

# QUALITY OF EMPLOYMENT IN BOGOTA (COLOMBIA): CONCEPT, METHOD AND EVIDENCE

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## **Abstract**

The concept of quality of employment is a helpful response to different conceptualisations and typologies' failures in the analysis of the diversity of labour institutions in Latin America. The authors with the help of an original methodology combining socio-economic dimensions in a Multiple Correspondence Analysis (MCA), construct a multidimensional indicator. Analysing individual data coming from a household survey in Bogota for 2013, they found a clear polarization in the quality of employment distribution, transcending the classical typologies. Finally, this original and contextualized measure seems to be useful to describe precisely the complexity of the labour market institutions.

**Keywords.** *Colombian labour market, Multidimensional analysis, Multiple Correspondence Analysis, Quality of employment concept, Univariate clustering*

## Introduction

Since the 1990s some Latin American countries have implemented reforms on labour markets and social structures to construct neoliberal institutions within their specific types of capitalism (Tuman, 2000; Portes and Smith, 2012; Bizberg, 2014). Particularly in the Colombian employment regime, in opposition with the expectations of mainstream economic policies, the *flexibilization* of legal standards and the privatization of large parts of the public sector have led to increased unemployment and informality, reduced incomes and a decrease in collective protections (Piñeda Duque and Acosta, 2011; Farné and Vergara, 2015). These mutations have accentuated the difficulties in the urban labour market characterization. However, a proper grasp of this social sphere is crucial to efficiently orient the public policies of employment.

Thus, *ad hoc* informal<sup>1</sup> and formal economic formulations or the opposition between employees and self-employed are now broadly criticized, unable to grasp the changing forms of employment and social practices, particularly in Latin America (Floro and Messier, 2011). The heterogeneity between “upper” and “lower” tiers in the informal economy (Günther and Launov, 2012; Radchenko, 2014), where activities are “chosen” or “necessary” (Perry *et al.*, 2007), the existence of subordination links between informal and formal activities (Arimah, 2001), “[...] depending on social ties (and social relations) for its effective functioning” (Portes and Haller, 2005: 407; Berrou and Combarous, 2011, 2012), the desire to avoid the non-wage costs (Maloney, 2004), the increasing of the sub-contracted jobs in modern economy (Tokman, 2007) within the global labour standards reduction (Galli and Kucera, 2004) and the weak data reliability constitute a non-exhaustive list of the contemporary debates on the informal economy. With this extreme complexity, how can we revisit the Latin American labour markets, abandoning these limited typologies and taking into account the socio-economic embeddedness of workers?

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<sup>1</sup> The definition of informal economy kept in this article leans on the characterization established by the ILO in 2003, regrouping two pillars: informal sector and informal employment. The informal sector is defined as small enterprises having less than five employees, unregistered or not holding a written account. Informal employment is defined as work without a contract or unprotected work, which can be located in the informal or in the formal sector (Husmanns, 2004).

In order to offer part of the solution, we have to “trespass on the territories of a variety of disciplines” to construct a plural approach necessary to understand the employment institutions in a specific context (Streeck, 2005: 254). According to the Smelser and Swedberg’s (2005: 241) definition of the labour market as an institutional process regulated through social norms, we need to develop a general socio-economic analysis of the multiple processes describing the employment in the Latin American context.

Focused on this question, various studies revisit the concept of quality of employment (QoE), which is considered epistemologically functional, and allows the political objective of *decent work* to become operational in Latin America (Burchell *et al.*, 2014; Ramos *et al.*, 2015). Based on a multidimensional approach, this paper offers to construct an original quality of employment measure to analyze a specific case in this developing region: the Colombian’s labour market. Using individual data produced in Bogota by the 2013 *Gran Encuesta Integrada de Hogares* (GEIH), we applied a Multiple Correspondence Analysis (MCA) to summarize all conceptual dimensions into a unique quantitative indicator, that goes beyond the simple indexes used in previous economic studies (Fernández-Macías, 2012). This novel employment measure applied in Bogota appears relevant to describe the labour market and transcends common typologies (formal vs. informal or employee vs. independent). In particular, we show that a low-quality of employment is not necessarily limited to informal workers and even less to independent ones. Finally, the groups created based on the quality of the individuals’ jobs reveal the importance of social factors, such as socio-economic strata or level of education, to obtain better jobs in Bogota.

This paper is organized as follows. Section 2 presents the conceptual approach of quality of employment. Section 3 displays the methodology adopted to construct a relevant and multidimensional QoE index. Section 4 presents the data and introduces the socio-economic context of the Bogota’s labour. Finally, section 5 presents the empirical results before a general discussion.

## **The quality of employment conceptualization: a multidimensional view**

From the 2000s, different studies trying to operationalize the decent work concept, reactivate the notion of QoE (Burchell *et al.*, 2014). Functional from its reappearance, this notion is considered a pillar of the European Employment Strategy since the Lisbon summit in 2000. The OECD and the ILO also consider this idea to be an adapted instrument, named as a reference indicator (OECD, 2014). Across its social involvements, QoE constitutes a particularly interesting and pertinent statistical redefinition for the labour market analysis in the industrial countries (IC) as well as in the developing countries (DC) (Osterman, 2013; OECD, 2015).

The macro-institutional approach uses this concept as a multidimensional tool that is advantageous for international comparisons. Indeed, QoE proves to be particularly efficient at highlighting the links between labour markets, the varieties of capitalism, the polarization in the employment structure and the technological change (Erhel and Davoine, 2007; Gallie, 2007; Davoine *et al.*, 2008; Goos *et al.*, 2009; Green *et al.*, 2013)

In spite of the proliferation of international comparisons, QoE turns out to be naturally comprehensible on the level of all job's characteristics. This concept promotes its microeconomic interpretation and focuses on working and living conditions (Floro and Messier, 2011). In this sense, Van Bastelaer and Hussmanns (2000 in Farné, 2003: 15) have shown that “the [QoE] refers to a set of characteristics determining the ability of employment to meet certain needs commonly accepted”. However, how can we characterize this notion and its dimensions?

A first approach offers a unidimensional measure of QoE, keeping income as a possible approximation (Fernández-Macías, 2012). This choice is justified due to the absence of data and through the correlation between the level of income and the components QoE.

A second approach apprehends this instrument by its psychological, sociological and ergonomic dimensions through the measurement of satisfaction in relation to working conditions (Clark, 2005; Rose, 2005). This subjective approach expresses the preferences of workers in a social context. For example, where obstacles to improve working conditions are strong, claims are poor and the satisfaction level is high. This situation explains why these satisfaction indicators appear lower in the IC than DC, or between men and women (Clark, 1997). Bustillo

*et al.* (2011) then offer the exclusion of any type of subjectivity on behalf of the workers. However, the subjective dimension identifying the “sense of purpose” which individuals give to their jobs cannot then be completely excluded (Guergoat-Larivière and Marchand, 2012).

The third strategy, predominant in socio-economic studies, consists of identifying a multidimensional aspect by gathering a series of objective characteristics of employment. In the United States, Kalleberg *et al.* (2000) identify individuals with bad jobs through low income, without access to health insurance or a pension system. Johnson and Corcoran (2003) perceive the QoE as a combination of wage, working time and protection against occupational risk. In Europe, Green *et al.* (2013) characterize this concept across income and working time, allowing them to formulate a regional labour market typology. This objective approach finds a considerable interest in Latin America thanks to ECLAC (Economic Commission for Latin America and the Caribbean), allowing precise analysis of employment forms and their further evolution to the general implementation of deregulation policies from the 1990s. Farné and Vergara (2015) establish a QoE index in Colombia, by raising the type of contract, social security cover, income and working time. In Ecuador, Floro and Messier (2011) define their QoE index across income, working time, multiple activities, workplace, employment security and non-wage benefits.

