

MEASURING ECONOMIC INSECURITY USING A COUNTING APPROACH. AN APPLICATION TO THREE EU COUNTRIES

MARINA ROMAGUERA-DE-LA-CRUZ*

Universidad de Alcalá

EQUALITAS

In this paper, we propose the use of a multidimensional approach to the measurement of economic insecurity in three European countries. We combine six different unidimensional indicators proxying the subjective and objective determinants of economic insecurity into a single index based on a counting approach method, which allows us to measure the incidence and the intensity of the phenomenon. Using longitudinal data from the European Union Statistics on Income and Living Conditions (EU-SILC) from 2008 to 2016, we find that the incidence of insecurity falls as income grows, being significantly present in middle-income households both in Spain and France but not in Sweden. Interestingly, in all three countries, the contribution of different dimensions to insecurity changes as household income grows, while for all income levels a higher education and being employed in a non-fixed term contract are strongly related to a lower probability of being economically insecure.

JEL Codes: D63, I31

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1. INTRODUCTION

Traditionally, the study of individual well-being has focused on the measurement of inequality and poverty in a static and a dynamic perspective and on the evaluation of the most effective policies to reduce them. Until recent years, the literature has paid little attention to the role of economic insecurity in modifying the individual perception of well-being, given a level of inequality and poverty. However, since the seminal works of Osberg (1998), Osberg and Sharpe (2005) and Hacker (2005), academics have become increasingly aware of the prominent role of insecurity in the measurement of well-being and have begun to study its dimensions and evolution and, most importantly, have continued to discuss the way economic insecurity should best be measured.

There is not yet a consensus on the definition of economic insecurity, even if some common elements may be already drawn from the relevant literature.

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*Correspondence to: Marina Romaguera-de-la-Cruz, Departamento de Economía, Facultad de CC. Económicas, Empresariales y Turismo, Universidad de Alcalá, Plaza de la Victoria, 2, 28802, Alcalá de Henares, Spain (marina.romaguera@uah.es)

Insecurity can be understood as the anxiety produced by anticipating future economic losses and the awareness of not being capable of overcoming them (Osberg, 1998, 2018; Osberg and Sharpe, 2002, 2005; Hacker *et al.*, 2010; Bossert and D'Ambrosio, 2013, 2016; Berloffia and Modena, 2014; D'Ambrosio and Rohde, 2014; Ivlevs, 2014; Rohde *et al.*, 2014, 2015; Rohde and Tang, 2018). Starting from this idea, economic insecurity has implications for individual well-being and should be analyzed beyond inequality and poverty. Even if economic insecurity could show a positive correlation with other indicators of economic well-being, this phenomenon is not based on current financial strain but on future economic distress. Furthermore, while inequality indices are based on a static perspective and analyze the income distribution in a given point in time, economic insecurity is based on the dynamics of certain economic hazards, which could potentially impact their feelings and behavior. Given that economic insecurity involves future situations and individuals' perspectives, its measurement is a complex issue. Our main purpose in this paper is to evaluate the level and evolution of economic insecurity in three European countries in recent years (from 2009 to 2016), focusing on its determinants and main changes during the Great Recession. We build a variety of indicators based on a counting approach and follow a comprehensive method put forward by Rohde *et al.* (2015) that allows us to construct an individual measure of economic insecurity that combines past experiences while predicting key future states that are most likely to determine the insecurity felt in the present (Osberg, 2015).

To illustrate the functioning of our proposed measure of economic insecurity, we analyze three European countries that show different levels and trends of this phenomenon based on the *IEWB Economic Security Index* (Osberg and Sharpe, 2002, 2005; see Figure A1). Our final selection includes Spain as a country with low levels of economic security and a downward trend (the *IEWB Economic Security Index* has dropped 17.9 percent between 1980 and 2014), France as a country with an intermediate level of economic security in the EU context which, in contrast with Spain, has increased in the last 30 years (with a positive growth rate of 4.2 percent between 1980 and 2014), and Sweden, a country with high levels of security and a downward trend, even if smaller than that observed in Spain (a negative growth rate of 9.1 percent between 1980 and 2014). Thus, the empirical part of this paper aims to contribute to the analysis of economic insecurity in European countries, where analysis on this matter are still scarce (D'Ambrosio and Rohde, 2014; Rohde *et al.*, 2014), and focusses on three of them in which insecurity has different patterns. Moreover, we aim to provide an improvement in the measurement of insecurity by considering objective and subjective indicators as determinants of the phenomenon and by analyzing the impact of the probabilities of certain hazards from a household perspective. We also provide guide for researchers aiming to estimate insecurity measures for EU countries using the currently available longitudinal data sets from the European Union Statistics on Income and Living Conditions (EU-SILC). Therefore, our approach could be straightforwardly applied in a wider European context in a comparative way in future research. Furthermore, the measurement of economic insecurity has relevant policy implications, as it can help identify the most insecure subgroups in the population and the kind of policies that should be carried out to reduce insecurity levels.

Our index of economic insecurity can be classified within an individual multidimensional approach to its measurement along the lines of Rohde *et al.* (2015, 2016), which combines objective and subjective dimensions and adopts a mixed strategy between forward-looking (Bossert and D'Ambrosio, 2013, 2016; Rohde *et al.*, 2015) and retrospective approaches (Hacker *et al.*, 2010, 2014; Rohde *et al.*, 2014). Therefore, it will include indicators based on previous experiences and probabilities of future events. The inclusion of objective and subjective measures gives us a more complete picture, as we will capture the individual's perceptions of his future economic situation and the risks he currently faces. As measures of perceived insecurity, we are analyzing the inability to face unexpected financial expenses, a measure of financial dissatisfaction and changes in the ability to go on a holiday, while income drops, the probability of future unemployment and the probability of extreme expenditure distress are our objective indicators.

We use a counting approach (Atkinson, 2003) to aggregate our six insecurity dimensions into a single indicator, in line with Alkire and Foster (2011) in the study of multidimensional poverty, Bucks (2011) within the insecurity context and Peichl and Pestel (2013a, 2013b) in the multidimensional affluence field. We are particularly interested in building an individual measure that allows us to study the distribution of economic insecurity within the population. We find that a counting approach that considers an intermediate threshold and weights the simple indicators by the proportion of the population not affected by a particular insecurity dimension is the most adequate method. Although this method does not capture the magnitude of economic insecurity in each dimension (we only consider whether an individual is insecure in each dimension and not the size of the gap), this approach has a large number of advantages: it is more robust to the presence of outliers and it allows for the study of the incidence and the intensity of the phenomenon through an aggregate indicator (M_{EI}), which is decomposable by population subgroups and dimensions. Thus, we will be able to analyze the determinants of economic insecurity depending on the individuals' position in the income distribution. Furthermore, once we have classified individuals as insecure or secure, we will study the correlation of several sociodemographic characteristics with the probability of being economically insecure by using a probit estimation.

The paper is organized as follows: Section 2 presents a discussion of the previous literature in the field, while Section 3 describes the methodology used in the construction of the unidimensional indices and the economic insecurity composite indicator. This section also includes a detailed description of the data source. In Section 4, we present our main results, and Section 5 discusses our main conclusions.

2. BACKGROUND

Even though there is not yet a consensus in the literature about what the definition of economic insecurity is, this phenomenon affects individuals' lives in many aspects, conditioning their economic and political decisions. In the short term, economic insecurity may have an impact on current consumption and housing investment, which would be delayed in the prospect of future losses.

Also, as Stiglitz *et al.* (2009) point out, a currently high level of economic insecurity may impact future generations because, for instance, it is significantly harder for families suffering from economic distress to invest in their children's education, which is a key determinant of future individual well-being. Moreover, labor market and fertility decisions may be affected by insecurity and may impact current and future physical and mental health (Smith *et al.*, 2009; Barnes and Smith, 2011; Modena *et al.*, 2014; Rohde *et al.*, 2016, 2017; Staudigel, 2016; Watson, 2017). Therefore, insecurity should be included in any analysis of well-being, as current and future inequality could be affected by the dynamics of individual behavior (Boarini and Osberg, 2014).

