0.078
		(0.008)	(0.005)	(0.005)	(0.005)			
	UK	0.257	0.089	0.131	0.037	0.346	0.511	0.143
		(0.010)	(0.005)	(0.006)	(0.006)			
	DE	0.173	0.097	0.081	−0.005	0.561	0.469	−0.030
		(0.006)	(0.004)	(0.004)	(0.004)			
	FR	0.119	0.066	0.053	0.000	0.551	0.448	0.001
		(0.002)	(0.002)	(0.002)	(0.001)			
High-skilled females	USA	0.188	0.109	0.074	0.005	0.581	0.394	0.025
		(0.009)	(0.005)	(0.005)	(0.006)			
	UK	0.209	0.098	0.101	0.010	0.469	0.484	0.047
		(0.015)	(0.007)	(0.009)	(0.008)			
	DE	0.152	0.121	0.094	−0.063	0.795	0.621	−0.415
		(0.023)	(0.018)	(0.010)	(0.016)			
	FR	0.078	0.092	0.050	−0.065	1.183	0.647	−0.829
		(0.003)	(0.003)	(0.002)	(0.004)			

Table 8 Decomposition of earnings dispersion by skill-gender groups: absolute and relative contributions, 1995

Group	Country	I_y	I_w	I_h	ρ	RC_w	RC_h	RC_ρ
Low-skilled males	USA	0.168	0.145	0.021	0.002	0.864	0.126	0.010
		(0.009)	(0.008)	(0.002)	(0.003)			
	UK	0.114	0.110	0.027	−0.022	0.961	0.234	−0.195
		(0.012)	(0.011)	(0.003)	(0.011)			
	DE	0.070	0.075	0.025	−0.030	1.071	0.356	−0.428
		(0.003)	(0.004)	(0.002)	(0.004)			
	FR	0.074	0.064	0.013	−0.002	0.861	0.172	−0.033
		(0.002)	(0.002)	(0.000)	(0.001)			
High-skilled males	USA	0.170	0.139	0.027	0.003	0.821	0.160	0.019
		(0.006)	(0.005)	(0.002)	(0.003)			
	UK	0.126	0.104	0.035	−0.014	0.830	0.278	−0.109
		(0.010)	(0.006)	(0.006)	(0.006)			
	DE	0.105	0.100	0.025	−0.020	0.951	0.241	−0.192
		(0.008)	(0.012)	(0.004)	(0.011)			
	FR	0.126	0.117	0.042	−0.034	0.931	0.337	−0.268
		(0.005)	(0.004)	(0.002)	(0.004)			
Low-skilled females	USA	0.169	0.123	0.043	0.003	0.728	0.252	0.020
		(0.007)	(0.007)	(0.003)	(0.007)			
	UK	0.266	0.100	0.122	0.044	0.377	0.459	0.164
		(0.012)	(0.008)	(0.007)	(0.007)			
	DE	0.178	0.100	0.096	−0.017	0.561	0.537	−0.098
		(0.008)	(0.007)	(0.005)	(0.009)			
	FR	0.132	0.068	0.059	0.005	0.518	0.447	0.035
		(0.003)	(0.002)	(0.001)	(0.001)			
High-skilled females	USA	0.215	0.138	0.055	0.023	0.641	0.254	0.105
		(0.007)	(0.005)	(0.003)	(0.003)			
	UK	0.244	0.127	0.099	0.019	0.518	0.405	0.077
		(0.021)	(0.012)	(0.009)	(0.010)			
	DE	0.153	0.125	0.086	−0.058	0.816	0.562	−0.378
		(0.019)	(0.015)	(0.009)	(0.013)			
	FR	0.097	0.096	0.056	−0.055	0.984	0.579	−0.562
		(0.003)	(0.003)	(0.002)	(0.003)			

Table 9 Decomposition of earnings dispersion by skill-gender groups: absolute and relative contributions, 2000

