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Employed or inactive? Cross-national differences in coding parental leave beneficiaries in European Labour Force Survey data.

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In survey research the parental leave beneficiaries are usually coded as either employed or inactive. An exception is the European Labor Force Survey (EU-LFS), which includes parental leave among other forms of being employed but temporarily not working. This paper explores classification of parental leave takers in EU-LFS. We show that classification rules differ cross-nationally: in some countries parental leave takers are considered inactive, in others – employed but temporarily not working. In particular in the Czech Republic, Estonia, Hungary and Slovakia the EU-LFS data classify the beneficiaries as inactive. We estimate the number of mothers on parental leave in these countries and show that EU-LFS employment rates of women aged 18-40 are biased downwards 2-7 percentage points; for mothers of children aged 0-2 the bias reaches 12-45 percentage points. Our study shows the limited comparability of EU-LFS employment rates and warns about possible bias in cross-national studies.
Keywords: comparative research; employment status; Labor Force Survey; maternity leave; parental leave

1 Introduction

Parental leave is a complex status to measure in the labour market. As a rule, parental leave beneficiaries remain formally employed and expect to return to their previous employer. The employment definition by the International Labor Office (ILO) contains a category for the *employed but temporarily not working* which justifies formal employment as a reason to classify leave takers as *employed*. At the same time, parental leave is an interruption in market work, therefore leave takers may be perceived as *inactive*. The dual nature of leave takers' labor market attachment requires that a precise and comparable definition be adopted across countries. However, up to this point the topic remains largely absent from the methodological literature; consequently, not only survey measurement usually fails to capture the specificity of this employment category but also classification rules differ across countries.

This is unfortunate as the classification rules used to define the labour market status of parental leave beneficiaries have important consequences. First, ignoring the category in classifications impedes monitoring employment policies and their effects. Second, the use of country-specific rules decreases the reliability and comparability of the official employment and inactivity rates, especially in countries where leaves are long or taken by a large part of mothers. Third, country-specific classifications that often lack transparency create risks for comparative research, mainly in the areas of women's employment, work-family reconciliation or any other topics for which employment of household members is important.

To our knowledge, this paper is the first to explore how parental leave beneficiaries are treated in the European Union Labor Force Survey (EU-LFS) – the basic source of information to estimate the employment structure in the European Union (EU). This contribution provides a pilot study for more in-depth analysis of the cross-country comparability of women's employment data across EU countries.

Our empirical strategy proceeds as follows. We focus on four countries (the Czech Republic, Estonia, Hungary and Slovakia) which do not report parental leave take-up in the 2008 EU-LFS, whereas other sources suggest that parental leaves are there well-paid, frequently taken and relatively long. For each country we estimate the number of parental leave beneficiaries using information from different data sources. We find that in these countries women on parental leave are classified as inactive. We then estimate what would be the employment rate if all maternity and parental leave takers receiving high benefits (minimum 50% wage replacement rate) were classified as employed. Our estimates reveal a difference of 2-7 percentage points among women aged 18-40 and 12-45 percentage points among mothers of young children in this category.

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2 Employment status of parental leave beneficiaries

Employed parents in Europe are currently entitled to two main types of childrearing leaves: parental and maternity leave.[1] Among the two, the maternity leave is usually a part of the health insurance system, it is typically compulsory for the mother and paid at a high wage substitution rate.[2]

On the other hand, the parental leave usually follows maternity leave, can be taken by each of the parents, and its duration, level of payment and sources of funding differ considerably among European countries (see, e.g. Moss, 2010).

Depending on the type of the leave, the formal labour market status of the beneficiaries differs. Whereas women on a maternity leave are consistently included among the employed, "[p]eople in full-time parental leave are treated as a case of long term absence from work" (Eurostat, 2003).[3] Such persons are considered employed only if they have a *formal* job attachment.

The conditions to establish a formal job attachment are listed in both (the more general) ILO guidelines (ILO, 1998, 2011b) and the Eurostat documents (explanatory notes, guidelines, see Eurostat, 2003, 2008) referring to the EU-LFS. Employees on parental leave "who have an assurance of a return to work with the same employer following the end of the leave, should be classified as employed if the employer continues to pay all or a significant part of the wage or salary of the person on leave, or if the duration of the leave does not exceed a time-limit to be specified according to national circumstances" (ILO, 1998). In other words (see ILO, 2011b; Eurostat, 2008) to be considered as having a formal job attachment during a long term absence from work, one of the following two conditions must be met (Eurostat, 2008; ILO, 2011b):

- the continued receipt of wage or salary, *and* an assurance of a return to work (or an agreement as to the date of return) following the end of the contingency.
- the elapsed duration of absence from the job which, wherever relevant, may be that duration for which workers can receive compensation benefits without obligation to accept other jobs

While the above mentioned conditions for establishing formal job attachment are formulated consistently in the majority of the documents, the Eurostat's document on methods and definitions used in the EU-LFS (Eurostat, 2003) specifies in more detail the maximum duration of absence and the level of payment necessary to classify an employee during a long-term absence from work as employed. "If the total absence from work (measured from the last day of work to the day on which the paid worker will return) exceeds three months then a person is considered to have a job only if he/she continues to receive $\geq 50\%$ of the wage or salary from their employer" (Eurostat, 2003).

This recommended classification logic becomes more apparent when we examine in detail the two variables central to our analysis: WSTATOR and NOWKREAS (Eurostat, 2008).