Due to the complexity of the phenomenon, there are many classifications of economic insecurity indices according to the unit of analysis (aggregate vs. individual indices), the nature of the dimensions included (objective vs. subjective indicators) or the reference period (backward vs. forward-looking approaches). Regarding the first classification, most of the economic insecurity indicators have been constructed from an aggregate perspective, resulting in measures for a whole population using macro data (Osberg, 1998; Osberg and Sharpe, 2002, 2005, 2014; Hacker *et al.*, 2010, 2014; Berloffia and Modena, 2014). Interestingly, a variety of recent papers underline the advantages of constructing individual indicators instead, which, potentially, could subsequently be aggregated into a social indicator at a second stage, summarizing insecurity for any given population (Bossert and D'Ambrosio, 2013, 2016; D'Ambrosio and Rohde, 2014; Osberg, 2015). Calculating an economic insecurity index for each individual in the population allows the researcher to study the distribution of this phenomenon and its incidence in specific socio-demographic subgroups in addition to changes over time. It also allows for the possibility of identifying key covariates to design effective policies to fight against high levels of insecurity. Bossert and D'Ambrosio (2013) developed an individual measure of economic insecurity, which is calculated as a weighted sum of current wealth and past changes on wealth stock, giving more weight to past declines than to gains (loss aversion) and to more recent events than to those further back in time. Another individual measure is the one proposed by Rohde *et al.* (2014), which considers insecurity as downward income instability.

We cannot find an agreement in the literature about which should be the nature of the dimensions included in an economic insecurity measure. Some authors have proposed the use of objective indicators (Osberg, 1998; Osberg and Sharpe, 2002; Hacker *et al.*, 2010; Bossert and D'Ambrosio, 2013; D'Ambrosio and Rohde, 2014; Rohde *et al.*, 2014), due to a lack of reliability of subjective measures.¹ Nevertheless, economic insecurity is referred to people's expectations about their financial future, revealing that this phenomenon has a relevant psychological component which one cannot deny. In addition, the validity of subjective indicators to predict individuals' behavior has been checked in several studies (Manski, 1990, 2004; Zafar, 2011a, 2011b), and the results contradict the idea that subjective

¹Traditionally, some authors have denied the reliability of subjective indicators, as they are influenced by culture or people's aspirations. Also, they argue that when studying well-being, there is a weak correlation between subjective and objective measures (Krueger and Schkade, 2008; Jahedi and Méndez, 2014).

measures are not reliable enough to be used in economic analysis. In the insecurity context, a variety of authors have chosen to use individuals' opinions about their future economic situation to approximate this phenomenon (Anderson, 2001; Espinosa *et al.*, 2014). Clearly, these perspectives will be capturing different parts of economic insecurity that are equally important: the subjective dimensions will capture expectations, whereas the objective indicators will establish which is the standard of insecurity in a given society.

Recently, some other papers have focused on building an individual economic insecurity indicator that combines objective and subjective measures. Economic insecurity is a multifaceted phenomenon which cannot be identified with only one variable. Rohde *et al.* (2015) introduce an individual multidimensional approach using the Household, Income and Labour Dynamics in Australia (HILDA) data, identifying economic insecurity with a variety of dimensions. As subjective indicators, they consider perceived job security, financial satisfaction and the inability to raise emergency funds. As objective dimensions, they include that of a relevant downward change in the income stream following the approximation by Hacker *et al.* (2010, 2014), the probability of extreme expenditure distress as a proxy for the inability to meet standard expenses and the probability of unemployment.² When analyzing the effect of economic insecurity on mental health, Rohde *et al.* (2016) add a level-and-change index of income dynamics, which is inspired by the Bossert and D'Ambrosio (2013) indicator and which approximates insecurity as a function of current income and a weighted sum of its past changes. Following the same approach, Rohde *et al.* (2017) use income volatility instead of large income losses as an objective estimate of economic insecurity. The authors point out that a single indicator is not enough to capture economic insecurity and that there is a need to combine these dimensions into a synthetic index which potentially reflects this abstract phenomenon. Hence, their index is calculated by aggregating the different insecurity dimensions using a Principal Components Analysis. We may highlight that composite measures allow us to study the joint distribution of those variables in which we believe insecurity reveals itself,³ considering those situations in which an individual is simultaneously facing insecurity in several dimensions.

Furthermore, the notion of economic insecurity refers not only to current well-being but to future situations and people's perspectives, making its measurement much more difficult than that of other well-being phenomena. For that reason, it is most common in the literature to use a backward-looking approach, considering that past experiences would determine anxiety about the future. However, an ideal measure of economic insecurity should try to predict future states that would determine the insecurity felt in the present (Osberg, 2015). In fact, some authors have tried to capture this effect using probabilities of certain hazards (Rohde *et al.*, 2015; Rohde *et al.*, 2017).

²Rohde *et al.*'s (2015) economic insecurity index shows that this phenomenon impacts more strongly on young and unmarried individuals with low incomes and low levels of education.

³The separate analysis of these dimensions may lead us to obtain different conclusions about the insecurity level of a given individual, as that individual may lack security in one indicator but not in other. The joint analysis of these dimensions through a synthetic measure allows us to avoid this issue and reduces the information they provide.

Our index of economic insecurity can be classified within an individual multidimensional approach to the measurement of economic insecurity that combines objective and subjective dimensions which gives us a more complete picture of the situation, as we will be capturing the individuals' perceptions of their future economic situation and the risks they are facing. It also adopts a mixed strategy between the forward-looking and the retrospective approaches, as it will include indicators based on previous experiences and probabilities about future events. We are interested in building up an individual measure to analyze not only overall economic insecurity in the selected countries but to study the distribution of the phenomenon among relevant population subgroups. Although our measure can be classified within the individual indices, we include several dimensions, which are determined at a household level, due to the existence of economies of scale and a shared decision-making process.

3. METHODOLOGY

3.1. *Economic insecurity dimensions*

To construct a multidimensional index of economic insecurity, we must consider several issues: the selection of the dimensions of insecurity, the creation of an economic insecurity index selecting the weighting and aggregation method and the identification of individuals who are economically insecure. Our measure of economic insecurity is based on the dimensions' proposal developed by Rohde *et al.* (2015) using HILDA with some unavoidable adjustments to adapt it to the information available in the EU-SILC.

Unfortunately, there are fewer questions in EU-SILC than in HILDA related to people's appreciations about their future economic situation. Nevertheless, we develop three subjective indicators of insecurity. The first one is *household's incapacity of facing unexpected expenses*, a binary variable that takes the value of 1 if the household does not own the resources to afford an unexpected required expenditure. As our second indicator, we consider the *household's financial dissatisfaction*, which is constructed as the difference between household disposable income and the lowest annual income that would be necessary to make ends meet according to the respondent's view, giving us more information than would an ordered scale of dissatisfaction. We construct this measure with respect to the needed income level, and we assign a value of 0 for individuals who are not financially dissatisfied:

$$(1) \quad \text{financial dissatisfaction}_{it} = \begin{cases} \frac{w_{it} - y_{it}}{w_{it}} & \text{if } w_{it} > y_{it} \\ 0 & \text{otherwise} \end{cases}$$

where w_{it} is the lowest annual equivalized income needed to make ends meet and y_{it} is the equivalized household disposable income. This indicator is bounded between 0 and 1, reflecting a higher level of dissatisfaction as it becomes closer to 1 and capturing the intensity of this phenomenon for those who are not able to afford basic expenses.