Finally, the last approach opens a possibility of a synthesis between these different streams. It envisages a combination of objective and subjective criteria. Thus Körner *et al.* (in Burchell *et al.*, 2014) draw a model in seven dimensions, in which QoE is organized into a hierarchical structure inspired by Maslow’s pyramid of needs (Maslow, 1943). This representation illustrates the fundamental characteristics of employment at the base of the pyramid and secondary characteristics at the summit.

Two conclusions can be drawn from this literary survey. First, variables are not fixed *a priori* in order to statistically characterize this idea. More importantly, this concept must be intuitively located in legal and social contexts. Second, despite this necessity, the following six dimensions mark the “common core” of QoE (Floro and Messier, 2011; Guergoat-Larivière and Marchand, 2012):

- Income level

- Working conditions and legal status
- The possibilities of reconciling work and family life
- Social securities, including pension types and social protections
- Collective employment components, such as the possibility of social dialogue and unionization
- The subjective dimension given to the job and to its opportunities

It is then possible to assert that the concept of quality of employment tends to approximate that of decent work (Farné and Vergara, 2015), insofar as the definition of the latter by the ILO's Commission of Experts uses these six dimensions, namely: fundamental rights at work, employment, working and employment conditions combining remuneration and health/safety at work, labour inspections, labour relations, and social security (Auvergnon, 2014).

## **Methodological approach**

QoE is necessarily a multidimensional and contextualized matter. From this scheme, arises the need to use measurement tools that can meet this requirement. In Latin America, most studies in social sciences define a synthetic QoE index with a horizontal and/or vertical weight alternatively for employees and independents (Floro and Messier, 2011).

In a second strategy coming from the literature on poverty measures, Huneus *et al.* (2015) use the Foster-Greer-Thorbecke (FGT) method to measure deprivations in the area of employment quality. They construct a multidimensional and composite indicator on Brazilian data, but this method transforms the QoE into a measurement of deprivations not allowing incorporating some important variables such as a subjective dimension.

A third approach uses the exploratory multivariate analysis and consists on eliminating these pre-established representations to construct a composite indicator in which weight will depend on the relative importance of every category in a specific social context. Particularly in Colombia, Farné and Vergara (2015) have used a weighting method based on Categorical

Principal Components Analysis (CATPCA) with its Euclidean metric. However, with this method, the analyst must determine the arbitrary scale and weight of each indicator.

Thus, this approach makes quality of employment an intrinsically relative concept, whose formulation aims to distinguish “stable” situations from “precarious” situations - with all their subtleties - on a particular labour market. So any defects relating to the exclusively quantitative and binary classical approach are thus mitigated, resulting in the possibility of reintroducing indicators of a legal nature - which are by definition qualitative data. These indicators must be chosen from amongst the most important legislative provisions and national jurisprudence, based on their discriminating nature - by company size, seniority, activity or sector of activities - and must as far as possible embrace all aspects of the job: individual and collective employment relations and social protections.

Following Combarrous and Deguilhem (2019), we opted for another multivariate strategy. Faced with the categorical nature of household survey data, the Multiple Correspondence Analysis (MCA) seems to be the more appropriate technique in social sciences to deal with mixed data (Lebart *et al.*, 2006). This approach constitutes an empirical method particularly adapted to construct a contextualized QoE index, based on the factorial scores of each category for each variable (OECD, 2008).<sup>2</sup> In this sense, we assume that the  $Q$  indicators are categorical and each indicator  $q$  has  $j_q$  categories. Suppose that the first factorial axis meets the consistency conditions to be considered as a quality of employment factor<sup>3</sup>, we can then define as an appropriate composite indicator:  $QoE = F_1$ . In this sense, the QoE index for every worker is calculated based on the normalized score of each category of all the variables taken into account on the composition of the first factorial axis of the MCA. We can express the quality of employment index for the individual  $i$  under the following functional form:

$$QoE_i = \frac{\sum_{q=1}^Q \sum_{j_q=1}^{j_q} \omega_{j_q}^{*1,q} K_{i,j_q}^q}{Q} \quad (1)$$

Where  $Q$  corresponds to the number of variables in the first MCA factor,  $j_q$  the modality  $j$  of variable  $q$ ,  $\frac{\omega_{j_q}^{1,q}}{\sqrt{\lambda_1}}$  is the normalized score of modality  $j_q$  of variable  $q$  on the first factor, to

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<sup>2</sup> See e.g., Asselin (2009: 19-77).

<sup>3</sup> If the first factor obtains the major part of the adjusted MCA eigenvalues (Greenacre, 1993).

simplify, let us write  $\omega_{j_q}^{*1,q} = \frac{\omega_{j_q}^{1,q}}{\sqrt{\lambda_1}}$ .  $K_{i,j_q}^q$  is the binary variable, taking a value of 1 when the individual presents the modality  $j_q$ , 0 if not.

The value of the QoE index corresponds to the normalized category-score average on the first factorial axis of the MCA. Finally, we have  $QoE_i \in [-1; 1]$  that we brought back into  $[0; 1]$  by the linear interpolation, to make reading easier. Then, we have a continuous QoE index:  $QoE_i \in [0; 1]$ , with 0 corresponding to the worst possible quality, and 1 corresponding to the best possible one in this specific social context.

In spite of the empirical interest of this quantitative indicator, the QoE index tends to oppose two categories: “poor” versus “strong” quality of employment. However, this discretization cannot come from our subjective decision on fixed values.

This type of partitioning, necessarily deterministic, consists in grouping  $n$  dimensional observations into  $k$  homogeneous classes. Homogeneity is measured here through the sum of intra and interclass variances.<sup>4</sup> Through this algorithm, we are looking to maximize the inertia between different groups and minimizing the inertia within them (Fisher, 1958). This QoE index can be discretized rather naturally by clustering in two groups: the “poor” quality group and the “strong” quality group. According to the statistical distribution of the QoE index (section 5), we kept two groups: low and high quality of employment.

## **Context of Bogota’s labour market and data**

### *Social and economic context*

In 2013, the city of Bogota had nearly 7.6 million inhabitants, compared to 715,000 in 1951. It now represents nearly 17% of the Colombian population, increase of 87% from 1985. Despite a low birth rate, and a downward trend in the average annual urbanization rate - going

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<sup>4</sup> To create the most appropriate score possible on a quantitative variable, the optimization technique to implement is fairly complex and has long been debated in the literature. However, in various disciplines, it appears that the method of Fisher remains an appropriate response to this problem because of its efficiency and speed of calculation compared to other possible methods.

from 7% between 1950 and 1955 to 1.36% between 2010 and 2015 - the capital remains marked by urban transition, arising from internal migration. It forms a “hub of the territorial system”, hosting populations from forced displacements resulting from the internal conflict (Dureau *et al.*, 2014: 35).

Faced with expanding informal urbanization and growing inequalities, the government implemented a socio-economic space stratification method in order to introduce a mixed subsidy mechanism for municipal services payments. Various homogeneous groups of buildings (6 groups) were established on the basis of the cadastral zones. These “blocks” of homogenous residences give a good approximation of the social hierarchy: the poorest (1, 2 and 3), representing almost 90% of the population in 2013, receive a subsidy between 10% and 40% of the cost of services, whereas the richest (5 and 6) pay a surcharge of between 20% and 40%. Since the introduction of this policy, Bogota has followed an insular, residentially segregated developmental logic, between a north-eastern zone occupied by the wealthiest households, a southern area inhabited by poor households, and a western area occupied by the middle class (Dureau *et al.*, 2014: 113-114). This social hierarchization directly determines individual behaviour, household location decisions, and influences social groups identity in access to education, healthcare and employment (SDP, 2013).