Labour status during the reference week (WSTATOR) contains following categories:

1 Did any work for pay or profit during the reference week – one hour or more (including family workers but excluding conscripts on compulsory military or community service)
2 Was not working but had a job or business from which he/she was absent during the reference week (including family workers but excluding conscripts on compulsory military or community service)
3 Was not working because on lay-off
4 Was a conscript on compulsory military or community service
5 Other (15 years or more) who neither worked nor had a job or business during the reference week
9 Not applicable (child less than 15 years old)

Reason for not having worked at all though having a job (NOWKREAS) *Filter:* the variable concerns only persons who had a job from which they were absent during the reference week (WSTATOR=2)

0 Bad weather
1 Slack work for technical or economic reasons
2 Labor dispute
3 School education or training
4 Own illness, injury or temporary disability
5 Maternity leave (including parental leave until 2005)
6 Parental leave (from 2006)
7 Holidays
8 Compensation leave (within the framework of working time banking or an annualized hours contract)
9 Other reasons (e.g. personal or family responsibilities)

This data structure, as well as the above mentioned

[1] Additionally, other types of leaves, e.g. paternity leave, childcare leave, career breaks or other measures are available in some countries.

[2] "Maternity leave is first given to the mother (but may include the leave of the father in the case of a transfer of the entitlements) and corresponds to the compulsory period of the leave stipulated by national legislation to ensure that mothers before and after childbirth have sufficient rest, or for a period to be specified according to national circumstances." (Eurostat, 2003).

[3] "Women on maternity leave, who have an assurance of a return to work following the end of the leave, should be classified as employed if, during the reference period, they are in receipt of all or a significant part of their wage or salary from the employer or an equivalent payment from other sources received by virtue of being an employee. Women on maternity leave, who have an assurance of a return to work following the end of the leave, should also be considered as being employed during the compulsory period of the leave stipulated by national legislation to ensure that mothers before and after childbirth have sufficient rest, or for a period to be specified according to national circumstances" (ILO, 1998).

"...the notion of temporary absence from work refers to situations in which a period of work is interrupted by a period of absence. This implies that persons are generally to be considered as having been temporarily absent from work and therefore employed, if they had already worked at their current activity and were expected to return to their work after the period of absence" (Eurostat, 2008).

guidelines and definitions suggest that the parental leave beneficiaries (as well as maternity leave beneficiaries) with a formal job attachment should be coded as employed but temporarily not working (code 2 in WSTATOR), and that the type of leave should be coded accordingly in NOWKREAS.

In practice however, both the regulations and the data collection procedures allow using national definitions and national measurement tools. The EU-LFS data are collected by national statistical offices and subsequently harmonized according to the EU-LFS data matrix in order to ensure their cross-national comparability.[4] Specifically, the "target structure harmonization" method used to prepare the EU-LFS data implies that only the selected *core variables* are measured according to the rules and recommendations set by the Eurostat, whereas the remaining ones are measured according to the national rules (Hoffmeyer-Zlotnik & Warner, 2011). As a consequence, although the list of variables that the member states should deliver to the Eurostat is specified by a legal act (EC, 1998), the data collecting agencies autonomously define some of the variables and prepare the relevant measurement instruments (Körner, 2012). This situation creates two types of problems.

First, due to large cross-country differences of the parental leave regulations (in such aspects as level of payment, duration, or source of funding), establishing the formal job attachment of parental leave beneficiaries is sometimes ambiguous. In particular, the condition of continued receipt of a significant portion (50%) of wage or salary yields complications.[5] For flat-rate parental leave benefits strict application of this criterion means that employment status of leave takers depends on their previous earnings (parents in better paid jobs would be more often classified as inactive). Moreover, parental leave benefits payments are often social insurance transfers which are not equivalent to wages or salaries paid by the employer. In some countries the right to parental benefit does not depend on actually taking the leave so that the leave may be considered formally unpaid. For example, a report from the OECD highlights inconsistencies between Austria and Finland, two countries with long and frequently taken generously paid parental leaves (OECD, 2010). The report states that Austrians on parental leave – for whom benefits are not contingent on taking a leave – are commonly classified as *inactive*, whereas stay at home Finnish on parental leave are counted as *employed*.

The second type of complications stems from the fact that the current regulations allow departing from the international guidelines in order to adhere to the national definitions. For example, the EU-LFS users' guideline: "a person absent from work should be considered as employed if there is a formal attachment to the job, for example *if at least* one of the following criteria is fulfilled (...)" (Eurostat, 2008) clearly allows alternative definitions of formal job attachment. As a consequence, data collecting agencies follow the ILO and the Eurostat recommendations to varying degrees, and adjust the definitions of variables to their own national contexts. Also the measurement tools (wording of questions, interviewers' instructions, filters, re-codification schemas) adhere rather to the national than to the international definitions (Körner, 2012). An analysis by Valentova and Mikucka (2012) demonstrated how did the 2008 EU-LSF questionnaires in the Czech Republic and Slovakia differ from the EU-LFS guidelines when measuring the category "person has a job but was not working during the reference week". In line with Körner (2012), the authors showed differences in the number, the order and wording of questions, in the instructions for interviewers, as well as in the filtering rules.

In some cases, the differences are so substantial that we can speak about a clash between the national definitions and the international guidelines provided by the ILO and the Eurostat. In particular, the Czech Republic, Estonia, Hungary and Slovakia explicitly exclude parental leave beneficiaries from the employed category (ILO, 2011c, 2011d, 2011e).[6]

3 Data and Methods

Data

This paper uses data drawn from the EU-LFS 2008 survey.[7] Our sample is restricted to all women aged 18-40 who have at least one child aged zero to two years (before the third birthday, i.e. aged 0-35 months) – i.e. a group of respondents most likely to be on parental leave – in order to clearly identify parental-leave users' misclassification.

