

## A multidimensional operationalization of precarious employment with a counting approach: Evidence from Spain\*

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### Abstract

The article proposes a novel multidimensional operationalization of precarious employment using the Alkire-Foster dual threshold counting approach methodology. The proposal is made in a context in which, although precarious employment tends to be considered a multidimensional construct characterized by an accumulation of unfavorable features of employment quality, there is neither a standard and generally accepted definition nor operationalization of the phenomenon in the literature. The proposed methodology has the advantages that it can be easily applied to the usual content of most labor surveys and that it allows an analysis of both the scale and the nature of precariousness. The illustrative evidence obtained for Spain reveals both a high incidence of multidimensional precariousness (affecting almost 40% of wage earners) and a high intensity (multidimensional precarious wage earners suffer from around 3 job deprivations). Moreover, it shows that employment precariousness is highly persistent over time and tends to grow over time and that there is great heterogeneity in the scope of the phenomenon according to its individual incidence and among different groups of workers.

**Keywords:** labour precariousness; quality of employment; multidimensional indices; Spain.

**JEL Codes:** J20, J21, J28, J80.

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\* This research has been funded by the grants PID2020-114896RB-I00 (Agencia Estatal de Investigación, AEI/10.13039/501100011033; Spanish State Plan for Scientific and Technical Research and Innovation 2017-2020) and AICO/2021/062 (Generalitat Valenciana, Department of Innovation, Universities, Science and Digital Society, R&D&I Programme of the Comunidad Valenciana).

# **A multidimensional operationalization of precarious employment with a counting approach: Evidence from Spain**

## **1. Introduction**

This article proposes a novel multidimensional operationalization of precarious employment using the Alkire and Foster (2011) dual threshold counting approach methodology. This methodology was originally designed for the identification and measurement of poverty through multidimensional states of deprivation, and has been extensively used for the empirical analysis of poverty (e.g. Alkire and Santos, 2014 and Prieto et al., 2016 for the case of Spain), including the recent elaboration of the Multidimensional Poverty Index by the United Nations (UNDP, 2019). Yet, given its flexibility and other desirable characteristics, it has also been subsequently employed to examine multidimensional phenomena in other fields of research such as energy poverty (Aristondo and Onaindia, 2018; Nusbaummer et al, 2012; Sadath y Acharya, 2017), quality of employment (Sehnbruch et al., 2020), multidimensional affluence (Peichl and Pestel, 2013), economic insecurity (Romaguera, 2020; Cantó et al., 2020), or housing poverty (Ulman and Cwiek, 2020).

Precarious employment is one of the most relevant issues in analyses of labour markets and labour policy (International Labour Organization, 2011), *inter alia* because it may generate a deterioration in health (Benach et al., 2014) and it particularly affects vulnerable groups of workers, such as young people, women or immigrants (Fudge and Owens, 2006; Bhalla and McCormick, 2009; Porthé et al., 2010). Moreover, it is a phenomenon that is on the rise in last decades in advanced economies (Kalleberg, 2018 and Livanos and Papadopoulos, 2019). Yet, paradoxically, despite both the interest it has received from the literature and major economic institutions and different attempts to propose a common definition related to a sound measurement methodology, there is currently no generally consensus on how to measure and examine the phenomenon (Olshtoorn, 2014 and Kretsos and Livanos, 2016), which makes it difficult to design appropriate economic policy measures to help to reduce it and to promote the creation of quality jobs (OECD, 2015a). In any case, there are some common points that can be found in previous studies related to the phenomenon, including to consider labour precariousness as a complex multifaceted phenomenon to be approached from a multidimensional perspective, instead of with single indicators (e.g. Olsthoorn, 2014 and Kretsos and Livanos, 2016), and to examine it through job attributes associated with the ‘atypicality’ and, especially, poor quality of jobs, instead of attributes related solely to job instability or insecurity (Rodgers and Rodgers, 1989; Kalleberg, 2009; Fullerton et al., 2011; Vosko, 2006). In this vein, it is noteworthy that, after a recent systematic review of previous studies on precarious employment in different research disciplines, Kreshpaj et al. (2020) consider that at present precarious employment tends to be considered a multidimensional construct characterized by an accumulation of unfavorable features of employment quality.

The proposal of multidimensional operationalization of precarious employment in the article is made, hence, in a context in which although there is not consensus in the literature neither on the definition nor on operationalization of the phenomenon,<sup>1</sup> precarious employment tends to be considered a multidimensional phenomenon characterized by an accumulation of job deficiencies associated at job-quality employment.<sup>2</sup> For this reason, the dual threshold counting approach Alkire-Foster technique is particularly appropriate for operationalizing and examining labour precariousness, as it fits to the multidimensional nature of this phenomenon characterized by the simultaneous presence of different undesirable job attributes which can be identified in different job dimensions.

The use of composite indicators for the analysis of different phenomena has increased recently in a significant manner helped, among other circumstances, by their widespread adoption by global institutions such as the United Nations, the World Bank or the OECD (see Greco et al., 2019 and Kuc-Czarnecka et al., 2020 for more details). Although these indicators are not free from criticism, due essentially to the discretionary decision-making in the sequence of steps inherent in their construction, they also present important advantages, including its ability to simplify complex phenomena and make them accessible to the public, the media and policymakers (Saltelli, 2007; Greco et al., 2019). Yet, while the use of composite indicators has been increasing in almost all areas of research, their use has been traditionally comparatively less significant in the area of labour market and labour analysis (Greco et al., 2019 and Kuc-Czarnecka et al., 2020). In order to help fill this gap, this article proposes to operationalize labour precariousness by constructing via the Alkire-Foster methodology multidimensional indices based on various dimensions and indicators potentially related to low-quality employment. In this vein, although some precedents related to the calculation of multidimensional indices from the perspective of multidimensional states of deprivation by Alkire and Foster (2011) can be found in the labour literature, they are very scarce. Hence, García-Pérez et al. (2017) proposed the construction of multidimensional indices of labour precariousness with this technique, but considering only a reduced set of 3 job attributes not grouped into dimensions, which prevents the identification of particularly problematic labour areas or dimensions where to focus policy actions.

