► Methodological Brief

Measuring Quality of Employment in Emerging Economies:
A Methodology for Assessing Job Amenities using Big Data

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Key points

► This brief presents a novel methodology that leverages online vacancy data and natural language processing (NLP) to measure job amenities across different country contexts.

► The methodology employs a taxonomy comprising 16 amenity subcategories, organized into five broad categories. It is specifically designed for vacany data and can be adapted to country-specific contexts.

► Alongside wages, non-wage job attributes are an important aspect of what characterises decent work.

► Measuring job amenities through vacancy data allows to answer key questions such as: what matters for attracting talent? Are high-paying firms also high-satisfaction firms, or do they offset better amenities with lower wages? Moreover, are these trends consistent across different groups of workers? While it is well-established that workers have a significant willingness to pay for non-wage amenities, the nuances of how these preferences are exploited or accommodated by firms remain underexplored.

► Introduction

In the realm of workforce dynamics, job amenities[1] and working conditions exert profound influence on employee satisfaction (Sullivan and To 2014), productivity, and organizational success (Cassar and Meier 2018). These job attributes encompass a wide range of factors, from workplace safety and ergonomic design to benefits such as healthcare, childcare, and professional development opportunities. Understanding the impact of job amenities or attributes is crucial for employers seeking to attract and retain talent in competitive markets, as well as for policymakers aiming to create conducive environments for economic growth and social well-being.

The existing literature highlights that workers exhibit a significant willingness to pay for job amenities. For instance, Maestas et al. (2023) find that switching from a job with no amenities to one with the best set of amenities is perceived as equivalent to a wage increase of approximately 56 percent. Similarly, Sockin (2021) suggests that workers, particularly those with higher earnings, are willing to accept lower wages in exchange for greater job satisfaction, indicating that amenity value corresponds to wage gains. This underscores the economic value that employees place on non-wage job attributes.

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[1] In this brief, we use the terms "job amenities", "job attributes" and "non-wage amenities" interchangeably.

However, working conditions and access to amenities vary substantially across sociodemographic groups, reflecting disparities that extend beyond wages alone. These differences can be shaped by factors such as occupation type, industry norms, bargaining power, and historical inequalities in labour market opportunities.

From a policy perspective, understanding the extent of these disparities is essential for assessing labour market inequality and designing targeted interventions. If certain groups consistently face poorer working conditions despite similar qualifications or productivity levels, this raises concerns about equity, social mobility, and economic efficiency. Addressing these gaps through improved labour regulations, employer incentives, or collective bargaining mechanisms could enhance both worker well-being and overall economic performance. Future research should continue to explore how job attributes interact with wages and broader labour market outcomes to inform evidence-based policies that promote fair and inclusive workplaces.

Furthermore, despite an increasing body of literature that focuses on job amenities and their importance vis-à-vis wages (Lamadon, Mogstad, and Setzler 2022; Sorkin 2018; Taber and Vejlin 2020; Hamermesh 1999; Oyer 2008; Mas and Pallais 2017; Maestas et al. 2023), our understanding of job amenities in certain parts of the world still remains limited. This methodological brief introduces an innovative approach which leverages big online data and advanced natural language processing (NLP) techniques to reveal job amenities in low- and middle-income countries. By extracting detailed information from job vacancies, this novel method offers unprecedented insights into job amenities that are being offered across various sectors and occupations. This approach not only addresses the significant data gaps in these economies but also provides a robust framework for analysing non-wage amenities.

▶ Methodology: Taxonomy and implementation

The methodology for identifying amenities in unstructured vacancy data is akin to that used for skills identification (see Adamczyk et al. 2025). Similar to the process employed for

skills, a categorization of amenities was developed based on a taxonomy that was constructed following the empirical literature, primarily Maestas et al. (2023) and Sockin (2021), with adaptations to country's contexts.

Initially, insights were drawn from Maestas et al. (2023), whose categorization focuses on a concise list of nine job attributes deemed crucial based on the results from the AWCS (American Worker Conditions Survey). The survey collects workers' assessments of nine work characteristics: i) schedule flexibility, ii) telecommuting opportunities, iii) physical demands, iv) pace of work, v) autonomy, vi) paid time off, vii) working with others, viii) job-training opportunities, and ix) impact on society. To broaden the scope of the categorisation and minimize biases related to U.S.-specific preferences, this list was complemented with additional information from the literature. In particular, the comprehensive categorisation presented by Sockin (2021) was employed, which organizes non-wage amenities in 48 categories derived from the literature using a topic-modelling machine learning algorithm implemented in the text of amenities descriptions in U.S. employer-employee data.

