



BANCA D'ITALIA
EUROSISTEMA

Questioni di Economia e Finanza

(Occasional Papers)

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by Andrea Brandolini and Eliana Viviano

November 2014

Number

253



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The series is available online at www.bancaditalia.it .

ISSN 1972-6627 (print)

ISSN 1972-6643 (online)

Printed by the Printing and Publishing Division of the Bank of Italy

ACCOUNTING FOR TOTAL WORK

by Andrea Brandolini* and Eliana Viviano**

Abstract

We analyse how accounting for household production could affect labour market statistics. This topic has grown in importance since the release of the new System of National Accounts in 2008. Because the traditional headcount ratios focussing on the number of people carrying out some home and some market production may not be very informative, we propose a general class of indices based on the time spent on each type of work that encompasses headcount indicators. We apply these indices to selected configurations of the parameters to make cross-country comparisons.

JEL Classification: JEL: J22, J21.

Keywords: home production, work intensity, employment rate.

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We thank Conchita d'Ambrosio and Ignazio Visco for helpful comments. In this paper we use the Multinational Time Use Study, Versions World 5.5.3, 5.80 and 6.0 (released October 2012). Created by Jonathan Gershuny and Kimberly Fisher, with Evrim Altintas, Alyssa Borkosky, Anita Bortnik, Donna Dosman, Cara Fedick, Tyler Frederick, Anne H. Gauthier, Sally Jones, Jiweon Jun, Aaron Lai, Qianhan Lin, Tingting Lu, Fiona Lui, Leslie MacRae, Berenice Monna, José Ignacio Giménez Nadal, Monica Pauls, Cori Pawlak, Andrew Shipley, Cecilia Tinonin, Nuno Torres, Charlemaigne Victorino, and Oiching Yeung. Centre for Time Use Research, University of Oxford, United Kingdom. The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of Italy.

1. Introduction

Many activities carried out daily by individuals, such as housekeeping and care for dependent family members, are often defined as home production, as opposed to employment. Whereas employment is aimed at the production of goods and services which are sold in the market, home production is carried out for own consumption. The distinction does not depend on the intrinsic nature of the goods or services produced, but rather their destination: market vs. self-consumption. Hence, the quantity of labour typically measured in a market economy misses the time worked in home production.

The importance of accounting for the aggregate value of home production has been long recognised (e.g. Nordhaus and Tobin, 1973; see also references in Chaudeau, 1985), whereas the consideration of how total time is allocated among market work, non-market work, and leisure has been central to the modelling of household economic behaviour since the seminal article by Becker (1965). Somewhat less attention has been paid to the implications for the assessment of employment levels and more generally the analysis of labour markets.

The standard definition of the employment rate refers to a social arrangement that values certain activities only if they are carried out in the market, i.e. if they contribute to gross domestic product. Thus, childcare counts for the employment rate when performed by a paid nanny, but not when performed by a grandparent, although the services provided and the effects on child well-being need not be different. In the face of the unanimously recognised value of household work for both output and welfare aggregate estimates, the persistence of such a distinction likely reflects the lack of reliable data and the need to rely on imputation procedures. Substantial improvements on both sides allow us to move forward, but standard labour market statistics need to be reconsidered to account for household work. Headcount ratios may not be very revealing: during the week, an overwhelming majority of people engages in household activities, when broadly defined. This suggests that we may need to focus on the “intensity” of this engagement: what matters is, then, how much time is spent in working at home vis-à-vis the time spent in paid work, on one side, and leisure and remaining activities, on the other.

In this paper, we propose a general framework to account for household work by extending the notion of generalized employment rate discussed by Brandolini and

Viviano (2014). Brandolini and Viviano's class of generalised indices embodies a richer characterisation of the employment status, which considers work intensity, as measured by actual hours of work, rather than the simple dichotomous variable employed/non-employed. An aggregation of the employment status based on hours lends itself quite naturally to be developed to accommodate the time spent in non-market activities. As in Brandolini and Viviano (2014), we continue distinguishing headcount from intensity-weighted rates of work participation. Unlike that paper, however, we focus solely on measures of work engagement at the individual level and ignore the implications for household-level measures. This important issue faces significant data limitations and is left for future research.

The paper is organised as follows. First, we discuss the implications of accounting for home production from a labour market perspective. Second, we introduce our measure of total work for individuals. Next, we briefly describe the data. Our empirical analysis uses time use data drawn from the Multinational Time Use Study (MTUS) database for years 1995-2005. We then study the distribution of employment, household work and total work in a selected group of advanced countries (France, Germany, Italy, the Netherlands, the United Kingdom and the United States).

2. A glimpse at the literature and the main concepts

There is an extensive literature on the estimation of the aggregate value of home production. For instance, Gronau (1980: 408) measured individual productivities and estimated that the "... the value of home production associated with the work at home of U.S. wives in 1973 exceeded ... 70% of the family's money income after taxes". Goldschmidt-Clermont (1982) calculated that the aggregate value of housework in industrialised countries could account for as much as 25 to 40 per cent of the measured gross national product. Subsequent economic research has investigated the impact on income inequality (e.g. Jenkins and O'Leary, 1996; Frick, Grabka and Groh-Samberg, 2012). Home production is viewed as an additional resource, which is available for consumption, and should be added to money income. If individuals have the same preferences and are equally productive in home production, high-wage workers spend no more time in home production than low-wage workers do, and income "extended" to include the value of this production is distributed more equally than money income.

Macroeconomic models often incorporate household production.¹ For example, in a standard real business cycle model, Benhabib, Rogerson and Wright (1991) and Baxter and Jermann (1999) show that it can help explaining empirical regularities observed in the relationship between household consumption and income (the so-called *excess sensitivity puzzle*).

This growing attention extends to official statistics. The new System of National Accounts (2008 SNA) singles out household production as the main problem for defining the range of activities to be recorded in the production accounts. It adopts the following definition:

“The SNA ... includes all production of goods for own use within its production boundary, as the decision whether goods are to be sold or retained for own use can be made even after they have been produced, but it excludes all production of services for own final consumption within households (except for the services produced by employing paid domestic staff and the own-account production of housing services by owner-occupiers). The services are excluded because the decision to consume them within the household is made even before the service is provided” (European Communities et al., 2009: 6-7, par. 1.42).

The 2008 SNA acknowledges that the production of services should be conceptually included within the production boundary, but adopts a compromise solution in order to account for the different uses of the national accounts. In particular, it qualifies the previous choice as follows:

“If the production boundary were extended to include the production of personal and domestic services by members of households for their own final consumption, all persons engaged in such activities would become self-employed, making unemployment virtually impossible by definition. This

¹ Some authors argue that home production give individuals extra utility beyond the consumption of the home produced good. This is typically the case of childcare, as the time spent with children may increase parents' utility (e.g. Connelly and Kimmel, 2007; Graham and Green, 1984). On the other hand, also working in the market can increase utility beyond the wage earned, as it raises self-esteem and social recognition. This further blurs the boundaries between home production and market work.

illustrates the need to confine the production boundary in the SNA and other related statistical systems to market activities or fairly close substitutes for market activities” (European Communities et al., 2009: 7, par. 1.42).²

