




'Bad Jobs' in Europe: Derivation and Analysis of a Wellbeing-Related Job Quality Threshold

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Abstract

A method is proposed for defining the threshold of a 'bad job', based on a discontinuity in the relationship between a composite index of job quality and subjective wellbeing. Applied to European data, there is a monotonic relationship between the job quality index and psychological wellbeing. However, there is a distinctly large increase in psychological wellbeing, and in several measures of work-related wellbeing, between workers in the lowest decile and those in the second lowest decile of job quality. We therefore propose that 'bad jobs' should be designated as those in lowest decile. Using this threshold gives a 'bad jobs'/ 'other jobs' dichotomy that discriminates on wellbeing far better than definitions based only on low earnings and job insecurity. Using multi-level probit analysis, we find that bad jobs are more common in poorer countries and in countries with weaker labour regulation. Three findings differentiate the distributional pattern of bad jobs from that of low-earnings jobs: first, the prevalence of bad jobs is greater in large establishments; second, there is no gender gap in the prevalence of bad jobs; third, working in the private sector raises the chance of being in a bad job but not of being in a low earnings job.

Keywords Job quality · Wellbeing · Gender gap · Migrant · Regulation · Employer-size wage effect

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Introduction

‘Bad job’ is a commonly used, though rarely well-defined, phrase in public discourse. It has also come to be used increasingly in scholarly papers, paralleling the growth of research interest in a multi-dimensional concept of job quality (Green, 2021).¹ Commonly, ‘bad job’ is used loosely to denote low job quality, rather than something delineated in relation to a defined threshold (e.g., Ablaza et al., 2021; Benton & Kim, 2022; Jenkins & Chivers, 2022). Occasionally, however, more precision is applied: jobs are deemed bad if pay is below a normatively specified threshold, or if several dimensions each fall below a dimension-specific threshold (e.g., Schmidt, 2007; Wallace & Kwak, 2018). This paper considers the challenge of defining and measuring a theoretically mandated cut-off within a job quality distribution, below which jobs are ‘bad jobs’. In addition to the general scientific value to scholarly discourse of a rigorously founded threshold, a theory-based ‘bad jobs’ concept may also be useful for the identification of enhanced policy need.

We propose a method for defining the threshold, based on the relationship of job quality with wellbeing. If, as is increasingly argued, policy is to be based on the enhancement of wellbeing (Layard, 2021), then a definition of bad jobs derived from wellbeing considerations would help to inform the issue: where might job quality interventions by policymakers, or changes in employers’ practices, make a distinctly large difference? Our method has similarities with the literature on income poverty thresholds, wherein poverty is conceived as deprivation, and moving out of poverty is expected to be associated with a distinct improvement in health and wellbeing. Similarly, we see bad jobs as depriving workers of the resources for meeting their basic needs from work. For those in bad jobs, a rise in job quality shifting them above the threshold would be associated with a sharp improvement in wellbeing. We investigate and apply this concept to data from the European Working Conditions Survey in 2015.

The paper proceeds to investigate the distribution of the proposed index of ‘bad jobs’. It considers whether the distribution conforms to expected patterns and whether the distribution differs from the pattern of variation of low wage and insecure jobs. What are the bad jobs in Europe, who is selected into doing them, and where are they? It could be expected that the factors which determine if a person’s job is a bad job are the converse of conventional antecedents of high job quality outcomes, typically measured through earnings alone. We anticipate, however, that the impact of some antecedents of job quality (hence on the prevalence of bad jobs) will differ from their impact on earnings (hence on the prevalence of low-earnings jobs). We investigate the importance of country-level factors (GDP per capita and indicators of national labour regulation) and, within countries, at the importance of industrial and sectoral characteristics, establishment size, employment form, and individual selection according to education, age, gender and migration status

¹ Excluding reviews and book chapters, articles on ‘bad jobs’ averaged 1 per year in the 1990s, 5 in the 2000s and 12 in the 2010s, primarily in sociology, industrial relations and economics – according to a Web of Science search 18/9/2023.

– factors which are found in prior research to be associated with earnings or with other aspects of job quality (e.g., Wagner, 1997; Carruth et al., 2004; Gallie, 2007; Eurofound, 2017; Horodnic & Williams, 2020; Cantalini et al., 2022; for a review see Green, 2021).

The paper contributes to the expanding literature on wellbeing, emphasising as it does the importance of job quality for the understanding of wellbeing (Green (forthcoming)). In providing the first systematic analysis of the distribution of bad jobs across Europe, it also adds to the growing literature on job quality in the past two decades within industrial relations, broad multi-disciplinary scholarship, and public policy discourse. That discourse has involved international organisations such as the International Labour Office promoting 'decent work', and the OECD championing 'more and better jobs'. The literature explicitly recognises that many other features of jobs, besides just their earnings, affect workers' wellbeing, and that trends and distributional patterns in these other features cannot be assumed to be adequately described or proxied by the distribution of earnings.

Section 2 sets out the proposed wellbeing derived concept of bad jobs, and Section 3 develops the bad jobs indicator, considers its robustness and compares it with other more conventional indicators. Section 4 then provides an analysis, using multi-level probit estimation, of the determinants of distribution of bad jobs among individuals in 31 European countries. Section 5 discusses the key findings concerning the inter-country and within-country variation in the prevalence of bad jobs, in relation to prior literature on the determinants of job quality. Section 6 presents our conclusions, considers the limitations of the proposed method for defining bad jobs, and notes potential applications in future research.

Bad Jobs as Job Quality Deprivation

Underpinning any classification of a 'bad job' is an implied concept and spectrum of job quality, and a threshold within that spectrum between 'bad jobs' and 'other jobs'. For some analysts of bad jobs, the job quality concept is, simply, pay. Where wage outcomes are modelled as either high or low, the latter is then, unproblematically, a 'bad job' (Acemoglu, 2001). Where earnings fall on a continuous spectrum there arises the question of what is 'low'. Common practice is to derive low pay thresholds from pre-existing income poverty thresholds or from relative pay cut-offs (Lee & Sobek, 2012; Fusaro & Shaefer, 2016; Branch & Hanley, 2017).

However, if it is accepted that other job quality dimensions, not necessarily correlated closely with pay, also meet workers' needs, then jobs may be mis-classified as 'bad' or not 'bad' by any indicator that focuses solely on low pay. In fact, many studies recognise that job quality is multi-dimensional. Non-wage benefits are typically stressed alongside pay in the US, where the value of job-linked health care insurance is high (Howell & Kalleberg, 2019). Pay, benefits and job security in the context of declining out-of-work social benefits and reduction of basic rights are all emphasised in studies of 'precarity' (Grenier et al., 2017). In much of the job quality literature using twenty-first century data sources, the dimensions extend to working time quality and to several aspects of intrinsic job quality, including work intensity,

the social and physical environments, skill requirements and job autonomy (Belloni et al., 2022; Eurofound, 2012). An extensive and expanding literature finds strong links between each of these job quality dimensions and wellbeing (e.g., Caroli & Godard, 2016; Eurofound, 2019; Green et al., 2024; Jin et al., 2024; Murtin et al., 2024; Green, forthcoming).

Where there is data on multiple dimensions, there might be a way of delineating ‘bad’ within each dimension drawing on normative considerations; but a two-way classification into good and bad jobs is problematic (Sengupta et al., 2009). To designate any job as a whole as ‘bad’ requires either an arbitrary set of conditions on separate dimension thresholds – the solution followed by Schmidt (2007) – or else the initial reduction of multiple dimensions to a single index spectrum, along which a threshold can be set.

The latter route is more commonly taken. There are well-known alternative methods for reducing multiple dimensions to single indices of job quality (Muñoz de Bustillo et al., 2011). Some are explicitly driven by (and therefore specific to) a particular wellbeing index (Williams et al., 2020); others deploy simple averaging or principal component methods; others allocate researcher-driven normative weights to dimensions. The ‘job-strain’ model originating in psychology generates dichotomous variables for all dimensions, then computes the net sum of resources (positive for job quality) and demands (negative) (Bakker & Demerouti, 2008; Eurofound, 2021). A specific case of a single index arises where each dimension of job quality is already dichotomised into ‘bad’ and ‘other’ jobs (Ablaza et al., 2021). In such cases, ‘bad’ is commonly taken to be synonymous with ‘deprived’, in the sense that workers are deprived of the resources in that dimension required to meet their needs—for example, an informal sector job is deemed to deprive workers of needed contractual and regulatory support for their security. Other common examples of job quality dichotomies are with/without pension and, in the US context, with/without health-care benefits. A systematic and analytically convenient way of capturing cumulative deprivations from multiple dichotomous elements in a single index of job quality is deployed by, *inter alia*, Gonzalez et al. (2021), drawing on a widely used method for measuring poverty from multi-dimensional deprivations (Alkire & Foster, 2011). The method can easily be configured to weight dimensions using normative considerations and has been applied fruitfully in a developing country context.

