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MEASURING (IN)SECURITY IN THE EVENT OF UNEMPLOYMENT: ARE WE FORGETTING SOMEONE?

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In this paper we argue that the consequences of the unemployment risk may be quite different according to the number of household members who depend on the income of the earners. We propose new measures for the aggregate economic (in)security related to employment risk, that take into account the household composition: a *per-earner* amount corresponding to the aggregate *equivalent* expected loss, and the *inactive-unemployed dependency rate* (IUDR), i.e. the average number of persons not in the labor force that each unemployed has to provide for (beyond herself). Both have a simple interpretation but the latter has an advantage in terms of data-requirement. Our results suggest that the overall level of insecurity associated with similar unemployment and replacement rates increases if we consider all the individuals in the households that are potentially affected by this risk. Moreover, the use of net rather than gross incomes and of micro-level data changes quite significantly the relative position of countries in terms of insecurity levels.

1. Introduction

"Economic insecurity arises from the exposure of individuals, communities and countries to adverse events, and from their inability to cope with and recover from the costly consequences of those events" (UNDESA, 2008). Some authors do not distinguish between different types of misfortunes and model an individual's sentiment of insecurity as a function of his wealth (Bossert and D'Ambrosio, 2013). The human-rights perspective, instead, identifies four key objective economic risks: unemployment, sickness, widowhood, and old age. We follow this approach and propose a new measure for the economic (in)security related to employment risk.

In the Osberg/Sharpe Index of Economic Well-Being (IEWB), the measure of the risk imposed by unemployment is a weighted sum (or product) of the unemployment rate (which captures the probability of not having a job), and the financial protection rate (the average percentage of lost earnings replaced by unemployment benefits). In Osberg (2010) a higher weight has been given to the former because it has been found to have a larger negative impact on self reported life satisfaction for the working population. On the assumption that changes in the subjective level of anxiety about a lack of employment security are proportionate

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to changes in objective risk, this index captures the anxiety imposed by employment risk on individuals who participate in the labor market.

However, these individuals do not live in isolation. This means that not only "a middle aged worker with . . . dependent children and no other source of family income is likely to feel far more anxiety than an older worker with . . . grown up children . . . and an employed spouse" Osberg (1998, p. 35), but also that these children and spouses are themselves exposed to the same risk, and, if they are aware of it, to the same anxiety. The importance of considering unemployment from a household perspective is highlighted by the recent stream of literature which is based on analysis of jobless household rates (Gregg and Wadsworth, 2008; Mocetti *et al*., 2010; Gradín *et al*., 2012). In research on social exclusion and poverty, the share of individuals living in jobless households started to be considered (Europe 2020 strategy, OECD, 2001).

The recognition that we should not restrict our attention only to individuals who participate in the labor market when evaluating security in the event of unemployment, is supported also by an argument directly related to the specific concern of the economic insecurity literature. In comparing the latter with the literature on vulnerability, Osberg (2010, p. 7) underlines that "the main substantive difference appear to be that vulnerability discourse focuses on the risk of poverty and destitution, while the insecurity perspective concerns the hazards faced by all citizens." Therefore, we argue that we should consider the hazard faced by all the members of the household, and not only by the individuals who participate in the labor market. In this sense, our concept of insecurity is more related to the objective degree of risk of economic losses faced by all individuals in a country than to their subjective perception of it. So, for example, even if children may not be entirely aware of the economic situation of their family, they *are at risk* of experiencing economic losses and therefore their condition should be taken into account when evaluating the overall degree of economic insecurity in a country.

In this paper we explore two different ways in which one can take into account the number of people who are affected by the risk of unemployment, corresponding to the two approaches used in the construction of the relevant component in the IEWB: the insurance approach and the weighted sum approach. With reference to the former, we propose an index that assigns to each member of households at risk an equivalent expected loss (due to the possibility of unemployment of the working individuals in the household), and then it computes, at the country level, a *per-earner* amount that corresponds to the aggregate expected loss. In this way one recognizes that the same financial loss has different consequences for households with different composition, and that an increase in the proportion of individuals in households with higher expected losses implies an increase in the overall level of insecurity.

As regards the weighted sum approach, we propose to add a new dimension in the measure of risk imposed by unemployment: the inactive-unemployed dependency rate. The latter captures the average number of dependent individuals for each unemployed person in the country, assigning to each person not in the labor force a weight equal to the ratio between unemployed and active individuals in the household, and dividing the sum of them by the total number of unemployed

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members. As will be illustrated in the following section, in this way we account for all persons who are exposed to the event of unemployment, and simultaneously recognize that the effect of this event may be different if there are other employed individuals in the household.

The paper is organized as follows. In Section 2 we discuss the methodological foundations of the two approaches and the data used in the empirical applications. In Section 3 we present the results based on the insurance approach, and in Section 4 those related to the inactive-unemployed dependency rate approach. Section 5 concludes.

2. Methodology and Data

2.1. *The Insurance Approach*

The original probabilistic approach used for measuring the unemployment-related insecurity dimension of the IEWB was based on the expected value of individual financial loss. When moving from the individual to the household perspective, ideally one would like to compare the household well-being under uncertainty both across households and over time. One possibility to do this would be to consider the ex-ante compensating variation, i.e. the amount that should be given to a certain household so that its certainty equivalent would be equal to that of a reference household (see, e.g., Anderson, 1979). This approach can be used also for intertemporal comparisons, by expressing lotteries in real terms and comparing the compensating variation of the reference household at different points in time (net of the effect of changes in demographic characteristics). An increase in economic insecurity in this case would be captured by an increase of the compensating variation. The main advantage of this approach is its clear welfare foundation, whereas the drawbacks are the need of ad-hoc estimation of the compensating variations for each country and each year and the departure from the framework used by Osberg (2010) in the construction of the insecurity dimension of the IEWB.

Alternatively, one can follow the original probabilistic approach used for the IEWB, which is based on the expected value of financial loss, and adjust it in order to capture the presence of different individuals in the household. Let Δy_i^h be the income lost by household h if individual i becomes unemployed,[1] which corresponds to the difference between the potential household income if individual i is working ($y_{w,i}^h$) and the income actually received in case of unemployment ($y_{u,i}^h$); i.e., $\Delta y_i^h = y_{w,i}^h - y_{u,i}^h$. Let p_i^h indicate the (unconditional) probability of unemployment for individual i in household h, and $p_{i|j}^h$ the probability of unemployment for individual i conditional on individual j being unemployed.