The principles at the basis of labour statistics have changed accordingly. In the *Resolution* adopted by the International Conference of Labour Statisticians in 1982, the economically active population comprised all persons engaged in the production of primary products, irrespective of their destination, and of all other goods and services for the market, inclusive of the part allotted by producers to own consumption (see ICLS, 1982: par. 5). The *Resolution* adopted in 2013 takes a far more nuanced view, also in comparison with the 2008 SNA. After calling for a “comprehensive measurement of participation in all forms of work” (ICLS, 2013: 2, par. 3), the *Resolution* excludes activities that do not involve any production, self-care, and all activities that cannot be performed by another person in one’s own behalf (ICLS, 2013: 2, par. 6). It then identifies five mutually exclusive forms of work (ICLS, 2013: 3, par. 7): *own-use production work* (production of goods and services for own final use); *employment work* (performed for others in exchange for pay or profit); *unpaid trainee work* (performed for others without pay to acquire workplace experience or skills); *volunteer work* (performed for others without pay); and *other work activities* (e.g. unpaid community service, unpaid work by prisoners). Diagram 1 in the *Resolution*, reproduced here as Figure 1, helps understanding the relationship between these forms of work and the 2008 SNA. In particular, it highlights the compromise solution adopted in the 2008 SNA of classifying outside the production boundary the services, but not the goods, produced by someone for own-use or, without any pay, for others.

The framework adopted by the *Resolution* is consistent with the guidelines issued by a panel study of the National Research Council (2005), entitled “Beyond the market: Designing nonmarket accounts for the United States” and adopted to construct the satellite accounts for home production in the US (e.g. Landefeld, Fraumeni and Vojtech, 2009; Bridgman et al., 2012). In particular, the National Research Council guidelines clearly delimit home production by establishing that it should include only

² This concern is somewhat exaggerated, as we could still define as unemployed those who do not have a market job and are looking for it.

those activities that could be carried out by a third person outside the household, paid at the market wage.

The *Resolution* provides a detailed characterisation for each of the five forms of work and suggests a set of indicators for monitoring the participation in these activities. In this paper, we focus exclusively on two forms: employment and own-use production work (henceforth, OUP work). Figure 2 shows the description of the activities comprised in OUP work, for which the *Resolution* recommends computing headcounts, participation rates and volume measures (ICLS, 2013: 15, par. 74).

3. Measuring total work

Brandolini and Viviano (2014) argue that the standard headcount employment rate, which takes the ratio of the number of employed persons to the number of persons in the reference population, fails to discriminate among people spending very different time at work. Somebody working one hour in the reference week counts as much as somebody working 40 hours. Hence, they define work intensity as the ratio of the total numbers of hours worked by individual i during a reference period divided by a benchmark. To account for work intensity, they propose a generalized employment rate index:

$$(1) \quad GER(\alpha) = \frac{1}{P} \sum_{i=1}^P \omega_i^\alpha, \quad 0 \leq \alpha \leq 1,$$

where ω_i is the work intensity of individual i and P is the number of people in the reference population (e.g. the working-age population). The parameter α governs the “social” evaluation of work participation. The standard headcount employment rate obtains when $\alpha = 0$.³ In this case, the social evaluation assigns a unit value to having a job, regardless of its time arrangements. From this perspective, part-time jobs are equivalent to full-time jobs. This view can be justified by considering that having a job may enhance self-esteem and social integration. At the other extreme, when $\alpha = 1$ the index (1) fully takes into account differences in the intensive margin by weighting each individual by the (normalised) time spent at work ω_i . The diversity between somebody

³ For simplicity’s sake, as ω_i can be equal to 0, we adopt the convention that 0 to the power of 0 equals 0.

working one hour in the reference week and somebody not working at all is maximum in the standard employment rate $GER(0)$, but very small in the intensity-weighted rate $GER(1)$. An intermediate value of α assigns people working less than the standard reference hours a weight lower than 1, but by proportionately less than the shortfall in worked hours would imply. Thus, a rather broad range of social concerns can be accounted for by the index (1) by letting α vary between 0 and 1.

In this paper, we suggest to generalise this framework to account for OUP work in addition to employment. Our aim is to define an index that embodies simple headcount measures as well as an estimate of the total hours spent in both forms of work. Estimates of “total work” defined as the sum of time spent in employment and home production are common in the literature, for instance in the analysis of gender differences in total work supplied by men and women (e.g. Hamermesh, 2007; Burda, Hamermesh and Weil, 2013). We define a general class of work participation measures as follows:

$$(2) \quad TWR(\alpha, \gamma) = \frac{1}{P} \sum_{i=1}^P (\omega_i + \gamma \upsilon_i)^\alpha, \quad 0 \leq \alpha \leq 1, \quad 0 \leq \gamma \leq 1.$$

The variable υ_i corresponds to ω_i for employment and measures person i 's OUP work intensity. As time spent in either type of activities is expressed as a ratio to the total number of hours available in the reference period (e.g. 24 hours if it is a day), it is $0 \leq \omega_i + \upsilon_i \leq 1$; given the time required by self-care, the sum of ω_i and υ_i actually falls below 1. As before, α determines the social evaluation of time spent working in the market and, when $\gamma > 0$, in household production. It varies from valuing participation by itself irrespective of time effort ($\alpha = 0$) to giving it a value proportional to the amount of worked hours ($\alpha = 1$). The second parameter γ is new and captures the relative weight of OUP work with respect to employment in the market: setting $\gamma = 0$ means that only paid jobs matter for the social evaluation, which is the hypothesis currently underlying the standard employment rate; taking $\gamma = 1$ goes in the opposite direction of equating employment and work at home. This parameter determines the degree of substitution of one hour of OUP work for one hour of employment.

When α and γ are set equal to zero, the TWR is equal to the standard headcount employment rate, that is $TWR(0,0) = GER(0)$. The headcount of people involved in the two types of work, normalized by the total population, can be obtained by taking $\gamma = 1$

and $\alpha = 0$. When $\alpha = 1$, TWR averages across working-age people the (normalised) hours of employment for $\gamma = 0$, so that $TWR(1,0) = GER(1)$, and the (normalised) total hours of work for $\gamma = 1$. These are the four main cases on which we focus in this paper, although the general formulation (2) allows the parameters α and γ to take other intermediate values, so to assess differently the hours spent in employment and in OUP work and their relative weight.

4. The data: the Multinational Time Use Study

In this paper, we use the harmonized time use microdata made available by the University of Oxford in the context of the Multinational Time Use Study (MTUS).⁴ We focus on France, Germany, Italy, the Netherlands, the United Kingdom (UK) and the United States (US) and we select the surveys conducted from 1995 to 2005. We exclude surveys for subsequent years, which are available only for some countries (e.g. the US), to avoid that country estimates are unequally affected by changes in time allocation induced by the global financial crisis. Table 1 reports the sample size for each country and year used in this paper.

Typically, time use surveys are based on daily diaries of individuals. Time use diaries refer to a 24-hour period of a specific day in the week. Respondents are asked to record their activities (usually in 10 minutes time intervals), which are often distinct in primary and secondary activities. As the detailed list of possible activities can vary by country, the MTUS aggregates activities in 25 relatively broad categories, reported in Table A1 in the Appendix. Thus, in the “MTUS simple file” used here, the single observation unit is the time spent by individuals, but only in the primary activity (in minutes). Standard socio-demographic characteristics (gender, age, main activity status, marital status, etc.) and household characteristics (number of children, number of household members) are available for each person in the sample. MTUS reports only good quality diaries: the dataset, however, provides also weights to adjust for the exclusion of incomplete diaries. We calculate all statistics using these weights.