In order to, *inter alia*, overcome these limitations, this article proposes the operationalization of employment precariousness through the elaboration of global multidimensional indices of precariousness based on a broad set of 6 individual indicators of jobs which are grouped into 3 dimensions. These dimensions encompass different monetary and non-monetary elements of jobs, and show a remarkable coincidence with both the basic dimensions of employment precariousness identified by Kreshpaj et al. (2020) in their review on the literature on employment precariousness with a thematic-analysis and the most relevant areas for measuring the quality of employment according to the current OECD Job Quality approach (OECD, 2014 and 2018). Our proposal bears some similarity to Sehnbruch et al. (2020), which examines the characteristics of employment in a number of Latin American economies using the Alkire-Foster technique. However, the purpose of this latter study is not to measure labour precariousness but to produce an index of job quality and the labour indicators used for this purpose, such as the formality of employment, are particularly appropriate only for emerging economies, where this phenomenon is highly extended.

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<sup>1</sup> An excellent review of the literature related to the conceptualisation of precarious work (and precarity, as a broader condition) and can be found in Posch et al. (2020).

<sup>2</sup> The type of job deficiencies considered in previous studies is very diverse so that, for example, Kreshpaj et al. (2020) identify in their literature review with a thematic-analysis on quantitative and qualitative studies on employment precariousness in different research disciplines 145 sub-themes grouped into 9 themes that can be grouped, in turn, into 5 basic dimensions of precariousness.

One major advantage of the proposed operationalization is that it allows an analysis of both the scale and the nature of precariousness. Hence, the potential usefulness of the obtained evidence with the consequent examination of labour precariousness is twofold from an economic policy perspective. On one hand, it allows for an overall quantification of the incidence, intensity and extent of labour precariousness in the whole population, providing therefore useful information on the scale of the phenomenon. On the other hand, as regards its nature, it provides evidence on the socioeconomic groups and job dimensions most related to precariousness and, consequently, could facilitate the design of specific labour policy actions focused on particularly vulnerable groups and on particularly problematic dimensions of jobs. Moreover, the multidimensional approach to labour precariousness is flexible and can be potentially adapted to any specific labour market through the choice of the individual job indicators and their relative weights. This is particularly relevant since the perception of what constitutes precarious employment can vary significantly between countries (Fullerton et al., 2011). In the same vein, it must be noted that the multidimensional indices of labour precariousness can be easily calculated from the information on objective job indicators usually available in many existing labour surveys.

For illustrative purposes, the multidimensional labour precariousness indices are calculated for Spain on the basis of microdata from the main source of labour information for this country, the *Labour Force Survey*. Spain is a very interesting case of analysis, insofar as it has a dysfunctional labour market, with a very high incidence of precariousness from an international comparative perspective according to simple indicators such as the proportion of temporary jobs (Kretsos and Livanos, 2016). Moreover, a plausible reduction in the quality of employment in Spain followed both the Great Recession and the approval in 2012 of major regulatory changes that increased significantly labour flexibility (OECD, 2013), so that involuntary part-time and low-wage employment have added to more traditional problems of low-job quality, such as the high temporality and overqualification (for more details see Malo, 2015, OECD, 2015b and 2018b, and International Monetary Fund, 2018).

The structure of the article is as follows. After this introduction, the second and third sections develop the methodological proposal for the calculation of the multidimensional labour precariousness indices and describe the data used in the empirical analysis. The fourth section presents the results obtained in the illustrative analysis of labour precariousness in Spain. The final section of the article presents the main conclusions.

## **2. Methodology**

This section describes the proposed operationalization of employment precariousness through the elaboration of the multidimensional labour precariousness indices based on the identification of employment deficiencies, within the framework of the application of the dual cut-off methodology proposed by Alkire and Foster (2011). In short, the starting point in the application of this methodology is the selection of the individual job indicators potentially associated with labour precariousness and the conditions to identify a deficiency in each of them. Subsequently, for each employee the total number of deficiencies weighted according to the relative weights set for each individual indicator is calculated, so that the comparison of the number of weighted deficiencies with a reference threshold determines whether or not the employee is multidimensionally precarious. Individual information is then aggregated into global measures of precariousness that approximate the incidence of precarious employment (i.e. how many employees are affected), its intensity (the number of

deficiencies that precarious jobs exhibit on average) and the Multidimensional Labour Precariousness Index, which incorporates both incidence and intensity into a single measure.

### 2.1. Identification of multidimensional precariousness in individual jobs

The elaboration of indices to identify whether each job is in a situation of multidimensional labour precariousness requires first selecting the labour indicators potentially associated with precariousness, as well as the variables that allow them to be measured. A specific threshold must also be set for each indicator, below which a job is considered to have a deficiency. Thus, if  $X_{ij}$  is the observation of job  $i$  in indicator  $j$  (with  $i = 1, \dots, N$  and  $j = 1, \dots, D$ ) and  $Z_j$  is the threshold established for the indicator, then job  $i$  presents a deficiency in indicator  $j$  if  $X_{ij} < Z_j$ . In the case of qualitative dichotomous variables, a job exhibits deficiencies in the individual indicator if it fulfils a certain condition.

The next step is to assign the corresponding weights to job indicators and to calculate the indicator  $P$  (*adjusted weighted precarity count*) which synthesizes the total proportion of (weighted) deficiencies of the job  $i$  as:

$$P_i = \sum_{j=1}^D w_j I_{ij} / D \quad \text{for } i = 1 \dots N \quad (1)$$

Where  $I_{ij} = I_{\{X_{ij} < Z_j\}}$  is an indicator function that takes the value 1 if the condition between the keys is true and 0 in all other cases;  $w_j$  is the weight assigned to each indicator and  $N$  is the total number of jobs. Weights  $w_j$  are standardized so that their sum is equal to the total number of indicators  $D$  and the indicator  $P_i$  is standardized, so it takes values between 0 and 1 (value 0 corresponds to jobs without any deficiency and 1 to jobs with deficiencies in all the individual indicators).

In the context of a dual cut-off method, the identification of multidimensionally precarious jobs also requires setting an alternative threshold,  $k$ , so that a job  $i$  is considered to be multidimensionally precarious if  $P_i \geq k$ . Different multidimensional thresholds can be used in practice, in a range between the extreme criteria of considering that a job is precarious if it exhibits a deficiency in a single (weighted) indicator ( $k \geq \min \{w_1, \dots, w_D\} / D$ ; union approach) or, alternatively, in all of them ( $k=1$ ; intersection approach).

### 2.2. Global measures of multidimensional labour precariousness

From an aggregate perspective, the incidence of precariousness on all employees can be measured by the multidimensional precariousness rate,  $H$ :

$$H = \frac{\sum_{i=1}^N I_i}{N} \quad (2)$$

Where  $I_i = I_{\{P_i \geq k\}}$  is an indicator function that takes value 1 if the individual job  $i$  is considered multidimensionally precarious (i.e., if  $P_i \geq k$  is fulfilled). Consequently,  $H$  measures the proportion of all employees which are precarious from a multidimensional perspective.