When an individual suffers from an economic disorder or believes that he will be prone to suffer from it in the relatively near future, it is very likely that expenses for certain items will be cut off, especially those which are less necessary for his daily life. For that reason, we consider a new dimension in our insecurity index that takes into account *changes in the ability to go on a holiday*, meaning the household's incapacity to afford one annual week away from home, even if household members would like to (t), provided they enjoyed such a holiday the previous year ($t - 1$). Having a week of holiday away from home is important for social inclusion in Europe, as it is one of the items included in the Eurostat's material deprivation index. Changes in this indicator will reflect the perception of a strain in the household, meaning that if individuals think they are prone to suffering a financial hardship in the near future, they will save the intended holiday expense to cope with this economically uncertain situation (Deutsch *et al.*, 2014). We believe that the dynamics of the ability to go on a holiday indicator capture changes in individual economic insecurity for many households, particularly those over median income.⁴

Our economic insecurity measure also includes three objective indicators: income drops, unemployment hazard and the probability of extreme expenditure distress. We consider that an individual suffers an *income drop* if his household's disposable income has experienced at least a 25% decline from the previous year and if its level is below his permanent income, following Hacker *et al.*'s (2010) approach and in the same manner as Rohde *et al.* (2015):⁵

$$(2) \quad \text{income drop}_{it} = \begin{cases} \frac{y_{it} - y_{it-1}}{y_{it-1}} & \text{if } y_{it} < 0.75y_{it-1} \text{ and } y_{it} < \bar{y}_i \\ 0 & \text{otherwise} \end{cases}$$

where y_{it} is the equivalized household disposable income at moment t , y_{it-1} is that of the previous year and \bar{y}_i is permanent income, calculated as the average equivalized household disposable income for each individual and for the period available in the data. All income measures are deflated by the Harmonised Consumer Price Index provided by Eurostat for each of the countries in the analysis.

Labor market situation is one of the most relevant determinants of individual economic security, as it is the first source of income for most of the population. We believe that being currently insecure regarding future employment implies two risks: the risk of losing one's job (for current employed individuals) and the risk of not finding a job (for those currently unemployed). Thus, to calculate *unemployment risk*, we adopt a forward-looking strategy following Rohde *et al.*'s (2015) example. For active individuals in the household, we estimate a probit model for each country in which the dependent variable takes the value 1 if the individual

⁴As a robustness check, we have also calculated our individual economic insecurity index (EI_i) and aggregate indicators without the changes in the ability to go on a holiday indicator. We do not find significant differences in the results of our analysis, and the main conclusions hold (see Tables B3, B4 and Figures B2, B4 in the Appendix).

⁵Certainly, a level-and-change index of income dynamics (Bossert and D'Ambrosio, 2013; Rohde *et al.*, 2016) would be a better option to measure the actual risk of a fall in income, as we would be also capturing income changes beyond the prior year. Unfortunately, the dimension of attrition in EU-SILC data does not allow us to include income drops two or three years before t as many individuals only remain in the sample for two interviews.

is unemployed in period t , according to the ILO definition, and lagged individual characteristics (those at $t - 1$) are used as explanatory variables (see Table A2). After predicting this unemployment risk, we introduce a household perspective: we compute a household unemployment risk as a weighted average between the unemployment probabilities of the active members of the household. These weights capture the relative importance of each market income in the total household market income for a given year t . Market income is calculated as the sum of employee cash income, non-cash employee income, cash benefits or self-employment incomes and pensions from individual private plans. To avoid weights above 1, we impute a value of zero to all negative values:

$$(3) \quad \bar{p}_h(u_{it}) = \frac{\sum_{i=1}^k u_{it} \cdot m_{it}}{\sum_{i=1}^k m_{it}}$$

where u_{it} is the individual probability of unemployment, m_{it} is the individual market income at moment t and k is the number of active members in the household. After that, we impute this household unemployment probability to the inactive members, who do not have any value in this dimension but who suffer from a similar risk.

The *probability of extreme expenditure distress* allows us to focus our attention on certain household overdue payments: arrears on mortgage or rental payments, arrears on utility bills and arrears on hire purchase instalments or other loan payments. We create an indicator from 0 to 3 that counts the number of these difficulties experienced by the household and consider it to be the dependent variable in an ordered probit model (see Table A3).⁶ Based on this estimation, individual probabilities of obtaining a score of 2 or 3 are predicted and combined to obtain the household's probability of extreme expenditure distress in the short term, which is imputed to each member in it.

3.2. Constructing a multidimensional index of economic insecurity

Individual index

Our goal is to create a composite indicator that gathers all the information supplied by the six dimensions of insecurity described above (see Table A1 for complete information on the correlations between dimensions in each country). Although there are several ways to summarize the information provided by different variables (Nardo *et al.*, 2005), it is not yet clear in the literature if there is an advantage in using one particular method.

The counting approach method (Atkinson, 2003) is commonly used in multidimensional poverty analysis (Alkire and Foster, 2011) and has been adapted to other fields, such as labor precariousness (García-Pérez *et al.*, 2017) or

⁶The pseudo R^2 of unemployment risk estimations is 0.378 for Spain, 0.344 for France and 0.304 for Sweden. Regarding the probability of extreme expenditure distress estimations, the pseudo R^2 is 0.157 for Spain, 0.181 for France and 0.149 for Sweden.

multidimensional affluence (Peichl and Pestel, 2013a, 2013b), among others. In line with Bucks (2011), we adapt this strategy to produce an economic insecurity index. Alkire and Foster (2011) propose to use a dual cut-off approach that needs a threshold to be set to identify individuals who lack security in a given dimension and, subsequently, a multidimensional threshold to classify individuals as economically insecure. Regarding the incapacity to face unexpected expenses, financial dissatisfaction, the ability to go on a holiday and income drops, we consider that an individual lacks security in any of these if the dimension's value is different from zero. With respect to the unemployment risk and the probability of extreme expenditure distress, we establish the mean as a threshold (see Table 1). Our individual index (EI_i) counts the number of weighted dimensions in which the individual lacks security with respect to the total number of dimensions:

$$(4) \quad 0 \leq EI_i = \frac{\sum_{j=1}^D w_j I_{ij}}{D} \leq 1$$

where I_{ij} is a variable that takes the value 1 if the individual i lacks security in the dimension j and 0 otherwise and where D is the total number of dimensions (in this case, $D=6$). We weight each dimension j by w_j , obtained as follows:

$$(5) \quad w_j = \frac{D * P_j}{\sum_{j=1}^D P_j}$$

where D is the total number of dimensions and P_j is the proportion of individuals who do not lack security in dimension j . We choose to weight our simple indicators by the relative proportion of the population that does not suffer from insecurity in that dimension when constructing EI_i (Decancq and Lugo, 2013), as we believe it is worse to suffer from economic insecurity in a dimension in which most of the individuals in a reference population are secure. These weights can be identified as objective indicators of subjective feelings of insecurity, meaning that people feel worse if they observe that a large part of the population has security when they are among those who are insecure (Desai and Shah, 1988). Furthermore, this relative perspective allows us to adapt our economic insecurity index to a given society, as the relevance of each dimension may be different in one country or another, depending on its distribution. As a robustness check, we have also calculated our individual economic insecurity index (EI_i) and aggregate indicators with an equal weight of the insecurity dimensions. Even though insecurity levels are somewhat higher, the main conclusions of the analysis hold (see Table B2 and Figures B1 and B3 in the Appendix).

In a second step, we set a multidimensional threshold (k) to identify which individuals are economically insecure. Several strategies exist for choosing this threshold: the union approach considers an individual to be economically insecure if he is lacking security at least in one dimension, whereas the intersection approach requires lacking security in all indicators. In this paper, we will focus on an intermediate approach (an individual is economically insecure if he is not secure at least in 50 percent of the sum of weighted dimensions: $k \geq 0.5$, see Table B1 in

TABLE 1
DEFINITION OF INSECURITY DIMENSIONS

	Indicator	Variable	Description	Threshold
Subjective	D1	Incapacity to face unexpected expenses	Household cannot afford an unexpected required expense and pay through its own resources, meaning not asking for financial help, the account must be debited within the required period and the situation regarding potential debts is not deteriorated.	Household cannot face unexpected expenses ($=1$)
	D2	Financial dissatisfaction	Difference between lowest annual income to make ends meet (to pay usual necessary expenses) and current household disposable income in relation to needed income. This indicator has a value of zero when the difference is negative (disposable income is larger than needed income).	Household is financially dissatisfied (>0). Disposable income is smaller than needed income.
Objective	D3	Changes in ability to go on a holiday	Household's incapacity to afford one week away from home in the current period (t), while the household could afford this vacation the previous period ($t-1$).	Household cannot afford holidays in t while it was able in $t-1$ ($=1$).
	D4	Income drops	Fall in household equivalized disposable income from one year ($t-1$) to another (t). This indicator takes a value of zero if this fall is not at least of a 25% and current income is not below permanent income.	Household has a large income drop (<0).
	D5	Unemployment risk	Probability of unemployment (not finding a job or losing the current one).	Individual has a probability of unemployment above the society mean.
	D6	Probability of extreme expenditure distress	Probability of having at least two arrears in the following household payments: (1) mortgage or rent, (2) utility bills, (3) hire purchase installments or other loans.	Individual has a probability of extreme expenditure distress above the society mean.