Group	Country	I_y	I_w	I_h	ρ	RC_w	RC_h	RC_ρ
Low-skilled males	USA	0.147	0.126	0.016	0.005	0.858	0.111	0.031
		(0.007)	(0.006)	(0.001)	(0.003)			
	UK	0.098	0.087	0.022	−0.011	0.893	0.221	−0.114
		(0.006)	(0.006)	(0.002)	(0.003)			
	DE	0.093	0.076	0.025	−0.007	0.809	0.268	−0.078
		(0.004)	(0.003)	(0.002)	(0.002)			
	FR	0.076	0.065	0.014	−0.002	0.851	0.181	−0.032
		(0.003)	(0.002)	(0.000)	(0.001)			
High-skilled males	USA	0.169	0.139	0.021	0.008	0.824	0.127	0.049
		(0.005)	(0.004)	(0.001)	(0.002)			
	UK	0.122	0.108	0.027	−0.013	0.885	0.218	−0.103
		(0.009)	(0.008)	(0.005)	(0.005)			
	DE	0.119	0.090	0.024	0.005	0.755	0.200	0.045
		(0.011)	(0.007)	(0.003)	(0.005)			
	FR	0.120	0.106	0.034	−0.021	0.887	0.285	−0.172
		(0.005)	(0.004)	(0.001)	(0.003)			
Low-skilled females	USA	0.176	0.124	0.041	0.010	0.707	0.235	0.058
		(0.014)	(0.013)	(0.003)	(0.003)			
	UK	0.247	0.108	0.113	0.025	0.439	0.459	0.102
		(0.013)	(0.010)	(0.007)	(0.012)			
	DE	0.212	0.093	0.110	0.010	0.437	0.517	0.047
		(0.006)	(0.004)	(0.004)	(0.005)			
	FR	0.131	0.065	0.061	0.005	0.494	0.465	0.041
		(0.003)	(0.002)	(0.001)	(0.001)			
High-skilled females	USA	0.203	0.141	0.047	0.016	0.692	0.229	0.079
		(0.007)	(0.005)	(0.003)	(0.003)			
	UK	0.191	0.099	0.088	0.004	0.518	0.460	0.022
		(0.014)	(0.010)	(0.009)	(0.013)			
	DE	0.157	0.086	0.087	−0.016	0.549	0.551	−0.100
		(0.012)	(0.007)	(0.007)	(0.008)			
	FR	0.107	0.090	0.048	−0.032	0.848	0.454	−0.302
		(0.003)	(0.002)	(0.002)	(0.003)			

Table 10 Decomposition of earnings dispersion by skill-gender groups: absolute and relative contributions, 2007

Group	Country	I_y	I_w	I_h	ρ	RC_w	RC_h	RC_ρ
Low-skilled males	USA	0.152	0.127	0.019	0.006	0.837	0.123	0.039
		(0.006)	(0.005)	(0.002)	(0.004)			
	UK	0.125	0.109	0.024	−0.008	0.869	0.195	−0.064
		(0.013)	(0.013)	(0.004)	(0.008)			
	DE	0.138	0.109	0.030	−0.002	0.793	0.218	−0.011
		(0.008)	(0.005)	(0.002)	(0.003)			
	FR	0.072	0.060	0.019	−0.006	0.830	0.260	−0.089
		(0.004)	(0.004)	(0.002)	(0.003)			
High-skilled males	USA	0.187	0.163	0.024	0.001	0.867	0.130	0.003
		(0.008)	(0.008)	(0.002)	(0.003)			
	UK	0.160	0.127	0.026	0.007	0.792	0.163	0.046
		(0.015)	(0.012)	(0.004)	(0.007)			
	DE	0.104	0.079	0.026	−0.000	0.760	0.245	−0.004
		(0.008)	(0.006)	(0.003)	(0.006)			
	FR	0.121	0.086	0.037	−0.002	0.709	0.303	−0.013
		(0.008)	(0.005)	(0.003)	(0.006)			
Low-skilled females	USA	0.173	0.116	0.041	0.016	0.670	0.235	0.094
		(0.008)	(0.005)	(0.003)	(0.003)			
	UK	0.207	0.084	0.088	0.035	0.407	0.426	0.167
		(0.016)	(0.008)	(0.006)	(0.008)			
	DE	0.253	0.112	0.124	0.017	0.442	0.489	0.069
		(0.008)	(0.007)	(0.006)	(0.008)			
	FR	0.107	0.066	0.057	−0.016	0.617	0.530	−0.147
		(0.005)	(0.005)	(0.003)	(0.006)			
High-skilled females	USA	0.215	0.161	0.040	0.014	0.748	0.187	0.065
		(0.008)	(0.007)	(0.002)	(0.003)			
	UK	0.219	0.118	0.082	0.020	0.538	0.372	0.090
		(0.015)	(0.008)	(0.007)	(0.008)			
	DE	0.196	0.098	0.092	0.006	0.499	0.471	0.031
		(0.015)	(0.007)	(0.010)	(0.008)			
	FR	0.098	0.073	0.046	−0.021	0.746	0.472	−0.218
		(0.007)	(0.005)	(0.004)	(0.006)			