Bogota has a relatively low rate of poverty, at 17% in 2011; it remains high, however, in the South of the city and in strata 1 and 2: 40% for stratum 1 and 25% for stratum 2 (SDP, 2013). As an illustration of this heterogeneous situation, the capital city has observed a significant increase in income inequality, with the Gini index for income increasing from 0.51 in 2008 to 0.61 in 2013<sup>5</sup>.

Moreover, the labour market in Bogota shows certain singularities. In 2013, 64% of workers were men and only 36% were women, the majority of jobs are formal, but the rate of informality remains at 35.6%, according to the definition given by the ILO in 2003. The jobs are mainly located in the commercial sector; in 2013, the vast majority of individuals are private sector employees (49%) or self-employed (35%), and a small percentage work in the public sector (4.5%).

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<sup>5</sup> The 2008 Gini index came from Bogota’s Department of District Planning (SDP, 2013). Authors have calculated the 2013 Gini index with the 2013 household’s survey.

### ***Legal provisions applicable to the Bogota's labour market***

In Colombia, the labour law corresponds closely to the “model” prevalent in Andean countries (Deguilhem and Frontenaud, 2016). Although there are obviously specificities and differences within each legal system, South American labour law is characterized by a legislation that is strong in terms of individual labour relations, but often ineffective, and conversely, by state centralism concerning collective labour relations, the right to organize and the right to strike being most often tightly conditioned. However, where Colombia stands out, probably alongside Peru as well, is in its liberalization of the labour market since the 1980s, under the pressure of successive neoliberal policies (Vega Ruiz, 2005).

Thus without attempting to be exhaustive (Cadavid, 2014), the applicability of several legal provisions are subject to criteria based either on the size of the company, seniority, the business sector concerned, or even the business activity itself. Thus, various discriminating legal variables could be retained as part of the proposed analysis.

First of all, the rules associated with the right to **vocational training** only apply to companies with more than 50 employees subject to a 48-hour workweek. Both the Constitutional Court (decision No. C-557-93 of December 2, 1993) and the Supreme Court (decision No. 128 of October 10, 1991) have ruled on its constitutionality. Collectively, it is only possible to form a **local union** in companies with at least 25 employees (Article 359 of the CST, Constitutional Council decision No. C-201-02 of March 19, 2002). In the Colombian socio-economic context, characterized by the omnipresence of microenterprises and small enterprises, this closes the door, for a large number of workers, to the collective defence of their rights. Moreover, article 416 of the Colombian CST, derived from decree 2663 of 1950, excludes **public-sector employee unions** from the right to collective bargaining and the right to strike. The Constitutional Court did, however, nuance the scope of this legislation, public-sector employees have access to the right of collective bargaining to some extent, but not the right to strike.

Regarding **social security**, the access to the *Sistema General de Riesgos Laborales* (General System of Occupational Risks Insurance) is limited for the self-employed workers; the establishment of a *Comité Paritario de Salud Ocupacional* (Joint Committee on Occupational

Health) is mandatory only for companies with at least 10 employees. An employment contract lasting at least one month is also required for entering the occupational risk coverage system.

Based on the data available, it is now possible to put forward a panel of variables consistent with the proposed methodology. We have therefore selected the following socio-economic and legal variables (Table 1). Using this selection, we have built the QoE index, which allows to analyse Bogota's labour market in the clearest and most accurate way possible.

[INSERT TABLE 1]

[INSERT TABLE 2]

## **Findings**

### ***The quality of employment polarization in Bogota***

The quality of employment index built for Bogota for 2013 shows a bimodal distribution allowing the construction of two opposing groups (Figure 1). On the one side, there is a low-quality group composed of vulnerable individuals lacking protection, and on the other side, a high-quality group with labour rights and legal safeguards. Moreover, this marked contrast in the distribution justifies the use of the univariate partitioning method for this QoE index (Fisher, 1958). Thus, an analysis of the two distinct quality of employment groups, on either side of the cutline allows a redefinition of a new and authentic typology more suited to the specificities of employment in Bogota.

[INSERT FIGURE 1]

Though the analysis of Bogota's labour market via these two groups accounts for a real contrast between low and high QoE, the fact remains that this divergence is primarily centred on certain specific variables. In other words, the split between the two groups appears to be restricted to certain components of quality of employment but shows continuity in regard to the remaining elements.

The low-quality group, composed of unprotected and vulnerable individuals, is characterized by a specific combination of elements (Table 3). In terms of social security, 15.6% are not members of a healthcare coverage system, 93.6% are not insured against occupational risks and 88.2% do not contribute to a pension plan. Furthermore, regarding the type of contract, 90.9% have a basic level, which means that most of these workers are submitted to verbal contracts with no protections included. Moreover, these workers have no legal limit on their working hours, almost half earn less than the minimum wage, and only 2% are members of a *Caja de Compensación Familiar*.<sup>6</sup> As for individual and collective rights, workers with low-quality of employment do not receive vocational training, are not unionized, and only 4% are able to create a local union in the workplace. This low level of unionization can be explained by the accumulation regime particularly unfavourable to workers' collective organizations regardless of the workplace.

Conversely, the high-quality group is composed predominantly of workers with protections, as 48.4% have a complete employment contract and 84.5% are contributing members of a health plan. Moreover, these workers enjoy other types of protections, such as occupational risk insurance, membership to a pension plan, a stable income above the minimum wage, and the possibility of balancing work and family life. As for collective rights, 77.6% are able to create a local union but only 5.5% are unionized.

[INSERT TABLE 3]

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<sup>6</sup> The *Cajas de Compensación Familiar* are private not for profit entities that provide economic redistribution through subsidies and services (health, education, sports, culture, tourism, housing, loans, etc.). All employers must register membership for all permanent employees or workers engaged in work activity for more than four hours a day or more than 93 hours monthly.

Nonetheless, despite these elements of rupture, the continuity can be observed through different variables, for example, 92% of workers with low QoE have no second activity, and 49.3% have a stable job. Likewise, 42% of individuals with a high-quality of employment have unstable jobs, 5.9% have a second activity to ensure sufficient revenue, and almost 12% earn less than the minimum wage. On the basis of this detailed description, we can establish the profiles for these two groups in terms of quality of employment (Figure A1). This representation shows that quality of employment is neither absolute nor a linear combination of qualitative elements.

Lastly, as regards the meaning given by workers to their jobs, we observe that the low-quality group shows general “unsatisfaction” toward its jobs. Individuals are therefore aware of the state of insecurity and vulnerability in which they live. However, the result is significantly different for workers in the second group, since almost half have a regular or bad perception of their jobs still, they have more protections than the low-quality group.

This redistribution of quality of employment in Bogota not only calls into question the traditional typologies regularly used but also clarifies the perspective on the demographic characteristics of each socio-occupational group.

### ***Revisiting the classical typologies***

Beyond the specific configuration of each group, the reality of the labour market in Bogota demonstrates the weaknesses of the classical typologies used to describe the forms of employment in developing countries. In this sense, an analysis of this quality of employment index highlights the futility of formality/informality and employment/self-employment dichotomies.

In visualizing the QoE index for the formal and informal economy, it emerges that 90% of informal workers in Bogota have a low-quality of employment (Figure 2) which also means that being informal implicates protection and security for one out of ten workers. As for formal workers, 25% have low-quality of employment demonstrating that this form of employment is not necessarily synonymous with safety and protection (Figure 2). In other words, 34% of low-

quality job workers are formal but only 5% of high-quality workers are informal (Table 4). Thus, this new representation of the labour market in Bogota illustrates the strength of the *informalisation* process striking one out of four workers. The insecurity present in employment that once enjoyed protections confirms that the informal economy is a default choice since no better opportunities exist in the formal economy (Kucera and Ronkolato, 2008).