However the single index is constructed, a threshold for overall job quality deprivation must be specified. From a direct wellbeing perspective, a job might be deemed ‘bad’ if those performing it expressed the lowest level of overall job satisfaction; however, job satisfaction is affected by expectations and adaptation behaviours, leading some groups in objectively poor working conditions to express reasonable satisfaction (Léné, 2019; Nie et al., 2020; Pagan & Malo, 2009). In practice, wherever ‘bad job’ is explicitly defined in scholarly research, hitherto writers have drawn on experts’ normative judgements. Just as for the delineation of income poverty thresholds (Alkire & Foster, 2011), the choice of threshold for job quality deprivation might be based on explicit principles, or on particular policy needs. For example, some job characteristics might be deemed as necessary to meet human rights, in which case deprivation in that dimension would signify ‘bad job’. Alternatively a job might be deemed bad if it involved ‘dirty work’ (morally tainted work)

(Adamson & Roper, 2019; Press, 2022). In such a case, designating the bad job threshold would still involve a normative judgement—such as which occupations are 'dirty' and which are not—though the distinction could be made in a relatively open manner (Sever & Özdemir, 2022).

Proposal for Setting the Threshold

Yet reliance on expert-driven normative principles seems inferior to a method, if it can be found, that draws explicitly on the foundational (and evidenced) relationships between job quality and wellbeing from need satisfaction. Drawing on ideas from both the poverty and the job quality literatures we propose a theory-driven definition of bad jobs. Along with most writers on job quality we define job quality as constituted by those features (dimensions) of jobs that normally contribute to allowing workers to meet their (multi-faceted) work-related needs (Eurofound, 2012). Combining multiple job quality dimensions into a single measure gives an index that captures cumulative effects on wellbeing, across dimensions.

If that index were to follow a bimodal distribution, with a distinct cluster of jobs having very low job quality, it might permit a useful and robust binary classification of 'bad jobs'. However, in practice comprehensive job quality indices do not have neat bimodal distributions. Thus, similar to the delineation of income poverty, the inclusion or exclusion of substantive groups from the 'bad jobs' category can be highly sensitive to the deprivation threshold adopted.

For a reasoned threshold, we propose to examine the distribution of the marginal effects of job quality rank on wellbeing. Underpinning poverty concepts is the expectation that there is a stronger relationship between material resources and individuals' health/wellbeing for those in poverty than for the non-poor. Analogously, we define 'bad jobs' as job quality deprivation. To operationalise this idea, we first divide the job quality distribution into job quality deciles (with very large datasets it could be finer tuned). We propose that the bad jobs threshold can usefully be located between deciles somewhere in the lower half of the job quality distribution, where there may be a discontinuity in the wellbeing increments between deciles. Thus, there will be a distinctly large difference in wellbeing associated with job quality below and above the threshold. In what follows, we refer to those jobs above the deprivation threshold as 'other jobs', rather than 'good jobs', since the latter might usefully be reserved for jobs above some separate threshold near the top of the job quality spectrum.

The viability of the proposed threshold job quality deprivation concept depends on the assumed discontinuity being manifested in practice. We investigate this below in respect of the association between a composite generalised job quality index and the World Health Organisation's WHO-5 measure of general psychological wellbeing. Since the threshold may be sensitive to the particular wellbeing and health measure(s) available in any given data set, we also use alternative wellbeing measures to assess the robustness and sensitivity of this threshold concept. It should be noted, however, that while the proposed wellbeing-based methodology could be applied to any data set where suitable measures and job quality dimensions and of wellbeing are available, the chosen threshold for where to draw the line between

bad jobs and other jobs is likely to vary between regions depending on the variation in job quality within each economy. Finally, it can be noted that the concept to be delineated here is based upon an index derived from objective characteristics of jobs, as is common practice among job quality analysts (Green, 2021); the subjective concept of wellbeing enters the analysis as the means to set the threshold between bad and other jobs.

Data and Derivation of a Bad Jobs Measure for Europe

Data

We deploy the 2015 European Working Conditions Survey (EWCS), collected by the European Foundation for the Improvement of Living and Working Conditions (Eurofound, 2017, 2023). The scope of the survey questionnaire has widened since the first edition in 1990. Benchmarked and followed by similar surveys in the United States and South Korea, the EWCS became the most detailed nationally representative survey of job quality in existence, with questionnaires covering all job quality dimensions and many related items. The 2015 wave interviewed in person approximately 44,000 employed individuals from all 28 European Union (EU) member countries plus 7 non-EU countries within Europe. Based on the size of the country, the sample ranged from 1,000 to 3,300 per country. Clustered random sampling methods were used, and survey weights were included in all our analyses, yielding nationally representative estimates. This data is then supplemented at national level by GDP per capita from national accounts and indicators of national regulation, collective participation and union-density, drawn from the ICTWSS Data base (Visser, 2019). Together, these provided complete data for 31 countries, and our analysis is based therefore on the EU countries in 2015 plus Norway, Switzerland and Turkey.

Derivation of the Bad Jobs Measure

Eurofound (2012) computed composite indices for seven theory-based job quality dimensions capturing multi-faceted work-related environments, including *Earnings*, other extrinsic aspects (*Prospects* and *Working Time Quality*) and four intrinsic aspects (*Skills and Discretion*, *Physical Environment*, *Social Environment* and *Work Intensity*). The relevant items within each job quality dimension and the brief description of each item are shown in the Appendix (Table 7). Some but not all of these indices are positively correlated with each other (Table 8). From these dimensions we computed a single job quality index as the first principal component, a weighted sum of the dimensions, with weights listed in the Appendix (Table 9). We also generated the WHO-5 Index of psychological wellbeing using the conventional 5-item scale, which is a widely used and validated self-reported measure of psychological wellbeing (Topp et al., 2015).

Table 1 shows descriptive statistics for all job quality dimensions which are normalised to within a range 0–100; for the single index job quality which is a standardised variable; and for the WHO-5 Wellbeing Index.

Table 1 Job Quality and Wellbeing: Descriptive Statistics

Job Quality Dimensions	Obs	Mean	Std. Dev
Earnings	32,838	9.31	5.83
Prospects	32,838	64.85	18.76
Working Time Quality	32,838	69.96	14.15
Skills and Discretion	32,838	55.58	21.17
Physical Environment	32,838	83.08	14.93
Social Environment	32,838	77.32	23.19
Work Intensity	32,838	34.73	18.53
Single Job Quality Index	32,838	0.00	1.37
WHO-5 Wellbeing Index	32,671	68.19	20.09

Survey weights applied to all results. Missing Earnings values have been imputed using a regression analysis. All job quality indices and WHO-5 wellbeing indices are normalised to 0–100. The complete cases cover 31 countries (EU-28, + Norway, Switzerland and Turkey)

To investigate and characterise the non-linear association of job quality with wellbeing, we deployed a non-parametric framework, with cells defined by deciles of the single job quality index. Deciles were chosen in preference to quartiles or quintiles, in order to be able to capture with some precision the location of any kinks in the relationship, while retaining sufficient cell sample numbers. Figure 1 plots the increment to wellbeing associated with a one-decile increase in job quality.

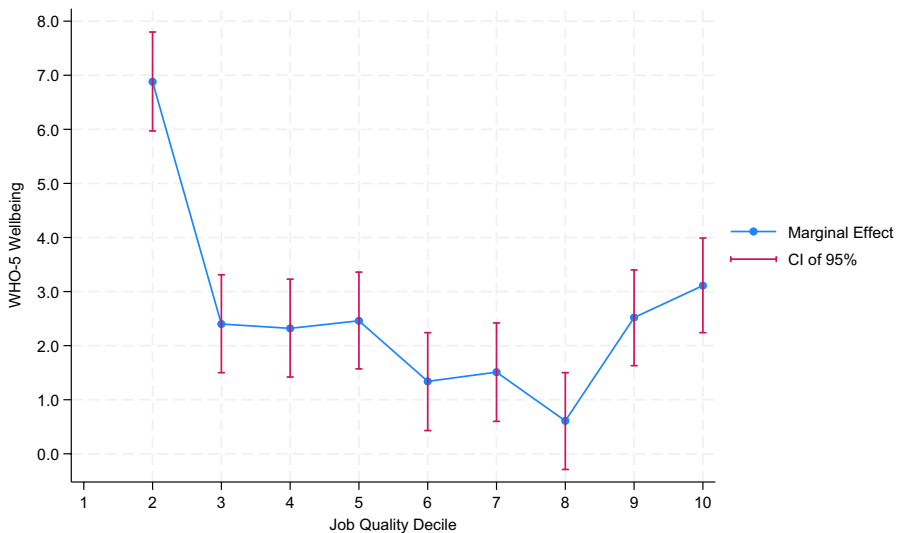


Fig. 1 Marginal Effects: Improving a Decile of Job Quality. Note: The figure shows the marginal effects of improving one decile of job quality. The values are estimated using the following regression model: $Y_i = \alpha + \beta_j j q_i + \varepsilon_i$, where Y_i indicates the WHO-5 wellbeing index, and $j q_i$ represents dummies for deciles of the single job quality index. The values shown in the figure indicate the incremental difference between the coefficients for each job quality index decile

Two observations may be made. First, it may be seen that, as expected, all increments are positive: there is thus a monotonic relationship between job quality and the WHO-5 measure of psychological wellbeing. Second, there is a distinctly large gap in the wellbeing measure between the lowest and the 2nd lowest decile (6.88 units), compared with the gaps between other deciles (which average 2.03 units). That difference between the marginal effect of moving up one decile on wellbeing for those in the bottom decile and for those in the remaining jobs is statistically significant at the five per cent level.