The intensity of precariousness is measured, in turn, by the ratio of the average number of deficiencies of multidimensionally precarious jobs to the maximum number of potential shortcomings,  $A$ :

$$A = \frac{\sum_{i=1}^N I_i P_i}{\sum_{i=1}^N I_i} \quad (3)$$

The Multidimensional Labour Precariousness Index (from now on MLPI) is calculated by combining both the incidence and the intensity of precariousness, resulting in the product of both. This indicator is equivalent to the *adjusted multidimensional rate* ( $M_0$ ) in Alkire-Foster's methodology and is defined as the total sum of the proportion of deficiencies of multidimensionally precarious jobs divided by the total number of jobs,  $N$ . Consequently, the MLPI is the product of  $H$  times  $A$ :

$$MLPI = \frac{\sum_{i=1}^N I_i P_i}{N} = HA \quad (4)$$

The MLPI provides the relationship between the total number of deficiencies in multidimensionally precarious jobs and the maximum number of deficiencies that could hypothetically exist if all jobs had all the deficiencies simultaneously. The MLPI takes values between 0 and 1, with 0 corresponding to a situation without any multidimensionally precarious job and 1 to an extreme case where all jobs in the economy are precarious and present all potential deficiencies.

A salient feature of the MLPI is that it is decomposable both by population subgroups and by indicators, which ultimately facilitates the examination of the causes of overall labor precariousness. This is so because in the first case the MLPI is the average (weighted by its relative share) of the MLPI of the population subgroups, while in the case of the indicators it is the weighted average of the proportion of employees who are precarious and have a deficiency in each indicator (see Alkire and Foster, 2011 for details).

### 2.3. Dimensions, indicators, and thresholds

The global indices for examining multidimensional precariousness in Spain are divided into 3 alternative dimensions (related to labour income, employment stability, and other working conditions), which are composed of 6 indicators which encompass different monetary and non-monetary elements of jobs (Table 1). These 3 dimensions show a remarkable coincidence with the basic dimensions of employment precariousness identified by Kreshpaj et al. (2020) in their review on the literature on employment precariousness with a thematic-analysis. Moreover, they roughly coincide with the most relevant areas for measuring the quality of employment according to the current OECD Job Quality approach (OECD, 2014 and 2018).

The first dimension considered in the MLPI is therefore related to labour income and is made up of two indicators. The first identifies a deficiency when the gross monthly income of the main job is lower than 1,000 euros, while the second does so when the hourly wage is lower than 60% of the median wage of the economy. The consideration of two alternative labour income indicators is in line, for example, with the OECD approach that gives relevance to this issue both in absolute and relative terms (OECD, 2014 and 2018). The second dimension is related to employment stability/contractual situation and is also made up of 2 indicators. The first identifies a deficiency when the worker's contract is fixed-term,<sup>3</sup> and the second identifies it when the worker works part-time involuntarily because of the impossibility to find a full-time job. Finally, the third dimension corresponds to other employment conditions and is also made up of 2 indicators that measure, respectively, whether the worker is overqualified (this situation is identified by means of a statistical

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<sup>3</sup> Although a fixed-term contract may be associated with employees' voluntary search for flexibility or not be considered a problematic element by individuals that frequently change careers, it is important to note that in the specific case of Spain temporary contracts are very mostly involuntary (more than 90% according to Eurostat, 2014) and present comparatively very low conversion rates to indefinite contracts (International Monetary Fund, 2020). We thank an anonymous reviewer for his/her comments on this issue.

approximation, corresponding to those individuals with higher level of studies than the most frequent level in their occupation) and if the working day is excessive or atypical (either because the individual usually works more hours than those agreed in the individual contract or collective agreement, or because he/she habitually works at night, at weekends, or on shifts). The choice of these 6 specific indicators is justified by the abundant evidence showing that they are generally clearly associated with greater unpredictability in the length of employment and/or worse employment conditions. See, for example, Fudge (2009) and Barbier (2004) for low-wage employment; Guadalupe (2003) and Comi and Grasenì (2012) for fixed-term employment; Hirsch (2005) and Fernández-Kranz et al. (2015) for part-time work; Allen and van der Velden (2001) and McGuinness (2006) for overqualification; and Muñoz de Bustillo et al. (2011), OECD (2015c) and Bartoll and Ramos (2020) for excessive or atypical working hours.<sup>4</sup>

In the elaboration of the Multidimensional Employment Precariousness Index, the same relative weights ( $w_i$ ) are assigned to the 6 indicators of job attributes (1/6) and, by extension, to the 3 dimensions into which they are grouped (1/3). Although there is no consensus in the literature when it comes to set these relative weights, the use of the same weights for each indicator is by far the most common approach in the construction of composite indicators (OCDE, 2008; Bandura, 2008). Even if it can be considered arbitrary, it is justified both by its simplicity and by the absence of alternative criteria without shortfalls (Decancq and Lugo, 2013; Greco et al., 2019). On the other hand, in order to classify a job as multidimensionally precarious, a threshold equivalent to 33% of the individual job indicators has been used ( $k=0.333$ ), which implies that the job must have at least 2 deficiencies. This implies that, for example, a worker with a temporary contract is not considered precarious despite his/her job instability if the rest of the job characteristics reveal a certain quality insofar as no additional labour deficiencies are identified. In any case, to the extent that the choice of both the relative weights  $w_i$  and the threshold  $k$  are discretionary, the empirical analysis provides as a robustness check evidence about the variations in multidimensional precariousness indices in the face of changes in both issues.

To conclude, insofar as the values of the MLPI are only interpretable in normative terms, we propose to consider different degrees of global multidimensional precariousness according to different ad hoc thresholds. Thus, the MLPI would reflect a *moderate* precariousness when it is lower than or equal to 0.11 (that particular threshold is equivalent to a situation where 1/3 of employees are multidimensionally precarious and suffer from 1/3 of possible deficiencies in jobs); *intense* when it takes values between 0.12 and 0.25 (this latter threshold corresponds to a combination of 1/2 of precarious employees with 1/2 of the possible job deficiencies); *severe* when it is between 0.26 and 0.44 (the 0.44 threshold corresponds to 2/3 of precarious employees with 2/3 of the potential deficiencies); and *extreme* when it takes values higher than a threshold of 0.44.