[INSERT FIGURE 2]

[INSERT FIGURE 3]

Furthermore, the second classical dichotomy often envisioned via the separation between self-employed and employed workers is also contradicted by the construction of this QoE index (Figure 3). Thus, whereas 57% of workers having a low QoE are independent, 43% of workers belonging to the same group are also employees (Table 4). This observation puts into perspective the idea that the self-employed essentially have precarious and vulnerable jobs. Again, this result illustrates the employment *vulnerabilization*, as for employees work tends to become precarious for more than one out of three workers, gradually losing certain key protections due to the effects of outsourcing, exemptions from the application of labour law, and the flexibility of employment contracts.

These results affirm the weaknesses of conventional typologies, which are unsuitable for describing the prevailing situation in Bogota. A new characterization of the labour market is then necessary and seems to find a proper tool through QoE. A better understanding of these typologies allows analysing more specifically the segmentation of the labour market in developing countries.

### ***A more accurate socio-economic description of groups***

The expression of QoE through certain sociodemographic variables illustrates the effects of dominance and social inequality in the access to QoE in Bogota, where income disparities and the lack of appropriate public policies accentuate this phenomenon (SDP and Universidad Nacional de Colombia, 2013). Thus when looking at the relationship that may exist between the

quality of employment groups and the various socio-demographic variables, we encounter some surprising results sometimes even counterintuitive (Table 4).

[INSERT TABLE 4]

Contrary to the expected results in terms of professional experience in the labour market, there is no significant statistical correlation between quality of employment and the age of the individual<sup>7</sup>. This can be explained in the case of employees by the fact that the variables with the most important weight in our QoE index are dependent on legal facts and are not subjected to the willingness of the employer. In other words, variables such as income or working hours that can be determined by the employer have a minor weight in our index.

Similarly, there is no dependent relationship between quality of employment and the gender of individuals. In this way, there is no significant difference between men and women in terms of quality of employment in the various groups of QoE (Table 4). Thus, the discrimination suffered by women seems to be held upstream from their participation in the labour market, particularly in the distribution of unpaid work in households (Alaniz *et al.*, 2015). Also, Farné and Vergara (2015) show that, between 2002 and 2011 in Colombia, there has been an improvement of quality of employment for women. Two main reasons could explain this progress: the increase in paid employment for women and the low decrease of domestic work, predominantly a female occupation.

Inversely, there is a statistical dependence between individuals' level of education and their quality of employment. The results from Bogota for 2013 underline the existence of a weak correlation between the quality of employment and the number of years of study, highlighting a limited positive effect of human capital in this labour market<sup>8</sup>. Specifically, we find that 52% of individuals in the group of poor QoE have a basic level of education while 9% have a university level. Conversely, in the high-quality group, they are 34% and 20% respectively (Table 4).

In light of these results concerning professional experience and human capital, other factors must be considered in order to better perceive the social differences existing between the

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<sup>7</sup> We used the OLS regression to test the relationship between age and our QoE index.

<sup>8</sup> We used the OLS regression to test the relationship between years of education and our QoE index.

groups of quality of employment. In this sense, socio-economic stratification in Bogota is reflected in the labour market by unequal access to the QoE, illustrating the effects of segregation and social isolation envisaged by Dureau *et al.* (2015). Thus, individuals living in poor neighbourhoods (strata 1) mostly have a poor quality of employment while individuals from advantaged neighbourhoods (strata 4, 5 and 6) generally have better jobs. *A fortiori*, while 60% of individuals in strata 1 and 2 have a poor quality of employment, 50% of individuals of middle and upper neighbourhoods (strata 3, 4, 5 and 6) have a good quality of employment (Figure B1). More precisely, we observe a statistically significant difference in terms of social classes, especially for the poorest that appear over-represented in the poor quality group, while the most favoured are under-represented in the same group. Conversely, strata 1 is under-represented in the group of good quality while strata 4, 5 and 6 are overrepresented in the same group. Inside each group, the average quality of employment for the upper strata is higher than for the lower strata, highlighting the social mechanisms of segregation in the labour market (Table 3).

[INSERT TABLE 5]

Finally, the analysis of the quality of employment based on the sectors of activity (Figure B2) reveals an opposition between very vulnerable sectors reaching between 65% and 80% of low-quality employment such as activities in private households, the hotels and restaurants, and protected sectors ensuring good quality jobs, such as public administration, and financial intermediation. Corroborating this observation, employees in the public services have the best jobs in terms of quality while unpaid family workers, own account workers and domestic employees have a poor quality of employment (Figure B3).

## **Discussion**

It appears that there are two original aspects to this paper: its conceptualization and the original methodology used to describe a multidimensional indicator favourable to a labour market analysis in DC. Thus, through a Multiple Correspondence Analysis, suited to the specific context

of Bogota and to the variables available in the 2013 GEIH database, we have constructed a multidimensional quality of employment index allowing for a better description of the labour market, emphasizing on the variety of employment institutions.

Consistent with the bimodal aspect of the distribution of the QoE index, two quality of employment groups were established, permitting a precise description of the individuals constituting them. In this sense, the results show that the first group is made up of low-quality jobs, reflecting the state of vulnerability and social insecurity in which those individuals find themselves. And on the other side, we find individuals with a good quality of employment, enjoying protections.

Moreover, quality of employment constitutes a useful tool for a re-examination of the classical typologies. They appear to be unsuitable for describing Bogota's labour market since one formal employee out of four is just as precarious as the poor quality informal jobs. Moreover, in this context, the distinction between employed and self-employed no longer appears relevant, since 35% of self-employed workers have good quality jobs, while 35% of employed workers have poor quality jobs. This interesting outcome, consistent with the results of Cunningham and Maloney (2001) but reversing those of Bocquier *et al.* (2010), questions the empirical effectiveness of conventional distinctions between employees and independents, as well as public policies established on the basis of this rupture in DC.

We also wish to make a few important observations on the used methodology and the results presented. The sequence of the MCA and the univariate partitioning methods appears as an instrument having good reproducibility insofar as these methods demonstrate precision and flexibility to take into account the specific legal and social context studied (Asselin, 2009). However, like all statistical multivariate methods, the results generated in different contexts cannot be directly compared with each other to the extent that, for example, the factorial axes produced are related to the specificity of the modalities considered. Although this method gives all the guarantees to be considered a good instrument for measuring quality of employment, the comparison of the results produced is a limit to its dissemination. However, partial resolution (without allowing a truly comparative analysis) of this difficulty may be considered through the positioning of additional modalities produced in a specific field on the graphic generated in a different context (Lebart *et al.*, 2006). Finally, other studies using the same data source (GEIH

2013) are needed to deepen the understanding of quality of employment and to estimate its determinants. These studies will allow refining, through the observed polarization, the targeting of institutions in charge of public action on this specific labour market.