Based on this second observation, we therefore propose a threshold for Europe at the 10th percentile, so that ‘bad job’ will be the term used for jobs in the bottom decile. With this definition, there is a much sharper increase in wellbeing associated with a one-decile increase in job quality for those in bad jobs than for those in other jobs above the threshold. Note that each increment in job quality decile does not necessarily represent the same absolute increment in the job quality index. Thus the sharp jump in wellbeing between the first and second decile could arise from extremely poor job quality at the bottom, or from non-linearity in the relationship between job quality and wellbeing (Warr, 2007), or both. Either way, if job quality policy is to be aimed at remedying ‘bad jobs’, a focus on jobs below this threshold at the lowest decile would be well-founded on wellbeing grounds.

It may also be noted in passing from Fig. 1 that the intra-decile gap in wellbeing increases somewhat after the 8th decile. This observation, using similar logic, might provide the basis for proposing a threshold for ‘good jobs’, in distinction from all other jobs. However, the increment gap is not large. Moreover, this objective would be beyond the scope of the current paper.

Validity

Adopting this threshold will be additionally supportable if it also marks sharp breaks in the incremental rank differences for other general or work-related wellbeing measures, such as indicators of health, of meaningful work (Cassar & Meier, 2018), work-life balance (Drobnič & Guillén, 2011), life satisfaction or overall job satisfaction. Table 2, column (1) covers self-reported general bad health, while columns (2) to (7) report a variety of indicators of work-related wellbeing. Column (2) shows the percentage who think that their work negatively affects their health, column (3) is a measure of meaningfulness derived from work,² column (4) is a measure of work-life balance, column (5) records self-perceptions of discrimination, column (6) covers self-perceptions of health and safety risks, and column (7) shows the number of sick days taken in a year. In every case, the wellbeing of those categorised as being in a bad job is the lowest among all deciles, and the incremental gap between ‘bad job’ and the second decile is greater than all gaps between other deciles. To illustrate from column (2), the proportion of those in bad jobs who think that their job has negative effects on their health is 18 percentage points lower than for those in the

² We use the same two items as in Nikolova and Cnossen (2020) but deploy a simplified linear combination of these items.

Table 2 Validation of Bad Job Index: Marginal Effects

Job Quality Decile	(0) Wellbeing ^a (0–100)	(1) Bad health (%p)	(2) Negative effects on health (%p)	(3) Meaningful work (%p)	(4) Work-life balance (0–100)	(5) Discrimination (%p)	(6) Health/ safety at risk (%p)	(7) Sick leave (Days)
1→2	6.88	-3.04	-17.82	9.76	5.72	-8.91	-18.09	-2.84
2→3	2.40	-1.84	-9.65	6.60	3.93	-4.09	-6.82	-0.65
3→4	2.32	-0.16	-6.76	6.77	2.42	-0.82	-7.33	-0.17
4→5	2.46	-0.35	-4.23	6.51	1.83	-1.22	-3.63	-0.35
5→6	1.34	-1.11	-5.27	2.3	0.87	-0.84	-5.57	-0.19
6→7	1.51	-0.02	-4.20	2.12	1.32	-1.09	-2.95	-1.01
7→8	0.61	0.16	-1.52	3.4	0.43	0.15	-3.10	0.28
8→9	2.52	-0.45	-0.97	3.89	1.46	-1.27	0.05	-0.33
9→10	3.11	-0.20	-5.05	3.72	1.13	-1.93	-4.49	-0.06

Each cell represents the marginal effect of improving a decile of job quality on 7 different indices plus the WHO-5 wellbeing index

^a Column 0 is corresponding to Figure 1

second decile; it diminishes monotonically but much more gradually across all other deciles. From column (7), the gap between the first and second deciles is 2.84 days of sick days, again well above the gaps between subsequent deciles. Unfortunately, the EWCS data contain no indicators of life satisfaction or overall job satisfaction. Nevertheless, we conclude that, by the several available measures of work-related wellbeing available and one of general ill-health, those in bad jobs are distinctly worse off than those in the next decile. While these are assuredly not unbiased estimates of causal relationships, the associations support treating the lowest job quality decile as the ‘bad jobs’ category for this data.

Distinctiveness

While the proposed measure is thus valid in these terms, we next address, in Table 3, whether it yields a classification of bad jobs that is substantively different from alternative classifications based on remuneration, employment security or contract-type. If earnings and other work conditions were thought to covary closely, then use of a single dimension index such as ‘low earnings’ might for many purposes be deemed a good enough proxy for ‘bad job’. Yet, in practice, at the individual level the Earnings index is only positively correlated (and then, quite loosely) with three of the other dimensions: Prospects, Skills and Discretion and the Physical Environment; Earnings has no correlation with the Social Environment at work and is correlated with lower Working Time Quality and greater Work Intensity (see Appendix Table 8). It could therefore be expected that our bad jobs category is quite distinct from the category of low Earnings, and this turns out to be the case. The first panel of Table 3 shows that only 16 percent of those jobs with low (that is, bottom decile) earnings are bad. The second panel considers ‘dead-end jobs’ (Mattijssen & Pavlopoulos, 2019), which we designate here as jobs with both low earnings (bottom 20 percent) and low prospects (bottom 20 percent of the Prospects index which covers both job security and career advancement prospects). It shows that only 31 percent of dead-end jobs are ‘bad jobs’. Finally, the third panel shows that non-permanent jobs are more likely than permanent jobs to be bad jobs, but that nevertheless only 21 percent are bad.

In short, it seems that none of these conventional indicators of bad jobs are close proxies for the proposed measure of bad jobs that is derived from all dimensions of

Table 3 Comparison: Bad Job Index vs. Others

Category	Low Earnings			Dead-End Jobs			Non-Permanent Contract		
	Yes	No	Total	Yes	No	Total	Yes	No	Total
Bad Jobs (%)	15.8	9.5	10.0	31.2	8.5	10.0	21.2	7.0	10.0
Other Jobs (%)	84.2	90.5	90.0	68.8	91.5	90.0	78.8	93.0	90.0

The table shows column percentages. Low earnings represent those in the bottom 10% of earnings. Dead-End jobs represent those in the bottom 20% of earnings and the bottom 20% of prospects. Survey weight is applied to all results

the job, rather than just one or two. To see which indicator performs best in discriminating between bad and other jobs in terms of wellbeing, Table 4 reports the results of regressing psychological wellbeing on each indicator in turn.

The table shows that the association with wellbeing is very substantially greater for the bad job indicator than for the other indicators. The R^2 value for bad jobs is approximately nine times as high as it is for 'dead-end' jobs, and even greater for the other indicators. The difference in wellbeing between being in a 'bad' or 'other' job is 15.1, which is more than three quarters of wellbeing's standard deviation; this difference is very much wider than the wellbeing gap for the other indicators. This finding reinforces the conclusions in Green et al. (2024), emphasising the relative importance of job quality for general wellbeing.

The Distribution of Bad Jobs in Europe

We next deploy the proposed new measure to describe and analyse the distribution of bad jobs in Europe. As noted in the introduction, we expected that in many respects the pattern of this distribution would reflect long-standing findings about what factors lead to successful labour market outcomes as measured by earnings. However, the several dimensions of job quality may be subject to separate drivers, so the distribution of overall job quality may not reflect that of earnings. Are there pockets of bad jobs in industries, sectors or among socio-economic groups, which would not be revealed by a focus just on low earnings or on dead-end and precarious jobs?

Analytical Strategy

We estimate probit models for the probability that a job is a bad job. Our analysis proceeds in six stages. In model (1) we include only job characteristics, in order to provide a description of what are the bad jobs – that is, which industries, sectors and types of contracts. In model (2), while still focusing on job characteristics, we add country-dummies, in recognition that jobs are commonly constituted differently across countries and labour markets.