[1]One can consider either gross or net earnings according to whether one wants to abstract from differences in the mix of taxes and public services in the various countries, or to account for the effect of taxes and other transfers (family and housing benefits in particular), disregarding differences in public services. In order to be more in line with the usual IEWB measure which includes *gross* replacement rates, we will first consider the loss in gross incomes but we will also show some results using net household incomes.

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For a single individual, the expected loss associated with unemployment would be:

$$EL^h = p_i^h \Delta y_i^h, \tag{1}$$

whereas, for a household with two earners,

$$EL^h = p_i^h \Delta y_i^h + p_j^h \Delta y_j^h + p_{i|j}^h p_j^h \left(\Delta y_{ij}^h - \Delta y_i^h - \Delta y_j^h\right), \tag{2}$$

where Δy_{ij}^h represents the income lost by household h when both individuals i and j are unemployed (see Appendix A for the details of the calculation).

With no correlation between the unemployment probabilities of the two members we would have:

$$EL^h = p_i^h \Delta y_i^h + p_j^h \Delta y_j^h + p_i^h p_j^h \left(\Delta y_{ij}^h - \Delta y_i^h - \Delta y_j^h\right). \tag{3}$$

The difference between the two cases depends on whether the income loss when both are unemployed (Δy_{ij}^h) is significantly larger or smaller than the sum of the losses when only one is unemployed ($\Delta y_i^h + \Delta y_j^h$). Since in many cases the unemployment benefits are calculated according to the individual wage and are capped at a fairly low threshold, this difference is likely to be either null or quite small. Moreover, since this difference is multiplied by the product of the two probabilities, the effect on the overall expected loss will be negligible. Therefore, in our empirical application we will compute the expected loss under the simplifying assumption of no correlation between the unemployment probabilities of the two members.[2]

Similarly to the approach followed for the measurement of poverty and inequality, we recognize that resources are shared within the household, but that the welfare unit is the person. Therefore, we transform the above-specified total expected loss into an adult-equivalent expected loss by using the equivalence scale for household h (s_h). In other words, a given financial loss for household h, say Δy_i^h, corresponds to an adult-equivalent loss of $\Delta y_i^h / s_h$. Given the linearity of the expected value operator, the *adult-equivalent* expected loss for household h is simply:

$$EL_e^h = \frac{EL^h}{s_h}. \tag{4}$$

We can then assign this adult-equivalent expected loss to each individual in the household and compute an aggregate equivalized expected loss for country c:

$$EL_e^c = \sum_{h=1}^{H} n_{ih} EL_e^h, \tag{5}$$

[2]The unemployment probability could also be correlated with income. If, as one would expect, this correlation is negative, individuals with lower income would be more likely to become unemployed, but they would also have a lower potential loss (Δy_i^h). The resulting expected loss could therefore be equal to, or higher or lower than the one for high-income households, depending on the relative magnitude of these two effects.

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where H is the total number of households in country c, and n_{ih} represents the number of individuals in household h.[3]

In order to make this expected loss comparable across countries, we divide it by the total number of earners in country c:

$$\pi_e^c = \frac{EL_e^c}{\sum_{h=1}^{H} n_{eh}}, \tag{6}$$

where n_{eh} represents the number of earners in household h. Equation (6) expresses the aggregate equivalized expected loss as an average per-earner amount of money. Note that we could also interpret (6) as an equally distributed *per-earner contribution* that would compensate the country expected loss (i.e., that would ensure a zero expected profits condition), over and above what is already covered by the unemployment benefits. For this reason, and for simplicity of exposition, we will refer to (6) as the "equivalized insurance premium."

The effect of taking into account all household members on the measure of economic insecurity can be grasped by comparing (6) with a similar expression, in which the numerator is represented by the simple sum of the expected loss of all households:

$$\pi^c = \frac{\sum_{h=1}^{H} EL^h}{\sum_{h=1}^{H} n_{eh}} = \frac{EL^c}{\sum_{h=1}^{H} n_{eh}}. \tag{7}$$

For simplicity of exposition we will refer to the numerator of (7) as the "aggregate non-equivalized expected loss" and to π^c as the "non-equivalized insurance premium."

In our empirical application we consider eight European countries (Belgium, Finland, France, Germany, Italy, the Netherlands, Spain, and the U.K.), from 2005 to 2009. We used the OECD Tax-Benefit model to compute household gross and net income when the earners work and when they are unemployed, for some typical household types: a single person, a one-earner couple, and a two-earner couple with no children, and the same types of households with two dependent children. The basic parameter to perform this computation is the level of the individual wages, expressed as a percentage of the OECD average wage.[4] We computed these wages using EU-SILC cross-sectional data. We considered only households where all members are less than 65 years of age, and the earners declare

[3]In computing the overall expected loss for a country, we should add the expected change in income for those individuals who are unemployed and have a probability of reentering employment. However, since the information about the probability of reentering employment conditional on unemployment is not so easily available for all countries (and one minus the unemployment rate is not an appropriate proxy for this), we prefer not to consider this expected gain.

[4]The average wage used in the OECD model is calculated using earnings for industry sectors C to K of the International Standard Classification of all Economic Activities (including both manual and non-manual workers). The worker is an adult (male or female) worker in the covered industry sector, he is assumed to be fully employed during the year, and the average refers to the country as a whole. The values of this average wage for the countries and years considered in our empirical application are reported in Table B1 in Appendix B.

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to work, are employees, and report positive earnings. For each type of household mentioned above, we computed the average salary separately for males and females. The results of this estimation expressed as a percentage of the OECD average wage are reported in Tables B2–B4 in Appendix B.[5]

The OECD Tax-Benefit model does not compute incomes for households with three or more earners. Therefore, for these households we used the following procedure. First, we computed the average wages of male and female earners in this type of household from EU-SILC data (see Table B4 in Appendix B). Second, we considered the first two earners as a couple and predicted their family income using the OECD model; then we predicted the individual income of the third (male) earner as if he was single, and we added up the former and the latter to obtain the overall household income. We ignored the presence of more than three earners.