EU-LFS data will be examined against information on parental leave regulations (length, level of payment, eligibility) and data on take-up and user rates available in other sources, including collective reports (Moss, 2010; Plantenga & Remery, 2005; Anxo, Fagan, Smith, Letablier, & Perraudin, 2007; ILO, 2011a), descriptions available on-line (for Estonia: Estonian Ministry of Social Affairs, 2011) and administrative data on number of recipients of the benefits (for Hungary: KSH, 2011 and for Estonia: Estonian Health Insurance Fund, 2008).

To trace the inconsistencies stemming from misclassifying parental leave beneficiaries, we examine the countries where EU-LFS does not report any persons on parental leave, despite the fact that parental leaves in these countries are well-paid, long and frequently taken. These countries include the Czech Republic, Estonia, Hungary and Slovakia (Moss, 2010; Plantenga & Remery, 2005; Anxo et al., 2007; ILO, 2011a). All of them present visible discrepancies between the numbers of parental leave users reported by the EU-LSF survey and other data sources.

[4] The data matrix occasionally undergoes edition, in particular in 2006 variables addressing parental leaves have been added.

[5] The first EU-LFS condition should be of less practical importance, since after the Parental Leave Directive (96/34/EC) countries are obliged to offer leaves of minimum three months.

[6] To eliminate differences in the implementation of core variables in the national questionnaires and related differences in measurement instruments used in the EU member states, Eurostat and the national statistical institutes participate in a joined Task Force on improvements of the harmonization of the measurement of employment and unemployment (Körner, 2012).

[7] Such extraction, i.e. cross-tabulation of selected variables, can be obtained from Eurostat on request.

Comparing data across various sources

Parental leave usage may be expressed in forms of various statistics: as the total number of respondents collecting benefits during a calendar year, the number of person-months of leave (benefit) taken (paid), or as a take-up (or user) rates. In order to compare these statistics across different data sources, we derive formulas expressing the number of beneficiaries at one given point in time.

1. *Number of beneficiaries at one given point in time* (NB) is usually reported by surveys including the EU-LFS.
2. *Total number of beneficiaries during a calendar year* (TNB) is a statistic sometimes provided by administrative sources (e.g., Estonian Health Insurance Fund, 2008). It includes all parents who – in a given year – took at least a small part of their leave. If we assume that 1 month is the minimum length of a leave and that the leave taking is equally spread over the year, the number of leave takers at one given point in time does not only depend on TNB but also on the average length of a leave expressed in months (L). Hence, we can write:

$$NB \approx \mathrm{TNB} \cdot \frac{L}{(L+11)} \quad . \tag{1}$$

   For instance, if $L = 1$, the number of beneficiaries observed at one given point in time (NB) corresponds to $1/12$ of all beneficiaries recorded during the year (TNB). As the average length of a leave increases, the proportion grows, reaching over 76% for leaves lasting 36 months.
3. *Person-months of a leave taken or benefits paid* in a year (MB) is sometimes available from administrative sources (KSH, 2011). MB/12 corresponds to the number of benefits paid per month and – with our assumptions – may be directly compared to NB (number of beneficiaries at one given point in time). Therefore:

$$\mathrm{NB} \approx \frac{\mathrm{MB}}{12} \quad . \tag{2}$$

4. *Take-up rates* (TR) are frequently reported in comparative policy reports (Moss, 2010; Plantenga & Remery, 2005; Anxo et al., 2007; ILO, 2011a) and express the number of beneficiaries in proportion to the eligible population (Bruning & Plantenga, 1999). The number of beneficiaries observed at one given point in time also depends – besides the take-up rate (TR) – on the length of a leave (L), and on the size of the eligible group defined as the product of the number of childbirths in a given year (NCh) and the proportion of mothers eligible for a leave (ER):[8]

$$\mathrm{NB} \approx \mathrm{TR} \cdot \mathrm{ER} \cdot \mathrm{NCh} \cdot \frac{L}{12} \quad . \tag{3}$$

   Formula 3 assumes that the fertility of eligible women does not differ systematically from that of non-eligible women.

   A similar formula may be derived to estimate the number of eligible individuals at one given point in time:

$$\mathrm{NE} \approx \mathrm{ER} \cdot \mathrm{NCh} \cdot \frac{L}{12} \quad , \tag{4}$$

   which implies that:

$$\mathrm{NB} \approx \mathrm{TR} \cdot \mathrm{NE} \quad . \tag{5}$$

5. *User rates* (UR) are reported less often. They express total number of beneficiaries in a given group (e.g. all parents or mothers of children born in given year) in relation to the size of this group (Bruning & Plantenga, 1999). The formula is similar to the one used for TR. Since $\mathrm{UR} \approx \mathrm{TR} \cdot \mathrm{ER}$, it follows that:

$$\mathrm{NB} \approx \mathrm{UR} \cdot \mathrm{NCh} \cdot \frac{L}{12} \quad . \tag{6}$$

To derive the estimates, we necessarily made a number of additional assumptions which are likely to affect the precision of our results. However, we believe that these assumptions do not introduce a large bias as they were made by borrowing figures reported in the literature.

First, in several countries we were unable to correct for part-time leaves or combining leaves with market work (such parents – although on a leave – are in the EU-LFS coded as *employed and working*). Part-time leaves should be of less importance since in our countries of interest leaves are taken predominantly full-time. Lack of data on parents who continue to work during the leave might bias upwards the estimated number of leave takers (only for Estonia we can correct for that) and overestimate the impact of classification on women's employment rates.

Second, we restricted our EU-LFS sample to mothers of young children within the 18-40 age range. In contrast to that, administrative data and policy reports concern all parental leave takers: i.e. also fathers and other family members, as well as women outside our age range. Given the lack of information, we are not able to fully correct for this discrepancy. To account for some of the leave takers being outside of our age range, we use information on the proportion of all children that are born to women aged 18-40. By doing this we assume that leave-taking behaviour of oldest and youngest mothers does not differ significantly from those aged 18-40.