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**Table 1. Socio-economic and legal variables for the QoE index, 2013 (GEIH)**

<b>Dimensions</b>	<b>Variables</b>	<b>Description</b>
<b>I. Income</b>	<i>Monthly income expressed as a function of the minimum wage</i>	1 if the individual earns less than one MW ( <i>see note under the table</i> ); 2 if he/she earns between 1 and 2 MW; 3 if he/she earns between 3 and 4 MW; 4 if he/she earns more than 4 MW
	<i>Completeness of the work contract</i> <i>Type of social welfare</i>	<i>See note under the table.</i> 1 if the individual makes payments into a health plan, 2 if he/she has a special system; 3 if he/she has a subsidized health coverage system; 4 if he/she has no social welfare coverage
<b>II. Social Welfare Coverage</b>	<i>Coverage of occupational hazards</i>	1 if the individual has coverage for occupational hazards; 2 otherwise
	<i>Contribution to a retirement fund</i>	1 if the individual pays contributions into a pension fund; 2 otherwise
	<i>Contribution to a Family Compensation Fund Workplace</i>	1 if the individual has a Family Compensation Fund; 2 otherwise
<b>III. Working conditions</b>	<i>Use of means of transport made available by the company</i>	1 if the individual works at a fixed location; 2 if working at home; 3 if other
	<i>Other activity</i>	1 if the individual is able to use company transportation; 2 otherwise
	<i>Employment stability</i>	1 if the individual has a second job; 2 otherwise
		1 if the individual has held the job for more than a year; 2 otherwise
<b>IV. Balance between work life and family life</b>	<i>Working time</i>	1 if the individual works less than 24 hours per week; 2 if he/she works 24 to 48 hours (legal maximum time); 3 if he/she works more than 48 hours
<b>V. Individual and Collective Rights</b>	<i>Right to create a Comité Paritario de Salud Ocupacional (CPSO)</i>	1 if the individual has the right to a CPSO at his/her workplace; 2 otherwise
	<i>Right to participate in an Occupational Risk Coverage System</i>	1 if the individual has the right to membership in a PRS; 2 otherwise
	<i>Right to Vocational Training</i>	1 if the individual has the right to professional training; 2 otherwise
	<i>Right to establish a local union in the workplace</i> <i>Unionization</i>	1 if the individual has the right to organize a local union; 2 otherwise 1 if the individual is a union member; 2 otherwise
<b>VI. Meaning derived from work</b>	<i>Individuals' perception of their work (satisfaction level)</i>	<i>See note under the table.</i>

Note: The income variable was discretized into four categories according to its distribution. Moreover, given the current state of Colombian labour law (see note below), it was necessary to build these categories around the concept of a minimum wage to the extent that this standard appears as an essential dimension of quality of employment in Colombia. The minimum wage is 589,500 pesos per month in 2013 (article 145 *Código Sustantivo de Trabajo*). Contract completeness: scored variable, initially assembled on the basis of 7 variables. It indicates the level of contract completeness in 6 classes. However, we do find a graduated effect on this variable. Essentially, those individuals who present modality 0 are active in the complete absence of an agreement, whereas modality 1 identifies the presence of the primary elements of the contract, which itself remains verbal, modality 2 indicates that a written contract has been drafted, but the content remains fairly weak, modality 3 indicates the appearance of some labour rights provisions in the contract, and 4 and 5 are complete contracts. There is no presumption made regarding the importance of each modality, therefore no weighting is necessary here. Special systems are applied for the military, Ecopetrol workers, and employees of public Universities. The Subjectivity variable constitutes an objective indicator of the subjective representations. This variable is a synthesis constructed across MCA from eight variables expressing the necessity of change and the satisfaction of workers. The first axis explaining more than 88% of the eigenvalue (Greenacre, 1993), and can be defined as an axis of workers satisfaction. After analysis of distribution, we have discretized this quantitative variable in three groups: 1 is a good satisfaction level and a will to stay in the current job, 2 is an intermediate satisfaction level, 3 a dissatisfaction level and a will to change job.

**Table 2. Variables of individual characterization, 2013 (GEIH)**

<b>Variables</b>	<b>Definitions</b>
<b>AGE</b>	1 if individual is between 18-25; 2 if individual is between 26-45; 3 if individual is between 46-65; 4 if individual is more than 65
<b>GENDER</b>	1 if female; 0 if male
<b>STRATA</b>	1 Strat 1; 2 Strat 2; 3 Strat 3; 4 Strat 4,5 and 6
<b>EDUCATION</b>	1 if individual has none or basic graduation; 2 if he has ICFES level; 3 if he has a technological or technical level; 4 if he has a university level

**Table 3. Composition of the QoE in the two groups defined by the univariate clustering (%),<sup>a</sup> (GEIH)**

	Low-Quality	High-Quality
Social security contribute	<b>0.544</b>	<b>0.848</b>
Social security subsidy	<b>0.274</b>	<b>0.061</b>
Social security without social security	<b>0.156</b>	<b>0.039</b>
Transportation	0.006	0.045
Occupational risk	<b>0.064</b>	<b>0.970</b>
Other activity	0.080	0.059
Family fund	<b>0.018</b>	<b>0.880</b>
Union	0.017	0.055
Stability job	0.498	0.580
Pension fund	<b>0.118</b>	<b>0.974</b>
Income ([0; 1[ MW)	<b>0.446</b>	<b>0.112</b>
Income ([1; 2[ MW)	0.416	0.529
Income ([2; 4[ MW)	0.113	0.198
Income (More than 4 MW)	0.067	0.160
Weekly hours ([0; 24])	0.248	0.020
Weekly hours ([24; 48])	<b>0.370</b>	<b>0.719</b>
Weekly hours (More than 48)	0.382	0.261
Hard workplace	<b>.440</b>	<b>0.835</b>
Households	0.306	0.023
Others	0.254	0.143
Completeness contract (0)	<b>0.488</b>	<b>0.012</b>
Completeness contract (1)	<b>0.421</b>	<b>0.054</b>
Completeness contract (2)	0.034	0.082
Completeness contract (3)	0.041	0.142
Completeness contract (4)	0.006	0.226
Completeness contract (5)	<b>0.011</b>	<b>0.484</b>
Subjectivity (satisfied)	<b>0.191</b>	<b>0.480</b>
Subjectivity	0.364	0.299
Subjectivity (unsatisfied)	<b>0.445</b>	<b>0.221</b>
Union section	<b>0.043</b>	<b>0.776</b>
Professional training	<b>0.006</b>	<b>0.188</b>
<i>Comité Paritario de Salud</i> (CPSO)	<b>0.105</b>	<b>0.889</b>
<b>Mean QoE</b>	<b>0.2288</b>	<b>0.7738</b>
Std.	0.1037	0.1070
<b>N</b>	<b>4448</b>	<b>4407</b>
<b>(%)</b>	<b>(0.502)</b>	<b>(0.498)</b>

Note: <sup>a</sup>The Pearson's chi-squared test was used to test dependency between the four QoE groups and every variable. We can observe a statistically significant dependency at 1% level for each of them.

**Table 4. Socio-economic characterization of the two QoE groups (%),<sup>a</sup> 2013 (GEIH)**

	Low-Quality	High-Quality
Formal	0.336	0.955
Informal	0.664	0.045
Employee	0.432	0.719
Independent	0.568	0.281
Age (Young)	0.067	0.074
Age (Middle young)	0.432	0.451
Age (Middle old)	0.394	0.386
Age (Old)	0.106	0.089
Gender (Men)*	0.658	0.638
Gender (Women)*	0.342	0.362
Strata 1	<b>0.142</b>	<b>0.093</b>
Strata 2	0.450	0.414
Strata 3	0.332	0.356
Strata 4	<b>0.076</b>	<b>0.136</b>
Education level (None or basic)	<b>0.525</b>	<b>0.349</b>
Education level (Bachelor)	0.286	0.304
Education level (Technological)	0.095	0.145
Education level (University)	<b>0.094</b>	<b>0.202</b>
<b>Mean QoE</b>	<b>0.2288</b>	<b>0.7738</b>
Std.	0.1037	0.1070
<b>N</b>	<b>4448</b>	<b>4407</b>
<b>(%)</b>	<b>(0.502)</b>	<b>(0.498)</b>