We select working-age population, commonly identified as composed of people

⁴ The data are available at <http://www.timeuse.org/mtus/> after registration.

aged between 15 and 64 years. According to the ILO official criteria, a person is employed if he or she has worked at least one hour during the week preceding the interview. In this paper, since we have only daily reference periods, we define the condition of being employed as a dummy equal to 1 if the person has worked at least one hour in the sampled day and zero otherwise. This criterion is more restrictive than the standard definition: it excludes people who have a job but were not at work in the day of the interview, due to sickness, vacation, or simply a working time spread on different days of the week. However, as long as the sample is representative of the total working-age population in each day of the week, aggregation at the country level should allow us to limit the impact of measurement errors.

The information available from the MTUS maps rather closely the description of own-use production work given in the *2013 Resolution* of the International Conference of Labour Statisticians (see Figure 2). We hence identify OUP work with the following activities: (1) food preparation; (2) cleaning home and similar activities; (3) child care (including child/adult care travel); (4) care of other household members and elderly care; (5) maintenance of home and vehicles (including collecting fuel); (6) purchase of goods; (7) gardening; (8) pet care (including walk dogs).⁵ Table A2 in the Appendix reports, by country, the time spent in each activity, expressed as fraction of the day.

We define the daily intensity in employment, in OUP work, and in total work as the ratio of the time spent in that activity to the total of 24 hours. Participation in employment and OUP work requires that someone spends at least 1 hour per day in either type of activities.

5. Results

5.1. Headcount participation rates

As individuals can engage in both employment and OUP work, the headcount indicators must consider the combination of both types of productive processes. The columns of Table 2 report, for the total and by sex, the share of people: (1) in both employment and OUP work; (2) in employment only; (3) in OUP work only; and (4)

⁵ In the *2013 Resolution* time spent travelling to and from work is excluded from both employment and OUP activities.

not in work.

On average, around 40 per cent of the total working-age population has a paid job and engages in household production. This share is higher in the Netherlands than in the other countries, possibly because of the very high incidence of part-time work. An extreme pattern of work division within the household emerges for Italy, which stands out for the highest shares of men engaged only in employment, on one side, and women working only at home, on the other. The proportion of people without any work activity is around 10 per cent on average, but it reaches 12.6 per cent in Italy and France, where the high male share drives it.

Table 3 reports the rates of employment, OUP work, and total work, based on MTUS data, together with the standard employment rates drawn from Labour Force Survey data (LFS) for the corresponding years. The MTUS employment rates in the second column (the sum of columns 1 and 2 in Table 2) are sufficiently close to the LFS rates in the first column, given the many differences in surveys and definitions. Overall, the cross-country picture is unaffected, also by sex: the employment rate is higher in the Netherlands, the UK and the US than in the other countries, and it is lowest in Italy; the participation of Italian women, whose rate is at least 20 percentage points lower than in the first three countries, explains the gap. However, there are perceptible differences between the two sources. The MTUS rates are consistently higher than the LFS rates in the US, whereas the opposite happens in the UK and Italy. The largest discrepancy is found for the employment rate of Dutch women, who appear to have a much higher probability of having a paid job in the MTUS than in the LFS (7.5 percentage points). This evidence suggests that some work of reconciliation may be desirable before data from time use surveys are routinely used to construct labour statistics.

Cross-country differences are remarkably smaller for the OUP work rates in the third column of Table 3 (the sum of columns 1 and 3 in Table 2) than for the employment rates. These headcount ratios vary between 60.8 per cent in Italy and 66.4 per cent in Germany, a range of 6 points that compares with the over 20 points of the employment rates. On the other hand, sex differences are larger for OUP work than for employment, and reach a maximum in Italy.

The total work rate in the fourth column (the sum of columns 1 to 3 in Table 2) is the share of working-age people who are engaged in production for the market, for own-use, or both. This rate falls within a range of about 5 percentage points around 90

per cent. The inclusion of OUP work reduces then differences in work participation across countries. The strong improvement in the figure for Italy is not due to men, who are characterised by the lowest rates in both types of work, but entirely to women, who compensate the low participation in the market with a strong presence in the household production.

The comparison between the index $TWR(0,0) = GER(0)$ in the second column and the index $TWR(0,1)$ in the fourth column highlights how including household production raises the proportion of people engaged in any work activity very close to 1. Yet, the headcount rates for total work are not totally uninformative: not only cross-country differences do not vanish, but also the disaggregation by age and sex reveals diverse patterns. Figure 3 shows the age profile of the total work rate, together with the employment and OUP work rates. In all countries, the headcount rate for OUP work is remarkably smaller for young individuals than for older people. It reaches 50 per cent between 25 and 30 years of age, which is the age at which people typically end studying and start living alone, except for Italy, where this happens after age 30. Aside from the US, the OUP work rate does not decrease after age 55 like the employment rate, but rather it steadily goes up. In all countries, the headcount rate for total work approaches 1 after age 30 and then declines slightly after age 50. This decline characterises only men, who partially substitute employment in the market with OUP work as they aged. As OUP work is so more widespread among them, for women there is virtually no drop in the total work rate.

In brief, the analysis of these indicators of the extensive participation margin suggests that the diversity in total work across countries is not negligible, but is small in comparison to that in employment. These differences are likely to reflect dissimilarities in the weight of the young in the total population and the variety in the timing of family formation and fertility.

5.2. Intensity-weighted participation rates

Time spent working per day is our measure of the intensive margin of work. Unlike the headcount ratio, it allows us to consider not only how many people are at work, but also how much they work. In Table 4 we report the fractions of the day spent in work for market and own-use production. As for the standard dichotomous index, the intensity-weighted employment rate in the first column, which is $TWR(1,0) = GER(1)$, is

higher in the UK and the US than in the other countries. Differently from the headcount indices in Table 3, however, accounting for hours of work pushes Italy ahead of France, Germany and the Netherlands. Thus, the higher number of hours worked by Italians in the market compensates for the lower proportion of people in employment. The comparison of the intensity-weighted and standard headcount indices reveals that this result is mainly due to the male component of the workforce. This country re-ranking of the employment rates survives to the inclusion of OUP work, i.e. when we consider the intensity-weighted rate of total work $TWR(1,1)$ in the last column of Table 4. The intensity of OUP work is rather similar across countries if we look at the means, not if we look at the breakdown by sex. Women spend in household work about twice the hours spent by men, except for Italy where this ratio rises above 3.

The age profiles of the intensity-weighted rates of total work show that in the US and in Italy people aged between 30 and 55 work more than in other countries (Figure 4). The difference persists also after age 55. However, it depends on high employment intensity of both men and women in the US, but on very high OUP intensity of women of aged 55 years or more in Italy (similar evidence is also found by Fang and McDaniel, 2014). The distribution of intensity dramatically changes when we compare employment to total work. Figure 5 reports the kernel density estimates of the two distributions for all countries. To ease comparisons, we do not show the hikes corresponding to those who have no employment. Unsurprisingly, the inclusion of OUP work shifts the mass away from zero intensity towards the right in all countries: the mode of the total work distribution is around 40 per cent of the day, which is more than nine and a half hours.

Figure 6 compares the same kernel density distributions across countries, separately for employment intensity (top panel) and total work intensity (bottom panel). The dissimilarity is noticeable for employment intensities around zero and approximately 8 hours (0.33 on the horizontal axis), but is less pronounced for total work intensity. Cross-country differences in work participation narrow significantly when we take a broader concept of work that includes household production.