Upon identifying all relevant categories from the literature, three key steps were undertaken. First, these categories were reorganized to align with vacancy data since the literature primarily relies on U.S. workers' reviews, and not all categories are pertinent to vacancy data, as firms may not advertise certain aspects of a job. Second, the list of keywords and expressions used in the literature to characterize different amenities was supplemented and keywords were translated from English into three additional languages—Spanish, Portuguese, and Russian—to accommodate the text analysis for the countries under investigation[2]: Uruguay, Brazil, the Russian Federation, and South Africa (see box 1 for a description of the data used). Lastly, an additional amenity subcategory was introduced, "work equipment and allowances", to reflect the post-pandemic reality and incorporate attributes of manual work that may hold greater importance in developing countries.

The set of keywords and expressions were used to define 16 distinct amenities, which were subsequently grouped into five broad categories. To ensure that each amenity

captures unique job attributes and to avoid double-counting, the keywords and expressions were carefully reviewed and adjusted so that no term appeared in more than one subcategory. This process resulted in a final set of 629 words and expressions in Spanish, 678 in Portuguese, 658 in English, and 660 in Russian. Additionally, for compound expressions, reversed versions were included to account for variations in phrasing. For example, both "extra pay" and "pay extra" were considered valid matches.

▶ **Box 1. Data**

The methodology was applied and adapted to four country contexts: Uruguay, Brazil, the Russian Federation and South Africa. The data used comes from:

▶ **BuscoJobs** which is a private job-search portal. It provides high-frequency detailed information on job vacancies posted by firms in Uruguay (2010–2023) and Brazil (2010–2023).

▶ **Adzuna** which is a job aggregator. It provides detailed job advert data in Russia (April 2016–December 2021) for 580,000 job posts per week and their characteristics, representing 90% of the online job marketplace; and South Africa (April 2016–December 2021) with 20,000 adverts per week, representing 85% of the online jobs marketplace.

Table 1 provides a list of these categories and subcategories, along with the definitions and, where applicable, sources from the literature.[3]

It is important to clarify that while we use the term amenities to refer to non-wage job attributes, these attributes are not inherently positive or negative for job quality or job satisfaction. Whether an attribute enhances or detracts from job quality depends on how workers perceive it and on the specific labour market context. To classify each subcategory as amenity or disamenity, an extensive literature review was conducted, drawing on studies that analyse worker sentiment, willingness-to-pay, and job preferences (Sockin and Sockin 2019; Maestas et al.

2023; Mas and Pallais 2017; Goldin 2015; Wiswall and Zafar 2018 among various others).[4]

Based on this review, 12 subcategories were classified as amenities: i) bonuses and commissions, ii) paid time-off; iii) health insurance; iv) retirement contributions; v) food and services subsidies and other employee discounts, vi) office space and other office amenities, vii) work equipment and allowances, viii) work schedule flexibility, ix) workplace safety, x) job security, xi) work environment and impact on society, as well as xii) human capital development. Two subcategories were identified as disamenities: i) hourly work and overtime and ii) physical effort and pace of work. Lastly, two subcategories—i) location and commuting and ii) working in teams—were classified as context-dependent, meaning that their association with job satisfaction depends on individual worker preferences. Their role should therefore be evaluated empirically based on the findings of the analysis in question.

To apply this dictionary to the vacancy data, both the terms in the dictionary and the free-text content from the job advertisements must first be processed into a compatible format. The process largely mirrors the one used to create the skills variables (see Adamczyk et al. 2025), albeit with some modifications. The steps encompass tokenization (splitting text into single units or tokens), normalization (removing capitalization and special characters), removal of stop words (with exceptions for keywords included in the dictionaries for each language), and lemmatization (reducing words to their root forms, such as converting conjugated verbs to their base form).

Once both the text describing vacancies and the keywords and expressions from the dictionary are in the same format, they are matched using a rule-based NLP classification approach to identify amenities in the vacancy data. Matches are disregarded if a keyword is preceded by negations such as "no", "nor", or "not". Additionally, the process allows for matches even if there is one intervening word between the terms in a dictionary expression.