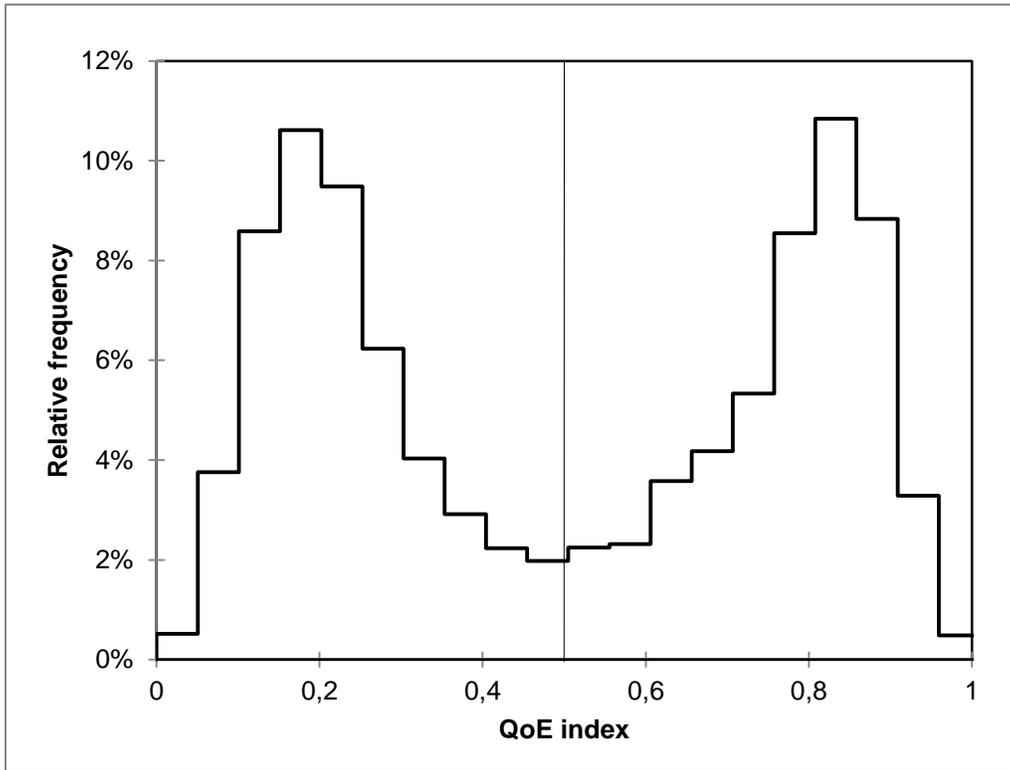
Note: <sup>a</sup> The Pearson's chi-squared test was used to test dependency between the four QoE groups and every variable. We can observe a statistically significant dependency at 1% level for each of them. \* Only gender is not significant.

**Table 5. QoE index average by social characteristics, <sup>a</sup> 2013 (GEIH)**

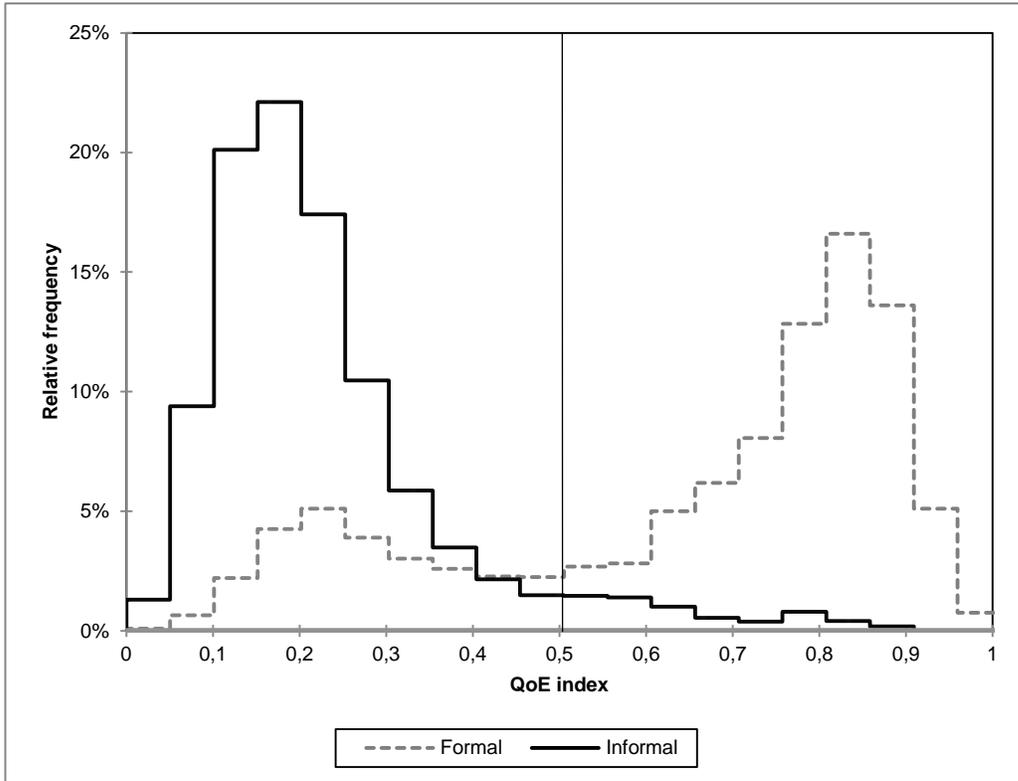
	Low-Quality	High-Quality
Formal	0.2792*	0.7799*
Informal	0.2033*	0.6430*
Employee	0.2421*	0.7838*
Independent	0.2186*	0.7482*
Age (Young)	0.2331	0.7583**
Age (Middle young)	0.2259	0.7760*
Age (Middle old)	0.2281	0.7743*
Age (Old)	0.2401	0.7730
Gender (Men)	0.2293	0.7733
Gender (Women)	0.2277	0.7746
Strata 1	0.1982***	0.7412***
Strata 2	0.2170***	0.7694***
Strata 3	0.2417***	0.7829**
Strata 4	0.2992***	0.7855**
Education level (None or basic)	0.2124***	0.7561***
Education level (Bachelor)	0.2335**	0.7724***
Education level (Technological)	0.2401**	0.7917**
Education level (University)	0.2942***	0.7934**
<b>Mean QoE</b>	<b>0.2288</b>	<b>0.7738</b>
Std.	0.1037	0.1070
<b>N</b>	<b>4448</b>	<b>4407</b>
<b>(%)</b>	<b>(0.502)</b>	<b>(0.498)</b>

Note: <sup>a</sup> The difference of QoE averages is statistically significant at 1% between the two different groups. (\*) QoE average for this modality statistically differs at 1% from the average of one another modality of this variable within the same group (Student T-test). (\*\*) QoE average for this modality statistically differs at 1% from the average of twice other modalities of this variable within the same group (tests post-hoc (ANOVA): LSD, Bonferroni and Tukey). (\*\*\*) QoE average for this modality statistically differs at 1% from the average of each other modality of this variable within the same group (tests post-hoc (ANOVA): LSD, Bonferroni and Tukey).