5.3. *The value of γ*

So far, we have considered solely the two extreme values for γ , 0 and 1. In a sense, this is a natural implication of the standard way of constructing labour statistics:

either we do not value household production and set γ equal to 0, or we value it and simply add up hours spent in the two types of work, taking γ equal to 1. Choosing a value of γ comprised between 0 and 1 means assigning a positive value to hours worked at home, but with a weight lower than those of market work. Using, for instance, lower productivity to justify such an assumption, however plausible it may be, raises the issue of why analogous productivity adjustments are not made for market jobs in different industries or requiring different skills. On the other hand, the method used to evaluate housework could help to pin down the value of γ (e.g. Goldschmidt-Clermont, 1982, 1993; Fitzgerald et al. 1996). With an “opportunity cost” valuation, housework must be at least as remunerative as a paid work obtainable in the market. If one hour of paid work is at the margin equivalent to one hour of household work, then it seems natural to set γ equal to 1. However, persons are rarely free to substitute market and non-market activities. The alternative “foregone expenses” valuation focuses on the costs saved by a household by engaging directly in housework. If we compute the cost of replacing the OUP work with goods and services purchased in the market, we can estimate the implicit hourly wage for the OUP work. The ratio of this implicit wage rate to the average wage rate represents the relative price of the OUP work, and it might provide a reference for choosing γ .

Without making any specific assumption on the most appropriate way to set γ , in Figure 7 we show how varying it between 0 and 1 affects the intensity-weighted rate of total work ($\alpha = 1$). Somewhat surprisingly, different values of γ do not change the rank of countries. Yet, in some cases, there is some narrowing of the gap observed when only employment matters. As γ moves towards 1, the Dutch total work intensity approaches the French figure, and the Italian rate reaches the UK rate. The US clearly leads the ranking for any value of γ , confirming the different preferences as regards the allocation of time between the two sides of the Atlantic.

6. Conclusions

There is no doubt that household production, as opposed to market production, is a crucial component in the evaluation of a country’s output and well-being. While methods for adjusting the estimates of national and individual incomes have received much attention, leading to the construction of satellite accounts to complement the

SNA, less is known as regards the implications for assessing work participation levels. In this paper, we have proposed a general framework, which allows us to account for household work by focusing on work intensity, as measured by actual hours of work, rather than on the dichotomous distinction between employed and non-employed. We have described a class of indices that encompasses headcount and intensity-weighted rates of work participation and allows the possibility to sum OUP work and employment. The empirical analysis using time use data shows that the ranking of countries is sensitive to the shift from headcounts to intensity-weighted indices, and that the inclusion of OUP work changes considerably the picture on the work burden of men and women. The comparison between the MTUS and LFS data show that there are discrepancies: this points to the need to work on the harmonisation and integration of the two sources.

Coyle (2014: 140) argues that we should rethink the meaning of “the economy”. She suggests that this is also related to the fact that “... the boundary between paid work in the market and unpaid work has become fuzzier the more people contribute to voluntary value-creation (Wikipedia and Linux being the canonical example), or draw on their ‘leisure’ activities for their paid work (having a brilliant idea while out with friends), or mingle the two (a landscape gardener practising new designs on family members before selling them to clients)”. There are older reasons to reconsider such a boundary, since certain household activities have traditionally contributed to well-being and to create economic value as much as market jobs, e.g. in the care of children and the elderly. This paper has attempted to cast this concern into a standard framework for the statistical analysis of the labour market. It has admittedly refrained from accounting for the household dimension of the problem as well as for a second important component of unpaid work, voluntary work. Further research is needed on both aspects.

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Table 1: MTUS Sample size by country and year

Year	France	Germany	Italy	Netherlands	UK	US
1995				19,824	1,502	
1998	10,971					
1999	1,424					
2000				10,472	6,433	
2001		20,343			8,674	
2002		7,697	27,019			
2003			8,723			17,242
2004						11,515
2005				12,446	3,686	10,893

Source: authors' elaboration on data from MTUS.

Table 2: Share of population in employment and OUP, people aged 15-64 (per cent of working-age persons)

Country and sex	Employment and OUP work	Employment only	OUP work only	No work	Total
<i>Men and Women</i>					
France	35.1	24.7	27.5	12.6	100.0
Germany	40.1	23.5	26.2	10.1	100.0
Italy	26.7	26.6	34.1	12.6	100.0
Netherlands	45.3	27.9	19.0	7.8	100.0
UK	39.5	29.3	23.2	8.0	100.0
US	44.4	30.6	17.6	7.4	100.0
<i>Men</i>					
France	27.7	40.0	16.8	15.5	100.0
Germany	37.4	36.4	14.3	11.9	100.0
Italy	21.3	45.0	16.9	16.9	100.0
Netherlands	36.4	42.8	11.8	9.1	100.0
UK	33.2	41.7	14.7	10.4	100.0
US	40.7	40.9	9.9	8.5	100.0
<i>Women</i>					
France	42.5	9.7	38.0	9.8	100.0
Germany	42.4	12.4	36.5	8.7	100.0
Italy	31.9	8.8	50.9	8.4	100.0
Netherlands	52.2	16.5	24.5	6.8	100.0
UK	45.7	17.2	31.6	5.6	100.0
US	47.9	20.7	25.0	6.4	100.0

Source: authors' elaboration on data from MTUS.

Table 3: Headcount rates of employment, OUP work and total work (per cent of working-age persons)

Country and sex	Employment	Employment	OUP work	Total work
	LFS	$TWR(0,0)$	MTUS	$TWR(0,1)$
<i>Men and women</i>				
France	60.7	59.9	62.6	87.4
Germany	65.7	63.6	66.4	89.9
Italy	55.1	53.3	60.8	87.4
Netherlands	70.3	73.3	64.3	92.2
UK	70.7	68.8	62.8	92.0
US	71.3	75.0	62.0	92.6
<i>Men</i>				
France	67.7	67.7	44.5	84.5
Germany	72.8	73.8	51.8	88.1
Italy	68.8	66.2	38.2	83.1
Netherlands	79.1	79.1	48.1	90.9
UK	77.1	74.9	47.8	89.6
US	77.2	81.6	50.7	91.5
<i>Women</i>				
France	53.5	52.2	80.3	90.2
Germany	58.3	54.8	79.0	91.3
Italy	41.5	40.7	82.9	91.6
Netherlands	61.2	68.7	76.7	93.2
UK	64.3	62.9	77.3	94.4
US	65.5	68.6	73.0	93.6

Source: authors' elaboration on data from MTUS and LFS. The LFS values are simple averages for the same years as the corresponding MTUS's.

Table 4: Intensity-weighted rates of employment, OUP work and total work (per cent of 24 hours)

Country and sex	Employment <i>TWR(0,1)</i>	OUP work	Total work <i>TWR(1,1)</i>
<i>Men and Women</i>			
France	13.3	13.1	26.4
Germany	12.3	13.7	26.0
Italy	13.8	14.3	28.1
Netherlands	12.7	13.7	26.4
UK	14.7	13.5	28.2
US	16.7	13.8	30.4
<i>Men</i>			
France	16.4	7.9	24.4
Germany	16.1	9.4	25.4
Italy	18.9	6.7	25.6
Netherlands	17.9	9.0	26.9
UK	18.3	9.3	27.6
US	19.8	10.2	30.0
<i>Women</i>			
France	10.1	18.2	28.3
Germany	9.0	17.5	26.5
Italy	8.9	21.6	30.6
Netherlands	8.7	17.3	26.0
UK	11.2	17.6	28.7
US	13.6	17.2	30.8

Source: authors' elaboration on data from MTUS.