### 3. Data

For illustrative purposes, the multidimensional set of labour precariousness indices are calculated for Spain on the basis of microdata from the *Labour Force Survey* (from now on LFS), prepared by the Spanish National Institute of Statistics. This survey is the most

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<sup>4</sup> It should be noted that it is possible that the use in the analysis of cross-cutting indicators common to all employees, which is relatively common in previous studies on job precariousness, may lead to the false identification as precarious of jobs whose apparently precarious characteristics are in fact in line with the preferences of the individuals who occupy them, which could lead to some overestimation of precariousness levels. We are grateful to an anonymous reviewer for commenting on this issue.

complete source of labour data for this country and includes rich information on the attributes of jobs that allows for the adequate measurement of multidimensional labour precariousness, considering for this purpose a wide set of indicators corresponding to the different dimensions of interest that includes, inter alia, information on wages.

The LFS is a survey aimed at households whose main purpose is to obtain information regarding the labour market, and its preparation is based on the definitions and criteria established by the International Labour Organisation, which allows for homogeneous comparison with other countries. The empirical analysis in the article is based on the microdata for the annual subsample of the LFS corresponding to cross-sections for each year in the period 2006-2018 and corresponds to the main job of individuals. The analysis is restricted to employees and the working sample of 2018, the year for which the bulk of the analysis takes place, is composed of 31,030 observations.<sup>5</sup> The sample weights provided by the survey have been considered, so that the results are representative for the entire employee population in Spain.

## 4. Results

### 4.1. *The scale of multidimensional labour precariousness*

This section examines labour precariousness in Spain on the basis of the set of proposed multidimensional indices. In this vein, Table 2 contains information on the proportion of employees with deficiencies in each of the 6 individual job indicators. The presence of attributes associated with poor-quality jobs is in general quite significant, although with a notable heterogeneity. Thus, with regard to the indicators associated with the first dimension of precariousness, low wages affect to 18% of employees when measured with monthly wages and a threshold of 1,000 euros and to 13.2% when measured in relative terms with hourly wages and a threshold of 60% of the median wage of the economy. As for the second dimension, temporariness is widespread and affects 26.3% of employees, with a lower incidence of involuntary part-time work (9.4%). Finally, regarding the third dimension, the scope of both over-qualification (28.2% of employees) and, very especially, atypical working hours (41.0%), is particularly striking. Overall, the average proportion of job deficiencies for all Spanish employees is 0.227, which means that on average employees suffer from 1.36 shortages in their jobs (i.e. 0.227 times 6) and that, consequently, the typical Spanish employee suffers at least one job deficiency.

Figure 1 shows the degree of overlap of the indicators of job deficiencies in the 3 dimensions of precariousness considered in the multidimensional precariousness indices for employees with at least one job deficiency (71.1% of all employees). A significant part of employees in Spain (41.4% of the total) are affected only by job deficiencies associated with a single labour dimension, namely with low-wage employment (2.7%), contractual situation (6.9%), or other employment conditions (31.8%). However, another relevant portion (29.7%) suffers from deficiencies in several labor dimensions together (with 21.1% of employees presenting deficiencies in two of the three dimensions considered and 9.1% simultaneously in the three). This evidence overall reveals that job precariousness and job quality problems can

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<sup>5</sup> A potential limitation of the analysis is that, although the Spanish LFS is designed to try to obtain an adequate coverage of the entire labor force, regardless of the legal status of individuals in the labor market, there could be an incomplete coverage of those individuals in a situation of informality, especially in the case of immigrants, a part of whom are in an irregular situation in Spain (e.g. around 8% according to information from the *National Immigrants Survey*). We thank an anonymous evaluator for commenting on this issue.



present very different forms in practice and, hence, the convenience of examining this intrinsically polyhedral phenomenon from a multidimensional perspective.

In turn, Table 3 contains the global indices of multidimensional precariousness. These correspond to the incidence of the phenomenon, measured by the rate of multidimensional precariousness ( $H$ ), its intensity, measured by the average proportion of deficiencies of multidimensionally precarious jobs ( $A$ ), and the MLPI (the product of  $H$  by  $A$ ). As stated in the methodology section, these indices are obtained using the same weights for the 6 job individual indicators and a value of  $k=1/3$  (or, alternatively, 2 job deficiencies) for the threshold that allows for the identification of multidimensional precarious jobs.

According to this evidence, the incidence of multidimensional labour precariousness is very high in Spain, affecting about 2/5 of employees (37.4%). The intensity of precariousness is also remarkable, since multidimensional precarious jobs exhibit almost half of the maximum number of deficiencies (45.7%). This implies that a representative multidimensionally precarious employee is very close to having a job with 3 simultaneous deficiencies (i.e. 50% of the maximum of 6), which contrasts with an average of only 9% of all possible deficiencies (i.e. 0.54) for those employees which are not multidimensionally precarious. According to these results, the MLPI for all Spanish employees is of 0.171 (0.374 times 0.457), which along with the thresholds defined previously corresponds to a situation of intense precariousness. All the values of the multidimensional indices are actually statistically different from zero according to conventional levels of significance.

Table 4 and Figure 2 contain information on the values of the multidimensional indices of precariousness for the period 2006-2018.<sup>6</sup> This temporal evidence is particularly interesting for several reasons. Firstly, because it shows that employment precariousness has remained at persistently high levels in recent decades, suggesting a certain structural nature of the phenomenon. Hence, the incidence of precariousness ( $H$ ) moved in the period in a range of values between 33.1% and 37.8%, while the intensity of precariousness ranged between 42.7% and 47.1%. Secondly, because it reveals that employment precariousness in Spain tends to grow over time, which is in line with the general trend observed in recent years for other advanced economies. Finally, because it shows the presence of temporary oscillations of some relevance, with different stages in the evolution of precariousness plausibly associated with changes in the cyclical position of the economy and regulatory changes in the labour market. Thus, the first stage would correspond to the expansionary period prior to the Great Recession of 2008-2009, when there was a significant reduction in the levels of precariousness (for example, the intensity of the phenomenon fell from 36% to 33%). A second stage would cover the period of the double-dip crisis that followed the Great Recession and which in Spain lasted until 2013 (during which an intense labour reform was passed in 2012 that boosted labour flexibility and led to a general worsening of employees' working conditions: see e.g. OECD, 2013), in which there was a significant increase in precariousness (precariousness intensity in that stage increased from 33% to 37% and the MLPI from 0.145 to 0.176). Finally, the last stage would correspond to the expansionary stage after the double-dip crisis in which, unlike the previous expansionary stage where employment precarity decreased, the levels of multidimensional employment precarity remained relatively stable.

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<sup>6</sup> In this temporal analysis, the threshold of 1,000 euros used for the identification of low monthly wages has been recalculated for each year of the period 2006-2018 by deflating at 2018 prices.

