ALTERNATIVE POLICY SOLUTIONS

BACKGROUND PAPER

The Change in Quality of Employment (QoE) in Egypt Over Time (2006 - 2018)

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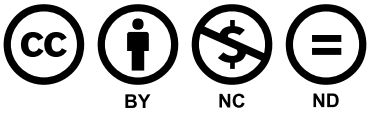

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Alternative Policy Solutions is a non-partisan, public policy research project at The American University in Cairo. Using rigorous, in-depth research and a participatory process of consultations with a diverse range of stakeholders, we propose evidence-based policy solutions to some of the most difficult challenges facing Egypt. Our solutions are innovative, forward-looking and designed to support decision makers' efforts to introduce inclusive public policies.

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1. Introduction

Throughout the COVID-19 crisis, job creation continues to remain a primary concern for policymakers all over the world. However, focusing solely on the number of jobs gives a partial picture, as wellbeing and economic sustainability also depend on the quality of available jobs. This issue remains more relevant in emerging markets and developing countries, where earnings are low, social security systems lack coverage, informality remains high and many formal jobs are highly precarious despite their formal status. Considering these difficulties, it is necessary to focus on measuring employment quality in conjunction with other conventional employment indicators.

In developed countries, the quality of employment (QoE) has been studied and measured by academics, international organizations and policymakers. During the 2000s, job quality had been central to the European Union's (EU) employment strategy, positioned through the 'more and better jobs' agenda (European Commission, 2001). The Sustainable Development Goals (SDGs) put forward by the United Nations (UN) include "decent work for all" as an objective.[1] In 2015, the G20—the forum of governments and central banks of developed countries—signed the Ankara Declaration. This declaration commits governments to strengthening job quality, in order to achieve sustainable growth that would improve living standards. Furthermore, academics have worked to understand the causes, trends and consequences related to job quality (Addison et al., 2018; Brown et al., 2007; Burchell et al., 2014; Muñoz de Bustillo et al., 2011; Díaz-Chao et al., 2016; Findlay et al., 2017; Gallie, 2007; Green & Livanos, 2015; Green, 2013; Sehnbruch, 2008). However, little consensus exists in both academic and institutional literature on how to measure progress toward this goal.

This lack of consensus as to what decent work, job quality or QoE really mean has led to a plethora of definitions.[2] Contentious views regarding the necessary dimensions to be included in the conceptualization, as well as differences over what constitutes minimum standards of QoE, have produced a significant degree of conceptual variance and a concomitant lack of reliable measurements (Burchell et al., 2014). Furthermore, the absence of a coherent theoretical framework for understanding and measuring QoE has been a significant difficulty for defining useful public policy approaches to the subject. More recently, however, Sehnbruch et al. (2020) have developed a measure for QoE in Latin America, which has also been replicated by Apablaza et al. (forthcoming). As this paper will illustrate, this methodology is also applicable to other regions in the world, especially to other developing countries.

The importance of employment quality has also been accentuated by the impact of globalization, artificial technology and international shocks. During the COVID-19 pandemic, researchers acknowledged that precarious jobs leave workers wholly unprotected and may lead to further medium- and long-term negative effects on wellbeing and employment (Blustein et al., 2020; Fana et al., 2020). Furthermore, a precarious labor market is ill-prepared for the job losses that technological advances and the advent of artificial intelligence may generate (Berg, 2019; Schulte et al., 2020). In particular, workers in precarious employment experience little investment in their human capital, which leaves firms with a shortage of qualified workers capable of working alongside technological advances.

This paper proceeds as follows: after a brief review of the Egyptian case and why we think it is

1 SDG 8.5 specifies achieving "full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value". Monitoring progress toward this goal is crucial because employment and the resources and capabilities it generates will contribute to improving SDG 1 (end poverty), SDG 3 (achieve universal health coverage), SDG 5 (achieve gender equality and empower all women and girls), and SDG 10 (reduce inequalities). For more information on the UN SDGs, please see: https://sdgs.un.org/goals.

2 These terms are used interchangeably in the literature. Often, the term used depends on the institution: for instance, the International Labour Organization (ILO) and the EU talk about decent work, while the Organisation for Economic Co-operation and Development (OECD) uses the term job quality, and the Inter-American Development Bank (IADB) talks about better jobs.

pertinent to measure QoE in Egypt, this paper will review the existing international and regional literature before explaining the methodology used in this paper. We will then discuss how this methodology has been adapted to the Egyptian context and which data sources we have used to calculate a QoE index for Egypt. Section 4 then presents the results of this index and uses a probit model to discuss the key mediating variables of employment quality in Egypt. The paper concludes with a preliminary policy discussion of the research's implications.