Table 4 Comparison: Importance of Each Index for General Wellbeing (WHO-5)

	WHO-5 against Bad Job	WHO-5 against Low Earnings	WHO-5 against Dead-End Job	WHO-5 against Permanent Contract
Coefficient	-15.10 (0.36)	-1.59 (0.42)	-6.02 (0.44)	0.39 (0.28)
R^2	0.0508	0.0004	0.0058	0.0001

Standard errors are shown in the parenthesis. Both coefficients and R-squared are from the following regression equation: $Y_i = \alpha + \beta_1 Index_i + \epsilon_i$, where $Index_i$ indicates four different indices used, i.e., bad job, low earnings, dead-end job, and permanent contract, separately. Survey weight is applied to all results

In model (3), we consider to what extent the general affluence of a country may be associated with the prevalence of bad jobs, over and above individual-level job characteristics. The country dummies are replaced by a single country-level variable, GDP per capita. For this estimation we deploy a multi-level probit model with random intercepts:

$$P(Y_{ij} = 1 | X_1, X_2, \dots, X_K) = \Phi(\beta_{0j} + \sum_{K=1}^n \beta_{kj} X_{Kij} + r_{ij})$$

where $\beta_{0j} = \pi_{00} + \sum_{L=1}^n \pi_L X'_{Lj} + u_{0j}$

Y_{ij} indicates whether a job is a bad job; X_1, X_2, \dots, X_K represent the individual-level job characteristics and demographic characteristics of workers, and X'_1, X'_2, \dots, X'_L represent the country-level variables. r_{ij} is a normally distributed individual-level error term and u_{0j} is a normally distributed country-level error term.

Next, in order to examine the different question, namely *who* is doing the bad jobs, in model (4) we look solely at the supply-side, analysing the individual determinants of selection into bad jobs in a single-level model. For this purpose, our model includes the same variables as in a conventional earnings equation, except that the predicted signs for education and work experience (proxied by a quadratic in age) are reversed, and the predicted gender sign is open.

Then, returning to the multi-level approach, models (5), (6) and (7) examine the contribution of both individual-level and country-level variables to the overall variation across Europe in the prevalence of bad jobs. Including both job and personal variables in a reduced-form model can deliver the best overall statistical account of the variation in bad jobs, though the estimated ‘marginal effects’ cannot be interpreted as causal. Model (5) combines job characteristics with the supply-side variables but excludes country-level determinants. In this model, the reported between-country variance is the variance not accounted for by individual worker and job characteristics (including industry composition). Model (6) then introduces GDP per capita. Finally, along the same lines, model (7) adds three variables capturing the national-level regulatory environment. Together, models (6) and (7), in comparison with model (5), will show the extent to which the between-country variation in bad job prevalence reflects the variation in GDP per capita and in the regulatory environment.

Findings

Descriptive statistics for the main explanatory variables are provided in Table 10 in the Appendix. Table 5 reports the average marginal effects derived from the estimates. Where appropriate we compare with equivalent findings in respect of the alternative bad job indicators defined in Table 3: low-earnings jobs, dead end jobs and non-permanent jobs. The relevant detailed results for this comparison are given in Table 11 in the Appendix.

We draw attention to several findings:

Table 5 Probit Regression and Multilevel Probit Models of the Probability that a Job is a Bad Job (EU-28 + Turkey, Norway, Switzerland)

	(1)	(2)	(3) ^a	(4)	(5) ^a	(6) ^a	(7) ^a
Industry [Reference group: A Agricultural, Hunting and Forestry]							
B Fishing	-0.004 (0.047)	-0.014 (0.039)	0.017 (0.070)	NI	0.025 (0.073)	0.025 (0.072)	0.023 (0.069)
C Mining and quarrying	-0.058* (0.007)	-0.055* (0.007)	-0.050* (0.013)		-0.040* (0.016)	-0.039* (0.014)	-0.038* (0.014)
D Manufacturing	-0.042* (0.006)	-0.040* (0.006)	-0.034* (0.010)		-0.024* (0.009)	-0.023* (0.009)	-0.022* (0.008)
E Electricity, gas, and water supply	-0.060* (0.006)	-0.059* (0.005)	-0.057* (0.007)		-0.048* (0.008)	-0.046* (0.008)	-0.044* (0.008)
F Construction	-0.031* (0.006)	-0.027* (0.006)	-0.020* (0.009)		-0.015 (0.009)	-0.014 (0.008)	-0.014 (0.008)
G Wholesale and retail trade; repair of motor vehicles and motorcycles	-0.064* (0.004)	-0.062* (0.004)	-0.057* (0.008)		-0.049* (0.008)	-0.047* (0.007)	-0.046* (0.007)
H Hotels and restaurants	-0.026* (0.007)	-0.028* (0.006)	-0.021* (0.011)		-0.017 (0.010)	-0.016 (0.010)	-0.016 (0.009)
I Transport, storage and communication	-0.050* (0.005)	-0.049* (0.005)	-0.043* (0.008)		-0.034* (0.008)	-0.033* (0.008)	-0.032* (0.007)
J Financial intermediation	-0.079* (0.002)	-0.076* (0.002)	-0.076* (0.006)		-0.070* (0.007)	-0.066* (0.006)	-0.063* (0.005)
K Real estate activities	-0.074* (0.004)	-0.070* (0.003)	-0.066* (0.007)		-0.052* (0.008)	-0.050* (0.007)	-0.048* (0.007)
L Public administration and defence; compulsory social security	-0.071* (0.003)	-0.070* (0.003)	-0.067* (0.006)		-0.056* (0.007)	-0.054* (0.006)	-0.052* (0.005)
M Education	-0.085* (0.003)	-0.082* (0.003)	-0.080* (0.007)		-0.065* (0.007)	-0.062* (0.006)	-0.060* (0.006)
N Health and social work	-0.055* (0.003)	-0.050* (0.003)	-0.041* (0.007)		-0.019 (0.007)	-0.018 (0.006)	-0.017 (0.006)

Table 5 (continued)

	(1)	(2)	(3) ^a	(4)	(5) ^a	(6) ^a	(7) ^a
O Other service activities	(0.005) -0.056*	(0.005) -0.053*	(0.010) -0.047*		(0.011) -0.038*	(0.010) -0.036*	(0.010) -0.035*
P Activities of households	(0.004) -0.037*	(0.004) -0.044*	(0.009) -0.034*		(0.009) -0.034*	(0.008) -0.033*	(0.008) -0.031*
Employment Type [Reference group: Employees]							
Self-employed	(0.011) -0.033*	(0.009) -0.032*	(0.012) -0.036*		(0.011) -0.030*	(0.011) -0.029*	(0.010) -0.028*
Dependent self-employed	(0.005) -0.038*	(0.005) -0.035*	(0.007) -0.032*		(0.007) -0.018	(0.007) -0.018	(0.006) -0.017
Private sector	(0.009) 0.021*	(0.009) 0.019*	(0.010) 0.018*		(0.012) 0.012*	(0.012) 0.012*	(0.011) 0.011*
Large establishment (> 250 workers)	(0.005) 0.011*	(0.005) 0.019*	(0.005) 0.022*		(0.005) 0.027*	(0.005) 0.027*	(0.005) 0.026*
Education [Reference group: C (Lower) Secondary]							
A Pre-primary	(0.004) NI	(0.004) NI	(0.005) NI		(0.006) 0.043	(0.005) 0.042	(0.005) 0.042
B Primary				0.071* (0.033)	0.043 (0.022)	0.042 (0.022)	0.042 (0.022)
D Upper secondary				0.040* (0.011)	0.007 (0.008)	0.007 (0.008)	0.007 (0.008)
E Post-secondary/non-tertiary				-0.029* (0.004)	-0.029* (0.006)	-0.028* (0.006)	-0.027* (0.005)
F 1st stage of tertiary				-0.038* (0.005)	-0.038* (0.006)	-0.036* (0.005)	-0.035* (0.004)
				-0.091* (0.004)	-0.077* (0.009)	-0.075* (0.007)	-0.072* (0.005)

Table 5 (continued)

	(1)	(2)	(3) ^a	(4)	(5) ^a	(6) ^a	(7) ^a
G 2nd stage of tertiary				-0.073* (0.003)	-0.065* (0.007)	-0.062* (0.006)	-0.059* (0.005)
Age/10	NI	NI	NI	0.010 (0.009)	0.003 (0.009)	0.002 (0.009)	0.003 (0.008)
(Age squared)/100	NI	NI	NI	-0.003* (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Male	NI	NI	NI	0.011* (0.003)	0.004 (0.005)	0.004 (0.005)	0.004 (0.005)
Migration Status (1 = immigrant; 0 = others)	NI	NI	NI	0.036* (0.007)	0.048* (0.009)	0.048* (0.008)	0.047* (0.008)
GDP per capita (\$10,000 units)	NI	NI	-0.009* (0.003)	NI	NI	-0.011* (0.002)	-0.008* (0.002)
Works Council (1 = Mandatory existence; 0 = otherwise)	NI	NI	NI	NI	NI	NI	-0.028* (0.011)
Union Density	NI	NI	NI	NI	NI	NI	-0.030 (0.015)
Minimum Wage (1 = National minimum wage across industries; 0 = otherwise)	NI	NI	NI	NI	NI	NI	-0.001* (0.000)
Country dummies	NI	Yes		NI			
Between-Country Variance	-	-	0.040 (0.009)	-	0.074 (0.018)	0.043 (0.011)	0.028 (0.007)
Observations	32,838	32,838	32,838	32,838	32,838	32,838	32,838