Third, due to the lack of eligibility rate data, we use as a proxy the employment rate, since being employed is usually the primary condition to become entitled to take parental (and maternity) leave. Unfortunately, it is not a perfect measure. First, being eligible to take a leave does not always depend on just being employed but also on the type of employment contract held or the length of employment before childbirth. Second, not being entitled for a leave may lead some

[8] Formally, take-up rates refer to whole period when the leave can be taken (e.g. in Luxembourg 6-months leave can be taken until the child is 5 years old) and not to the length of the leave. Using L implies the assumption that leaves are usually taken at the youngest possible age of the child.

women to postpone childbirth; similarly, anticipating childbirth may lead to searching for specific type of employment contract in order to become eligible. Third, the employment rates specific to the age-group in the four countries examined in our analysis are artificially low, due to coding parental leave beneficiaries as *inactive*. We perform a cross-validation analysis using Hungarian administrative data which suggests that eligibility rate is in fact higher than employment rate of respective population. Our eligibility rate proxy should therefore be viewed as conservative.

Fourth, with no data on take-up and user rates, we use as proxies values estimated in the literature. Finally, we also assume the shortest length of leave taken is one month, that the leave is equally spread over the year, and that the parental leave is taken at the youngest possible age of a child (despite the fact that eligibility often concerns longer period).

Validation of the estimation method

We test the validity of our estimation method in two ways. First, we estimate the number of women on parental leave for Germany, a country for which extensive information on parental leave policy is available in English, and which provides reliable data on parental leave beneficiaries in the EU-LFS. Germany stands out also with a high percentage of parental leave beneficiaries in the EU-LFS data (21%), which creates conditions for relatively accurate estimation.[9] The estimation is presented in Appendix 1.

Second, we assess the validity of our method by estimating, for each analysed country, also the number of women on maternity leave. Such estimation is a proper validity check, because all the countries participating in the EU-LFS code the maternity leave beneficiaries as employed and temporarily not working, i.e. consistently with the ILO and the Eurostat guidelines. The estimations regarding maternity leave are presented directly in the "Analysis" section.

4 Analysis

Table 1 presents employment structure of women aged 18-40 having a child aged 0-2 in 25 EU member states. Countries that report no parental leave users can be divided into several groups.

First, in Malta, Cyprus and Portugal the number of mothers who report being on parental leave is negligible (three respondents at most). This is consistent with the fact that parental leaves in these countries are unpaid and corroborates the literature which also reports very low take-up rates (Plantenga & Remery, 2005; Anxo et al., 2007). This leads us to believe that in these countries the number of mothers on parental leave is indeed very close to zero.

Second, Slovenia reports no parental leave users, high (over 80%) employment rate and 27% of maternity leave, which is the highest rate in Europe. The methodological EU-LFS note (ILO, 2011f) specifies that respondents on 12-months maternity and parental leave are classified as *employed*. Wage replacement rate of parental benefits in Slovenia is high (100% of insurance-covered earnings) and, as expected, the estimated take-up rate reported in the literature is also high (Stropnik, 2010; Anxo et al., 2007; Plantenga & Remery, 2005). This suggests that a significant number of respondents on parental leaves fail to be categorized as such in the EU-LFS survey. It is very likely that they are coded as employed on maternity leave. Indeed, according to our EU-LFS data, 14,482 women aged 18-40 and having a child aged 0-2 were on maternity leave in 2008. However, assuming 21,489 life births from women aged 18-40 in 2008, the length of post-birth maternity leave (11 weeks, i.e. 2.56 months), taking the employment rate as an approximation of eligibility (66%) and assuming 100% take-up rate lead us to believe that only about 3,045 Slovenian women were *truly* on maternity leave at one given point in time in 2008. [10] The remaining mothers (about 11,400) are likely to be on parental leave.[11]

Finally, among countries reporting no parental leave users, the Czech Republic, Estonia, Hungary and Slovakia stand out with over 70% inactivity rates and low levels of employment (below 24%) among women in our group of interest. At the same time, the overall employment rates of women aged 20-49 in these countries are high (e.g. among childless women or those with children aged 6 or older, employment in the age group 20-49 exceeds 80%, only in Hungary it is lower but still over 70%; Eurostat, 2011). Based on parental leave policies in place in these countries, we expect to observe frequent use of long and generously paid parental leaves. In what follows, we focus on these four countries in more details.

The Czech Republic

Classification rules. The Czech Statistical Office (CSO, 2011) classifies respondents on parental leaves as *employed and working* only if they keep working during their leaves; otherwise they are considered either *unemployed* or *economically inactive*. Maternity leave beneficiaries with previous work experience constitute the only group on long-term child-related leaves classified as *employed*.

Leave regulations. Parental benefits in the Czech Republic are relatively generous. They range from a *long option* of about € 300 (CZK 7,600) per month until the child is 21 months old and a monthly allowance of € 150 (CZK 3,800) afterwards until the child reaches 48 months, to a *short option* of € 445 (CZK 11,400) per month until the child is 24 months old. Consequently, the wage replacement rate ranges

[9] Among the other countries where the share of parental leave beneficiaries in our interest group in the EU-LFS 2008 is at least 10%, for Latvia and Lithuania the policy descriptions and take-up rates were not easily available in English, and Austria is mentioned as an example of a country where coding of parental leave beneficiaries is problematic (i.e. where the benefit is not contingent on taking the leave, see: OECD, 2010).