Table 11 Decomposition of earnings dispersion by skill-gender groups: absolute and relative contributions, 2012

Group	Country	I_y	I_w	I_h	ρ	RC_w	RC_h	RC_ρ
Low-skilled males	USA	0.180	0.135	0.027	0.018	0.754	0.148	0.098
		(0.012)	(0.011)	(0.002)	(0.003)			
	UK	0.151	0.117	0.032	0.001	0.777	0.214	0.009
		(0.006)	(0.005)	(0.002)	(0.003)			
	DE	0.146	0.107	0.040	−0.001	0.734	0.273	−0.007
		(0.008)	(0.007)	(0.004)	(0.006)			
	FR	0.078	0.061	0.022	−0.005	0.782	0.278	−0.060
		(0.004)	(0.003)	(0.001)	(0.003)			
High-skilled males	USA	0.198	0.156	0.028	0.014	0.790	0.141	0.068
		(0.006)	(0.005)	(0.002)	(0.003)			
	UK	0.175	0.143	0.028	0.004	0.815	0.161	0.023
		(0.007)	(0.006)	(0.001)	(0.003)			
	DE	0.117	0.082	0.028	0.008	0.699	0.235	0.067
		(0.008)	(0.005)	(0.004)	(0.003)			
	FR	0.130	0.098	0.025	0.006	0.754	0.197	0.049
		(0.008)	(0.006)	(0.002)	(0.004)			
Low-skilled females	USA	0.194	0.122	0.048	0.025	0.627	0.246	0.127
		(0.014)	(0.012)	(0.004)	(0.004)			
	UK	0.222	0.096	0.102	0.024	0.433	0.458	0.109
		(0.006)	(0.004)	(0.003)	(0.004)			
	DE	0.253	0.111	0.113	0.029	0.438	0.446	0.116
		(0.008)	(0.004)	(0.004)	(0.004)			
	FR	0.112	0.059	0.063	−0.011	0.531	0.563	−0.094
		(0.004)	0.003	(0.003)	(0.003)			
High-skilled females	USA	0.228	0.169	0.043	0.017	0.740	0.187	0.073
		(0.010)	(0.009)	(0.002)	(0.003)			
	UK	0.212	0.127	0.080	0.004	0.602	0.378	0.020
		(0.007)	(0.005)	(0.003)	(0.005)			
	DE	0.153	0.086	0.064	0.003	0.563	0.415	0.022
		(0.011)	(0.006)	(0.005)	(0.005)			
	FR	0.108	0.074	0.040	−0.005	0.680	0.368	−0.048
		(0.005)	(0.003)	(0.002)	(0.003)			

Competing interests
The IZA Journal of European Labor Studies is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

Acknowledgements
We are grateful to the audience participants at AMSE and at the 27th SASE annual meeting, as well as to the referees and editors of this journal. We would like to thank the anonymous referee and the editor for the useful remarks.
Responsible editor: Martin Kahanec

Author details
[1] University of Milan, Milan, Italy. [2] Irvapp-FBK, Trento, Italy. [3] IZA, Bonn, Germany. [4] Aix-Marseille University (Aix-Marseille School of Economics), CNRS & EHESS, Marseille, France. [5] CESifo, Munich, Germany.