NI = 'not included'. a. Columns 3, 5, 6, and 7 are the estimates from the multilevel model

Average marginal effects are shown, and standard errors are shown in parenthesis. Country dummies include 31 different countries in Europe. Marginal effects for each country are omitted for simplification. Work Council represents a binary variable, whether mandatory existence and rights of works council or structure for employee exist; Minimum Wage represents a binary variable, whether a statutory national minimum wage exists across all industries. Survey weight (w4) is applied to all results. * $p < 0.05$

- (a) From model (1) it can be seen that, at one end of the spectrum, bad jobs are rarest in the Education sector and in the Financial Intermediation industries. Relative to those industries, bad jobs are more common in Construction, Hotels & Restaurants, and Household Activities. They are most common in the Fishing and in the Agricultural, Hunting and Forestry industries—specifically, 8 percentage points more common than in the Education sector. This is a large difference, bearing in mind that the Europe-wide overall share of bad jobs is 10 percent.
- (b) The estimates in model (1) also show that bad jobs are about 2 percentage points more common in the private sector, 3 percentage points less common among the self-employed, and about 1 percentage point more common for jobs in large establishments (with at least 250 workers).
- (c) Model (2) shows that the above associations are largely unaltered by the inclusion of country dummies, implying that the associations with industry and other job characteristics is independent of nation-level effects. Note, however, that the estimated association with large establishments becomes 2 percentage points.
- (d) Model (3) shows the effect of GDP per capita. The coefficient estimate of -0.009 implies that a rise of \$10,000 in a country's GDP per capita is associated with 1 percentage point fewer bad jobs. The inclusion of this variable does not significantly alter the estimates of other coefficients.
- (e) Model (4) shows that, as expected, higher educational achievement substantially reduces the chances of being in a bad job. For example, compared with the reference category – those who achieved lower secondary level – graduates of the second tertiary stage are 7 percentage points less likely to be in a bad job. Also as expected, migrants are substantially more likely to be in bad jobs, by a margin of 4 percentage points. Finally, males are found to be 1 percentage point more likely to be in a bad job than females.
- (f) Model (5) reports that, after including all job characteristics and worker demographics, there remains a between-country variance of 0.074. Since the raw between-country variance (obtained from a similar model but excluding all terms but the intercept) is 0.059, we conclude that any differences across countries in industry composition or other job and worker characteristics do not help at all to account for the cross-country difference in bad job prevalence.
- (g) Model (5) also shows some differences compared with estimates in previous models. Most industry dummies are somewhat smaller; for example, for those working in Construction and in Health and Social Work, the prevalence of bad jobs is not significantly different from agricultural jobs, now that their demographics are controlled for. Moreover, in respect of their chances of being in a bad job, the dependent self-employed are not significantly different from the employed (see Horodnic & Williams, 2019, who note that this comparison varies between job quality dimensions). The gender coefficient is insignificant, suggesting that men's slight excess of bad jobs compared with women, as shown in Model (3), is associated with the jobs into which they are sorted.
- (h) Models (6) and (7) re-confirm the effect of GDP per capita as reported in model (3). The remaining between-country variance is reduced in Model (6) to 0.043, implying that some of the differences in bad job prevalence are attributable to the variation in countries' affluence. In model (7) this between-country variance is

further reduced to 0.028. Thus, both the differential regulatory environment and GDP per capita contribute to the cross-national variation in bad jobs. The estimated average marginal effects of regulation characteristics have the predicted signs: the probability of a job being a bad job is about 3 percentage points lower, *ceteris paribus*, in countries where works councils are mandated, and about 1 percentage point lower in countries with a national minimum wage; the estimated association with union density is negative but small and not quite statistically significant at the five percent level.

Discussion

Cross-Country Differences

The distributional pattern of bad jobs across countries conforms to expectations, in that the prevalence of bad jobs differs among countries with varying levels of country-level GDP per capita, and with different regulatory systems. In richer countries, a greater demand for labour can be expected to raise both earnings and other working conditions. Consistent with the substantial industrial relations literature, a national minimum wage, if enforced, sets a floor which, even if there is some compensating reduction in non-wage working conditions, may reduce the prevalence of bad jobs. Similarly, the legally mandated presence of works councils with real bargaining power, and more generally the strength of unions, could be expected to lower the chances of employers designing bad jobs. We find that both a country's GDP per capita, and national-level regulatory institutions have a negative association with the prevalence of bad jobs.

Moreover, the country dummies utilised in model 3 reveal substantial cross-country differences in the proportion of bad jobs. These differences are broadly consistent with the job quality literature which shows significant differences between countries in average job quality across Europe (Gallie, 2007). The analysis here contributes, not only by focusing specifically on the prevalence of bad jobs, but also by analysing factors that may account for the inter-country differences. While the overall average (as determined by the choice of threshold) is 10 percent, the country-level prevalence ranges from 2 percent in Norway to 18 percent in Greece. These inter-country gaps are not explained by differences in individual-level variables, but they can be partially accounted for by country-level characteristics. We compute the country-wide residuals from Model (7) in Table 5, which give the residual cross-country variation that is not accounted for by country-level variation in GDP per capita and regulation, and by individual-level variation. Figure 2 shows this residual variation alongside the raw variation in the proportion of bad jobs. As can be seen, a substantial part of the cross-country variation is explained, thereby illustrating the reduction in inter-country variance reported in Model (7). We conclude that both economic development and regulatory institutions are associated with a significantly reduced prevalence of bad jobs.

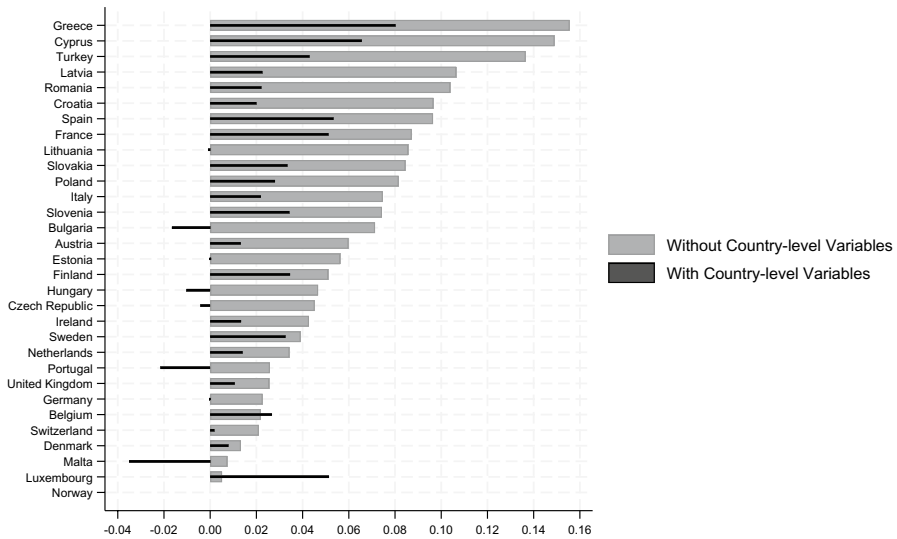


Fig. 2 Proportion in Bad Jobs (Reference Country: Norway). Note: The reference country is Norway, where only 2 per cent of jobs are bad jobs. The without-controls proportions represent the coefficients of country from the following regression equation: a) $Y_i = \alpha + \beta_1 \text{Country}_i + \varepsilon_i$. The with-controls proportions are the average country-wide residuals from model (7) in Table 5

Within-Country Variation

The within-country prevalence of bad jobs also varies as expected. In some respects, the pattern of distribution of ‘bad jobs’ is similar to that of the distribution of low wage jobs and is consistent with long-standing findings surrounding inter-industry wage variation (Carruth et al., 2004; Genre et al., 2011; Hospido & Moral-Benito, 2016). Bad jobs are more prevalent in the private sector, and in the same commonly reported low-wage industries (for example, in agriculture, and in hotels and restaurants), but are rare in financial service industries. Moreover, we find that selection into bad jobs is, as expected, much more likely among those with lower levels of education attainment, and among migrant workers (Cantalini et al., 2022). From this perspective, the bad job indicator does not materially reveal anything that is notably different from the pattern of the alternative indicators.