#### *4.2. The nature of multidimensional labour precariousness*

As noted previously, one advantage of the MLPI is its decomposability. Consequently, Table 5 contains the results of its decomposition according to the participation of each of the 6 individual indicators and the 3 dimensions that make it up. The dimension with the greatest quantitative weight in precariousness in practice is that associated with other employment conditions (as the deficiencies of jobs in this field explain 42.4% of the phenomenon), so that the dimensions associated with labour income (29.2%) and employment stability/contractual situation (28.4%) are less relevant. There are also very marked differences in the relative relevance of the 6 indicators, with a special impact on precariousness of atypical working hours (it explains 23% of the overall extent of precariousness), fixed-term contracts (19.6%), being overqualified (19.6%), and earning monthly wages lower than 1,000 euros (17.0%). Conversely, earning relative low hourly wages (12.2%) and working part-time involuntarily (8.8%) are less influential.

In turn, Table 6 contains the distribution of all employees according to the weighted number of deficiencies in their jobs. A striking finding is that only 28.3% of jobs in Spain do not suffer from any type of job deficiency. On the other hand, although they are not either in a situation of multidimensional labour precariousness, 33.65% of wage earners exhibit one deficiency and can therefore be considered to be vulnerable to this situation and at risk of precariousness. Finally, among employees who are in multidimensional precariousness (37.44% of the total), there is significant heterogeneity in the incidence of the phenomenon, since while approximately half of them have two job deficiencies (19.45% of all wage earners), the other half have between 3 and 6 deficiencies (17.99% of the total).

In order to examine to what extent the impact of multidimensional precariousness is similar for all employees, Table 7 contains the multidimensional precariousness indices and a qualitative assessment of the scope of precariousness depending on the MLPI values for different types of employees according to a broad set of personal attributes of individuals (gender, age, marital status, nationality, and educational level), their jobs (seniority, occupation, and supervisory tasks), and their firms (public/private sector, branch of activity, firm size and the municipality size). Hence, although the scope of precariousness tends to be intense for most categories of employees, there is a remarkable heterogeneity, with MLPI values ranging widely from 0.022 (employees in skilled occupations), which implies a moderate scope of precariousness, up to 0.453 (part-time employees), which corresponds to extreme precariousness. Discrepancies between groups of employees are due to a greater extent to more prominent differences in the incidence of precariousness (with values ranging from 0.062 in the case of skilled occupations to 0.840 for part-time workers) than in its intensity (with an overall range of values between 0.356 and 0.540).

More specifically, there are significant differences in the scope of precariousness in terms of individual characteristics such as gender (although males and females suffer from intense levels of precariousness, the incidence of precariousness for women is 50% higher than for men), age (young people suffer an incidence greater than 60% and a severe scope of precariousness), nationality (immigrants suffer severe precariousness and an incidence that doubles that of natives), and educational level (with a comparatively lower scope of precariousness for individuals with higher education). In the same vein, there is also a remarkable heterogeneity depending on various job characteristics, such as seniority (workers with less than 2 years of seniority exhibit severe precariousness with an incidence that triples that of individuals with more than 5 years), type of occupation (labour precariousness is moderate in skilled occupations, while elementary occupations suffer a severe precariousness and an incidence of the phenomenon close to 80%), supervision tasks, type of contract

(fixed-term workers suffer from severe precariousness and an incidence of 76% that triples that of permanent workers), and the type of working day (with extreme precariousness and an incidence of 84% for part-time employees). Regarding the characteristics of firms, the scope of precariousness is higher in the private sector (with an incidence that doubles that of the public sector), certain branches of activity such as the primary sector (with severe precariousness and an incidence of 66.6%), and micro-firms.

In order to delve into this question and to control for possible composition effects, Table 8 contains the results of the estimation of a logistic regression where the dependent variable is a dichotomous variable that reflects whether an employee/job is multidimensionally precarious and the same previous set of characteristics related to the attributes of individuals, jobs, and firms have been included as explanatory variables. The table contains the estimated coefficients and the marginal effects of these variables, which in the case of the dichotomous variables reflect percentage differences with respect to the reference category. Note that the model captures the determinants of the incidence of precariousness, the aspect where there is a greater degree of variability among different types of employees.

Attending to individual characteristics, a higher incidence of multidimensional precariousness net of compositional effects arises for females (with a probability 1.3% higher than that of observationally similar men), young people (with a probability 2.1% higher than individuals in central age groups), as well as immigrants (workers with foreign or dual nationality are a 6.3% more likely to be precarious than natives).<sup>7</sup> Regarding the characteristics of the jobs, the incidence of multidimensional precariousness decreases significantly with seniority, with supervisory tasks (they are associated with a 4.7% lower probability of incidence of precariousness) and, especially, with permanent contracts (fixed-term workers have a 29.4% greater probability of being precarious), full-time work (part-time work is associated with a 29.1% greater probability of precariousness), and the type of occupation (employees in unskilled and semi-skilled occupations are 42.4% and 16.4% more likely to experience precariousness than those employed in skilled occupations). As for firm attributes, significant effects on the incidence of precariousness are associated with the type of sector (with less precariousness in the public sector), the branch of activity (with a higher relative incidence in the primary and services sectors), firm size (employees in micro-firms have a higher probability of experiencing precariousness of 3.2%), and the size of the municipality (with a comparatively lower incidence in large municipalities). Overall, this evidence confirms that the incidence of multidimensional precariousness is rather heterogeneous, which underlines the relevance of obtaining disaggregated evidence for different types of employees.

#### *4.3. Robustness check*

The final part of the empirical analysis consists of a robustness check of previous evidence as regards two relevant aspects of the methodology of analysis, the choice of the relative weights of individual job indicators ( $w_i$ ) and the threshold to identify multidimensionally precarious jobs ( $k$ ). As previously indicated, the choice between the different potential options is rather discretionary in both cases, insofar as there are no clear criteria in the

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<sup>7</sup> The counterintuitive inverse relationship between educational level and the incidence of precariousness is explained by the strong inverse relationship of the overqualification indicator and educational level. In this vein, an alternative analysis excluding the overqualification indicator but maintaining both the rest of the individual job indicators and the threshold of  $k=0.33$  confirms that individuals with primary and secondary education are significantly more likely to be in multidimensional precarious jobs than individuals with upper studies (with marginal effects of 6.3% and 5.6%, respectively).

literature to guide their choice. As a matter of example, the choice of the relative weights is among the aspects of composite indicators more subject to criticism (Greco et al., 2019).