▶ **Table 1: Categorization of amenities, keywords, and sources**

Subcategory	Definition	Sources
Variable earnings		
A01 - Bonuses and commissions	Encompasses various forms of financial incentives and rewards aimed at motivating and compensating employees based on their performance, achievements, or specific goals within an organization.	Sockin and Sockin (2019); Sockin (2021)
A02 - Hourly work and overtime	Encompasses aspects related to flexible earnings, reflecting the compensation and conditions associated with working beyond regular hours, in an hourly base or during specific periods within an employment arrangement.	Beckers et al. (2008)
Fringe benefits		
A03 - Paid time-off	Reflects provisions for employees to take time away from work while receiving compensation in specific circumstances, thereby promoting work-life balance and employee well-being.	Maestas et al. (2023)
A04 - Health insurance	Includes provisions offered by employers to support employees' healthcare needs, ensuring access to medical services, and providing financial protection in cases of illness, accidents, or other health-related situations.	Simon and Kaestner (2004); Sockin (2021)
A05 - Retirement contributions	Encompasses provisions designed to assist employees in saving for their retirement and securing financial stability during their later years.	Simon and Kaestner (2004); Sockin (2021)
A06 - Food and services subsidies, and other employee discounts	Encompasses benefits related to food, housing, transportation, and various subsidies or discounts offered to employees.	Glassdoor (2015); Fractl 2020
Job attributes		
A07 - Office space and other office amenities	Covers workplace-related benefits, including facilities and amenities provided by the employer such as on-site cafeterias, sports facilities, gyms, etc.	Quinn (1974)
A08 - Location and commuting	Focuses on factors related to the workplace's geographical location and how employees commute to and from work.	Wasmer and Zenou (2002); Le Barbanchon, Rathelot, and Roulet (2020)
A09 - Work equipment and allowances	Sheds light on how the organization assists employees in ensuring they have the necessary tools and technology, including in remote or homebased work setups.	Adamczyk and Escudero (Forthcoming)
Working conditions		
A10 - Work schedule flexibility	Includes various aspects related to the flexibility of work schedules and arrangements, such as options for telecommuting, remote work, parttime employment, and flexible hours. Additionally, it covers practices that support a better work-life balance, including offering rest days or weekends off and promoting family-friendly work policies.	Mas and Pallais (2017); Maestas et al. (2023); Sockin (2021)
A11 - Workplace safety	Pertains to all aspects related to ensuring a safe working environment for employees. The focus is on creating a secure, hazard-free workplace that prioritizes the well-being of all employees.	Park, Pankratz, and Behrer (2021)
A12 - Job security	Encompasses all aspects related to ensuring job security, stability, and financial protection for employees in various employment scenarios.	Quinn (1974)

Working characteristics		
A13 - Work environment and impact on society	Provides insights into the organization's commitment to creating a positive workplace environment and contributing positively to the community and society as a whole.	Breza, Kaur, and Shamdasani (2017); Sockin (2021); Maestas et al. (2023)
A14 - Physical effort and pace of work	This category evaluates the physical demands and pace of the job. It considers factors like short lunch breaks, quick restroom breaks, physically demanding tasks, extended periods of standing, and fast work pace.	Holmlund (1983); Hayward et al. (1989); Neumark and McLaughlin (2012); Filer and Petri (1988); Maestas et al. (2023); Hamermesh (1990); Quinn (1974); Lopes, Lagoa, and Calapez (2014); Mas and Pallais (2017); Sockin (2021)
A15 - Working in teams	Assesses the collaborative aspects of the job, providing insights into the team-oriented nature of the work environment.	Maestas et al. (2023)
A16 - Human capital development	Assesses the opportunities for personal and professional growth and development within the organization, including aspects such as learning, training, mentoring, career advancement opportunities, etc.	Acemoglu and Pischke (1999); Athey, Avery, and Zemsky (2000); Parent (1999); Barron, Berger, and Black (1999); Maestas et al. (2023); Sockin (2021)
Notes: Adamczyk and Escudero (Forthcoming).		

The algorithm then counts the occurrences of each matched word or expression from the dictionary within the vacancy text and aggregates them into the broader amenity subcategories. To simplify the analysis, the count is transformed into a binary variable (dummy) for each amenity subcategory, taking the value of one if at least one keyword or expression from that subcategory is identified in the job advert.

Figure 1 displays the share of vacancies advertising each amenity across countries, while Table 2 provides key descriptive statistics. The analysis finds that:

• **Uruguay**: Out of the 164,763 unique vacancies (total database without filters), 46.2 percent were assigned at least one amenity. While some vacancies list up to eight amenities, more than three-quarters of those with amenities mention only one or two. The most frequently matched amenities are "*human capital development*" (26.2 percent of vacancies), "*working in teams*" (19.2 percent), and "*work environment and impact on society*" (16 percent). In contrast, "*retirement contributions*" (0.06 percent) and "*health insurance*" (0.05 percent) appear far less frequently, likely because these legally mandated benefits do not warrant explicit mention in the Uruguayan context.