Source: Author's own elaboration based on longitudinal EU-SILC data set.

the Appendix for a sensitivity analysis of the choice of multidimensional threshold on our aggregate indicators using a union and an intersection approach).

We believe that there are several reasons why the approach above described is the most adequate method for analyzing the multidimensional economic insecurity phenomenon: this method is not influenced by the way we define the dimensions or by the presence of outliers. Also, by weighting the simple indicators by the population less affected by the specific phenomenon, we are capturing the social and economic context in which the index is calculated. Furthermore, it allows us to calculate some interesting aggregated indicators, taking into consideration both the incidence and the intensity of economic insecurity.

Aggregate index

Once we have classified individuals as insecure or secure, the approach we follow allows us to calculate aggregate indicators of insecurity for each society, so we can study the level of economic insecurity for any country or subpopulation and its evolution over time. The incidence of economic insecurity (H_{EI}) in a given population is calculated as follows:

$$(6) \quad H_{EI} = \frac{\sum_{i=1}^N I(EI_i \geq k)}{N} = \frac{q_{EI}}{N}$$

where $I(EI_i \geq k)$ takes the value 1 if the individual is economically insecure, q_{EI} is the number of people classified as economically insecure above the threshold k and N is the total population. Also, we can measure the intensity of economic insecurity:

$$(7) \quad \mu_{EI}^{q_{EI}} = \frac{\sum_{i=1}^N EI_i I(EI_i \geq k)}{\sum_{i=1}^N I(EI_i \geq k)} \rightarrow A = \frac{\mu_{EI}^{q_{EI}}}{D}$$

where $\mu_{EI}^{q_{EI}}$ measures the mean value of the variable EI_i among the economically insecure and A is the standardization of this indicator by the number of dimensions. After that, we can calculate the economic insecurity adjusted rate (M_{EI}), an adequate social measure of economic insecurity that considers the incidence and the intensity of the phenomenon. Moreover, it easily allows for comparisons in the dimension and trend of economic insecurity between different countries or subpopulations over time and is decomposable both by subgroups and by insecurity dimensions (Alkire and Foster, 2011):

$$(8) \quad M_{EI} = \frac{\sum_{i=1}^N EI_i I(EI_i \geq k)}{ND} = \frac{q_{EI}}{N} \frac{\mu_{EI}^{q_{EI}}}{D} = H_{EI} A$$

3.3. Data

To calculate our index of economic insecurity, we use the EU-SILC dataset. This is a standardized source of income and socioeconomic data in the European

Union that allows for sound comparisons of EU countries' populations' well-being. It contains annual individual and household data on multiple variables, such as income, employment, education, material deprivation or health. We use the longitudinal version of the survey, which is a four-year rotating panel that has been conducted by Eurostat since 2004 and that follows individuals in a maximum of four waves. However, we must be aware that income variables are referred to the previous year of the interview, while demographic and socioeconomic information are related to the interview year.

In 2013, a new method for household income measurement was introduced in the Spanish version of the EU-SILC. It is well known that information related to income is difficult to obtain from individuals' surveys because people tend to under-declare it. In this context, administrative records of Social Security and tax databases are now combined with survey information to construct better-quality income variables. This methodological change does not seem to have significantly affected inequality and poverty indicators based on household income in Spain (Vega and Méndez, 2014), although mean household income increased significantly after the new system was introduced. For this reason, in this paper, we are only using a consistent income data series covering the period from 2008 to 2016, in which the new method is used. Moreover, we find that focusing on the crisis period and evaluating how the economic downturn and recovery is reflected in economic insecurity in our selected countries is of interest.

We decided to trim the data, eliminating the 1 percent tails of the household disposable income distribution (Cowell and Victoria-Feser, 2006), and to discard those individuals remaining in the survey only for a single wave due to the dynamic nature of certain dimensions. Our final data set includes 247,181 observations corresponding to individuals observed from two to four times during the 2008–2016 period. A total of 106,503 observations correspond to Spain (43.1 percent), 113,713 to France (46 percent) and 26,965 to Sweden (10.9 percent).

4. RESULTS

4.1. *Dimensions of economic insecurity*

Focusing on the entire period of analysis, on average, all insecurity dimensions are higher in Spain than in the other two countries, whereas Sweden presents the lowest values (see Table A4). We find that the incapacity to face unexpected expenses is above 30 percent of the population in Spain and France (37.9 percent and 31.6 percent, respectively), while in Sweden, this indicator does not reach 14 percent. The average gap of financial dissatisfaction is 0.11 in Spain (for the mean individual, household income should increase by an 11 percent to be satisfactory), and nearly 37 percent of the population declares needing more than its current income to make ends meet. The incidence of this phenomenon is approximately 28 percent in France and much lower in Sweden, where only 5.5 percent of the individuals are financially dissatisfied (although the average gap among those not satisfied with their income is higher than in France). The inability to go on a holiday indicator shows the same pattern: while 10 percent of Spaniards are affected by this dimension, only 6.4 percent and 2.7 percent of

individuals in France and Sweden experience a worsening in their capability of having one week away from home. Thus, from a subjective point of view, Spain is the most insecure country of the three we analyze.

Regarding our objective indicators of insecurity, a similar pattern holds. The mean income drop is higher in Spain (6.2 percent), followed by France (3.2 percent). In this case, differences in the mean income drop are mainly due to differences in the incidence of this indicator: the percentage of individuals who have experienced a large income fall in Spain (14.2 percent) is six percentage points higher than in France (8.1 percent) and more than double than in Sweden (6.5 percent), even though the mean income drop for those affected is around 40 percent in all countries. France and Spain show similar results with respect to the probability of extreme expenditure distress, the incidence being a bit lower in the latter, whereas in Sweden, this indicator is less frequent. Especially interesting are the results for the unemployment risk: in Spain, nearly 24 percent of the population has an above-average probability of unemployment, whereas the incidence of this dimension is 15.1 percent and 16.6 percent in France and Sweden, respectively. Clearly, the labor market crisis during the recession in Spain is directly reflected in this indicator.

All previous results belong to the mean of each dimension for the entire period of analysis, whereas dimensions may have various yearly averages depending on their correlations with the economic cycle (Figure 1). Spain was characterized by a negative Gross Domestic Product (GDP) growth from 2009 to 2013, recovering briefly from the recession in 2011 but suffering again from GDP falls for two more years. As a consequence, there was a huge increase in unemployment rates (rising almost 18 percentage points since the beginning of the crisis) along with a large increase in private debt as a result of the housing bubble. France and Sweden experienced negative GDP growth at the beginning of the recession but recovered positive rates shortly after (except for Sweden in 2012). This GDP growth was moderate in France (with a maximum rate of 2.2 percent), whereas there was more growth volatility in Sweden (with a maximum rate of 6 percent in 2010). Unemployment rates increased around two points in these two countries, and by 2016, they had not yet returned to their pre-crisis levels. The results of our insecurity dimensions seem to reflect the different impact of the Great Recession in these three countries.

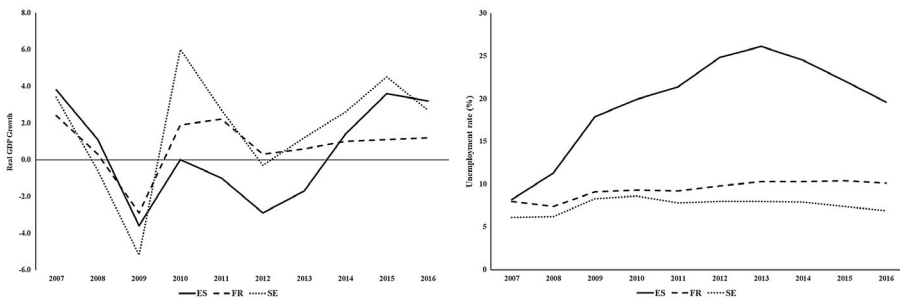


Figure 1. Real GDP growth rate and unemployment rate. 2007–2016.