[10] From formula 3: $NB = TR \cdot ER \cdot NCh \cdot L/12 = 100\% \cdot 65\% \cdot 21,489 \cdot 2.56/12 = 3,045$.

[11] This is again consistent with our estimate for parental leaves. Assuming average length equal to the full leave, i.e. 260 days = 8.7 months and 100% take-up and using formula 3: $NB = TR \cdot ER \cdot NCh \cdot L/12 = 100\% \cdot 66\% \cdot 21,489 \cdot 8.7/12 = 10,309$.

Table 1 Employment structure of women aged 18-40 having children aged 0-2
EU member states (without Denmark and Sweden)

	Employed						
Country	Working %	Maternity leave %	Parental leave %	Temporarily not working for other reasons %	Inactive %	Unemployed %	Employed %
HU	7	3	–	1	89	1	11
SK	7	6	–	–	86	1	13
CZ	6	8	–	1	85	–	15
EE	22	2	–	–	75	1	24
BG	22	10	5	2	61	–	39
MT	37	5	–	–	56	1	43
LV	32	3	15	1	46	3	51
GR	44	3	< 1	4	44	5	51
PL	37	7	4	4	45	3	51
IT	39	7	1	5	44	4	52
FI	34	13	3	4	43	4	53
UK	35	14	< 1	5	41	4	55
ES	46	4	1	5	33	11	56
DE	29	3	21	3	41	3	56
IE	41	13	< 1	4	40	2	58
AT	24	2	30	2	40	2	58
LT	23	8	30	1	38	1	61
RO	43	10	8	2	37	2	61
FR	44	8	< 1	9	33	6	61
LU	37	10	7	11	31	4	64
BE	53	4	1	8	27	8	66
CY	57	7	–	7	26	3	71
PT	62	6	–	4	18	10	72
NL	60	7	< 1	9	22	2	76
SI	46	27	–	8	15	4	81

Source: Labor Force Survey data 2008, extraction provided by Eurostat

from 50% (of average wage) for the short option to 26% for the long option until the child reaches its third birthday.[12]

The receipt of parental benefit may be combined with employment, i.e. it is not contingent on actually being on a leave. For this reason parental leaves in the Czech Republic are considered formally unpaid (Kocourkova, 2010). According to the literature, the majority of women stay on parental leave until the child is between two and three years old (Plantenga & Remery, 2005; Anxo et al., 2007). Unfortunately, no precise data on take-up or user rates are currently available (Kocourkova, 2010).

Estimating the number of beneficiaries. We first cross-validate maternity leaves data. In 2008, there were 119,570 childbirths, out of which 98% (117,179) were children born to women aged 18-40. We assume 100% take-up rate (in the Czech Republic maternity leave is compulsory), 54% eligibility rate (equal to employment rate of our age group) and a length of 4.9 months (length of maternity leave is 28 weeks but 6-8 weeks are taken before childbirth, which is not covered by statistics used in current analysis). According to this estimation 25,838 women were on maternity leave at one given point in time, which is fairly close to the estimate of 23,114 reported by the EU-LFS.[13]

Maintaining the aforementioned assumptions, we estimate the number of parental leave users assuming two take-up rate scenarios: TR = 70% and TR = 90%. Accounting for the co-existence of two parental benefit schemes – short and long, we also need to assume in what proportion they are taken. We consider five scenarios: 90%-10%, 70%-30%, 50%-50%, 30%-70% and 10%-90%. We end up with 10 possible scenarios which are presented in Table 2. The values presented in Table 2 give us estimates of the potential number of parental leave users depending on the wage replacement rate threshold chosen to classify women as having a "formal job attachment". At the lowest threshold (17%), the estimated number of beneficiaries varies between 76,406 and

[12] Considering the average gross monthly wage in 2008 of CZK 22,593, the benefit level corresponds to 50% of avarage wage in the short option, to 34% during the higher-paid period in the long option, and to 17% during the lower-paid period in the long option.

[13] Using formula 3: $NB = TR \cdot ER \cdot NCh \cdot L/12 = 100\% \cdot 54\% \cdot 117,179 \cdot 4.9/12 = 25,838$.

154,711 users; at 50% wage replacement rate estimated numbers range between 81,579 and 7,050 mothers on parental leave at one given point in time. The highest estimate corresponds to 50% of all women and 59% of inactive women in our group of interest; the lowest one – to about 2-3% of these groups.

Estonia

Classification rules. The methodological note of ILO (2011c) specifies that parental leave beneficiaries in Estonia are classified as *inactive*, whereas women on maternity leave are considered *employed*.

Leave regulations. Parental benefit in Estonia is paid for 435 days following the maternity leave, or until the child reaches the age of 18 months (if the mother is not entitled to take maternity leave). The level of benefits corresponds to 100% of previous (calendar) year's earnings (Estonian Ministry of Social Affairs., 2011).[14] Significantly lower childcare benefit (approximately € 40 per month) is paid until the child is three years old.

Permanent and temporary residents of Estonia are all eligible to collect parental benefits (Estonian Ministry of Social Affairs, 2011). Parental benefits may be collected along with earnings from employment, in which case the amount of benefits is reduced depending on the amount of income earned. It is estimated that about five per cent of women who receive parental benefit also receive taxable income. Although the exact take-up rate is not known, it is likely over 80% (Pall & Karu, 2010). Leaves are mainly taken by women, predominantly full-time (Plantenga & Remery, 2005) – only about six per cent of takers are men (Pall & Karu, 2010). Employment protection is guaranteed to all people raising children under the age of three (ILO, 2011a).