In other respects, however, the pattern of bad jobs is distinctive. We find, for example, that bad jobs are significantly more common in large establishments. Yet there is extensive prior evidence that wages are elevated for those working in large establishments, and our data confirms that low earnings jobs are indeed more common in small workplaces, as are ‘dead end’ jobs (see Appendix Table 11 columns (1) and (2)). One leading theory explains the ubiquitous establishment size wage effect as a consequence of dynamic monopsony in the labour market; another attributes it to compensating differentials whereby higher wages in large establishments are hypothesised to be in response to lower non-wage job quality (e.g., Fakhfakh & Fitzroy, 2006; Green et al., 1996; Manning, 2003). Some studies also find a positive relationship of employer size with job

quality broadly defined (Gebrehiwot, 2022; Gomez-Salcedo et al., 2017; Brummund et al., 2018), the offered explanation being that larger firms could practise better human resource management and thereby raise job quality. Conversely, however, Wagner (1997) argued that there was more rigid work organisation and tighter control in larger organisations; and later Bryson et al. (2021), using matched employer-employee data in France and Britain, found that firm size is negatively related to important aspects of non-wage job quality, namely task variety and autonomy.

To see whether this explanation is plausible in the present context, we compared specific dimensions of job quality between small and large establishments. Table 6 shows how sub-indices of job quality varies by job size across Europe. In contrast to previous studies, we do not find evidence of tighter control: there is only a minor and insignificant difference between large and small establishments in the chances of being in the lowest decile for task discretion. However, small establishments score well for other elements of non-wage job quality: the Social Environment is in its lowest decile in 9 percent of small, but 14 percent of large establishments, and top decile Work Intensity is more likely to be found in large establishments. We conclude that differential non-wage job quality remains as a plausible explanatory factor for the employer-size wage effect.

A second way in which the pattern of bad jobs is distinctive concerns gender. Notwithstanding the persistent gender wage gap favouring men, ubiquitous throughout and beyond Europe, we find that there is little difference between men and women in the prevalence of bad jobs. A possible interpretation is that there is an overall balancing of advantages and disadvantages for men and women from the various dimensions at the low end of the job quality spectrum. Even though women in Europe are more likely to be in jobs with low earnings, those jobs may have a better working time quality or compensate in other ways. A third distinct pattern is that being in the private sector raises the likelihood of a job being a bad job, even though in this data there is no private sector pay penalty (Appendix Table 11).

Table 6 Job Quality by Establishment Size

Dimensions	Establishment Size	
	Small (%)	Large (%)
Discretion (lowest 10%)	9.73	10.66
Social Environment (lowest decile)	9.02	14.06
Work Intensity (top 10%)	7.83	14.46
Dead-end jobs	8.34	3.34
Low earnings	12.02	6.11

The table shows the percentage of 1) those with the lowest decile of the Discretion index, 2) those with the lowest decile of the Social Environment, 3) those with top decile of the Work Intensity index, 4) those with dead-end jobs (bottom quintile of earnings and bottom quintile of prospects), and 5) those with low earnings jobs (bottom decile of earnings)

Conclusion

A wellbeing-based definition of ‘bad jobs’ could be a valuable aid for assessing policy priorities, if they are to be influenced by their potential effects on wellbeing. We have presented an innovative proposal for such a concept, drawing on the discontinuity in the relationship between a single index of job quality and a widely used measure of psychological wellbeing. Since this definition is based on theoretically expected relationships between job quality and wellbeing which have been strongly verified in the scientific literature, we suggest that this method is potentially superior to relying on individual researchers’ normative judgements about what constitutes bad jobs. The method could be applied to any large data set with sufficiently comprehensive job quality and general wellbeing data.

Deploying the method to comprehensive data on multiple dimensions of job quality, the evidence suggests a cut-off threshold for ‘bad jobs’ in Europe at a relatively low point in the job quality spectrum, at just the 10th percentile. Comparing workers in jobs below this threshold with those at the next decile, there is a distinctly large gap in psychological wellbeing. The delineation of this threshold is robust in that there are also large gaps in several other measures of wellbeing between the lowest and second-lowest decile. Using this threshold gives a bad jobs/ other jobs dichotomy that discriminates on wellbeing far better than definitions based on either low earnings, or on a combination of low earnings and low job security, or on the contractual distinction between permanent and non-permanent jobs.

We find that bad jobs are associated with lower education, migrant status, and working in traditionally low-wage industries such as agriculture. In these respects, the pattern confirms what is long known from the literature on wage studies. We also find a cross-country variation of bad jobs that conforms with expectations, in that the probability of being in a bad job is lessened in richer countries, and in countries with stronger labour regulation. However, three findings differentiate the pattern of bad jobs from the pattern of low-earnings jobs. We find that the prevalence of bad jobs is moderately greater in large establishments, even though large establishments have greater earnings and hence fewer low-earnings jobs. Breaking this down, this reversal arises because large establishments are more susceptible to high work intensity and a poor social environment. Second, we find that there is no gender gap in the prevalence of bad jobs. Third, working in the private sector does not significantly change the probability of being in a low-earnings job in Europe, but it raises the chance of being in a bad

job. Together, these findings add support to the case for a bad job indicator based on multidimensional job quality.

Certain limitations to the proposed method deserve mention. First, it must be accepted that some extremely bad jobs – those involving forced labour – will not feature in conventional surveys, and therefore not be picked up through this method. Recent estimates suggest that some 50 million people, including 12 million children, were in forced labour in the early 2020s (ILO et al., 2022). Second, different indicators of wellbeing could lead to different thresholds within the same job quality distribution. There being no single 'best' indicator of wellbeing, it will be desirable if the chosen threshold is not overly sensitive to the particular choice of wellbeing measure in any data set. Our robustness analysis using other wellbeing indicators shows no sensitivity in the present context, but that may not always be true, and then the determination of the bad job threshold would depend on an explicit choice of wellbeing indicator. A third limitation is that to operationalise the method requires a substantive data set, with broad coverage of job quality dimensions and enough observations to enable a threshold to be specified reasonably precisely. Such data sets are currently rare, though growing in recent decades. To operationalise this method broadly for practical purposes will require an ongoing expansion of data collection on job quality. Multiple jobholding also constitutes a potential issue for data collection in some countries where that applies to more than a small minority: at present, data is only collected for each respondent's main job. Finally, it must be stressed that the associations, drawn as they are from single cross-sections with no obvious exogenous identifying factors, are not estimates of causal relationships. In mitigation, however, the choice of dimensions is founded upon a rich literature in which evidence of the links between them and wellbeing has been built up over decades (see, e.g., Caroli and Godard, 2016; Eurofound, 2019; Belloni et al., 2022).

Future research on bad jobs using the wellbeing method might be applied in other contexts. Although the evidence points to a relatively low threshold for delineating bad jobs in Europe, in other regions, using the same principle of identifying any discontinuities in the relationship between job quality and wellbeing, the revealed threshold could be at a different level, perhaps designating a larger proportion of bad jobs. Within a region, the trend in the proportion of bad jobs could be tracked over time, as long as consistent measures are available; for this a fixed threshold would need to be set. Further research could also usefully examine whether the effects of regulation in limiting bad jobs vary, as might be expected, across socio-economic groups.

Appendix

Table 7 Summary Description of the Job Quality Indices

Index	Questionnaires and Description
1	<i>Earnings</i> EF10 (net monthly earnings)
2	<i>Prospects</i> Q6 (employment type) Q7 (contract type), Q77C (career progression), Q77A (job security)
3	<i>Skills and Discretion</i> Q49C (solving problems) Q49E (complex tasks), Q49F (learning new things) Q50A (order of task), Q50B (methods of work), Q50C (rate of work) Q51C (consulted before targets are set), Q51E (choice of colleagues), Q51I (your own ideas), Q51O (important decisions) Q51H (computer use), Q61A (training by employer), Q61C (on-the-job training), EF1 (average education level of occupation)
4	<i>Social Environment</i> Q51A (peer support), Q51B (manager support), Q58A (feedback), Q58B (respect), Q58C (resolving conflicts), Q58D (organising work), Q58E (encouragement), Q77E (good friends at work) Q70A, Q70B, Q70C, Q71A, Q72B, Q72C (no abuse)
5	<i>Physical Environment</i> Q23A (vibrations), Q23B (noise), Q23C (high temperature), Q23D (low temperature), Q23E (smoke & dust), Q23F (vapours), Q23G (chemical substances), Q23H (tobacco smoke), Q23I (infectious materials) Q24A (painful positions), Q24B (lifting people), Q24C (carrying heavy loads), Q24D (standing), Q24E (repetitive hand movements)
6	<i>Work Intensity</i> Q45A (working at high speed), Q45B (tight deadlines), Q46A (colleagues' work), Q46B (direct demands from people), Q46C (performance targets), Q46D (automatic speed of a machine), Q46E (direct control of boss) Q51G (enough time to get job done), Q51L (conflicts with personal values), Q54P (hiding feelings), Q24G (handling angry clients)
7	<i>Working Time Quality</i> Q18 (work hours), Q32, Q33 (night work), Q34 (Sunday work), Q35 (Saturday work), Q39 (time arrangement), Q43 (short-term flexibility)