• **Brazil**: In Brazil, 46.3 percent of unique vacancies were assigned at least one amenity subcategory. The most frequently mentioned amenities are "*human capital development*" (16.1 percent of vacancies) and "*food, subsidies and discounts*" (13.7 percent).

• **Russian Federation**: 70 percent of vacancies were assigned at least one amenity subcategory in the country. The most commonly mentioned amenities are "*human capital development*" (37 percent) and "*location and commuting*" (18.1 percent).

• **South Africa**: In South Africa, 33.1 percent of vacancies were assigned at least one amenity subcategory. The most frequently mentioned amenities are "*human capital development*" (10.5 percent of vacancies) and "*working in teams*" (9.3 percent).

▶ **Figure 1: Share of vacancies advertising amenities, by country**
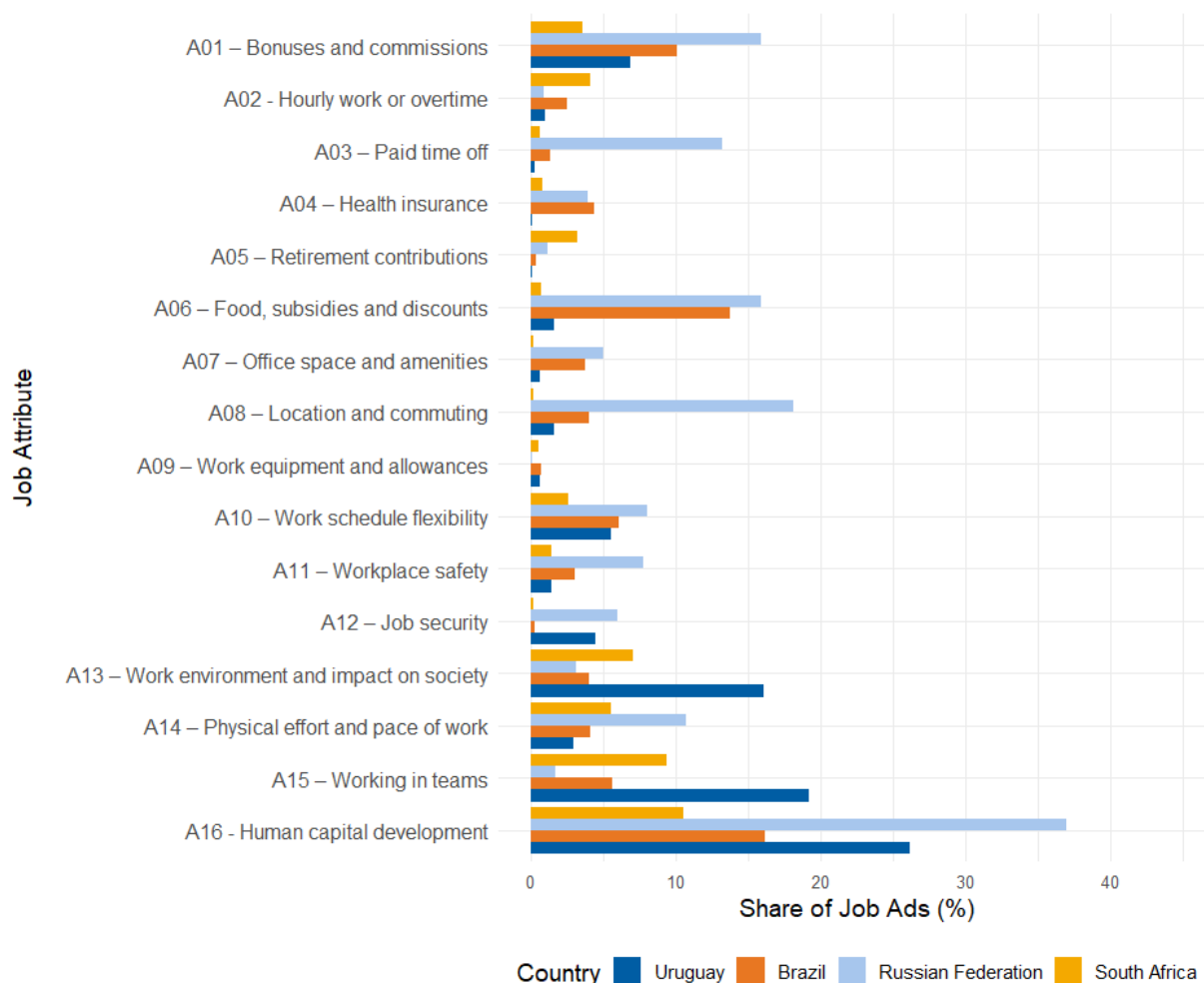
Source: Analysis based on BuscoJobs data for Uruguay (2010-2023) and Brazil (2010-2023); and Adzuna data for the Russian Federation (2016-2021) and South Africa (2016-2021).