Source: Eurostat database. Real GDP growth. Available at <https://ec.europa.eu/eurostat/web/products-datasets>.

Figure 2 displays the population averages of our insecurity dimensions by country and year for the 2009–2016 period. In general, the incapacity to face unexpected expenses raised during the first period of the crisis (except for 2010 in Sweden and 2011 in Spain), with a slight recovery in the last years. Financial dissatisfaction has been more stable in France and Sweden, whereas it has persistently grown in Spain from 2011 to 2015, with a slight decrease in 2016. The inability to go on a holiday indicator presents more volatility than others, and we must highlight its large increase in 2012 in Spain, precisely when GDP fell in a second recession period, as well as its improvement with economic recovery. In general, it seems that individuals' expectations are clearly influenced by economic activity. Income drops show more correlation with the economic cycle in Spain, where it is worth

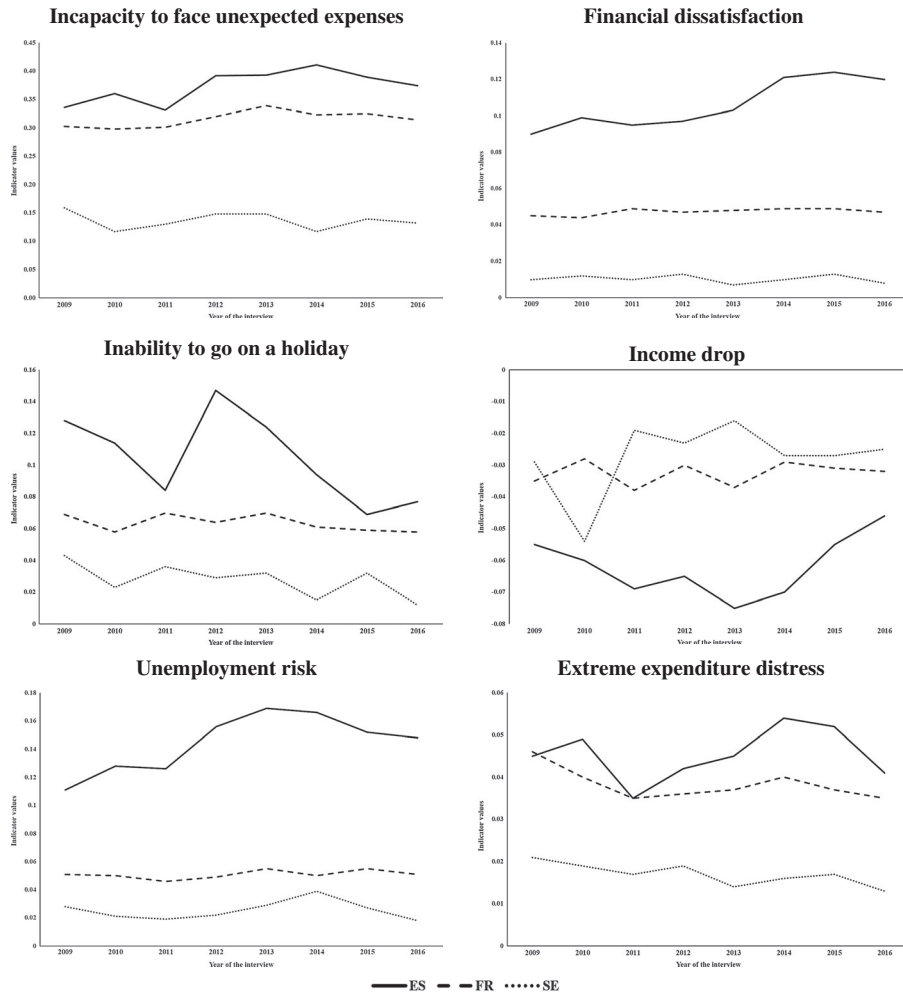


Figure 2. Evolution of economic insecurity dimensions. 2009–2016.
 Source: Author's calculations based on longitudinal EU-SILC data set.

noting the ‘W’ shape in this indicator, reflecting the large GDP drop in 2010.⁷ As it could be expected, unemployment risk rose notably in Spain in 2012 and 2013 due to the labor market crisis when unemployment rate reached 24.8 percent and 26.1 percent, respectively. However, this probability also increased in Sweden and France from 2010 to 2014, even though it showed a more stable trend in France. In contrast, the probability of extreme expenditure distress shows a slight downward trend in France and Sweden while in Spain it clearly reflected the economic cycle trend, falling after the first recovery of economic activity in 2011 and experiencing a large increase during the worst years of the recession up to 2014, when it reached its maximum. This may be strongly linked to the increase in unemployment risk and its concentration in some households so that when all active members become unemployed, the household has large difficulties in keeping up with previous consumption levels.

4.2. *Individual economic insecurity index*

Figure 3 displays the evolution of our individual economic insecurity index (EI_i). These results are in line with the idea that economic insecurity is related to the evolution of economic activity in each of the three countries analyzed. This correlation seems to be stronger in Spain, where insecurity reached its maximum in 2014 and has not yet returned its 2009 level. In this country, we can clearly distinguish various sub-periods in accordance to GDP growth: the increase of insecurity in 2010 is related to the large reduction of economic activity at the beginning of the Great Recession, followed by a slight recovery in 2011 (the EI_i decreases 9.9 percent). Then, the worsening of the Spanish labor market, the loss of unemployment benefits for long-term unemployed people (which may cause a rise in the income drops indicator) and the reduction of public spending (which could cause a deterioration of subjective dimensions) are reflected in a large increase in insecurity that lasted until 2014. Subsequently, the return to positive GDP growth rates improves security from 2015 onward. Thus, it appears that our economic insecurity index captures decreases in economic activity relatively quickly, but the subsequent rebound is reflected with a certain delay. This is probably because it takes more time to recover individuals’ confidence after an economic crisis than to lose it when a deep recession begins.

Conversely, economic insecurity in France shows a remarkably stable trend (Figure 3). Positive GDP growth rates in 2010 pushed insecurity downward (with a decrease of 7.5 percent from the previous year) while the recession led to a modest increase up to 2013. It seems that moderate GDP growth rates were not sufficient to mitigate insecurity during a period where unemployment rates were steadily rising. Once the recovery strengthens and unemployment stabilizes, insecurity decreases again. In contrast, in Sweden we find a general downward trend of individual economic insecurity in this period. The volatility of GDP growth is reflected on the Swedish economic insecurity index: there was a reduction of insecurity in

⁷In this case, a positive correlation exists, as the index is defined in negative terms: when the economic cycle experiences a decrease, income drops are larger.

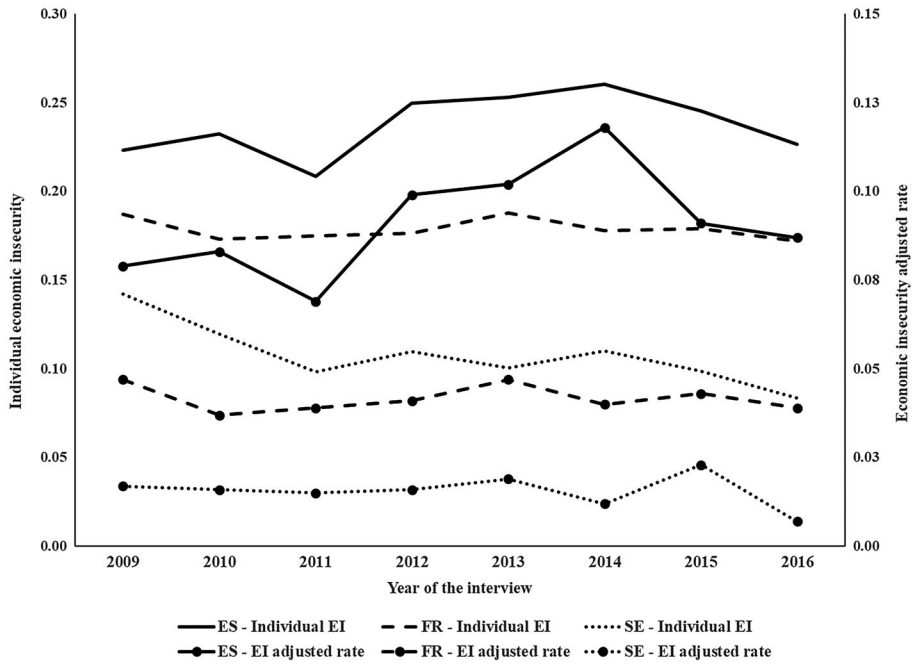


Figure 3. Evolution of the individual economic insecurity index (EI_i) and the economic insecurity adjusted rate (M_{EI}). 2009–2016.