Estimating the number of beneficiaries. Once again, we first cross-validate the number of women on maternity leave. In 2008 there were 16,028 life births in Estonia out of which 15,507 from women aged 18-40. The post-natal leave lasts between 70 and 110 days (2.33-3.67 months) (Employment Contracts Act, 2008), and we continue to use the employment rate of women aged 20-40 (65%) as a proxy for the eligibility rate. According to our calculations, in 2008 between two and three thousands women were on maternity leave in Estonia.[15]

We find comparable figures in the *Estonian Health Insurance Fund Annual Report* (Estonian Health Insurance Fund, 2008), which reports that 13,229 women received some maternity benefit in 2008. This implies that at one given point in time between 1,158 and 2,599 mothers were on maternity leave depending on the assumed length of the leave (70 or 100 days).[16] The EU-LFS reports much lower number of 606 women, however the data are marked as unreliable ("category a", i.e. not publishable).

With respect to parental leaves, we again assume NCh = 15,507 and an 80% take-up rate (TR). Eligible are all resident parents, but the leave can only be taken by employed parents therefore assuming ER = 65% is more appropriate than ER = 100%. The length of the leave after the maternity is 14.5 months (L), and we exclude the 5% of beneficiaries who are simultaneously employed (factor of 95%). According to formula 3, we estimate that 9,256 women received generously paid parental leaves, which represents about 28.2% of all women in our group of interest and about 35% of inactive in this group.[17]

Hungary

Classification rules. The EU-LFS methodological note (ILO, 2011d) for Hungary does not specify how parental leave takers are treated. The absence of this category suggests parental leave beneficiaries are coded as *inactive*.

Leave regulations. There are currently two types of parental leave and benefit in Hungary.

- GYED (child-care allowance) is a child-care fee available to insured parents of children under two (up to one year old – only for mothers) paid at a rate of 70% of earnings, not exceeding the 70% of double minimum wage (HUF 102,900, i.e. € 360 per month). Eligible are parents employed for at least 365 days during the two years preceding childbirth.
- GYES (child-care aid) is paid to parents up to the child's third birthday, and is also available for parents not eligible for GYED (not insured). The benefit is much lower than GYED (equal to the minimum amount of the old-age pension, i.e. HUF 28,500, ≈ € 100 per month) and can be combined with employment earnings after the child's first birthday. Eligible are all parents (those taking GYED after finishing it).

The leave is taken mostly by women (Plantenga & Remery, 2005), with only about one to three thousands men per year taking some form of leave (Korintus, 2010).

Estimating the number of beneficiaries. Contrary to other countries covered by this study, Hungary disseminates detailed administrative data on the number of parental and

[14] With a minimum of € 278.02 (in 2011) for non-working parents or those with earnings below minimum wage, and with an upper ceiling of € 2,157.03 which corresponds to three times the national average wage of the previous year.

[15] From formula 3: $NB = TR \cdot ER \cdot NCh \cdot L/12 = 100\% \cdot 65\% \cdot 15,507 \cdot 2.33/12 = 1,960$, and $100\% \cdot 65\% \cdot 15,507 \cdot 3.67/12 = 3,080$.

[16] We use formula 1: $NB = TNB \cdot L/(L + 11)$. We have TNB = 13,229 mothers on pre- and post-natal benefits but we are only interested in the number of beneficiaries on post-natal leave. According to our formula, $NB = (13,229 \cdot 70/140) \cdot 2.33/13.33 = 1,158$ assuming 70 days postnatal leave and $NB = (13,229 \cdot 110/140) \cdot 3.67/14.67 = 2,599$ for 110 days leave.

[17] From formula 3: $NB = 95\% \cdot (TR \cdot NCh \cdot ER \cdot L/12) = 95\% \cdot (80\% \cdot 15,507 \cdot 65\% \cdot 14.5/12) = 95\% \cdot 9,744 = 9,256$. It is important to mention that many women would classify themselves as inactive due to pregnancy, maternity or parental leave. In 2008, 23 thousands of women aged 25-49 stated they were inactive for this reason (Eurostat, 2011). This number, however, probably includes women collecting childcare benefits, and those who interrupt their career but have no formal attachment to any employer.

Table 2 Estimated number of users of parental leave in the Czech Republic[a]

Assumed take-up rate (TR)	Assumed length of leave (L)[b]	Estimated number of parental leave users, NB: 17-50% of average wage	34- 50% of average wage	min 50% of average wage
90%	90% short, 10% long	95,864	89,220	81,579
	70% short, 30% long	107,728	86,372	63,450
	50% short, 50% long	121,491	83,525	45,322
	30% short, 70% long	137,152	80,677	27,193
	10% short, 90% long	154,711	77,830	9,064
70%	90% short, 10% long	76,406	69,393	63,450
	70% short, 30% long	89,325	67,178	49,350
	50% short, 50% long	103,721	64,964	35,250
	30% short, 70% long	119,592	62,749	21,150
	10% short, 90% long	136,941	60,534	7,050

Source: EU-LFS data and Eurostat statistics, authors' own calculation

[a]The calculation uses the formula 3: NB = TR · ER · NCh · $L/12$, with weighted length of leave.
[b]In the estimation the length of parental leave excludes time on maternity leave (4.9 months), consequently the effective length of short leave is 19.1 months, and of long leave: 31.1 for 17% wage replacement rate and 16.1 for 34% wage replacement rate; for calculation of leave with minimum 50% replacement rate, long leave is not included.

maternity benefit recipients (KSH, 2011). We use these administrative data – which provide a high degree of reliability – to estimate the number of maternity and parental leave users, the eligibility and take-up rates, and the average length of leaves.