Based on the specified wage levels, the OECD model allows us to compute gross household income (including family and housing benefits) and net household income (subtracting income taxes and social contribution), both when individuals are working and in the case of unemployment. In the latter case, beside family and housing benefits, the model computes unemployment benefits and, where present, unemployment assistance (which is usually offered when unemployment benefits are exhausted). Even if in the case of unemployment the model provides information on gross and net incomes over a five year period, we considered only the first year because we focus on employed individuals who are at risk of losing their job, and both the unemployment probability and the potential earnings can change quite remarkably as the number of years in unemployment increases. Clearly, the possibility of receiving benefits over a longer period of time can affect the anxiety associated with being unemployed, but we reckon that this effect is much weaker than the one associated with the financial conditions available in the first year of unemployment. In Section 3 we will show how this choice affects the level of economic insecurity of the different countries.

When necessary, we deflated incomes by means of the country-specific harmonized consumer price index, and expressed all variables in terms of 2005 euros. For the U.K., we first deflated the variables and then used the 2005 euro–pound exchange rate. The probability of unemployment is proxied by the gender-specific OECD unemployment rates. The equivalence scale is the OECD-modified scale (which assigns a value of 1 to the household head, 0.5 to each additional adult member, and 0.3 to each child). Finally, the proportions of the different types of households to be used in the calculation of the overall country expected loss are computed from the EU-SILC data, and reported in Tables B5–B6 in Appendix B.

2.2. *The Inactive-Unemployed Dependency Rate*

As underlined in the introduction, the Osberg/Sharpe IEWB measure of the risk imposed by unemployment is a weighted sum of the unemployment rate, and

[5]The EU-SILC cross-sectional dataset does not provide the level of gross earnings for Italy and Spain in 2005, and again for Italy in 2006. In order to impute these values, we first calculated the ratio between net and gross earnings in these countries for each household type for the years in which they were both available. These ratios were quite stable, and in some cases decreasing over time; differences across years never exceeded two percentage points. Therefore, we used the 2007 ratio to calculate gross earnings for Italy in 2005 and 2006, and the 2006 ratio to calculate gross earnings for Spain in 2005.

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the financial protection rate, with a higher weight assigned to the first component because it has been found to have a larger negative impact on self reported happiness for the working population. Our second approach is to add to this sum a measure that takes into account the number of individuals not in the labor force that "depend" on the unemployed ones, i.e. all the people actually exposed to the consequences of the event of unemployment. Clearly these consequences may be very different, both in economic and psychological terms, if there are other employed people in the household. For this reason we assign to each member not in the labor force (whom we will call "inactive") a weight that is equal to the ratio between the number of unemployed members and the number of individuals in the household who participate in the labor market (whom we will call "active").

The "inactive-unemployed dependency rate" (IUDR) is defined as follows:

$$IUDR_c = \frac{\sum_{h=1}^{H_c} n_i^h \frac{n_u^h}{n_a^h}}{\sum_{h=1}^{H_c} n_u^h} \quad \text{for } n_a^h > 0,$$

where n_i^h, n_u^h, n_a^h, are, respectively, the number of inactive, unemployed, and active individuals in household h, and H_c is the total number of households in country c.

Note first that this index considers only members of households where there is at least one unemployed individual; indeed if all active individuals in a household are employed, $\frac{n_u^h}{n_a^h} = 0$, i.e. the inactive members of these households are not counted in the IUDR. On the contrary, for households with unemployed members and no employed individuals, we have that $\frac{n_u^h}{n_a^h} = 1$, and therefore all inactive persons in these households are fully counted in the numerator of the IUDR. For households where there are both employed and unemployed members, each inactive individual counts for the fraction $\frac{n_u^h}{n_a^h}$, i.e. for the relative "importance" of unemployment in the household.

Second, if unemployed individuals move from one household to another, the denominator of the IUDR does not change, whereas the change in the numerator depends on the particular composition of the two households. More precisely, for each person who moves, the change in the numerator is

$$\Delta num = n_i^{new}\left(\frac{n_a^{new} - n_u^{new}}{n_a^{new}(n_a^{new}+1)}\right) - n_i^{old}\left(\frac{n_a^{old} - n_u^{old}}{n_a^{old}(n_a^{old}+1)}\right),$$

where n_i^{new}, n_a^{new}, n_u^{new}, n_i^{old}, n_a^{old}, n_u^{old} are the number of inactive, active, and unemployed individuals, excluding the one who moved, in the new and old households, respectively.

If an unemployed individual who was living on his own (which implies $n_i^{old} = n_a^{old} = n_u^{old} = 0$) moves into a new household, the index will either increase (if there are other employed and inactive people in the new household) or stay the

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same (if there are no inactive people in the new household or if all the other active members are unemployed). On the other hand, if an unemployed individual goes to live on his own, the index will either decrease (if there were other employed and inactive individuals in the household), or remain the same (if all the other active members were unemployed).

Third, beside summarizing the larger number of people affected by the unemployment risk, this index may also capture part of the psychological burden for the unemployed, because worries for the consequences of losing the job on other family members are a large component of it. For this reason we propose to include this index as a specific element of the measure of risk related to unemployment in the IEWB. There are actually two ways in which we can do this: either additively or multiplicatively. Indeed we could adjust the unemployment rate, by multiplying it by (1+IUDR), and then substitute the former with the latter in the measure of risk related to unemployment in the IEWB. Each percentage point increase in the IUDR would mean an increase in this "adjusted unemployment rate" (AUR) equal to 1/(1+IUDR) percent.[6] Note that the AUR could also be interpreted as a dependency ratio between all the (weighted) members in households with at least one unemployed and all active individuals. Indeed, we have:

$$AUR_c = \left(\frac{\sum_{h=1}^{H_c} n_u^h}{\sum_{h=1}^{H_c} n_a^h} \right) \cdot \left(1 + \frac{\sum_{h=1}^{H_c} n_i^h \frac{n_u^h}{n_a^h}}{\sum_{h=1}^{H_c} n_u^h} \right) = \frac{\sum_{h=1}^{H_c} n_T^h \frac{n_u^h}{n_a^h}}{\sum_{h=1}^{H_c} n_a^h} \quad \text{for } n_a^h > 0,$$

where n_T^h is the total number of individuals in household h.