Figure 1: Forms of work and the System of National Accounts 2008

<i>Intended destination of production</i>	<i>for own final use</i>		<i>for use by others</i>				
	Own-use production work		Employment (work for pay or profit)	Unpaid trainee work	Other work activities	Volunteer work	
<i>Forms of work</i>	of services	of goods				in market and non-market units	in households producing goods services
<i>Relation to 2008 SNA</i>	<p style="text-align: center;"><i>Activities within the SNA production boundary</i></p> <p style="text-align: center;"><i>Activities inside the SNA General production boundary</i></p>						

Source: ICLS (2013: 3, Diagram 1).

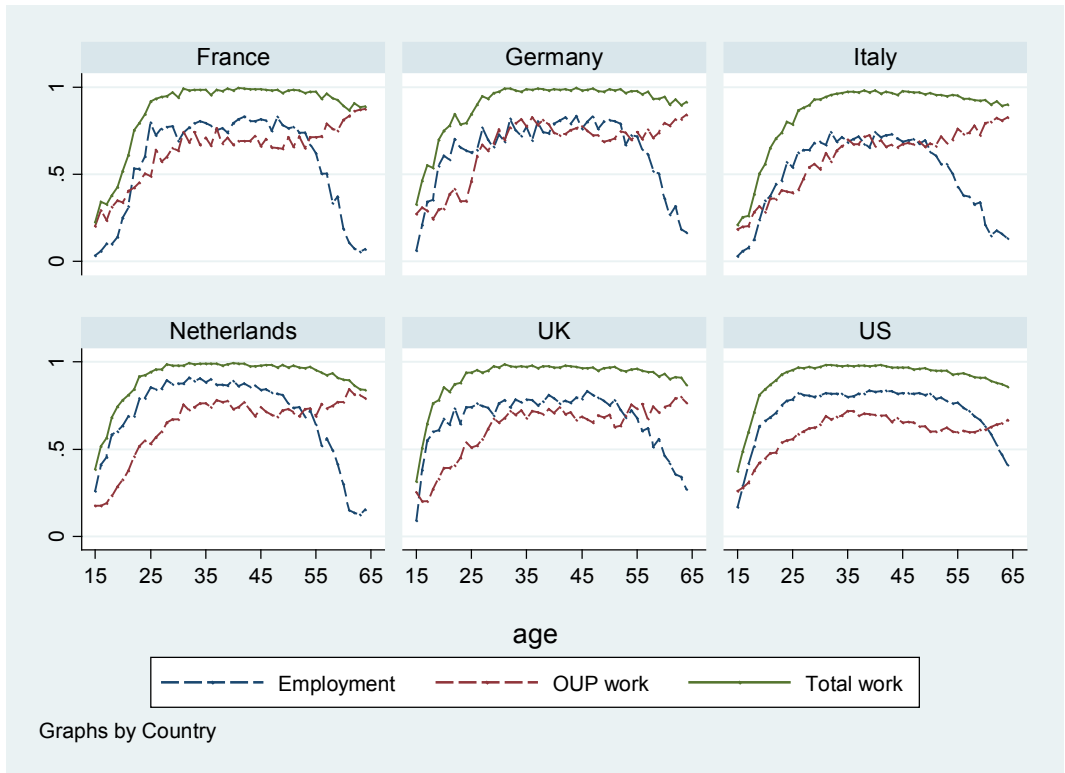
Figure 2: Definition of persons in own-use production work

<p>Persons in own-use production work are defined as all those of working age who, during a short reference period, performed any activity to produce goods or provide services for own final use, where:</p> <p>(a) “any activity” refers to work performed in the various activities under paragraph 22(b) and (c) for a cumulative total of at least one hour;</p> <p>(b) production of “goods” (within the 2008 SNA production boundary) covers:</p> <ul style="list-style-type: none"> (i) producing and/or processing for storage agricultural, fishing, hunting and gathering products; (ii) collecting and/or processing for storage mining and forestry products, including firewood and other fuels; (iii) fetching water from natural and other sources; (iv) manufacturing household goods (such as furniture, textiles, clothing, footwear, pottery or other durables, including boats and canoes); (v) building, or effecting major repairs to, one’s own dwelling, farm buildings, etc.; <p>(c) provision of “services” (beyond the 2008 SNA production boundary but inside the General production boundary) covers:</p> <ul style="list-style-type: none"> (i) household accounting and management, purchasing and/or transporting goods; (ii) preparing and/or serving meals, household waste disposal and recycling; (iii) cleaning, decorating and maintaining one’s own dwelling or premises, durables and other goods, and gardening; (iv) childcare and instruction, transporting and caring for elderly, dependent or other household members and domestic animals or pets, etc.; <p>(d) “for own final use” is interpreted as production where the intended destination of the output is <i>mainly</i> for final use by the producer in the form of capital formation, or final consumption by household members, or by family members living in other households:</p> <ul style="list-style-type: none"> (i) the intended destination of the output is established in reference to the specific goods produced or services provided, as self-declared (i.e. mainly for own final use); (ii) in the case of agricultural, fishing, hunting or gathering goods intended mainly for own consumption, a part or surplus may nevertheless be sold or bartered.
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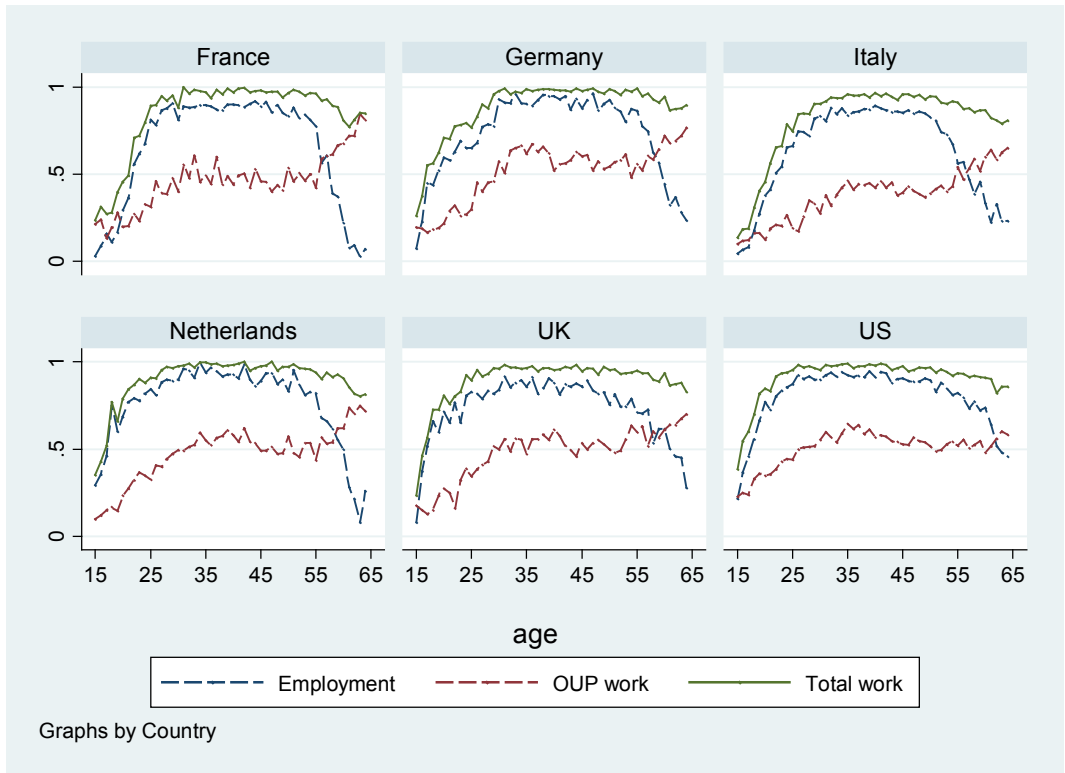
Source: ICLS (2013: 5, par. 2).