Source: Author's calculations based on longitudinal EU-SILC data set.

2011, corresponding with a large and positive GDP growth rate, but this insecurity increased again due to the slowdown of economic activity that lasted until 2014.⁸

4.3. Aggregate indicators of economic insecurity

As we stated in the methodology section, the approach we follow has the key advantage of allowing us to study several indicators regarding the incidence and intensity of economic insecurity, as well as the contribution of our six dimensions to the overall insecurity adjusted rate. The incidence of economic insecurity (H_{EI}) is 14.3 percent in Spain, more than double the incidence in France (6.5 percent) and far from that in Sweden, where only 2.3 percent of the population suffer from this phenomenon (see Table A6). This pattern holds when looking at the economic insecurity adjusted rate (M_{EI}), which combines the information on the incidence and intensity of economic insecurity.⁹ Therefore, differences in M_{EI} among countries seem to stem from differences in the incidence of the phenomenon more than in its intensity, since all three countries present a normalized

⁸Note, however, that the economic insecurity indices for Sweden in 2012 and 2013 are not statistically different.

⁹We may recall that the economic insecurity adjusted rate is defined as the total weighted sum of insecure dimensions among economically insecure individuals divided by the maximum number of dimensions in the population.

intensity around 0.65 (which approximately corresponds to 4 dimensions out of 6).

For all the three countries, four indicators mainly drive our results on economic insecurity by participating 20 percent each in the insecurity adjusted rate: unemployment risk, extreme expenditure distress and two subjective indicators (the incapacity to face unexpected expenses and financial dissatisfaction, see Table A6). It is worth noting that the relative contribution of these dimensions is fairly consistent among countries: in general, the previous dimensions are the most frequent in each of the analyzed countries, even though the higher contribution to overall insecurity does not necessarily correspond with the higher intensity in the population, as we modulate the results by giving more weight to dimensions that are less frequent in the population. The inability to go on a holiday indicator and income drops are the two insecurity dimensions contributing the least to overall insecurity in all three countries. In Spain, however, income drops contribute slightly more to insecurity than in the other two countries, 14.2 percent in comparison with 13 percent (Sweden) and 10.6 percent (France), while changes in the ability to go on a holiday is relatively more important to determine insecurity in Sweden (12 percent) than in France (10.4 percent) or Spain (8.5 percent).

Interestingly, when we analyze the evolution of the previous indicators by year, we find that increases in incidence do not always correspond to increases in intensity (for instance, in Spain, the incidence of insecurity grew from 10.6 percent in 2011 to 15.2 percent in 2012, while the difference in intensity between these two years was not significant). Therefore, in all three countries, changes in economic insecurity incidence seem to be the main drivers of changes in M_{EI} , as normalized intensity is mostly stable in time (see Table A7).

Figure 3 displays the evolution of M_{EI} from 2009 to 2016, showing that the three countries present structural differences regarding overall insecurity. The M_{EI} displays a similar evolution to that of the individual index, even though the adjusted rate emphasizes differences between periods. Spain is the country with the highest level of insecurity whatever year we consider. However, insecurity trends in this country are linked to the economic cycle so they reached a maximum in 2014 and decreased with recovery even if not yet at pre-crisis levels. France, in turn, shows an intermediate insecurity level with a stable trend in time (the economic insecurity adjusted rate fluctuates between 0.06 and 0.07). Sweden registers very low levels of economic insecurity making it a very limited social problem. This country also shows a stable evolution of insecurity in time, with a slight increase since the beginning of the Great Recession and somewhat more variability in recent years. The Swedish economic insecurity adjusted rate dropped from 0.023 in 2014 to 0.007 in 2016 (with an incidence of 3.4 percent and 1.1 percent of individuals, respectively).

4.4. *Characterizing the risk of being economically insecure*

The main purpose of this analysis is to establish a profile of insecure individuals to determine where and how policy makers should focus public action, characterizing those individuals with a higher risk of insecurity and checking whether these characteristics differ for those individuals in different socio-economic positions.

Figure 4 presents the incidence of economic insecurity by individual income decile.¹⁰ As it could be expected, insecurity decreases as the level of income grows in all three countries. Spain has the highest incidence in the first decile (55.2 percent), followed by France, where 28.3 percent of the population in the first income group is insecure, and Sweden with only 16 percent. However, in Spain and France, economic insecurity affects a significant group of individuals who are not placed in the first two deciles but in upper-low or middle-low deciles of the income distribution. In Spain, we can clearly distinguish one group of individuals who have relatively high values of economic insecurity (situated in the three first deciles), many individuals who still suffer from moderated levels of insecurity located in the fourth, fifth and sixth deciles, and another group of individuals whose levels of insecurity are almost inexistent (from the seventh decile onward). On the other hand, France shows significant levels of this phenomenon until the fourth decile. This result suggests that, even though economic insecurity is positively correlated with poverty, it may not be enough to focus on a poverty analysis when aiming to study individual lack of well-being. In Spain, 31.2 percent of insecure individuals would not be classified as poor and more than half of the individuals below the poverty line, 54.2 percent, are found not to be economically insecure.¹¹ Consistently with our results, insecurity in Sweden appears to be more correlated with poverty than in Spain and France (70 percent of insecure individuals are also poor).

In this context, taking advantage of the M_{EI} decomposability property, we can also check which dimensions are more important to individual insecurity depending on the individual's position on the income distribution (see Figure A2). Focusing our attention on the incapacity to face unexpected expenses, we find that its contribution to overall insecurity is rather constant by income decile. A similar result is obtained for the contribution of unemployment risk, suggesting that its participation in economic insecurity is more equally distributed in the population. In contrast, the contributions to the economic insecurity adjusted rate of either financial dissatisfaction or extreme expenditure distress decrease as we move from lowest to highest income deciles. These results reveal that the incapacity to face unexpected expenses and unemployment risk capture difficulties in facing expenditure emergencies, which can be understood as transitory distress regarding the position in the income distribution. Financial dissatisfaction and expenditure distress capture difficulties in covering basic needs, which is more a structural problem that mainly affects those individuals living in households with low incomes. As we could expect, changes in the ability to go on a holiday are more relevant for middle-income deciles than for lower ones, probably because individuals situated in the first deciles cannot afford a week away from home in any period and do not experience changes in this indicator. In contrast to what we find for other dimensions,

¹⁰Income deciles are calculated based on a measure of permanent income. Due to the limits imposed by data attrition in our dataset, we have proxied this permanent income with the average between current income and that in the prior year (t and $t - 1$). As a robustness check, we present results based on annual income in the Appendix (Figure B5).

¹¹We consider poor those individuals whose household equivalent disposable income (calculated with the Organisation for Economic Co-operation and Development modified scale) is below 60 percent of their country's median equivalent household disposable income, using the usual EU definition of individuals at risk of poverty.