Validating the number of women on maternity leave is straightforward: the Hungarian Statistical Office (KSH, 2011) reports that in 2008, 29,221 persons per month received "pregnancy and confinement benefit"; of this number, about 96% i.e. 28,171 should be aged 18-40, and of these 25,824 women should be on post-natal leave (this number corresponds to MB/12 in formula 2).[18] This estimate of women on maternity leave is much higher than the 7,220 women reported by the EU-LFS. (EU-LFS data seem clearly too low because they correspond to the number of births per month in Hungary. With over five-month leave, the number of beneficiaries should be much higher than the number of births.) This suggests problems with recording maternity leaves by EU-LFS.

The KSH data (KSH, 2011) may be used to estimate the user rate of maternity leaves (UR = ER · TR). Assuming: NCh = 95,587 and L = 5.1 months (22 weeks), we find that approximately 63% of mothers aged 18-40 take advantage of maternity leave.[19]

Consequently, assuming a 100% take-up rate of maternity leaves, the eligibility rate among mothers is 63%: a value much higher than the employment rate of women aged 20-40 (49%).

As far as parental leave is concerned, administrative statistics from 2008 (KSH, 2011) report that GYED was paid on average to 94,514 persons per month (MB/12 in formula 2). With 96.4% of children born to mothers aged 18-40 and two thousands of men taking leaves, we estimate that 89,119 women in this age range took paid parental leave at one given point in time. This number corresponds to 37% of women in our group of interest, and 41% of those coded as inactive.

The results presented allow estimating the probable take-up rate and length of parental leaves in Hungary. Currently, almost no data exist on the topic. Anxo et al. (2007) and Korintus (2010) suggest that the take-up rate is high, and Anxo et al. (2007) states that the length of leave ranges from 3-9 months for highly skilled professional women to 36 months for those in blue-collar and routine white-collar jobs. Assuming that eligibility for GYED leaves is the same as for maternity leave (ER = 63%, as estimated above), the average length of the leave and take-up rates are inversely related (from formula 3): L = NB · 12/(NCh · ER · TR) = 89,119 · 12/(95,587 · 63% · TR) = 17.72/TR. Consequently, for TR = 100% the average length is approximately 17.7 months (i.e. up to the 23rd month of child's life), which – assuming the choice between two-years and nine-months leave – may indicate that 92% of beneficiaries take the full two-years leave and 8% – the shorter nine-month option. If we assume lower take-up rates, the average length of the leave increases. In particular, if the take-up rate was as high as 94% we estimate that all eligible women would take the full GYED leave. Although these results are not precise, they show that the take-up rate and the proportion of women taking full GYED leave inevitably exceed 90%.

The second type of benefit, GYES, was paid to 167,021 families monthly in 2008. If in the first year of a child's life GYES is taken instead of GYED, it cannot be combined

[18] In 2008, 95,587 out of 99,149 children (i.e. 96.4%) were born to mothers aged 18-40. In Hungary maternity leave last 24 weeks but up to 4 weeks may be taken before childbirth. Here we assume that the average length of postnatal leave is 22 weeks.

[19] From formula 5: UR = NB · 12/(NCh · L) = 25,824 · 12/(95,587 · 5.1) = 63%.

with employment income; however, the low level of GYES benefits justifies classifying these women as inactive.

Slovakia

Classification rules. ILO methodological note (ILO, 2011e) informs that LFS category of *employed* persons excludes those on extended maternity or parental leave.

Leave regulations. According to the ILO database (ILO, 2011a), eligible (insured) parents are entitled to 260 days of parental leave until the child reaches the age of three.[20] The leave is paid 100% of "income basis" (i.e. average basis used for calculation of the insurance contributions for last 12 months before applying for the leave).[21] The payment is reduced in case of continuing employment or receiving sickness benefit. Periods of pregnancy, maternity and parental leaves are under employment protection.

Estimating the number of beneficiaries. We first estimate the number of maternity leave beneficiaries. We assume the average length of a leave L = 5.1 months (22 weeks after the birth), 100% take-up rate and that 55,388 children were born to women aged 18-40 in 2008.[22] As above, we continue to use the employment rate of women aged 20-40 (ER = 53%) as proxy for eligibility which yields 12,558 maternity leave beneficiaries.[23] This estimate is much higher than the 8.9 thousands beneficiaries reported by the EU-LFS.

Similar estimation of the number of beneficiaries on parental leave is difficult in the absence of information on the take-up rate. However, 100% wage replacement rate suggests high take-up rate. Assuming ER = 53% and $L = 8.7$ months, we simulate the number of parental leave users for three different take-up rates (see Table 3). Our estimates suggest that depending on take-up rates, the number of women on parental leave under the generous paid leave scheme would range between 10,601 and 19,081 which represents between 8% and 14% of all women in our group of interest and between 9% and 16% of all women in this group coded as inactive.

Table 3 Estimated number of users of parental leave in Slovakia[a]

Assumed take-up rate (TR)	Estimated number parental leave users (NB)
90	19,081
70	14,841
50	10,601

Source: EU-LFS data and Eurostat statistics, authors' own calculation

[a]The calculation uses the formula 3: NB = TR · ER · NCh · $L/12$

Impact of classification on the employment and activity rates

Table 4 presents to what extent treating parental leave beneficiaries as employed might affect the employment rates of women in the four countries under study. The estimates only account for parental leave beneficiaries whose wage replacement rate is high (it is 50% in the Czech Republic, 70% in Hungary and 100% in Estonia and Slovakia) and for the Czech Republic assume 50/50 proportion of long and short leaves.