Figure 3: Age profiles of headcount rates of employment, OUP work and total work, by country

(a) Men and women



(b) Men



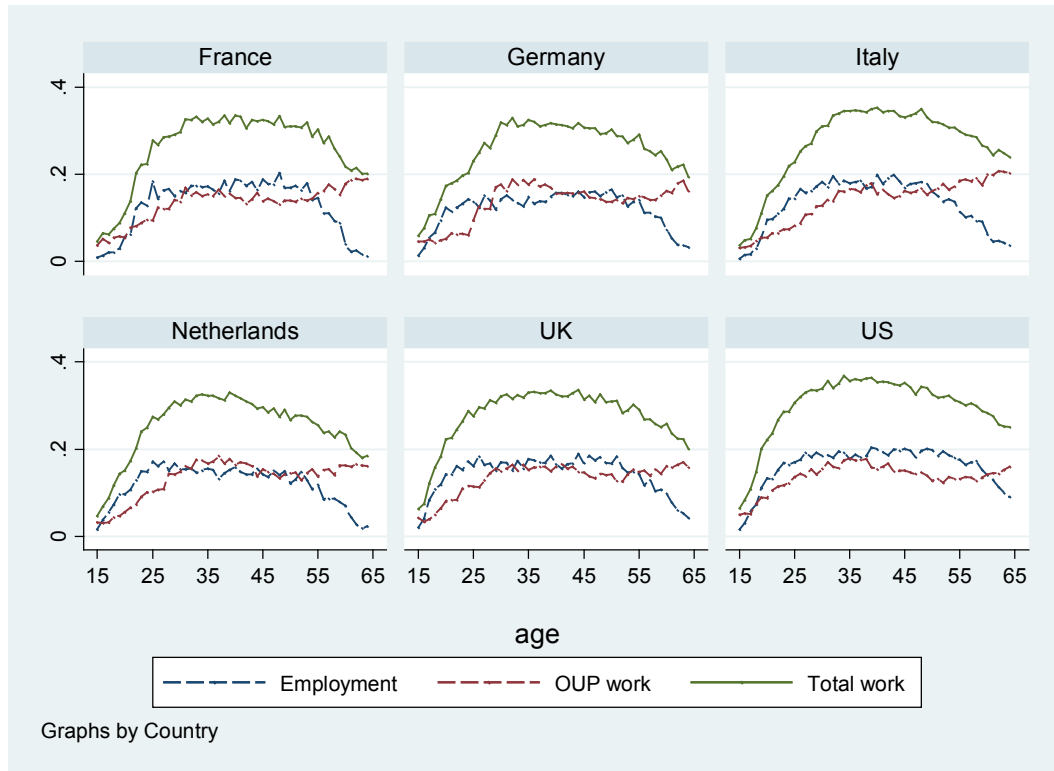
(c) Women



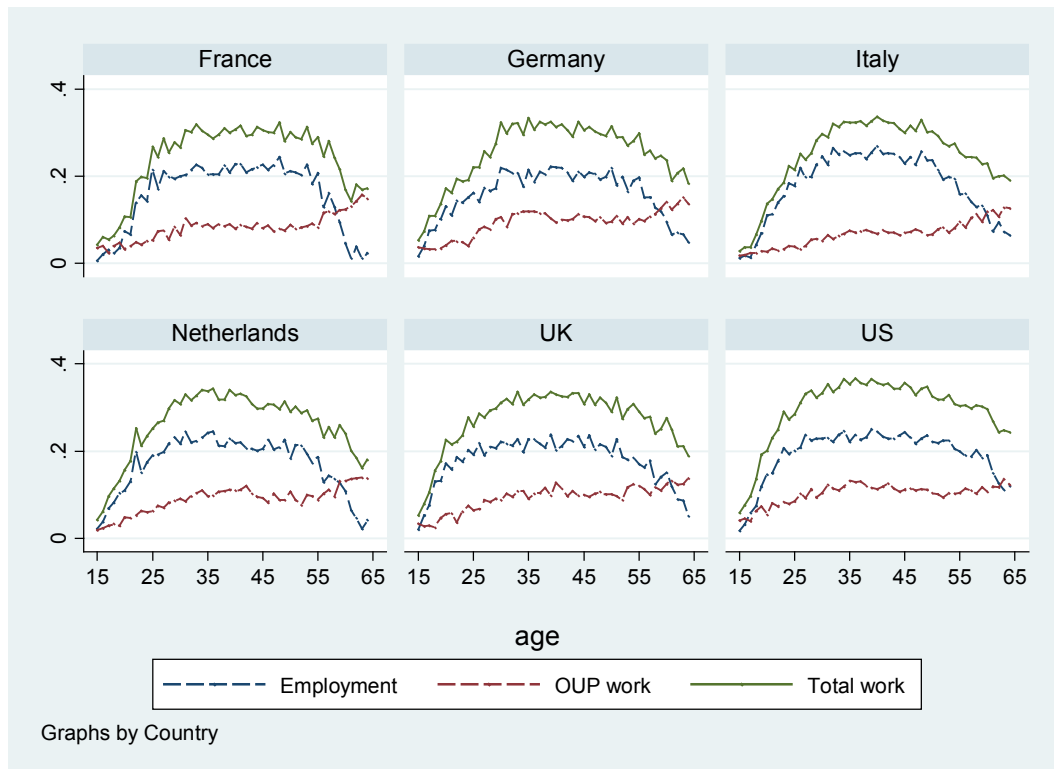
Source: authors' elaboration on data from MTUS.