The EWCS provides seven job quality indices, constructed based on the items above; for fuller details see Eurofound (2012). Missing values on Earnings were imputed using a regression analysis based on gender, education level, age quadratic, and industry

Table 8 Correlation between Job Quality Dimensions

	Earnings	Prospects	Skills & Discretion	Physical Env	Social Env	Work Intensity	Working Time Quality
Earnings	1.000						
Prospects	0.240*	1.000					
Skills & Discretion	0.388*	0.336*	1.000				
Physical Env	0.109*	0.125*	0.167*	1.000			
Social Env	-0.001	0.172*	0.155*	0.136*	1.000		
Work Intensity	0.106*	-0.022*	0.092*	-0.349*	-0.244*	1.000	
Working Time Quality	-0.127*	0.063*	-0.014*	0.240*	0.173*	-0.342*	1.000

* $p < 0.05$

Table 9 A Single Job Quality Index: Principal Component Analysis

Variable	Component 1
<i>Earnings</i>	0.2853
<i>Prospects</i>	0.4220
<i>Working Time Quality</i>	0.3040
<i>Skills and Discretion</i>	0.4165
<i>Physical Environment</i>	0.4655
<i>Social Environment</i>	0.3770
<i>Work Intensity</i>	-0.3404

Table 9 shows the weights attached to job quality dimensions in computing the first principal component as the single job quality index. Work Intensity is a negative indicator of job quality

Table 10 Descriptive Statistics for Individual-level and Country-level Variables

	Obs	Mean	Std. Dev
Self-employed (independent)	32,838	0.08	0.27
Self-employed (dependent)	32,838	0.02	0.14
Permanent contract	29,815	0.79	0.41
Private	32,838	0.76	0.43
Large establishment (> 250)	32,838	0.33	0.47
Pre-Primary	32,838	0.00	0.06
Primary	32,838	0.04	0.19
(Lower) Secondary	32,838	0.14	0.35
(Upper) Secondary	32,838	0.43	0.50
Post-Secondary	32,838	0.06	0.24
1st Stage of Tertiary	32,838	0.31	0.46
2nd Stage of Tertiary	32,838	0.01	0.09
Male	32,838	0.54	0.50
Age	32,838	41.61	12.30
Migration status	32,838	0.08	0.27
GDP per capita (2015 dollars)	32,838	32,968	16,193.19
Statutory national minimum wage	32,838	0.83	0.38
Work council (mandatory existence)	32,838	0.83	0.38
Union Density (%)	32,838	20.77	13.88

Survey weight is applied to all results. The unit of GDP per capita is 2015 constant US dollars. All variables, except GDP per capita and Union Density, are binary variables; hence, the mean values indicate the proportion

Table 11 Multilevel Probit Modelling with 'Low Earnings' and 'Low Prospects'

	(1) Low Earnings (Binary)	(2) Dead-End Job (Binary)	(3) Non-Permanent (Binary)
Industry [Reference group: A Agricultural, Hunting and Forestry]			
B Fishing	-0.022 (0.049)	-0.037* (0.010)	-0.077 (0.042)
C Mining and quarrying	-0.064* (0.007)	-0.043* (0.004)	-0.166* (0.017)
D Manufacturing	-0.038* (0.008)	-0.032* (0.005)	-0.147* (0.016)
E Electricity, gas, and water supply	-0.047* (0.013)	-0.030* (0.007)	-0.143* (0.013)
F Construction	-0.052* (0.009)	-0.028* (0.006)	-0.102* (0.015)
G Wholesale and retail trade; repair of motor vehicles and motorcycles	-0.018* (0.009)	-0.023* (0.006)	-0.139* (0.016)
H Hotels and restaurants	-0.003 (0.013)	-0.009 (0.008)	-0.082* (0.018)
I Transport, storage and communication	-0.047* (0.011)	-0.032* (0.006)	-0.131* (0.015)
J Financial intermediation	-0.059* (0.009)	-0.040* (0.005)	-0.144* (0.017)
K Real estate activities	-0.021* (0.010)	-0.019* (0.006)	-0.118* (0.019)
L Public administration and defence; compulsory social security	-0.039* (0.011)	-0.030* (0.006)	-0.118* (0.019)
M Education	-0.005	-0.019*	-0.093*

Table 11 (continued)

	(1) Low Earnings (Binary)	(2) Dead-End Job (Binary)	(3) Non-Permanent (Binary)
N Health and social work	(0.012) -0.037* (0.008)	(0.009) -0.026* (0.006)	(0.019) -0.121* (0.015)
O Other service activities	0.012 (0.017)	-0.010 (0.010)	-0.079* (0.019)
P Activities of households	0.146* (0.032)	0.092* (0.030)	0.060 (0.060)
Employment Type [Reference group: Employees]			
Self-employed	0.000 (0.014)	-0.001 (0.008)	0.598* (0.177)
Dependent self-employed	-0.034* (0.012)	-0.020* (0.008)	0.244* (0.099)
Private sector	-0.005 (0.007)	-0.000 (0.005)	-0.018 (0.011)
Large establishment (> 250 workers)	-0.027* (0.006)	-0.012* (0.003)	-0.031* (0.009)
Education [Reference group: C (Lower) Secondary]			
A Pre-primary	-0.000 (0.026)	0.010 (0.011)	0.070 (0.043)
B Primary	0.065* (0.015)	0.037* (0.013)	0.092* (0.032)
D Upper secondary	-0.028* (0.015)	-0.017* (0.013)	-0.049* (0.032)

Table 11 (continued)

	(1) Low Earnings (Binary)	(2) Dead-End Job (Binary)	(3) Non-Permanent (Binary)
E Post-secondary/non-tertiary	(0.005) -0.032*	(0.005) -0.019*	(0.016) -0.047*
F 1st stage of tertiary	(0.010) -0.089*	(0.006) -0.053*	(0.019) -0.096*
G 2nd stage of tertiary	(0.015) -0.072*	(0.007) -0.040*	(0.018) -0.001
Age/10	(0.011) -0.205*	(0.006) -0.097*	(0.041) -0.372*
(Age/10) squared	(0.020) 0.023*	(0.011) 0.011*	(0.033) 0.038*
Male	(0.002) -0.068*	(0.001) -0.034*	(0.004) -0.003
Migration Status (1 = immigrant; 0 = others)	(0.009) 0.028*	(0.004) 0.014*	(0.007) 0.071*
GDP per capita/10,000	(0.007) -0.016*	(0.007) -0.013*	(0.009) -0.014*
Between-Country Variance	(0.004) 0.139	(0.002) 0.045	(0.006) 0.118
Observations	(0.044) 32,838	(0.014) 32,838	(0.035) 29,815

Marginal effects are shown, and standard errors are shown in parenthesis. Low earnings represent those in the bottom 10% of earnings. Dead-End jobs represent those in the bottom 20% of Earnings and the bottom 20% of Prospects. The estimates can be compared with Model (6) in Table 5 of the main text