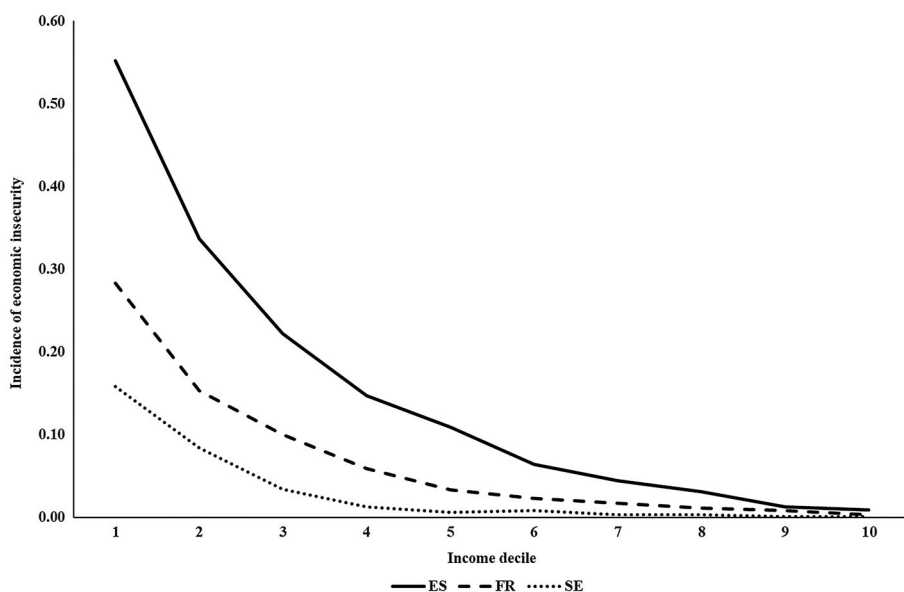


Figure 4. Incidence (H_{EI}) of economic insecurity by income decile.
 Source: Author's calculations based on longitudinal EU-SILC data set.

there seems to be no clear pattern of the contribution of income drops to economic insecurity by income decile. In Sweden, this dimension is more relevant for individuals situated in the lowest deciles, while in Spain and France, the contribution is slightly higher for individuals situated in middle-income deciles.

We are also interested in studying the relationship between insecurity and several sociodemographic individual characteristics, as well as possible differences in this relationship between countries. Table 2 displays the average marginal effects of the probability of being economically insecure. We find that insecurity is higher for individuals between 26 and 35 years of age in all countries. Individuals below 26 (as children and students) could be generally more secure due to financial dependence on other older household members while those over 35 could be more secure both due to a more stable labor status and an increasing probability of accessing life-time savings. Nevertheless, age is not significantly correlated with the incidence of insecurity in Sweden (except for those older than 60). In general, we believe that the fact that individual characteristics are less predictive in Sweden than in the other two countries could be suggesting a higher protection against insecurity provided by its welfare system.¹²

For all countries, having a tertiary education shows a large negative correlation with being insecure than when the individual only reaches a secondary education level. Regarding household composition, we find that an additional member in the household is negatively related to the likelihood of being insecure, whereas an additional child shows a small and positive interaction in Spain and Sweden.

¹²Nevertheless, interpreting these results in terms of the impact of welfare systems on individual economic insecurity levels would need a significantly deeper analysis.

TABLE 2
DETERMINANTS OF INCIDENCE OF ECONOMIC INSECURITY (H_{EI}) BY COUNTRY. AVERAGE MARGINAL EFFECTS

	ES	FR	SE
Male	0.002 (0.002)	-0.001 (0.002)	-0.002 (0.002)
Age			
<16	-0.018*** (0.004)	-0.012*** (0.003)	-0.004 (0.004)
16–25	-0.012** (0.005)	-0.009** (0.004)	-0.003 (0.004)
36–45	-0.007* (0.004)	-0.015*** (0.003)	-0.003 (0.004)
46–60	-0.029*** (0.004)	-0.017*** (0.003)	0.007* (0.004)
>60	-0.024*** (0.006)	-0.019*** (0.005)	-0.010** (0.005)
Level of education			
Secondary	-0.008** (0.003)	-0.015*** (0.004)	-0.025** (0.012)
Tertiary	-0.042*** (0.004)	-0.026*** (0.003)	-0.027*** (0.010)
HH disposable income (ln)	-0.178*** (0.002)	-0.152*** (0.003)	-0.064*** (0.004)
Basic activity status			
Inactive	-0.031*** (0.004)	-0.005 (0.003)	-0.000 (0.005)
Unemployed	0.099*** (0.005)	0.053*** (0.006)	0.028*** (0.009)
Marital status			
Married	-0.006* (0.003)	-0.013*** (0.002)	-0.007*** (0.002)
HH composition			
Number of members	-0.009*** (0.001)	-0.003*** (0.001)	-0.009*** (0.002)
Number of children	0.003* (0.002)	-0.000 (0.001)	0.005** (0.002)
Health			
Bad health	0.025*** (0.006)	0.027*** (0.005)	0.031*** (0.010)
Status in employment			
Never worked	0.031*** (0.006)	0.007 (0.005)	0.006 (0.007)
Temporary employee or without contract	0.092*** (0.004)	0.090*** (0.004)	0.019*** (0.004)
Employer	-0.047*** (0.006)	-0.028*** (0.010)	-0.005 (0.008)
Independent worker	-0.019*** (0.004)	-0.007* (0.004)	-0.000 (0.006)
Observations	100126	92457	20601

Notes: (1) We present average marginal effects for probit estimations in which the dependent variable takes the value 1 if the individual is economically insecure and 0 otherwise, computed by the counting approach method with an intermediate threshold. (2) ES = Spain, FR = France and SE = Sweden. (3) Standard errors are clustered by individual. (4) References of categorical variables are the following: between 26 and 35 years (age), primary (education), working (basic labor status), not married (marital status), good health (bad health) and permanent employee (employment status). (5) Average marginal effects for discrete variables are the discrete change from the base level. (6) For continuous variables, average marginal effects are calculated using the mean of continuous variables.

Source: Author's calculations from longitudinal EU-SILC data set.

TABLE 3
DETERMINANTS OF INCIDENCE OF ECONOMIC INSECURITY (H_{EI}) BY INCOME GROUPS. AVERAGE MARGINAL EFFECTS

	Total	Low income	Middle income	High income
Male	-0.001 (0.002)	-0.005 (0.005)	0.003 (0.002)	0.000 (0.001)
Age				
<16	-0.012*** (0.002)	-0.043*** (0.008)	-0.004 (0.004)	-0.001 (0.002)
16–25	-0.012*** (0.003)	-0.030*** (0.009)	-0.012*** (0.004)	0.000 (0.002)
36–45	-0.013*** (0.002)	-0.039*** (0.008)	-0.011*** (0.003)	-0.001 (0.002)
46–60	-0.019*** (0.002)	-0.053*** (0.008)	-0.017*** (0.003)	-0.002* (0.001)
>60	-0.020*** (0.003)	-0.078*** (0.010)	-0.017*** (0.004)	-0.001 (0.002)
Level of education				
Secondary	-0.012*** (0.003)	-0.030*** (0.008)	-0.015*** (0.004)	-0.002 (0.002)
Tertiary	-0.029*** (0.003)	-0.071*** (0.008)	-0.027*** (0.003)	-0.007*** (0.002)
HH disposable income (ln)	-0.143*** (0.002)	-0.320*** (0.006)	-0.189*** (0.006)	-0.048*** (0.002)
Basic activity status				
Inactive	-0.012*** (0.003)	-0.040*** (0.008)	-0.012*** (0.004)	0.001 (0.002)
Unemployed	0.069*** (0.004)	0.123*** (0.009)	0.071*** (0.008)	0.040*** (0.005)
Marital status				
Married	-0.012*** (0.002)	-0.029*** (0.005)	-0.009*** (0.002)	-0.002* (0.001)
HH composition				
Number of members	-0.005*** (0.001)	-0.010*** (0.002)	-0.006*** (0.001)	-0.001 (0.001)
Number of children	0.002* (0.001)	0.007** (0.003)	0.000 (0.002)	-0.001 (0.001)
Health				
Bad health	0.029*** (0.004)	0.065*** (0.012)	0.028*** (0.007)	0.007** (0.003)
Status in employment				
Never worked	0.021*** (0.004)	0.050*** (0.011)	0.031*** (0.007)	0.000 (0.002)
Temporary employee or without contract	0.091*** (0.003)	0.196*** (0.008)	0.083*** (0.006)	0.027*** (0.004)
Employer	-0.028*** (0.004)	-0.083*** (0.012)	-0.028*** (0.004)	-0.001 (0.004)
Independent worker	-0.006** (0.003)	-0.032*** (0.009)	-0.005 (0.005)	0.005* (0.003)
Observations	213184	55887	66429	90868

Notes: (1) We present average marginal effects for probit estimations in which the dependent variable takes the value 1 if the individual is economically insecure and 0 otherwise, computed by the counting approach method with an intermediate threshold. (2) Low-income includes individuals situated in deciles one to three, middle-income refers to deciles four to six and high-income contains individuals located in deciles seven to ten. (3) Standard errors are clustered by individual. (4) References of categorical variables are the following: between 26 and 35 years (age), primary (education), working (basic labor status), not married (marital status), good health (bad health) and permanent employee (employment status). (5) We control for regional differences by including country dummies. (6) Average marginal effects for discrete variables are the discrete change from the base level. (7) For continuous variables, average marginal effects are calculated using the mean of continuous variables.