Not surprisingly, largest change of employment rates concerns mothers of young children. Employment rates in this category increase from 13-15% to about 30% in the Czech Republic and Slovakia, from about 11% to over 50% in Hungary and from 24% to over 50% in Estonia. The impact on employment rates of all women in age group 18-40 is smaller, from about two percentage points rise in the Czech Republic and Slovakia, to five percentage points in Estonia and seven in Hungary. Overall employment rates of women aged 15-64 change only marginally: they increase by one percentage point in the Czech Republic and Slovakia and by three percentage points in Estonia and Hungary.

5 Summary and discussion

This paper examined the EU-LFS data on employment of mothers of small children in the Czech Republic, Estonia, Hungary and Slovakia. We analyzed parental leave policies in each of these countries and showed that parental leave beneficiaries receiving benefits are coded as inactive and not as *employed but temporarily not working*. Unfortunately, this practice fails to adopt standards recommended by the ILO and Eurostat which are already used in most European countries. Generally, our results are consistent with the conclusion of Cameron and Moss that "it is inadvisable to use the EU-LFS for occupational comparisons without reference to national experts who can evaluate the data for each country" (Cameron & Moss, 2007, 24).

We also estimated the number of beneficiaries in the four countries and the employment rates of women that would prevail if parental leave beneficiaries were treated as *employed*. Our results suggest that employment rates of women aged 18-40 derived from EU-LFS data are biased downwards between two and seven percentage points.

Our results have important implications for comparative studies. First, we show the limited comparability of employment rates calculated on the EU-LFS data. Although using inconsistent classification rules of parental leave beneficiaries only slightly impacts the overall employment rates of women (one to three percentage points), the impact is larger in smaller populations, e.g. women in their reproductive years and mothers of small children. In this respect, our results are relevant in terms of policy analysis: uniform and transparent measurement would allow better monitoring for achieving targets for women's employment prescribed by the

[20] Those eligible are employees covered by Parental Leave Insurance and insured prior to the first day of leave.

[21] The minimal level of parental leave benefit is set at 55% of the minimum salary, maximal – to 250% of the national average wage.

[22] Leave is compulsory for minimum six weeks after the birth.

[23] From formula (3), NB = TR · ER · NCh · L/12 = 100% · 53% · $55,388 \cdot 5.1/12 = 12,558$.

Table 4 Impact of changing the rules of classification of parental leave takers on employment rates of women

		Employment rate					
	Assumed	Women 15-64		Women 18-40		Mothers 18-40 with youngest child 0-2	
	take-up rate	current	estimated	current	estimated	current	estimated
Country	%	%	%	%	%	%	%
CZ	70	58	59	54	56	15	27
	90		59		56		30
EE	80	66	69	59	64	24	53
HU	–	51	54	49	56	11	56
SK	70	55	56	53	55	13	27
	90		56		55		30

Estimates for the Czech Republic assume the condition of minimum 50% wage replacement rate and 50/50 composition of long and short option of a leave. Estimates for Hungary do not include parents on GYES; they are based on administrative data therefore no assumptions on take-up rate are made.

Lisbon's Treaty. Second, our results warn about possible bias in cross-national comparative studies in which the employment status of young women or mothers is a variable of interest. Finally, we show importance of designing transparent and uniform measurement of employment status, both in EU-LFS and in other cross-national surveys.

All four countries of interest maintain a post-communist legacy suggesting that using different classification rules is a reminder of a common past that is difficult to explain. One hypothesis is that the national statistical offices in these countries did not account for the changes in the LFS data matrix in 2006 which included parental leaves. Alternatively, it is possible that these agencies decided to adhere to their own definitions to secure internal data consistency and comparability over time. Further research is necessary to uncover the true reasons and propose a strategy to address the problem of inconsistent classification of parental leave beneficiaries. Further research may also deal with the measurement of labour market status and parental leaves in survey studies since the problem spans over other data sources.

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Appendix

Estimation of the number of maternity leave beneficiaries for Germany, 2008

The maternity leave in Germany lasts 16 weeks, out of which 8 weeks are taken before, and the remaining 8 – after the childbirth (Erler, 2010), which implies that the length of the leave for the mothers is 8 weeks, i.e. 1.87 months. In 2008, the number of life births to women aged 18-40 was 660,413. The employment rate of women in the age group 20-40 (our proxy of eligibility rate) was 63%.

This implies that the number of women eligible for maternity leave at one point in time was about 64.8 thousands ($\text{NE} \approx \text{ER} \cdot \text{NCh} \cdot L/12 = 63\% \cdot 660,413 \cdot 1.87/12 = 64,761$). With the compulsory maternity leave, we assume the take up rate of 100%, which leads us to a number of 64.8 thousands of women taking maternity leave at one point in time in Germany in 2008. This value departs with only 7% from the number of 60,365 estimated by the EU-LFS.

Estimation of the number of parental leave beneficiaries for Germany, 2008.

Germany in the 2008 offered 12 months of paid parental leave (Erler, 2010). With the number of births and the eligibility rate (employment rate) as in the estimation for maternity leave (above), our estimated number of eligible mothers is about 416 thousands ($\text{NE} \approx \text{ER} \cdot \text{NCh} \cdot L/12 = 63\% \cdot 660,413 \cdot 12/12 = 416,323$).

The take up rate data for 2003 (the most recent available) report that about 14.2% of parents were not eligible for the leave and 12.6% did not take it despite being eligible (Erler, 2010), which implies the take up rate of 85.3%.[24] With the take up rate of 85.3%, our estimated number of women on parental leave at one moment in time is 355,185. This number departs less than 1% from the number provided by the EU-LFS (357,782).

[24] The take up rate is calculated in the following way: $100\% - (12.6\%/(1 - 14.2\%)) = 85.3\%$, where the $(1 - 14.2\%)$ is the share of eligible parents among all parents of children in the relevant age group, and 12.6% is the share of parents eligible but not taking the leave in the same age group.