Alternatively we could follow the additive approach used by Osberg (2010), and construct a weighted sum of the various dimensions. Since the IUDR may capture a part of the psychological burden of unemployment, it seems plausible to redistribute the weight given to the unemployment rate (0.8) to both the latter and the IUDR. We prefer this second approach because it is simpler and more transparent. We assign a weight equal to 0.6 to the unemployment rate and 0.2 to the IUDR, because we think that an increase of "dependent" people in the household can have the same importance as a reduction in the replacement rate. In order to facilitate international comparisons, in the empirical application shown in Section 4 we use data from the Eurostat LFS database, and consider the same group of countries mentioned above, i.e. Belgium, Finland, France, Germany, Italy, the Netherlands, Spain, and the U.K., 2005–09.

3. Results Based on the Insurance Approach

In order to understand the differences across countries and over time of the aggregate equivalized expected loss (summarized in (6)), we present first its main components, i.e. the unemployment rates for males and females, and the income

[6]For example, for an unemployment rate equal to 8 percent and an IUDR equal to 25 percent, the adjusted unemployment rate (AUR) would be 10 percent. An increase of the IUDR from 25 to 26 percent would imply an increase in the AUR of 8 percent, i.e. from 10 to 10.08 percent.

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TABLE 1
UNEMPLOYMENT RATES FOR MALES AND FEMALES

		Belgium	Finland	France	Germany	Italy	Netherlands	Spain	U.K.
2005	M	7.7	8.3	8.1	11.6	6.3	4.5	7.1	5.2
	F	9.6	8.7	9.9	11.0	10.1	5.1	12.2	4.3
2007	M	6.7	6.6	7.5	8.7	5.0	2.8	6.4	5.7
	F	8.5	7.3	8.6	8.9	8.0	3.7	10.9	5.0
2009	M	7.8	9.0	9.0	8.3	6.9	3.4	17.8	8.7
	F	8.1	7.6	9.4	7.4	9.3	3.5	18.5	6.5

Source: OECD, unemployment rate for males and females, aged 15–64.

TABLE 2
GROSS INCOME LOSS DUE TO UNEMPLOYMENT (PERCENTAGE, ONE-ADULT HOUSEHOLDS)

	2005	2007	2009	2005	2007	2009	2005	2007	2009
	Single Males (%)			*Single Females (%)*			*Lone Parent Female, 2 Children (%)*		
Belgium	61	59	53	54	52	49	39	33	33
Finland	39	41	45	33	35	40	18	17	20
France	43	42	43	41	39	43	25	24	26
Germany	64	64	64	62	62	62	28	26	29
Italy	65	68	65	63	64	62	60	61	56
Netherlands	30	24	29	21	16	29	18	17	22
Spain	39	41	45	36	36	37	30	31	32
U.K.	77	78	70	71	71	63	51	47	38

Source: Computation based on the OECD tax-benefit model; earnings are equal to the OECD average wage for each country multiplied by the coefficients reported in Table B2 in Appendix B.

loss in the event of unemployment for one- and two-adult households (with and without children).[7] The level and the evolution of male unemployment rates (Table 1, OECD data, age 15–64) is fairly similar for Belgium, Finland, and France. In Germany it was higher in 2005, but then declined, reaching the average level of the previous group. In Spain the opposite occurred: the unemployment rate was fairly similar to the mentioned group of countries in 2005 and 2007, but the effect of the crisis was much more pronounced. Italy, the Netherlands, and the U.K. have lower male unemployment rates, with an increasing trend for the latter. Female unemployment rates are generally higher than those for males, especially for Italy and Spain, but the time pattern is similar for the two groups.

Tables 2 and 3 report the percentage of gross income that is lost in the event of unemployment for one- and two-adult households (with and without children). Generally the income loss is larger for males than for females because the former have higher wages and therefore lower replacement rates. Note, however, that

[7]As shown in Tables B5 and B6 in Appendix B, in all countries except Italy and Spain, they represent more than 85 percent of our households of interest (with all members younger than 65 and at least one earner).

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TABLE 3

Gross Household Income Loss due to Unemployment (percentages, two-adult households)

	2005	2007	2009	2005	2007	2009
	1 Earner (Male), No Children (%)			*1 Earner (Male), 2 Children (%)*		
Belgium	65	66	58	58	61	53
Finland	35	35	44	27	31	35
France	43	43	43	39	37	36
Germany	59	59	57	48	47	45
Italy	63	65	60	62	61	57
Netherlands	30	31	29	29	30	28
Spain	42	41	42	35	35	37
U.K.	77	76	75	67	70	61
	2 Earners, No Children, Male Unemployed (%)			*2 Earners, 2 Children, Male Unemployed (%)*		
Belgium	37	37	32	40	40	36
Finland	25	26	31	26	27	29
France	24	23	24	25	24	24
Germany	36	37	37	37	39	39
Italy	37	40	37	41	42	41
Netherlands	18	18	17	19	19	19
Spain	24	23	26	22	23	23
U.K.	55	55	54	60	61	51
	2 Earners, No Children, Female Unemployed (%)			*2 Earners, 2 Children, Female Unemployed (%)*		
Belgium	22	22	19	21	19	16
Finland	17	18	18	12	13	14
France	17	16	18	15	15	15
Germany	26	25	25	17	14	14
Italy	25	26	26	22	22	24
Netherlands	12	11	12	10	9	10
Spain	15	15	15	13	14	14
U.K.	41	40	40	31	30	30

Source: Computation based on the OECD tax-benefit model; earnings are equal to the OECD average wage for each country multiplied by the coefficients reported in Table B3 in Appendix B.

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both levels and trends are different across countries.[8] Germany, Italy, and the U.K. present the highest losses for single males and females (all above 60 percent), with a fairly stable pattern over time. Gross income losses in Belgium are also higher than 50 percent, but with a declining trend. This is due to a declining trend in the level of wages and a constant level of the unemployment benefits. For Finland, France, and Spain the percentages for males are between 40 and 45 percent, with an increasing trend for Finland and Spain, and a stable pattern for France. While the latter has similar percentages also for females, in Finland and Spain females lose on average less than males (about 35 percent). Lone parent females also lose generally less than single females, with particularly pronounced differences for Germany and the U.K. (more than 30 and 20 percentage points, respectively), and very small differences for Spain and Italy (2–5 percentage points). No differences emerge for the Netherlands, except in 2009.

Gross income losses for one-earner (two-adults) households are similar to those for single males, for all countries, except Belgium and the Netherlands where they are somewhat higher (6–7 percentage points). The presence of children reduces the loss because of differences in family and housing benefits (except in the Netherlands); the reduction is quite small in Italy (3–4 percentage points), high in Germany (11–14 percentage points), and medium in the other countries (3–10 percentage points).