The first robustness check consists hence in the use of hedonic weights instead of equal weights for the individual job indicators that conform multidimensional precariousness indices. The calculation of the hedonic weight of each indicator is based on an alternative database, the *Quality of Life at Work Survey* (from now on QLWS).<sup>8</sup> In particular, the relative weighting of the indicators has been carried out by means of the estimation by ordinary least squares of a model in which the dependent variable measures the degree of job satisfaction and the 6 indicators included in the 3 dimensions of the MLPI are included as explanatory variables, together with significant control variables as regards determinants of job satisfaction. The relative weight of each indicator is calculated according to its estimated standardized beta coefficient.<sup>9</sup> The 6 individual job indicators exhibit a significant negative impact on job satisfaction, although with a rather heterogeneous impact in practice.<sup>10</sup> Consequently, certain indicators such as having a fixed-term contract or earning a low monthly wage (with hedonic weights of 0.27 and 0.23, respectively), exhibit comparatively higher hedonic weights (Table 9). This is also reflected in the relative weight of the 3 dimensions considered in the construction of the MLPI (with overall weights of 42%, 34% and 24% with hedonic weights, in contrast with 33% with unit weights).

The use of hedonic weights gives rise to some differences in the aggregate multidimensional precariousness indices, although they are not very significant (Table 10). Thus, the estimated incidence of labor precariousness is lower when hedonic weights are considered (it affects to 28.7% of employees, compared to previous 37.4%) and the intensity of the phenomenon is, on the contrary, higher (precarious workers exhibit on average 54% of the total possible deficiencies, compared to 46% previously). As a result, the values of the MLPI are relatively similar in both cases (0.155 vs. 0.171), reflecting an intense labour precariousness.

As regards the second robustness contrast, on the contrary, the multidimensional precariousness indices vary significantly depending on the particular value of the threshold  $k$  (Table 11). More specifically, the higher the value chosen for the threshold, the lower the incidence and the higher the intensity of precariousness and, to the extent that the impact is higher in the first case, the lower the MLPI values. Although for close values of  $k$  the scope of precariousness is somewhat similar (so that with values of  $k$  up to 0.5 the overall scope of precariousness is intense, whereas above that value it is moderate), this evidence confirms, in any case, that estimations of multidimensional precariousness indices depend crucially on the threshold required to consider a job as multidimensionally precarious.

## 5. Conclusions

This article proposes a novel multidimensional operationalization of precarious employment using a set of multidimensional indices calculated through the Alkire and Foster (2011) dual threshold counting approach methodology. This proposal associated to a fresh perspective

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<sup>8</sup> The QLWS is a survey carried out by the Spanish Ministry of Employment and Social Security until 2010 on an annual basis. It is composed of independent cross-sections for each year covering exclusively employed individuals and the purpose of the survey is to provide detailed information on the characteristics of employment, including job satisfaction. The pool of the cross-sections of the waves between 2006 and 2010 has been used for the analysis, with a final sample of 25,965 employees.

<sup>9</sup> This assignment based on a multivariate analysis of the factors influencing employee job satisfaction corresponds to a hybrid criterion of estimating relative weights, halfway between those based on empirical evidence (data-driven) and those derived from normative criteria (Decancq and Lugo, 2013).

<sup>10</sup> Full results of the estimation are available from the authors upon request.

on the measurement and analysis of labour precariousness is made in a context where the overall enriching use of composite indices in many other research fields is underdeveloped in the labour sphere, and where although there is currently no consensus on what exactly precarious employment is and how it should be measured, it tends to be considered a multidimensional construct characterized by an accumulation of unfavorable features of employment quality. The use of multidimensional indices based on indicators of job deficiencies to examine precarious employment with the Alkire and Foster (2011) methodology seems hence consequently fully appropriate, given that it is entirely in line with previous literature which has highlighted the multifaceted nature of the phenomenon and how it is strongly related with undesirable attributes of jobs which reveal poor quality of employment.

The elaboration of the indices starts with the individual identification as multidimensionally precarious jobs of those with a minimum number of undesirable attributes (or deficiencies), which allows the subsequent calculation for the whole employee population of the incidence of precarious employment, its intensity, and the Multidimensional Labour Precariousness Index, which combines both incidence and intensity. This index is structured in 6 employment indicators that allow the identification of salient labour deficiencies and 3 dimensions which are in line both with the main dimensions of employment precariousness identified in previous studies on the topic and with the current OECD Job Quality approach on quality employment measurement. The multidimensional indices allow both the overall quantification of precariousness (i.e., an estimation of the scale of the phenomenon) and the identification of which are the specific priority labour dimensions and groups (i.e. the nature of precarious employment) in the design of labour policy actions focused on combating labour precariousness.

For illustrative purposes, the Multidimensional Labour Precariousness Index is calculated for Spain, a very interesting case of analysis given its dysfunctional labour market, using microdata from the *Labour Force Survey*, a database with rich information that allows for an adequate measurement of multidimensionally precarious employment using a full set of indicators. In the analysis a multidimensional precarious employment must exhibit deficiencies in at least 2 of the 6 individual labour indicators as a requirement to have a precarious job.

In a nutshell, as regards the scale of the phenomenon, the evidence obtained shows that the incidence of multidimensional labour precariousness in Spain is very high (it affects 37% of employees) and that the intensity of the phenomenon is also very important (multidimensionally precarious employees exhibit around half of the 6 maximum potential job deficiencies). This results in a value of the Multidimensional Labour Precariousness Index that reflects an intense scope of precariousness. From a temporal perspective, the evidence for the period 2006-2018 shows, in turn, that employment precariousness has remained at persistently high levels in Spain in recent decades (suggesting a certain structural nature of the phenomenon), that employment precariousness in Spain tends to grow over time (in line with the general trend observed in recent years for other advanced economies), and, finally, that different stages can be differentiated in the evolution of precariousness (plausibly associated with changes in the cyclical position of the economy and regulatory changes in the labour market).

As for the nature of employment precariousness, according to the results of the decomposition of this index, the individual indicators that most determine the scope of the phenomenon are those associated with atypical working hours, fixed-term contracts, and being overqualified, so that labour precariousness in Spain is particularly associated to

indicators in the non-monetary dimension of other employment conditions. In the same vein, disaggregated evidence shows that there is great heterogeneity in the scope of the phenomenon by groups of employees attending to diverse attributes. Hence, even when once composition effects are controlled for, certain collectives such as females, young people, immigrants or individuals employed in elementary occupations suffer a significantly greater labour precariousness than other types of employees. Finally, an important heterogeneity is also observed as regards the individual impact of employment precariousness where, for instance, 28.3% of jobs in Spain do not exhibit any type of job deficiency and 18% suffer from between 3 and 6 deficiencies.