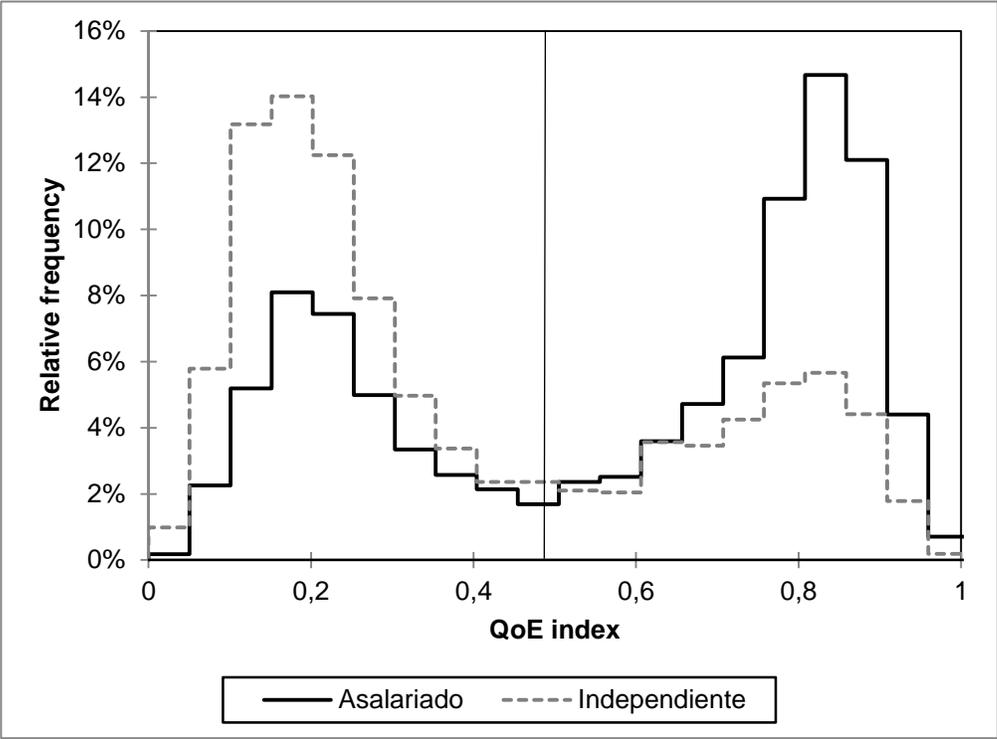
**Figure 1. Histogram of QoE index in Bogota's labour market, 2013**



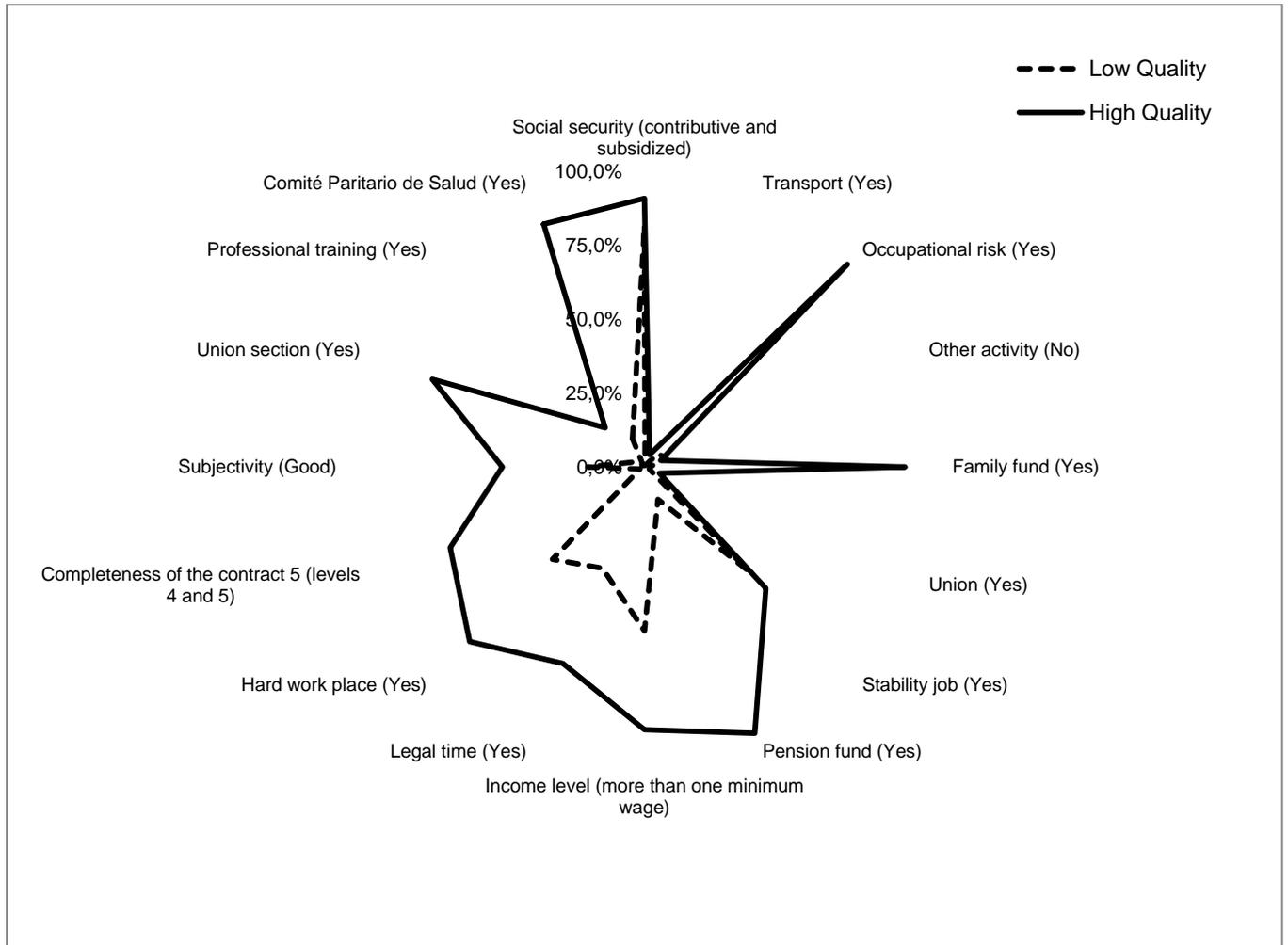
**Figure 2. Histogram of QoE index for formal and informal workers in Bogota, 2013 (GEIH)**