1.1. Egypt and work

This section provides a brief account of salient and interlinked issues regarding the Egyptian labor market, which is directly related to job quality. Employment and growth, informality, labor law, public-private employment and unions are discussed.

Egypt experienced an annual nominal growth rate of 5.6% in the fiscal year 2018/2019, marking a noticeable improvement on the preceding years (2015-2017). Despite the revived growth rates and the existence of a sizable workforce, not enough jobs have been created. This can be mainly attributed to a relatively low employment elasticity of growth, where the bulk of production is concentrated in capital-intensive activities (Baduel et al., 2017). Assaad et al. (2019) reach the same conclusion, further noting that employment patterns have not been sensitive enough to economic growth.

In addition to their insufficient quantity, newly created jobs are also characterized by their mediocre quality. The extent of precarious employment can be partially observed through the size of the informal sector. The share of informal work in total employment has been increasing continuously from 24% in 2006, to 31% in 2012, to 39% in 2018. Informal wage employment outside of a fixed establishment — one of the most vulnerable forms of employment in Egypt due to employment irregularity — has nearly doubled in size, increasing from 12% in 2006 to 23% in 2018, reflecting the growth of the construction and transport sectors, both characterized by low quality and low productivity (Assaad et al., 2019).

Those who make up the informal sector are the poor, women and young adults (Subrahmanyam, 2016). Since public employment is noticeably declining, workers are forced to make the transition from stable public jobs to the private sector. Low-income workers find this transition difficult and are often left with no choice but to work informally. In contrast, workers from higher income groups face fewer challenges in this transition and easily find jobs in the formal private sector (Assaad et al., 2019). Jobs in the informal sector are of much lower quality than their formal counterparts due to the absence of social protection. The differences are apparent, along with a set of other dimensions which include lower wages, lower job satisfaction and exclusion from benefits (World Bank, 2014). Moreover, Assaad et al. (2019) note that informal workers outside fixed establishments have the highest levels of workplace hazards, which include relatively high rates of workplace injuries.

Questionable job quality is not only a characteristic of informal work but can also be found in the formal public and private sectors. According to 2018 figures, more than half of all employed people had no formal employment contract. Similarly, the majority of formally employed workers are not covered by health and social insurance (Central Agency for Public Mobilization and Statistics [CAPMAS], 2019), rendering them more susceptible to economic and social crises.

The Labor Law 12/2003 introduced more flexibility into the Egyptian labor market, particularly in the hiring and firing processes. Under this law, contracts can be terminated more easily and temporary contracts can be renewed without making them permanent (Wahba & Assaad, 2017). However, despite the added flexibility, this law has been unable to mitigate informality. As Beinin (2012) points out, the law has also eliminated the means of long-term job security that workers usually sought. This issue has been exacerbated by the insufficient quantity of private sector jobs, which were always incomparable to the permanent and secure jobs that the public sector used to provide. The Labor Law also provides clauses that prohibit mass firings after the privatization of a public sector firm and provides compensation to workers affected by privatization. However, those clauses are poorly enforced (Beinin, 2012).

The legal reform has also introduced the right to organize a peaceful strike. Nevertheless, to organize a legal strike, approval must be sought from board members of the labor union. This is an obvious deterrent, especially if the union is not active enough. Additionally, workers have to inform their employer of the strike before it takes place (Ramadan & Adly, 2015). According to the latest publication of Egypt's Social Progress Indicators Report in 2018, the fields of 'Protection of the Right to Work', 'Right to Strike' and 'Exercising Labor Rights in Practice' have demonstrated zero progress compared to the preceding publication. Concerning workers' rights, according to the International Trade Union Confederation (ITUC), Egypt was among the 10 worst countries for workers in 2018. It ranked fifth in the 'Workers Rights' index, after Algeria, Bangladesh, Cambodia and Colombia (ITUC, n.d.).

For most of Egypt's history, trade unions have been state-controlled; the Egyptian Trade Union Federation (ETUF) is the only official and legal representative of workers. Attempts at forming other independent unions have been sabotaged and suppressed by the government; independent unionists have been arrested and tried. All in all, such concerted efforts of repression have significantly impacted workers' ability to bargain for better working relationships (Egyptian Streets, 2020). In early 2011, there were only three independent unions operating, the largest and most influential of which was the Independent General Union of Real Estate Tax Authority Workers (RETA). Additionally, in the aftermath of the January 25th revolution, the Egyptian Federation of Independent Trade Unions (EFITU) was formed. In 2012, EFITU was able to organize around 200 new unions, mostly in the public sector (Beinin, 2012).