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References

- Ablaza, C., Western, M., & Tomaszewski, W. (2021). Good jobs and bad jobs for Indonesia’s informal workers. *International Labour Review*, *160*(1), 143–168.
- Acemoglu, D. (2001). Good Jobs versus Bad Jobs. *Journal of Labor Economics*, *19*, 1–21.
- Adamson, M., & Roper, I. (2019). “Good” Jobs and “Bad” Jobs: Contemplating Job Quality in Different Contexts. *Work Employment and Society*, *33*(4), 551–559.
- Alkire, A., & Foster, J. (2011). Counting and multidimensional poverty measurement. *Journal of Public Economics*, *95*, 476–487.
- Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International*, *13*(3), 209–223. <https://doi.org/10.1108/13620430810870476>
- Belloni, M., Carrino, L., & Meschi, E. (2022). The impact of working conditions on mental health: Novel evidence from the UK. *Labour Economics*, *76*, 102176.
- Benton, R. A., & Kim, K.-J. (2022). The dependency structure of bad jobs: How market constraint undermines job quality. *ILR Review*, *75*(1), 3–27. <https://doi.org/10.1177/0019793920936250>
- Branch, E. H., & Hanley, C. (2017). A racial-gender lens on precarious nonstandard employment. In A. L. Kalleberg & S. P. Vallas (Eds.), *Precarious Work* (vol. 31, pp. 183–213). Emerald Publishing Limited. <https://doi.org/10.1108/S0277-283320170000031006>
- Brummund, P., Mann, C., & Rodriguez-Castelan, C. (2018). Job quality and poverty in Latin America. *Review of Development Economics*, *22*, 1682–1708.
- Bryson, A., Erhel, C., & Salibekyan, Z. (2021). Perceptions of non-pecuniary job quality using linked employer-employee data. *European Journal of Industrial Relations*, *27*(2), 113–129.
- Cantalini, S., Guetto, R., & Panichella, N. (2022). The ethnic wage penalty in Western European regions: Is the European integration model confirmed when differences within countries are considered? *Demographic Research*, *46*, 681–692.
- Caroli, E., & Godard, M. (2016). Does job insecurity deteriorate health? *Health Economics*, *25*(2), 131–147.
- Carruth, A., Collier, W., & Dickerson, A. (2004). Inter-industry wage differences and individual heterogeneity. *Oxford Bulletin of Economics and Statistics*, *66*(5), 811–846.
- Cassar, L., & Meier, S. (2018). Nonmonetary incentives and the implications of work as a source of meaning. *Journal of Economic Perspectives*, *32*(3), 215–238.
- Drobníč, S., & Guillén, A. M. (Eds.). (2011). *Work-Life Balance in Europe*. Palgrave Macmillan.
- Eurofound. (2012). *Trends in Job Quality in Europe*. Publications Office of the European Union.
- Eurofound. (2017). *Sixth European Working Conditions Survey – overview report (2017 update)*. Publications Office of the European Union.
- Eurofound. (2019). *Working Conditions and Workers’ Health*. Publications Office of the European Union.
- Eurofound. (2021). *Working conditions and sustainable work: An analysis using the job quality framework*. Challenges and prospects in the EU series, Publication Office of the European Union.

- Eurofound. (2023). *European Working Conditions Survey, 2015*. [data collection]. 4th Edition. UK Data Service. SN:8098.
- Fakhfakh, F., & Fitzroy, F. (2006). Dynamic monopsony: Evidence from a French establishment panel. *Economica*, 73(291), 533–545.
- Fusaro, V. A. and H. L. Shaefer (2016). How should we define "low-wage" work? An analysis using the Current Population Survey. *Monthly Labor Review*.
- Gallie, D. (2007). Production Regimes, Employment Regimes, and the Quality of Work. In D. Gallie (Ed.), *Employment Regimes and the Quality of Work* (pp. 1–34). Oxford University Press.
- Gebrehiwot, B. A. (2022). Job quality in the micro and small enterprise sector in Ethiopia: Evidence from firm-level data. *Cogent Economics & Finance*, 10(1), 2151703.
- Genre, V., Kohn, K., & Momferatou, D. (2011). Understanding inter-industry wage structures in the euro area. *Applied Economics*, 43(11), 1299–1313.
- Gomez-Salcedo, M. S., Galvis-Aponte, L. A., & Royuela, V. (2017). Quality of Work Life in Colombia: A Multidimensional Fuzzy Indicator. *Social Indicators Research*, 130(3), 911–936.
- Gonzalez, P., Sehnbruch, K., Apablaza, M., Pineda, R. M., & Arriagada, V. (2021). A Multidimensional Approach to Measuring Quality of Employment (QoE) Deprivation in Six Central American Countries. *Social Indicators Research*, 158(1), 107–141.
- Green, F. (forthcoming). *Job Quality, Wellbeing and the Global Economy*. Oxford University Press.
- Green, F., Machin, S., & Manning, A. (1996). The employer size-wage effect: Can dynamic monopsony provide an explanation? *Oxford Economic Papers-New Series*, 48(3), 433–455.
- Green, F., Lee, S., Zhou, Y., & Zou, M. (2024). Work and life: The relative importance of job quality for general wellbeing, and implications for social surveys. *Socio-Economic Review*, 22(2), 835–857.
- Green, F. (2021). Decent Work and the Quality of Work and Employment, U. Jirjahn, Handbook on Labor, Human Resources and Population Economics. Section: Worker Representation, Labor-Management Relations and Labor Standards. Online: Springer Nature:
- Grenier, A., Phillipson, C., Rudman, D. L., Hatzifilalithis, S., Kobayashi, K., & Marier, P. (2017). Precarity in late life: Understanding new forms of risk and insecurity. *Journal of Aging Studies*, 43, 9–14.
- Horodnic, I. A., & Williams, C. C. (2020). Evaluating the working conditions of the dependent self-employed. *International Journal of Entrepreneurial Behavior & Research*, 26(2), 326–348.
- Hospido, L., & Moral-Benito, E. (2016). The public sector wage premium in Spain: Evidence from longitudinal administrative data. *Labour Economics*, 42, 101–122.
- Howell, D. R., & Kalleberg, A. L. (2019). Declining Job Quality in the United States: Explanations and Evidence. *Rsf-the Russell Sage Journal of the Social Sciences*, 5(4), 1–53.
- ILO, Walk Free, & IOM. (2022). *Global Estimates of Modern Slavery: Forced Labour and Forced Marriage*. International Labour Office, Walk Free and International Organization for Migration.
- Jenkins, S., & Chivers, W. (2022). Can cooperatives/employee-owned businesses improve "bad" jobs? Evaluating job quality in three low-paid sectors. *British Journal of Industrial Relations*, 60(3), 511–535.
- Jin, T., Wang, T., Zhou, S., & Liu, D. (2024). Long Working Hours and Job Satisfaction in Platform Employment: An Empirical Study of On-Demand Delivery Couriers in China. *Applied Research in Quality of Life*, 19(1), 1197–1223.
- Layard, R. (2021). Wellbeing as the Goal of Policy. *LSE Public Policy Review* 2(2)
- Lee, S., & Sobek, K. (2012). Low-wage work: A global perspective. *International Labour Review*, 151(3), 141–155.
- Léné, A. (2019). Job Satisfaction and Bad Jobs: Why Are Cleaners So Happy at Work? *Work Employment and Society*, 33(4), 666–681.
- Manning, A. (2003). *Monopsony in Motion: Imperfect Competition in Labor Markets*. Princeton.
- Mattijssen, L., & Pavlopoulos, D. (2019). A multichannel typology of temporary employment careers in the Netherlands: Identifying traps and stepping stones in terms of employment and income security. *Social Science Research*, 77, 101–114.
- Muñoz de Bustillo, R., Fernández-Macías, E., Antón, J.-I., & Esteve, F. (2011). E pluribus unum? A critical survey of job quality indicators. *Socio-Economic Review*, 9, 447–475.
- Murtin, F., Arnaud, B., Gallie, D., Le Thi, C., & Parent-Thirion, A. (2024). Changes in Job Strain in the US, Europe and Korea. *Applied Research Quality Life*, 19, 1903–1926.
- Nie, P., Ding, L. L., & Sousa-Poza, A. (2020). What Chinese Workers Value: An Analysis Of Job Satisfaction, Job Expectations, And Labour Turnover In China. *Prague Economic Papers*, 29(1), 85–104.
- Nikolova, M., & Cnossen, F. (2020). What makes work meaningful and why economists should care about it. *Labour Economics*, 65, 101847.

- Pagan, R., & Malo, M. A. (2009). Job satisfaction and disability: Lower expectations about jobs or a matter of health? *Spanish Economic Review*, 11(1), 51–74.
- Press, E. (2022). *Dirty Work*. Head Zeus, Apollo.
- Sever, M., & Ozdemir, S. (2022). Classification of ‘dirty work’ and its forms in Turkey. *Journal of Humanity and Society (insan & toplum)*, 12(3), 101–121. <https://doi.org/10.12658/M0663>
- Schmidt, J. (2007). *The Good, the Bad and the Ugly. Job Quality in the United States over the Three Most Recent Business Cycles*. Washington, D.C., Center for Economic and Policy Research
- Sengupta, S., Edwards, P. K., & Tsai, C.-J. (2009). The good, the bad, and the ordinary. *Work and Occupations*, 36(1), 26–55.
- Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The Who-5 Wellbeing Index: A Systematic Review of the Literature. *Psychotherapy and Psychosomatics*, 84, 167–176.
- Visser, J. (2019). ICTWSS *Data base. version 6.1*. Amsterdam: Amsterdam Institute for Advanced Labour Studies AIAS. October 2019
- Wagner, J. (1997). Firm size and job quality: A survey of the evidence from Germany. *Small Business Economics*, 9(5), 411–425.
- Wallace, M., & Kwak, J. (2018). Bad jobs in a troubled economy: The impact of the great recession in America’s major metropolitan areas. In A. L. Kalleberg & S. P. Vallas (Eds.), *Precarious work* (1st ed.). Emerald Publishing.
- Warr, P. (2007). *Work, Happiness, and Unhappiness*. Lawrence Erlbaum Associates.
- Williams, M., Zhou, Y., & Zhou, M. (2020). *Mapping Good Work*. Bristol University Press.

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