**Figure 3. Histogram of QoE index for the employed and self-employed in Bogota, 2013 (GEIH)**

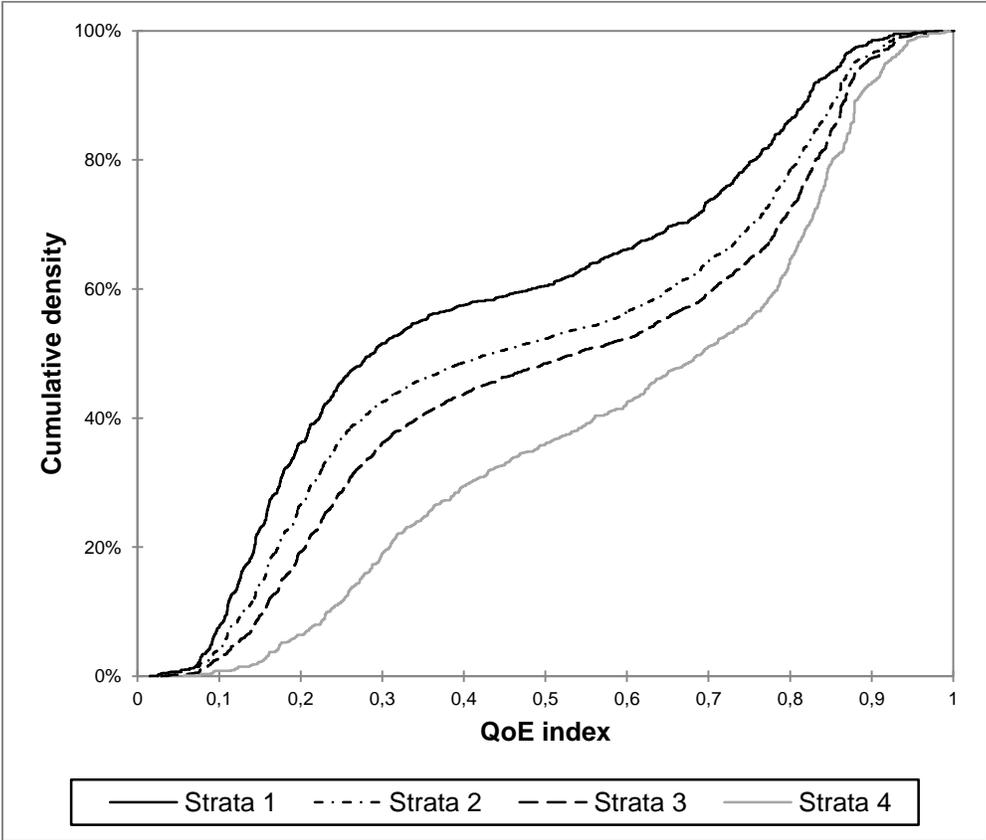


## Appendix A

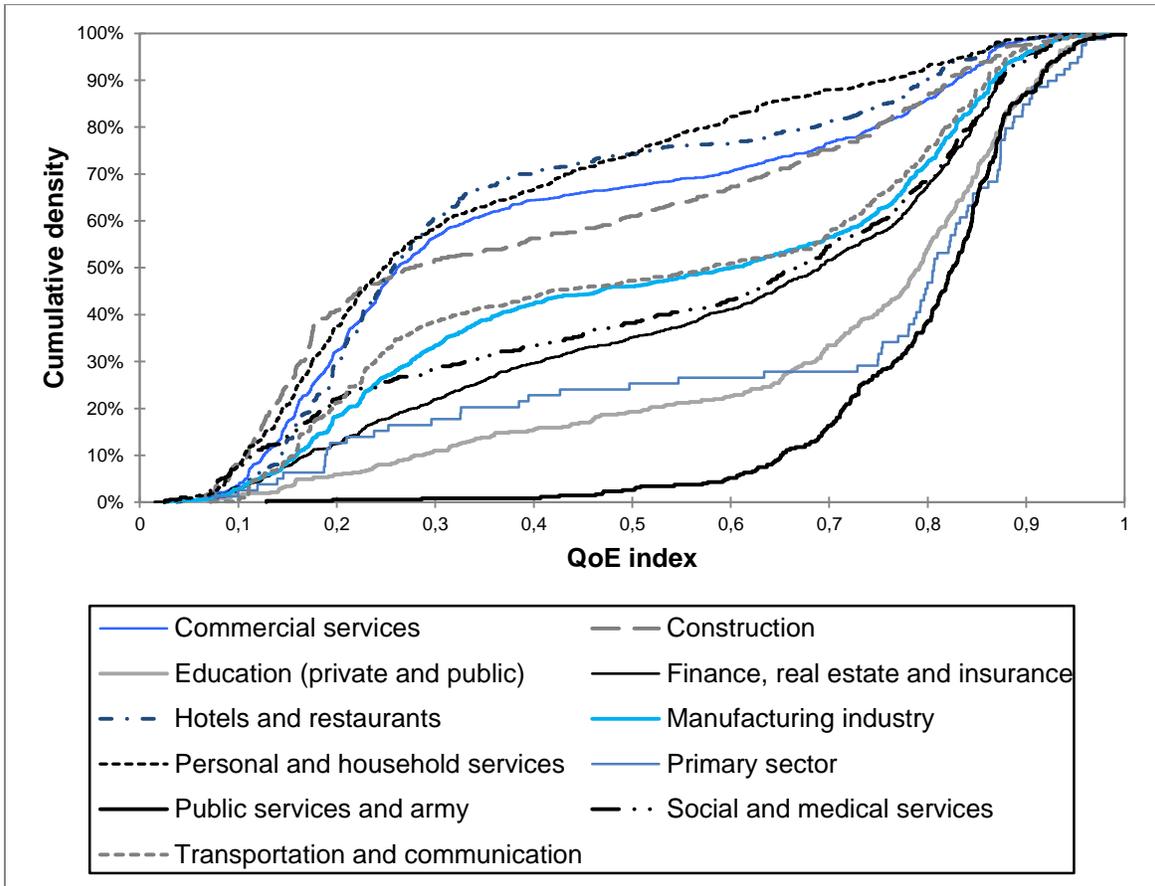


**Figure A1. Profiles of the two quality of employment groups in per cent of each variable, 2013 (GEIH)**

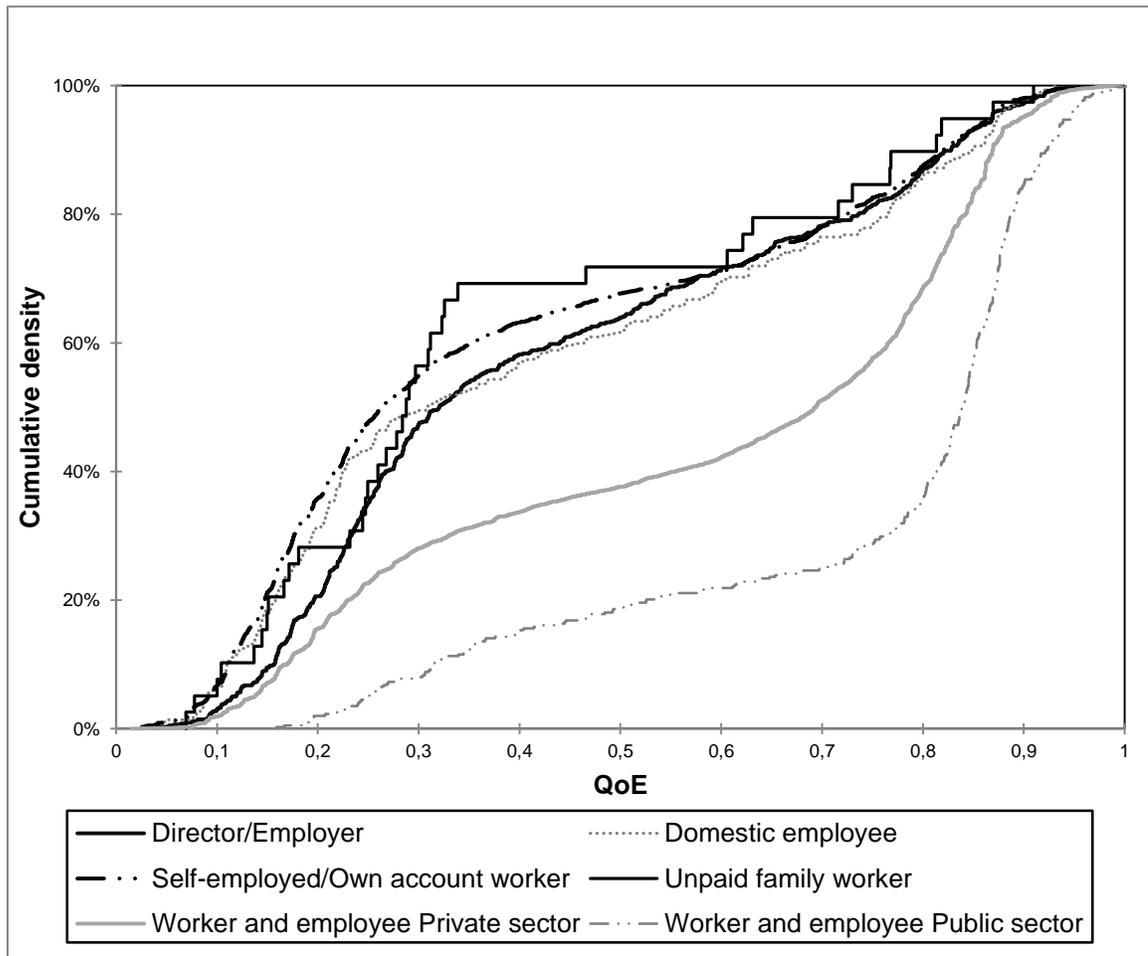
**Appendix B**



**Figure B1. Cumulative density of QoE index for strata categories**



**Figure B2. Cumulative density of QoE index for activity sectors**



**Figure B3. Cumulative density of QoE index for employment status**