The percentages of gross household income lost due to unemployment are clearly much smaller for two-earner households (without children) when either the male or the female is unemployed: the loss is below 40 percent (in the former case) and below 27 percent (in the latter case) in all countries, except the U.K. If children are present the loss slightly increases when the male is unemployed, whereas it decreases when the female is unemployed (by 1–3 percentage points). The sum of these two losses is similar to the one for one-earner households, except for Germany, Finland, and the U.K. where it is higher (about 5, 8, and 18 percentage points, respectively).

When we move from the financial losses suffered by households experiencing unemployment to the *expected* losses, differences between countries greatly reduce, even though they do not become negligible (see Tables 4 and 5). Expected losses are generally below 5 percent for all countries and all types of families, except Germany (up to 2007), and Spain and the U.K. in 2009.[9] If we look at the evolution of these losses over time, we can observe that the effect of the unemployment rate is quite strong (see, for example, the case of Spain). More precisely,

[8]Recall that gross income includes unemployment, housing, and family benefits. Differences in levels are mainly related to the generosity of the unemployment benefits: compared to the Netherlands, which is the most generous country, unemployment benefits in other countries are from 6000 to 14,000 euro less. Differences in housing and family benefits are instead much smaller (they never exceed 1000 euro). Taxes partly reduce these differences (see Tables B7 and B8 in Appendix B), although in some cases they still remain quite high.

[9]Note that, for two-earner households, the expected loss is given by the sum of the unemployment rate for males multiplied by the percentage loss reported in Table 3 when the male is unemployed, and the unemployment rate for females multiplied by the percentage loss reported in Table 3 when the female is unemployed (plus a residual term when they are both unemployed). Therefore, two-earner households will have a larger expected loss in those countries in which the sum of the percentages in Table 3 for two-earner households when the male and the female are unemployed is higher than the one for one-earner households (slightly amplified by the generally higher unemployment rate for females).

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TABLE 4

EXPECTED (GROSS) HOUSEHOLD INCOME LOSS AS A PERCENTAGE OF (GROSS) HOUSEHOLD INCOME (ONE-ADULT HOUSEHOLDS)

	2005	2007	2009	2005	2007	2009	2005	2007	2009
	Single Males (%)			*Single Females (%)*			*Lone Parent Female, 2 Children (%)*		
Belgium	4.7	4.0	4.1	5.2	4.4	4.0	3.7	2.8	2.7
Finland	3.2	2.7	4.1	2.8	2.5	3.1	1.6	1.2	1.5
France	3.4	3.2	3.8	4.1	3.4	4.0	2.5	2.1	2.5
Germany	7.3	5.5	5.3	6.8	5.5	4.6	3.0	2.3	2.2
Italy	4.1	3.4	4.5	6.4	5.1	5.8	6.0	4.8	5.2
Netherlands	1.3	0.7	1.0	1.1	0.6	1.0	0.9	0.6	0.8
Spain	2.8	2.6	8.1	4.4	4.0	6.9	3.7	3.4	5.9
U.K.	4.0	4.4	6.1	3.1	3.6	4.1	2.2	2.4	2.5

Source: Computation based on the OECD tax-benefit model, OECD data on male and female unemployment rates, and on EU-SILC cross-sectional data on employees' wages (see text for details).

TABLE 5

EXPECTED (GROSS) HOUSEHOLD INCOME LOSS AS A PERCENTAGE OF (GROSS) HOUSEHOLD INCOME (TWO-ADULT HOUSEHOLDS)

	2005	2007	2009	2005	2007	2009
	1 Earner (Male), No Children (%)			*1 Earner (Male), 2 Children (%)*		
Belgium	5.0	4.4	4.6	4.5	4.1	4.2
Finland	2.9	2.3	3.9	2.2	2.0	3.1
France	3.4	3.2	3.8	3.2	2.8	3.2
Germany	6.8	5.1	4.7	5.6	4.0	3.7
Italy	3.9	3.2	4.2	3.8	3.0	4.0
Netherlands	1.3	0.9	1.0	1.3	0.8	1.0
Spain	3.0	2.6	7.5	2.5	2.2	6.5
U.K.	4.0	4.3	6.5	3.5	4.0	5.3
	2 Earners, No Children (%)			*2 Earners, 2 Children (%)*		
Belgium	5.0	4.3	4.0	5.0	4.3	4.1
Finland	3.6	3.0	4.1	3.2	2.7	3.7
France	3.6	3.1	3.8	3.5	3.1	3.6
Germany	6.9	5.4	4.9	6.0	4.6	4.2
Italy	5.0	4.0	5.0	4.9	3.9	5.1
Netherlands	1.4	0.9	1.0	1.3	0.9	1.0
Spain	3.5	3.2	7.5	3.2	3.0	6.7
U.K.	4.6	5.1	7.2	4.4	4.9	6.3

Source: Computation based on the OECD tax-benefit model, OECD data on male and female unemployment rates, and on EU-SILC cross-sectional data on employees' wages (see text for details).

for single and one-earners, if the income loss is constant, the expected loss grows proportionally with the unemployment rate.[10] For this reason, differences in the expected loss across countries in some cases have the opposite sign compared to the actual one (see, for example, the difference for single between Germany and the U.K. in Tables 2 and 4).

[10]For example, if the unemployment rate is initially around 5–6 percent, an increase of two percentage points means an increase in the expected loss of about 33–40 percent.

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TABLE 6
EQUIVALIZED PER-EARNER INSURANCE PREMIUM (2005 EUROS) AND PERCENTAGE OF THE OECD AVERAGE WAGE

	2005		2006		2007		2008		2009	
	Euros	%	Euros	%	Euros	%	Euros	%	Euros	%
Belgium	1939	5.3	1886	5.1	1628	4.4	1401	3.7	1650	4.4
Finland	968	3.0	924	2.8	838	2.4	803	2.3	1368	3.9
France	1025	3.4	1043	3.4	872	2.8	807	2.6	1130	3.5
Germany	2298	5.9	1759	4.6	1552	4.0	1377	3.6	1566	4.1
Italy	1418	5.8	1261	5.1	1169	4.7	1196	4.8	1513	6.0
Netherlands	487	1.3	391	1.0	320	0.8	296	0.7	432	1.0
Spain	722	3.5	683	3.3	672	3.3	961	4.6	1794	8.2
U.K.	2423	5.5	2824	6.3	2867	6.2	2619	5.8	3100	7.0

Source: Calculation based on the OECD tax-benefit model and EU-SILC cross-sectional data.