▶ **Table 2: Descriptive statistics**

	Uruguay	Brazil	Russian Federation	South Africa
Share of job ads with at least one amenity identified	76,074 (46.2%)	19,473,812 (46.3%)	11,743,541 (70.0%)	1,865,481 (33.1%)
Average number of amenities per vacancy	0.88	0.80	1.48	0.50
Average length of job ads (in words)	90.3	178.9	107.4	195.8

Source: Analysis based on BuscoJobs data for Uruguay (2010-2023); and Brazil (2010-2023); and Adzuna data for the Russian Federation (2016-2021) and South Africa (2016-2021).

For each subcategory, a small number of keywords typically accounts for the majority of matches, while other terms make smaller contributions. Figure 2 displays word clouds for all amenity subcategories in South Africa, where the size of each word reflects its relative frequency within the subcategory.

It is important to note that the identification of amenities through keywords and expressions underwent several rounds of manual verification to ensure contextual accuracy. This verification process involved reviewing a sample of vacancies for all high-frequency keywords within each subcategory, as well as additional terms flagged as potentially ambiguous or context-dependent by the authors of this brief and Adamczyk and Escudero (Forthcoming).

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▶ **Figure 2: Word clouds for words matched in each amenity subcategory, South Africa**

A01 – Bonuses and commissions	A02 – Hours or overtime	A03 – Paid time off
A04 – Health insurance	A05 – Retirement contributions	A06 – Food, subsidies and discounts
A07 – Office space and amenities	A08 - Location and commuting	A09 – Home office equip. & allow.
A10 – Work schedule flexibility	A11 – Workplace safety	A12 – Job security
A13 – Work env., impact on society	A14 – Physical effort, pace of work	A15 – Working in teams
	A16 – Human capital dev.	

Notes: The analysis is based on the full sample of 5.6 million unique job adverts for South Africa. The words displayed in the word clouds represent the lemmas used to match amenities.
Source: Authors' elaboration based on Adamczyk and Escudero (Forthcoming).

▶ Conclusions

Job amenities play a critical role in shaping labour market outcomes, employee well-being, and organizational performance. The literature demonstrates that workers exhibit a substantial willingness to pay for job attributes beyond wages, with some amenities valued as highly as a significant wage increase (Maestas et al. 2023). However, access to job amenities is unevenly distributed across workers, reflecting disparities along occupational, industry, and demographic lines. Understanding these patterns is essential for designing policies that promote equitable labour market outcomes and enhance job quality.

Despite the growing body of research on job amenities, much of the existing evidence is concentrated in high-income economies, leaving a significant gap in our understanding of advertised job characteristics and attributes in low- and middle-income countries. This brief contributes to filling this gap by leveraging vacancy postings which are often available across different labour market contexts.

First, it provides a taxonomy of non-wage job attributes that integrates insights from the literature while adapting them for use with unstructured online job vacancy data. Second, it provides a replicable, scalable and adaptable framework for analysing non-wage job attributes using big data, making it adaptable across different countries and labour market contexts. Finally, while vacancy data typically do not allow for job quality assessments, our methodology enables this analysis by distinguishing between amenities (attributes generally associated with higher job satisfaction and better working conditions), disamenities (attributes associated with lower job quality), and neutral characteristics whose desirability depends on context. By introducing a way to measure job amenities through vacancy postings, this methodology creates new opportunities to explore job quality in relation to factors— such as applications and emerging skills demand—that can only be studied using big data.

The findings highlight important patterns in how amenities are advertised, showing, for example that *human capital development* and *teamwork* are frequently advertised among vacancies, while benefits like *health insurance* and *retirement contributions* appear far less often, possibly reflecting the influence of regulatory frameworks that make such benefits mandatory and therefore less likely to be explicitly advertised. The relative importance of amenities, however, is country specific.

From a research perspective, measuring job amenities through vacancy data allows to answer key questions such as: what matters for attracting talent? Are high-paying firms also high-satisfaction firms, or do they offset better amenities with lower wages? Moreover, are these trends consistent across different groups of workers? While it is well-established that workers have a significant willingness to pay for non-wage amenities, the nuances of how these preferences are exploited or accommodated by firms remain underexplored.

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