A potential limitation of the methodology is the discretionary choice of the number of job deficiencies required to consider a job as multidimensionally precarious (the threshold  $k$ ) and the relative weights of the individual job indicators in the multidimensional indices ( $w_i$ ), given that in neither case there are clear guidelines in the literature. The evidence obtained as robustness checks in the analysis confirms that this issue is apparently not very relevant in the case of the choice of the relative weights. On the contrary, the magnitude of the multidimensional indices of precariousness depends significantly on the threshold  $k$ . Although this circumstance does not affect the comparative analysis between groups or workers, it should be taken into account for making an appropriate assessment of the scale of precariousness when measured by multidimensional indices.

In any case, the overall evidence obtained illustrates how the use of the multidimensional indices proposed can offer a fresh measurement and insight into the analysis of labour precariousness, a phenomenon of enormous interest but relatively elusive when it comes to be operationalized and measured in practice. These indices allow both the quantification of precariousness and the identification of which are the labour dimensions and the priority groups in the design of labour policy actions focused on combating it and, hence, are useful for surveillance of precarious employment. Moreover, they also have the advantage that they can be calculated with information and job indicators usually available in existing surveys and that their design is flexible, allowing them to potentially adapt to the specific context of any country's labour market. Finally, they are easily applicable and can provide opportunities to explore operationalizations of employment precariousness across time and sociodemographic and occupational correlates.

A potential additional limitation of the research is that, although the Spanish LFS is designed to try to obtain adequate coverage of the entire labor force regardless of their legal status in the labor market, there could be an incomplete coverage of those individuals in a situation of informality, which plausibly affects immigrants to a greater extent.<sup>11</sup> For this reason, the results obtained for this specific group should be interpreted with caution and, in the same vein, it would be interesting to examine in depth in future research the relationship between informality and employment precariousness. In the same vein, it is also possible that if the use in the analysis of cross-cutting indicators common to all employees leads to the identification as precarious of jobs whose apparently precarious characteristics are in fact in line with the preferences of the individuals who occupy them, there could be some overestimation of the levels of precariousness, which should be taken into account in the interpretation of the results.

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<sup>11</sup> Although problems with measuring precarious work and, in particular, accessing those groups most likely to be engaged in precarious work seem ubiquitous (Livanos and Papadopoulos, 2019; Mai, 2017), survey statistics are still considered to offer key insights into the scale and nature of the phenomenon (Posch et al., 2020).

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## Tables and Figures

**Table 1.**  
**Dimensions, indicators and weights**  
**of the Multidimensional Labour Precariousness Index.**

<b>Dimension (weight)</b>	<b>Indicator (weight)</b>	<b>Deficiency identification</b>
Labour income (1/3)	Monthly wage (1/6)	Monthly wage lower than 1000 euros
	Hourly wage (1/6)	Hourly wage lower than 60% of median wage
Employment stability/ Contractual situation (1/3)	Type of contract (1/6)	Fixed-term contract
	Type of working time (1/6)	Involuntary part-time work
Other employment conditions (1/3)	Overqualification (1/6)	Overqualified
	Extended or atypical working time (1/6)	Extended or atypical working time (night, weekend or shifts)

**Table 2.**  
**Proportion of employees with deficiencies in each individual job indicator.**

Indicator	Proportion of employees
Low monthly wage	0.182
Low hourly wage	0.132
Fixed-term contract	0.263
Involuntary part-time	0.094
Overqualification	0.282
Extended or atypical working time	0.410

**Table 3.**

**Multidimensional labour precariousness indices.**

Incidence ( <i>H</i> )	0.374***
Intensity ( <i>A</i> )	0.457***
Multidimensional Labour Precariousness Index	0.171***

\*  $p < 0,1$ ; \*\*  $p < 0,05$ ; \*\*\*  $p < 0,01$ .

**Table 4.**  
**Multidimensional labour precariousness indices. 2006-2018**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Incidence ( <i>H</i> )	0.360***	0.346***	0.334***	0.331***	0.331***	0.345***	0.354***	0.363***	0.373***	0.374***	0.370***	0.378***	0.374***
Intensity ( <i>A</i> )	0.435***	0.427***	0.433***	0.439***	0.442***	0.450***	0.463***	0.468***	0.471***	0.469***	0.467***	0.463***	0.457***
MLPI	0.157***	0.148***	0.145***	0.145***	0.146***	0.155***	0.164***	0.170***	0.176***	0.176***	0.173***	0.175***	0.171***

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Table 5.**  
**Decomposition by dimensions and indicators**  
**of the Multidimensional Labour Precariousness Index.**

Dimension	%	Indicator	%
Labour income	29.2	Low monthly wage	17.0
		Low hourly wage	12.2
Employment stability/Contractual situation	28.4	Fixed-term contract	19.6
		Part-time work	8.8
		Overqualified	19.6
Other employment conditions	42.4	Extended or atypical working time	22.8
Total	100	Total	100

**Table 6.**  
**Distribution of workers according to weighted job defficiencies**

<b>Weighted job</b>	<b>Number of</b>	<b>Percentage of</b>	<b>Cumulative</b>
0%	0	28.91	28.91
16.7%	1	33.65	62.56
33.3%	2	19.45	82.01
50%	3	10.38	92.38
66.7%	4	5.63	98.01
83.3%	5	1.76	99.78
100%	6	0.22	100