In Table 6 we report the per-earner amount corresponding to the aggregate equivalized expected loss[11] (which we refer to as the "equivalized insurance premium"; see equation (6)), and we express it as a percentage of the OECD average wage for the different countries. This amount is clearly in line with the level of the proportional expected loss in the various countries; it reaches the highest value in the U.K. (about 6.5 percent), and the lowest in the Netherlands (about 1 percent). Over time, the premium follows a declining trend for Germany and Belgium, increasing for Spain and the U.K.; with a U-shape for Italy, France, and Finland.

Since the equivalence scale is always smaller than the number of household members, this premium is clearly larger than the one obtained by considering the aggregate non-equivalized expected loss, i.e. if we simply add up the expected financial loss of all households (see equation (7)). The magnitude of this effect is reported in Table 7, where we show the non-equivalized insurance premium and the proportion by which the equivalized premium exceeds it. The increase in the non-equivalized premium if we count all individuals in the households is between 22 and 30 percent, with higher percentages in Italy, Spain, Belgium, and France, and lower in Germany, Finland, and the U.K. This means that the overall level of economic insecurity is significantly affected by the consideration of all household members. However, as we will see below, differences across countries in the magnitude of this effect are not large enough to change their relative position in terms of insecurity levels.

Using the OECD model we can also compute the expected loss on *net* rather than gross incomes. Clearly both the income loss due to unemployment and the expected one decrease for all types of households (see Tables B7–B10 in Appendix B). Table 8 reports the equivalized insurance premium calculated on net household

[11]For households with more than two adults we considered an average of four components. Indeed, the estimated average household size for these types of households from EU-SILC data (for our sample of interest) is between 3.5 and 4.5 for all countries and years considered in our empirical application.

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TABLE 7

NON-EQUIVALIZED INSURANCE PREMIUM (2005 EUROS) AND RATIO EQUIVALIZED OVER NON-EQUIVALIZED PREMIUM

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
	Non-Equivalized Insurance Premium					Ratio Equivalized/Non-Equivalized Insurance Premium (%)				
Belgium	1517	1466	1281	1102	1300	128	129	127	127	127
Finland	787	747	686	661	1127	123	124	122	121	121
France	803	811	684	638	892	128	129	127	126	127
Germany	1887	1469	1293	1153	1314	122	120	120	119	119
Italy	1090	969	899	921	1160	130	130	130	130	130
Netherlands	390	309	254	233	344	125	127	126	127	126
Spain	559	527	518	742	1393	129	130	130	130	129
U.K.	1995	2296	2322	2130	2478	121	123	123	123	125

Source: Calculation based on the OECD tax-benefit model and EU-SILC cross-sectional data. See text for details.

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TABLE 8

Equivalized Insurance Premium on Net Household Incomes (2005 euros) and Ratio Over the Premium on Gross Incomes

	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
	Insurance Premium on Net Incomes					Ratio over the Premium on Gross Incomes (%)				
Belgium	856	845	729	539	592	44	45	45	38	36
Finland	625	611	565	545	894	65	66	67	68	65
France	528	553	490	455	628	52	53	56	56	56
Germany	684	544	486	438	486	30	31	31	32	31
Italy	731	646	600	612	843	52	51	51	51	56
Netherlands	386	270	239	214	324	79	69	75	72	75
Spain	487	459	442	654	1191	67	67	66	68	66
U.K.	1568	1810	1851	1702	1997	65	64	65	65	64

Source: Calculation based on the OECD tax-benefit model and EU-SILC cross-sectional data. See text for details.

incomes, and the ratio over the gross one. The level of economic insecurity measured on net incomes is much lower than the one measured on gross incomes: the insurance premium on net incomes is on average half of the gross one, but we observe significant variation across countries (from about 30 percent in Germany to more than 70 percent in the Netherlands).

Our goal is to compare the information about the degree of economic insecurity of these countries with what would be observed by using the index of economic security related to unemployment in the IEWB. The IEWB measure is based on the OECD gross replacement rates which are an average of the individual gross replacement rates (GRR) for three family situations (a single person, a married person with a dependent spouse, and a married person with a spouse in work), two different levels of previous earnings in work (average earnings and two-thirds of average earning), and three different durations of the unemployment spell (the first year, the second and third years, and the fourth and fifth years; see OECD, 1994; Martin, 1996).

Since our insurance premium is based on one year of unemployment, we first compare the IEWB index with an identical measure in which the GRRs refer only to the first year of the unemployment spell (for three family situations and two levels of previous earnings). We rescaled both these measures considering only our group of countries over the years 2005–09. As can be seen from Table B11 in Appendix B, the level of the index decreases quite significantly. Unfortunately, the scaling rule applied with such a small number of countries and years implies huge changes over time for the countries to which the scale is anchored. For this reason we do not compare the pattern of the two measures, but simply the order of countries in the initial and the final year. The ranking of the different countries is reported in columns (1), (2), (4), and (5) of Table 9.

While the most and least secure countries remain unchanged, when we consider only one year of unemployment intermediate positions change quite significantly, with Spain and France becoming more secure and Belgium and Italy becoming less secure in 2005 (for example, Belgium is the only country that pays

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TABLE 9
RANKING OF COUNTRIES FROM LESS TO MORE SECURE ACCORDING TO DIFFERENT MEASURES OF EMPLOYMENT SECURITY, 2005–09

2005			2009		
(1) IEWB 5yr	(2) IEWB 1yr	(3) EL 1yr	(4) IEWB 5yr	(5) IEWB 1yr	(6) EL 1yr
Germany	Germany	Germany	Spain	Spain	Spain
Spain	Belgium	Belgium	U.K.	U.K.	U.K.
France	Italy	Italy	Germany	France	Italy
Finland	Spain	U.K.	France	Italy	Germany
Italy	Finland	Finland	Italy	Germany	Belgium
Belgium	France	France	Finland	Finland	Finland
U.K.	U.K.	Spain	Belgium	Belgium	France
NL	NL	NL	NL	NL	NL

Source: Calculation based on the OECD tax-benefit model. See text for details.

unemployment benefits for all the five years, but the GRR in the first year is lower than in other countries).[12]

The second step in understanding the relationship between the insurance premium and the IEWB is to compare the "one-year" IEWB measure with what would be obtained if we use the original idea of multiplying the unemployment rate by the GRRs instead of using the more recent additive approach. Differences in this case are due mainly to the relative weights assigned to the unemployment rate and the gross replacement rates. Results are reported in columns (3) and (6) of Table 9. Since the additive approach gives more importance to the unemployment rate, countries where this is lower than the average (like the U.K. in 2005), appear less secure when we consider the expected loss, while for countries where it is higher than the average, the opposite occurs (like France in 2009).