Figure 4: Age profiles of intensity-weighted rates of employment, OUP work and total work, by country

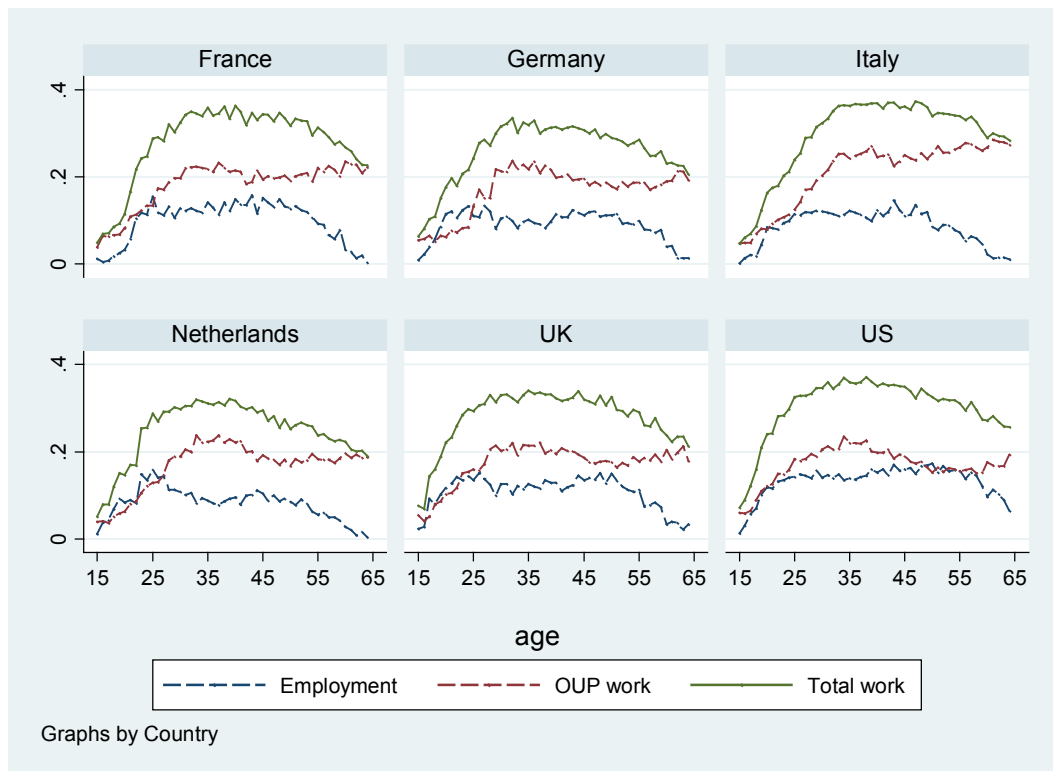
(a) Men and women



(b) Men

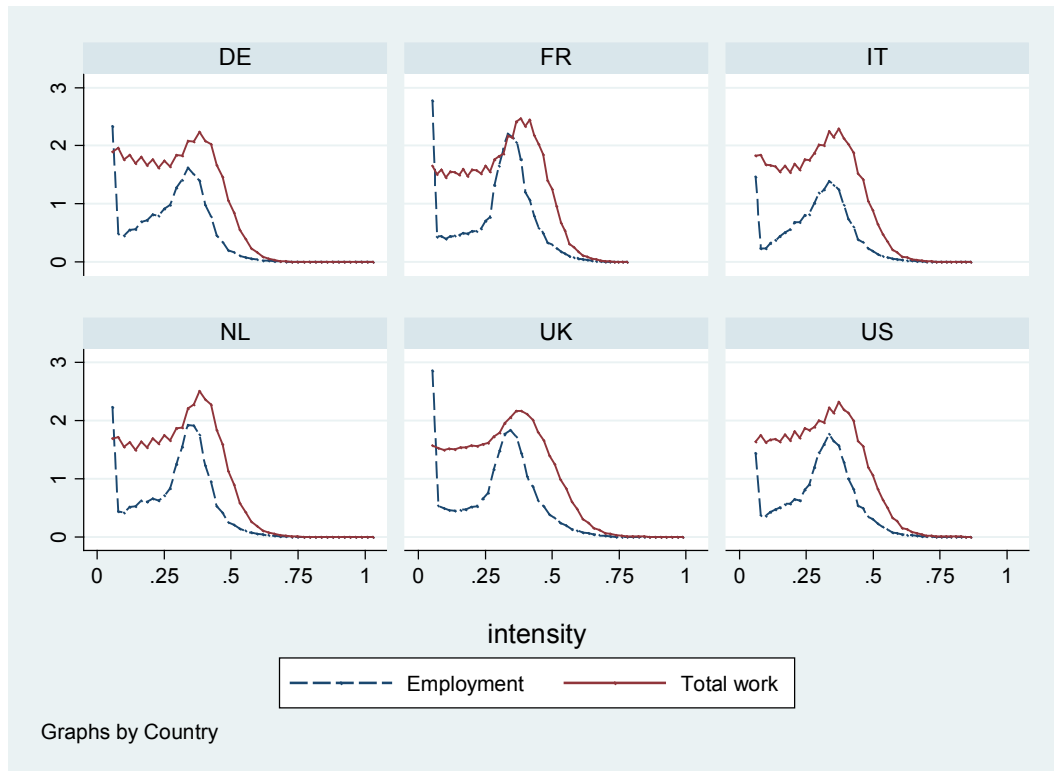


(c) Women



Source: authors' elaboration on data from MTUS.

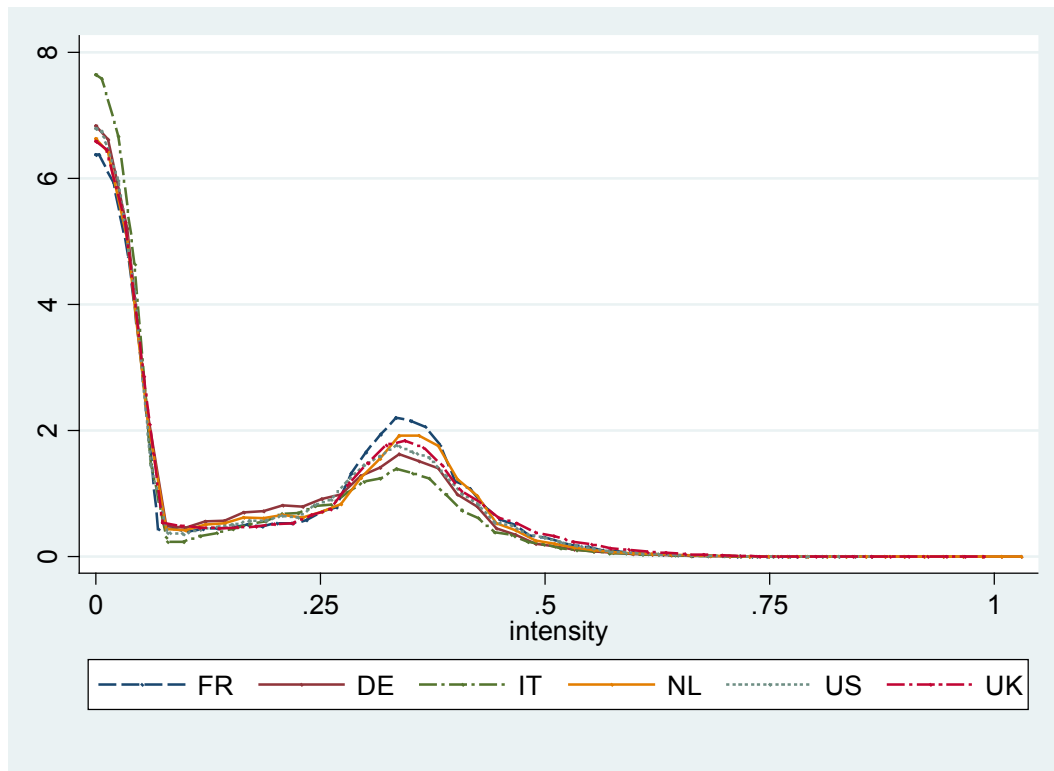
Figure 5: Distribution of intensity of employment and total work, by country