Source: Author's calculations from longitudinal EU-SILC data set.

Clearly, larger households have a greater ability to pool insecurity risk, so an additional adult in the household contributes to increasing disposable income, while children, on the contrary, increase household needs. As we would have expected, being currently unemployed implies a positive correlation (9.9 pp in Spain, 5.3 pp in France and 2.8 pp in Sweden) with respect to those who are employed, regardless of the country analyzed. Furthermore, employees with temporary contracts also show a higher positive correlation with insecurity, reflecting the anxiety stemming from the instability of temporary contracts or unregulated jobs and the anticipation of losses due to the termination of work.

It is also worthwhile to investigate if the previous socioeconomic characteristics are diversely related to the probability of being insecure, depending on the individuals' position in the income distribution (Table 3). We divide individuals into three groups: low-income (those situated below the fourth decile), middle-income (individuals positioned from the fourth to the sixth decile) and high-income (from the seventh decile onward). Results show that the higher probability of being insecure of individuals between 26 and 35 years of age mainly arises from individuals located in the lowest deciles and the previous negative correlation of age with insecurity is only significant for those above 35 that are placed in the middle-income group. Moreover, age has no significant correlation with economic insecurity for high-income individuals. Education level is negatively related to insecurity, with a higher relevance of tertiary rather than secondary education and for those located in the lowest tail of income distribution. As expected, household disposable income shows a negative correlation with insecurity, and this relationship is larger for low-income individuals, followed by the middle-income group. Regarding labor market variables, the positive relationship between unemployment and insecurity is larger for individuals situated below the fourth decile (12.3 pp), even though it is also significant for middle- (7.1 pp) and high-income (4 pp) groups. In the first two groups, employees without a contract, temporary employees and individuals who have never worked have a larger positive correlation with insecurity than those with a permanent contract. In contrast, only temporary employment increases insecurity for high-income individuals.

5. CONCLUSIONS

This paper proposes the use of a counting approach to study economic insecurity and analyze its nature and evolution from 2009 to 2016 in three developed countries. This procedure allows researchers to characterize insecure individuals along the entire income distribution. Our empirical analysis makes a sound proposal for an advantageous method to measure economic insecurity using the EU-SILC data set, which may allow for further empirical analyses of this phenomenon in the European context. We calculate a multidimensional individual index of economic insecurity, capturing subjective and objective dimensions, and we follow a mixed strategy between a retrospective and a forward-looking approach. In particular, we measure the incapacity to face unexpected financial expenses, financial dissatisfaction and changes in the ability to go on a holiday as proxies for self-assessed insecurity, in addition to large income drops, unemployment risk and extreme expenditure distress probability as objective indicators.

Although we base our analysis on Rohde *et al.*'s (2015) proposal on dimensions, we introduce new definitions for some of these, such as the comparison between necessary and current household income to measure financial dissatisfaction or the introduction of a household perspective regarding the probability of unemployment. In addition, we consider the use of new indicators, such as the ability to go on a holiday. Especially relevant in our proposal is the use of the counting approach with a dual cut-off strategy as a method of interest in insecurity analysis. This approach shows a variety of advantages: it is less sensitive to the presence of outliers, it highlights differences in time or by income decile and it allows us to analyze incidence and intensity through the economic insecurity adjusted rate and its decomposition by dimensions or subpopulations. Our work provides an empirical example of the use of a counting approach in the insecurity context, suggesting that its further development in this field may have significant advantages. Furthermore, our empirical results may help policy makers target insecure social groups and design social policies that aim to reduce the increasingly high levels of economic insecurity in some developed countries.

The approach we follow enables us to use aggregate indicators to analyze the level and intensity of economic insecurity in a society. Using this method, we undertake an empirical illustration in three European countries. On average, economic insecurity affects 14.3 percent of the population in Spain and 6.5 percent in France, whereas Sweden is the most secure country with an incidence of around 2.3 percent, showing that the three countries present structural differences regarding overall insecurity. Nevertheless, the evolution of economic insecurity between 2009 and 2016 reveals a negative correlation with the economic cycle particularly in Spain. In sum, even if economic insecurity is related to countries' socioeconomic status, its level differs from that of other well-being indicators because it is capturing the dynamics of a variety of economic hazards that may affect individuals in a mixed way. In fact, our index includes subjective indicators that proxy individuals' expectations about their financial situation that could be rather different from any other objective well-being measure. By identifying the groups that have been most affected by the increase in economic insecurity in recent years, this paper contributes to the measurement of economic insecurity as another relevant dimension of well-being in the European context, where previous analyses of this kind are scarce.

We find that there is a significant proportion of middle-income individuals that suffer from insecurity in some countries (economic insecurity is relevant up to the sixth decile in Spain and the fourth decile in France), proving that our index is capturing a different well-being concept to that of poverty. Moreover, the relevance of our six insecurity dimensions is different by income decile. While the contributions to economic insecurity of dimensions such as the incapacity to face unexpected expenses and unemployment risk are similar for any income decile, financial dissatisfaction and the probability of extreme expenditure distress mainly drive insecurity in the lower tail of the distribution. In contrast, changes in the ability to go on a holiday is a more important dimension for individuals in middle-income deciles. In addition, disposable household income, unemployment and the quality of the job are the most correlated variables with the probability of being economically insecure. These correlations seem to be larger for individuals located in the lowest tail of the income distribution.

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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

Table A.1: Correlation between insecurity dimensions by country

Table A.2: Unemployment risk. Probit model

Table A.3: Extreme expenditure distress. Ordered probit model

Table A.4: Descriptive statistics—dimensions of economic insecurity

Table A.5: Descriptive statistics—individual economic insecurity index (EI_i)

Table A.6: Aggregate economic insecurity indicators and decomposition by dimensions

Table A.7: Aggregate economic insecurity indicators by year (intermediate approach)

Table A.8: Descriptive statistics—Determinants of incidence of economic insecurity by country

Table A.9: Descriptive statistics—Determinants of incidence of economic insecurity by income group

Figure A.1: IEWB Economic Security Index. 1980–2014

Figure A.2: Contribution of dimensions to the economic insecurity adjusted rate (M_{EI}) by income decile

Appendix B

Table B.1: Aggregate economic insecurity indicators (union and intersection approaches)

Table B.2: Aggregate economic insecurity indicators (equal weighting of dimensions)

Table B.3: Aggregate economic insecurity indicators (excluding changes in the ability to go on a holiday)

Table B.4: Incidence of economic insecurity by income decile

Figure B.1: Evolution of the economic insecurity adjusted rate (equal weighting of dimensions). 2009–2016

Figure B.2: Evolution of the economic insecurity adjusted rate (excluding changes in the ability to go on a holiday). 2009–2016

Figure B.3: Incidence of economic insecurity by income decile (equal weighting of dimensions)

Figure B.4: Incidence of economic insecurity by income decile (excluding changes in the ability to go on a holiday)

Figure B.5: Incidence of economic insecurity by income decile (based on annual income)