If we compare the one-year IEWB measure based on the original multiplicative approach with the non-equivalized insurance premium, we get a different ranking of countries, with Belgium and Finland becoming more secure, and Spain and the U.K. becoming less secure in 2005 (see Table 9, columns (3) and (6), and Table 10, columns (1) and (4)). This is the result of two different elements. On the one hand, we assigned a level of wages equal to the average one from EU-SILC cross-sectional data for the different types of households. In particular, for singles and one-earner couples the OECD GRRs assign the average wage to half of the households and two-thirds of the OECD average wage to the other half, but micro-data suggest that this is not appropriate in many cases (see the ratio of the EU-SILC average salary over the OECD average wage for the different types of families in Tables B2–B4 in Appendix B). On the other hand, the proportional expected loss for two-earner households in our measure is lower than that implicit in the IEWB, because in the latter gross replacement rates refer to the individual wage, while in our measure they refer to the household income.

When we consider all individuals in the household, the ranking of countries does not change, except for a shift in the relative position of Italy and the U.K. in

[12]In 2009 only Germany becomes more secure than France and Italy; the relative stability of the ranking in this year is due to the larger role played by the unemployment rate.

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TABLE 10

Ranking of Countries from Less to More Secure According to Different Measures of Employment Security, 2005–2009

2005			2009		
(1) Non-Equiv. Ins. Premium (gross inc.)	(2) Equiv. Ins. Premium (gross inc.)	(3) Equiv. Ins. Premium (net inc.)	(4) Non-Equiv. Ins. Premium (gross inc.)	(5) Equiv. Ins. Premium (gross inc.)	(6) Equiv. Ins. Premium (net inc.)
Germany	Germany	U.K.	Spain	Spain	Spain
U.K.	Italy	Italy	U.K.	U.K.	U.K.
Italy	U.K.	Spain	Italy	Italy	Italy
Belgium	Belgium	Belgium	Belgium	Belgium	Finland
Spain	Spain	Finland	Germany	Germany	France
France	France	Germany	Finland	Finland	Belgium
Finland	Finland	France	France	France	Germany
NL	NL	NL	NL	NL	NL

Source: Calculation based on the OECD tax-benefit model and EU-SILC cross-sectional data. See text for details.

2005 (see Table 10, columns (1), (2), (4), and (5)). This means that, although accounting for household composition increases the level of economic insecurity in all countries, differences in this effect across countries are not large enough to change their relative ranking.

Finally, if we consider the level of economic insecurity measured on net incomes, the ranking of countries changes quite significantly (see Table 10, columns (2), (3), (5), and (6)): the U.K. becomes the most insecure country in 2005; Finland is relatively more insecure and Germany relatively more secure in both 2005 and 2009; Spain becomes relatively more insecure in 2005 and France in 2009.

Summarizing, the insurance premium has a direct and simple interpretation: the average amount (expressed as a percentage of the gross average wage) that would be required from each earner in order to insure the aggregate expected loss of the country over and above what is already covered by the unemployment benefits, under a zero expected-profits condition. The aggregate expected loss can be either equivalized or non-equivalized: in the second case we simply add up the expected loss of each household in the country; in the first case the expected loss of each household is expressed in adult-equivalent terms, multiplied by the number of household members, and then aggregated over all the households. The difference between these two cases is quite relevant: the insurance premium in the first case is 22–30 percent higher than in the second one, with cross-country differences due to their different household structure. If we compute the expected loss on net rather than gross household incomes, the insurance premium diminishes considerably, but this reduction can be very different across countries (from about 70 percent in Germany to only 30 percent in the Netherlands), causing significant changes in their relative position in terms of insecurity levels. Furthermore, compared to the simple use of the OECD gross replacement rates, this relative position can be quite different if we use micro-level data to estimate the average wages for the earners in the different types of household, as well as the proportions of the latter.

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TABLE 11

INDEX OF EMPLOYMENT SECURITY INCLUDING THE IUDR AND DIFFERENCES WITH RESPECT TO THE INDEX WITHOUT IT

	Index of Employment Security				
	2005	2006	2007	2008	2009
Belgium	0.585	0.576	0.605	0.631	0.599
Finland	0.675	0.707	0.729	0.752	0.697
France	0.602	0.606	0.621	0.643	0.593
Germany	0.515	0.556	0.610	0.638	0.635
Italy	0.539	0.567	0.587	0.564	0.548
Netherlands	0.745	0.773	0.808	0.828	0.823
Spain	0.556	0.592	0.593	0.507	0.285
U.K.	0.571	0.556	0.558	0.561	0.495
Index with IUDR – index without IUDR					
Belgium	–0.070	–0.086	–0.090	–0.093	–0.093
Finland	0.034	0.039	0.027	0.030	0.060
France	–0.030	–0.028	–0.048	–0.051	–0.027
Germany	0.070	0.073	0.058	0.036	0.041
Italy	–0.104	–0.115	–0.123	–0.115	–0.082
Netherlands	–0.050	–0.053	–0.046	–0.044	–0.020
Spain	–0.034	–0.026	–0.036	0.014	0.086
U.K.	–0.104	–0.086	–0.088	–0.081	–0.038

Notes: Weights: 0.6 to unemployment rate, 0.2 to replacement rate, and 0.2 to inactive-unemployed dependency rate; for the index without IUDR: 0.8 to unemployment rate, 0.2 to replacement rate.

Source: Calculation based on Eurostat database (LFS).