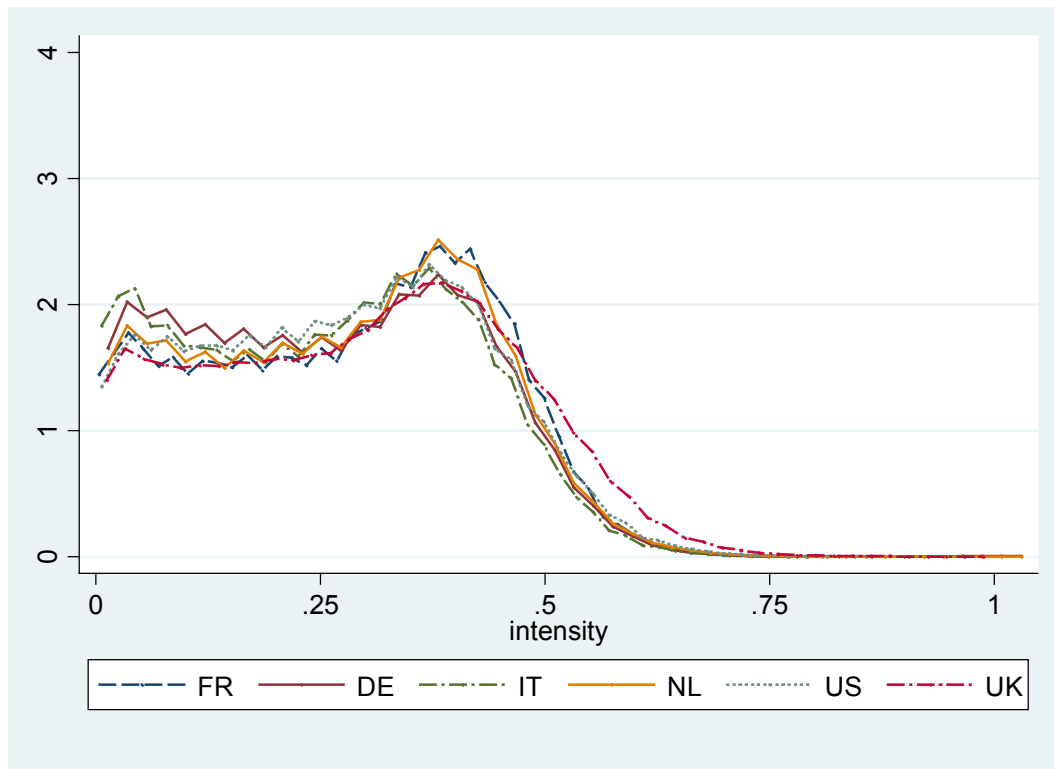
Source: authors' elaboration on data from MTUS.

Figure 6: Distribution of intensity of employment and total work

Employment intensity

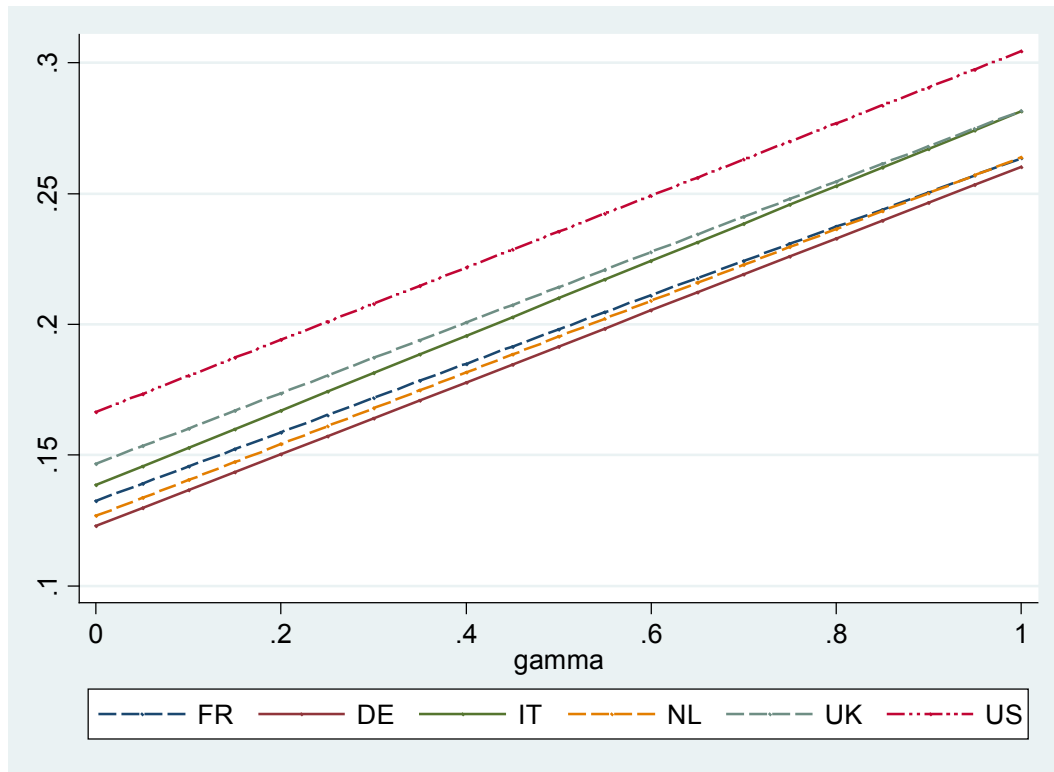


Total work intensity



Source: authors' elaboration on data from MTUS.

Figure 7: Total work for different values of the parameter γ



Source: authors' elaboration on data from MTUS.

Appendix

Table A1: List of variables in the MTUS dataset

Variable name	Activity
sleep	sleep and naps
eatdrink	meals or snacks
selfcare	wash, dress, care for self
paidwork	paid work and related activities
educatn	schooling, education, homework
foodprep	food preparation, cook, wash/put away dishes
cleanetc	cleaning, laundry, regular housework
maintain	maintain home/vehicle, including collect fuel
shopserv	purchase goods, consume services
garden	gardening/pick mushrooms
petcare	pet care (including walk dogs)
eldcare	look after adults needing help or care
pkidcare	physical, medical, supervisory, routine child care
ikidcare	play/sports with, read/talk to child, help with homework
religion	worship, religion, and prayer
volorgwk	voluntary, civic, organisational activities
commute	travel to/from work or education
travel	travel
sportex	sport or exercise
tvradio	watch television, listen to radio
read	read
compint	e-mail, web, program, computer games
goout	cinema/theatre, sport match, away from home leisure
leisure	other free time leisure
missing	no activity reported
restrnt	restaurant, café, bar, pub
eatatwrk	meals at work or school
compgame	play computer games
caretrav	child/adult care travel

Source: MTUS.

Table A2: Share of time spent in OUP elementary activities (%)

Elementary activities	France	Germany	Italy	Netherlands	UK	US
food preparation	3.4	3.0	4.1	3.4	3.2	2.1
cleaning home and similar activities	3.7	3.4	4.3	2.7	3.1	3.4
care of other household members, elderly care	0.0	n.a. (1)	n.a. (1)	0.4	0.1	0.9
child care	1.8	1.8	1.5	2.4	2.6	3.4
maintain home and vehicles	0.3	2.3	1.2	1.0	0.9	0.5
purchase goods, consume services	2.3	2.2	2.4	2.1	2.1	2.2
gardening	0.9	0.8	0.6	0.5	0.6	0.9
pet care	0.3	n.a. (1)	n.a. (1)	0.6	0.6	0.3

Source: MTUS. (1) Included in other house activities.