**Table 7.**  
**Multidimensional labour precariousness by type of employees.**

<b>Variable</b>	<b>Incidence (H)</b>	<b>Intensity (A)</b>	<b>MLPI</b>	<b>Scope of precariousness</b>
Total	0.374***	0.457***	0.171***	Intense
Female	0.449***	0.473***	0.212***	Intense
Male	0.306***	0.436***	0.133***	Intense
Age 16 to 29	0.626***	0.491***	0.307***	Severe
Age 30 to 45	0.362***	0.445***	0.161***	Intense
Age > 45	0.295***	0.447***	0.132***	Intense
Married	0.303***	0.441***	0.133***	Intense
Non-married	0.453***	0.469***	0.213***	Intense
Immigrant	0.577***	0.484***	0.279***	Severe
Native	0.340***	0.449**	0.153***	Intense
Primary studies	0.460***	0.454***	0.209***	Intense
Secondary studies	0.414***	0.469***	0.194***	Intense
Upper studies	0.322***	0.441***	0.142***	Intense
Tenure < 2 years	0.643***	0.494***	0.318***	Severe
Tenure 2-5 years	0.410***	0.448***	0.184***	Intense
Tenure > 5 years	0.225***	0.407***	0.092***	Moderate
Unskilled occupation	0.778***	0.514***	0.400***	Severe
Semi-skilled occupation	0.313***	0.432***	0.135***	Intense
Skilled occupation	0.062***	0.356***	0.022***	Moderate
Armed forces	0.083***	0.363***	0.030***	Moderate
Supervisory tasks	0.143***	0.380***	0.054***	Moderate
Not supervisory tasks	0.424***	0.463***	0.196***	Intense
Fixed-term contract	0.766***	0.497***	0.380***	Severe
Indefinite contract	0.235***	0.411***	0.097***	Moderate
Part-time working day	0.840***	0.540***	0.453***	Extreme
Full-time working day	0.284***	0.410***	0.116***	Intense
Public sector	0.222***	0.397***	0.088***	Moderate
Private sector	0.412***	0.465***	0.191***	Intense
Primary sector	0.666***	0.516***	0.343***	Severe
Industry	0.265***	0.398***	0.106***	Moderate
Construction	0.237***	0.402***	0.095***	Moderate
Services	0.394***	0.464***	0.183***	Intense
Firm size < 10 employees	0.499***	0.492***	0.245***	Intense
Firm size 10 or more employees	0.327***	0.437***	0.143***	Intense
Municipality < 10.000 inhabitants	0.406***	0.464***	0.189***	Intense
Municipality 10.000-100.000 inhabitants	0.394***	0.457***	0.180***	Intense
Municipality > 100.000 inhabitants	0.345***	0.454***	0.156***	Intense

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Table 8.**  
**Risk of being in multidimensional labour precariousness.**

<b>Variable</b>	<b>Coefficient</b>	<b>Marginal effect</b>
Female	0.106 (0.044)**	1.3%
Age 16 to 29	0.165 (0.066)**	2.1%
Age 30 to 45	-0.014 (0.046)	-0.0%
Married	-0.188 (0.045)***	-0.0%
Immigrant	0.498 (0.070)***	6.3%
Primary studies	-1.358 (0.119)***	-17.1%
Secondary studies	-0.454 (0.046)***	-5.7%
Tenure 2 to 5	-0.028 (0.065)	-0.4%
Tenure > 5	-0.293 (0.059)***	-3.7%
Unskilled occupation	3.370 (0.212)***	42.4%
Semi-skilled occupation	1.306 (0.203)***	16.4%
Armed forces	0.790 (0.464)*	9.9%
Supervisory tasks	-0.376 (0.067)***	-4.7%
Public sector	-0.870 (0.060)***	29.4%
Primary sector	0.473 (0.149)***	29.1%
Construction	2.338 (0.055)***	-10.9%
Fixed-term contract	2.313 (0.058)***	5.9%
Part-time	-0.989 (0.113)***	-12.4%
Services	0.315 (0.060)***	4.0%
Firm size < 10 employees	0.257 (0.047)***	3.2%
Municipality > 100,000 inhabitants	-0.144 (0.057)**	-1.8%
Municipality 10,000-100,000 inhabitants	-0.013 (0.059)	-0.2%
Constant	-3.313 (0.235)***	
Observations	31,030	
Wald $\chi^2(37)$	6.103,02	
Prob > $\chi^2$	0,000	

*Notes:* Standard errors in parentheses. The reference categories for each set of dichotomous variables are male, age 30 to 45 years, not married, Spanish nationality, tertiary studies, skilled occupation, not supervisory tasks, indefinite contract, full-time workday, private sector, industry, firm with 10 or more workers, and municipalities with less than 10,000 inhabitants, respectively. Fixed effects for region have also been included as explanatory variables.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .



**Table 9.**  
**Hedonic weights estimated by dimensions and indicators in the MLPI.**

Dimension	%	Indicator	%
Labour income	0.42 (0.33)	Low monthly wage	0.23 (0.16)
		Low hourly wage	0.19 (0.16)
Employment stability/Contractual situation	0.34 (0.33)	Fixed-term contract	0.27 (0.16)
		Part-time work	0.07 (0.16)
Other employment conditions	0.24 (0.33)	Overqualified	0.12 (0.16)
		Extended or atypical working	0.12 (0.16)
Total	100	Total	100

*Notes:* Unit weights in parentheses.

**Table 10.**  
**Multidimensional labour precariousness indices with hedonic weights.**

Incidence ( <i>H</i> )	0.287***
Intensity ( <i>A</i> )	0.540***
Multidimensional Labour Precariousness Index	0.155***

\*  $p < 0,1$ ; \*\*  $p < 0,05$ ; \*\*\*  $p < 0,01$ .

**Table 11.****Multidimensional labour precariousness indices according to threshold  $k$ .**

$k$	Deficiencies	Incidence ( $H$ )	Intensity ( $A$ )	MLPI	Scope of precariousness
0.167	1	0.711***	0.320***	0.227***	Intense
0.333	2	0.374***	0.457***	0.171***	Intense
0.500	3	0.180***	0.622***	0.112***	Intense
0.666	4	0.076***	0.715***	0.054***	Moderate
0.833	5	0.020***	0.852***	0.017***	Moderate
1.000	6	0.002***	1.000***	0.002***	Moderate

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

**Figure 1.**  
**Distribution of employees with at least 1 job defficiency**

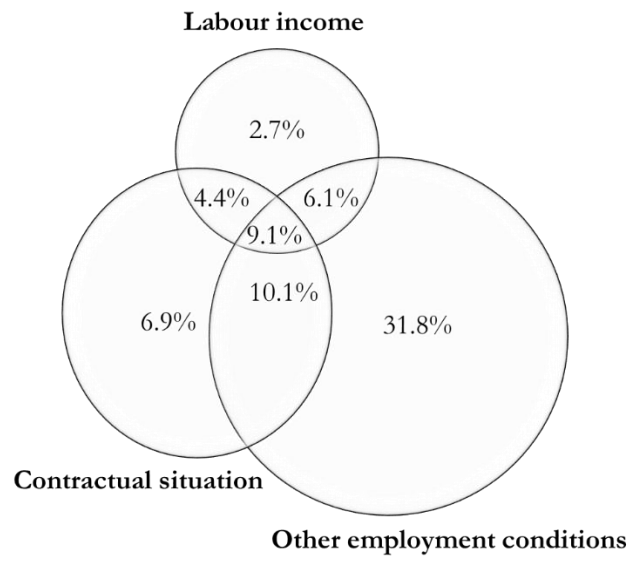


Figure 2.  
 Multidimensional labour precariousness indices: *A*, *H* and *Mo* (left scale). 2006-2018