4. EVIDENCE ON THE IUDR

As mentioned above, we calculate the IUDR using an extraction of the Eurostat database (LFS) which reports the number of households in each country according to the combination of the number of employed, unemployed, and inactive individuals, and the number of children, with each variable top-coded at three. Values are reported in Table B12 in Appendix B. There are relevant differences in the levels of the index for the various countries: Italy and Belgium have an IUDR higher than 0.8, whereas this ratio is below 0.5 in Finland and Germany. The trend is decreasing in five countries out of eight (particularly in the Netherlands), and fairly stable in Belgium, France, and the U.K.

These results suggest that the unemployment risk affects a different number of persons in the various countries, with the consequence that the overall level of insecurity associated to similar unemployment and replacement rates may be quite different. The implications of this for the index of economic security related to unemployment in the IEWB are illustrated in Table 11, where we report the index with the IUDR, and the differences with the corresponding index without the IUDR.[13]

[13]In order to better grasp the effect of including the IUDR, we considered the standard IEWB index of economic insecurity based on OECD gross replacement rates.

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TABLE 12

Ranking of Countries from Less to More Secure According to the Index of Employment Security With and Without the IUDR, 2005–09

2005		2009	
Without IUDR	With IUDR	Without IUDR	With IUDR
Germany	Germany	Spain	Spain
Spain	Italy	U.K.	U.K.
France	Spain	Germany	Italy
Finland	U.K.	France	France
Italy	Belgium	Italy	Belgium
Belgium	France	Finland	Germany
U.K.	Finland	Belgium	Finland
Netherlands	Netherlands	Netherlands	Netherlands

Source: Calculation based on OECD data for Gross Replacement Rates and unemployment rates, and on Eurostat, LFS data. See text for details.

Economic security (related to employment security) increased in the first three years considered for all countries except the U.K. The inversion of the trend was anticipated in Italy and Spain compared with the other countries (in 2008 instead of 2009), with a final level of security lower than the initial one in the case of France, Spain, and the U.K. The effect of introducing the IUDR is negative and quite large in all years for Italy, Belgium, and the U.K.; it is also negative but smaller for France and the Netherlands. For Finland and Germany we have a positive effect in all years, particularly large for Germany, whereas for Spain the effect changes its sign from negative to positive in the last year (when the decrease in the IUDR mitigates the huge increase in the unemployment rate).

If we compare the order of countries in terms of employment security (from the less to the more secure) reported in Table 12, we can see that, taking into account the inactive-unemployed dependency rate, Belgium and Italy become relatively less secure in both 2005 and 2009 (Italy moves from the fifth to the second position in 2005 and to the third in 2009), whereas Finland becomes more secure. The U.K. loses positions in 2005, whereas France, Spain, and Germany gain them (the former two in 2005, the latter in 2009).

These results suggest that our evaluation of the overall risk related to the possibility of losing one's job, and also international comparisons, are quite different if we consider all the individuals in the households that are potentially affected by this risk or solely those who participate in the labor market. In particular, the relative position of Italy, Belgium, and the U.K. worsens (they become less secure) when household composition is taken into account, whereas that of Finland and France improves.

5. Conclusions

In this paper we propose two new measures for the economic (in)security related to employment risk, that take into account the household composition of

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the unemployed. Usually the degree of risk related to the possibility of unemployment is evaluated considering only the unemployment rate and the replacement rate, i.e. restricting the attention to individuals who participate in the labor market. However, the consequences of this risk for the latter, as well as for the whole society, may be quite different according to the number of persons who depend on their income. In this paper we investigate two ways in which one can take into account the consequences of unemployment for these people: by computing a *per-earner* amount that corresponds to the aggregate *equivalized* expected loss (i.e., the sum over all individuals living in households at risk of the corresponding adult-equivalent expected loss), over and above what is already covered by the unemployment benefits; and by considering the *inactive-unemployed dependency rate*, i.e. the (weighted) average of individuals not in the labor force for each unemployed person in the country.

The interpretation of the latter is quite simple: the average number of persons that each unemployed individual has to provide for (beyond herself). This approach has the advantages of being more directly comparable to the IEWB sub-index, and to require additional data only with respect to the number of households with various compositions. Differences across countries in the level and evolution of the IUDR are quite marked: in Italy and Belgium each unemployed individual has on average 0.8 persons that depend on his/her income, whereas in Finland, Germany, and the Netherlands, the value is only about a half. The trend is decreasing in five countries out of eight (particularly in the Netherlands), and fairly stable in Belgium, France, and the U.K. Compared to the simple IEWB sub-index, the inclusion of the IUDR changes the relative position of various countries: Italy, Belgium, and the U.K. become less secure, whereas Finland and France become more secure. Therefore, the overall level of insecurity associated with similar unemployment and replacement rates may be quite different if we consider all the individuals in the households that are potentially affected by this risk or solely those who participate in the labor market.

Also the interpretation of the measure based on the insurance approach is quite simple: the percentage of the gross average wage that would be required from each earner in order to insure the aggregate expected loss of the country, under a zero expected-profits condition. Our analysis shows that this percentage can be quite different if we simply add up the expected loss of each household or if we consider the adult-equivalent expected loss and aggregate it over all individuals in the households at risk: in the second case the insurance premium increases by about a fourth, with some variation across countries due to their different household structure. Differences in the insurance premium become much more pronounced if we use net rather than gross incomes, with reductions that go from about 70 percent in Germany to only 30 percent in the Netherlands, causing significant changes in the relative position of countries in terms of insecurity levels. The main disadvantage of this approach is that it requires micro-level data. However, the picture of insecurity that emerges by using micro-data to estimate average wages and the proportions of the various types of households is quite different from the one based simply on unemployment rates and the OECD gross replacement rates.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix A: Expected loss for households with two active members.
Appendix B: Tables.
Table B.1: The OECD average wage (Euros).
Table B.2: Ratio of (gross) average wage calculated from EU-SILC data and the OECD average wage for one-adult households.
Table B.3: Ratio of (gross) average wage calculated from EU-SILC data and the OECD average wage for two-adult households.
Table B.4: Ratio of (gross) average wage calculated from EU-SILC data and the OECD average wage for households with more than two adults.
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Table B.7: Percentage of (net) income loss due to unemployment for one-adult households.
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Table B.9: Family expected (net) income loss as a percentage of (net) household income (one-adult households).
Table B.10: Family expected (net) income loss as a percentage of (net) household income, two-adult households.
Table B.11: Index of (scaled) per earner insurance premium (as a percentage of the average wage), and the rescaled index of employment security of the IEWB.
Table B.12: The inactive-unemployed dependency rate.

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