Received: 10 November 2015 Accepted: 18 May 2016
Published online: 11 August 2016

References
Acemoglu D, Autor D (2011) Skills, tasks and technologies: implications for employment and earnings. Handb Labor Econ 4:1043–1171

Alesina AF, Glaeser EL, Sacerdote B (2006) Work and Leisure in the US and Europe: Why so Different? In: NBER Macroeconomics Annual 2005, Volume 20. Cambridge, MA: MIT Press. pp 1–100
Askenazy P (2013) Working time regulation in France from 1996 to 2012. Camb J Econ 37(2):323–347
Atkinson AB (1983) The economics of inequality, Vol. 2. Clarendon Press, Oxford
Bardasi E, Jenkins SP, Rigg JA (1999) Documentation for derived current and annual net household income variables, BHPS Waves 1-7. Institute for social and economic research working paper 99-25, University of Essex, Colchester
Bell LA, Freeman RB (2001) The incentive for working hard: explaining hours worked differences in the US and Germany. Labour Econ 8(2):181–202
Blundell R, Bozio A, Laroque G (2013) Extensive and intensive margins of labour supply: work and working hours in the US, the UK and France*. Fiscal Stud 34(1):1–29
Bourguignon F (1979) Decomposable income inequality measures. Econometrica: J Econometric Soc 47(4):901–920
Bowles S, Park Y (2005) Emulation, inequality, and work hours: was Thorsten Veblen right?* Econ J 115(507):397–412
Dippo C, Kostanich D, Polivka A (1994) Effects of methodological change in the current population survey. In: Proceedings of the section on Survey Research Methods. American Statistical Association, Alexandria, VA Vol. 1. p 260
Duro JA, Esteban J (1998) Factor decomposition of cross-country income inequality, 1960–1990. Econ Lett 60(3):269–275
Fei JC, Ranis G, Kuo SW (1978) Growth and the family distribution of income by factor components. Q J Econ 92(1):17–53
Fitzgerald J, Gottschalk P, Moffitt RA (1998) An analysis of sample attrition in panel data: the Michigan Panel Study of Income Dynamics. National Bureau of Economic Research Cambridge, Mass, USA
Fournier M (2001) Inequality decomposition by factor component: a "rank-correlation" approach illustrated on the Taiwanese case. Recherches Économiques de Louvain 67(4):381–401
García-Peñalosa C, Orgiazzi E (2013) Factor components of inequality: a cross-country study. Rev Income Wealth 59(4):689–727
Garner TI (1993) Consumer expenditures and inequality: an analysis based on decomposition of the Gini coefficient. Rev Econ Stat 75(1):134–138
Gottschalk P, Danziger S (2005) Inequality of wage rates, earnings and family income in the United States, 1975–2002. Rev Income Wealth 51(2):231–254
Gottschalk P, Moffitt R, Katz LF, Dickens WT (1994) The growth of earnings instability in the US labor market. Brookings Papers Econ Act 2:217–272
Haider SJ (2001) Earnings instability and earnings inequality of males in the United States: 1967–1991. J Labor Econ 19(4):799–836
Jenkins SP (1995) Accounting for inequality trends: decomposition analyses for the UK, 1971-86. Economica 62(245):29–63
Jenkins SP, Van Kerm P (2005) Accounting for income distribution trends: a density function decomposition approach. J Econ Inequality 3(1):43–61
Juhn C, Murphy KM, Pierce B (1993) Wage inequality and the rise in returns to skill. J Pol Econ 101(3):410–442
Lemieux T (2008) The changing nature of wage inequality. J Popul Econ 21(1):21–48
Lerman RI, Yitzhaki S (1985) Income inequality effects by income source: a new approach and applications to the United States. Rev Econ Stat 67(1):151–156
Moffitt RA, Gottschalk P (2002) Trends in the transitory variance of earnings in the United States. Econ J 112(478):68–73
Murphy KM, Welch F (1992) The structure of wages. Q J Econ 107(1):285–326
Piketty T, Saez E (2003) Income Inequality in the United States, 1913-1998. Q J Econ 118(1):1–39
Podder N (1993) The disaggregation of the gin1 coefficient by factor components and its applications to Australia. Rev Income Wealth 39(1):51–61
Prescott EC (2004) Why do Americans work so much more than Europeans? Federal Reserve Bank Minneapolis Q Rev 28(1):2–13
Pyatt G, Chen CN, Fei J (1980) The distribution of income by factor components. Q J Econ 95(3):451–473
Schor J (2008) The overworked American: The unexpected decline of leisure. Basic books, New York, NY
Shorrocks AF (1982) Inequality decomposition by factor components. Econometrica: J Econ Soc 50(1):193–211
Van den Brakel J, Roels J (2010) Intervention analysis with state-space models to estimate discontinuities due to a survey redesign. Ann Appl Stat 4(2):1105–1138