In 2017, a new Labor Union Law 213/2017 was passed, introducing more stringent procedures and requirements for the establishment of labor unions by increasing the threshold number of workers necessary to form a union (Riad & Riad, 2018). In order to increase union bargaining power, Abdalla (2014) notes that there must be a higher union density, that is, a higher percentage of union members in the total labor force. Additionally, unions must be freed of the government's financial and administrative supremacy, where unions possess their own independent budgets and must have the ability to form freely. This has already been stipulated in several ILO conventions.

2. Literature Review

2.1. QoE in the international literature

Given this context, it is hardly surprising that little attention in Egypt has focused on QoE. However, as the international literature shows, deficient job quality has repercussions that extend beyond the labor market, particularly to social security systems, investment in skills and vocational training and by extension to the productivity of the labor force. For this reason, QoE has gained a strong foothold in international literature and has generated a significant amount of discussion and debate.

The academic literature focused on developed countries has made some progress on the conceptualization and measurement of job quality. Jencks et al. (1988) proposed an 'index of job desirability'; Olsthoorn (2014) elaborated a proposal for two indicators of precarious employment in the Netherlands; Bescond et al. (2003) measured seven indicators of decent work (see also Ghai, 2003); Leschke et al. (2014) constructed a 'Job Quality Index', while Green et al. (2013) used data from the European Working Conditions Survey (EWCS) to produce dashboard indicators of job quality's individual dimensions (Eurofound, 2012).[3] This research has significantly contributed to our understanding of the drivers of job quality (Piasna et al., 2019). International institutions, in particular the ILO, the EU, the OECD and more recently the IADB, have also drawn from this literature and have put forward their proposals for conceptualizing and measuring the quality of employment (Eurofound, 2012; ILO, 1999, 2008; IADB, 2017; Muñoz de Bustillo et al., 2009; OECD, 2014, 2015).

However, unlike the aforementioned dashboard indicators or the IADB's macro-level indicator, a summary indicator of individual-level employment conditions allows for estimations of the extent to which individuals are deprived in terms of their functionings in the labor market (Sen, 1999a, 1999b, 2000). It also permits a more comprehensive analysis of labor market outcomes in relation to other public policy concerns, such as household characteristics, education and skill levels, or macroeconomic outcomes like gross domestic product (GDP), (un)employment rates and productivity measures.

Another essential methodological characteristic must also be considered: an indicator based on the Alkire/Foster (AF) methodology not only allows for subgroup and dimensional decomposition, but also captures the marginal distribution of deprivations across individuals (Alkire et al., 2018; Alkire & Foster, 2011; Alkire & Santos, 2014). Such methodological rigor is essential for policymakers, who ultimately have to justify any distribution or redistribution of public resources based on (hopefully rigorous) information at their disposal. In short, a summary indicator would better inform policymakers in terms of the policies, legislative changes and economic developments which impact the multidimensional employment of particular groups or the labor market as a whole.

2.2. Egypt and a multidimensional QoE index

Multidimensional indices have already been used to measure different social phenomena in Egypt. These include the Global Multidimensional Poverty Index, calculated by the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Programme (UNDP), and the Demographic and Health Surveys; both are used to collect cross-sectional data on multidimensional poverty (Alkire et al., 2018). Furthermore, research on child wellbeing, through the measurement of multidimensional poverty, has been undertaken with a specific focus on stochastic dominance and weighting techniques (El Sayed & Zahran, 2018, 2020). Additionally, confirmatory and exploratory analysis has been used to construct and validate a multidimensional and context-specific scale of women's agency in rural Minya (Salem et al., 2020).

Different dimensions of employment quality have also been researched in the Egyptian academic literature, albeit through a fragmented approach.

3 More methodologies for constructing indicators of the quality of employment are also summarized by Muñoz de Bustillo et al. (2011).

Barsoum (2015, 2016, 2019) has used mixed methods to analyze the lack of quality jobs for the young, educated population and women in Egypt. Sieverding (2016) qualitatively examined labor market dynamics and worker preferences that contribute to the gap between effective legal coverage of social insurance among youth in Egypt; Sieverding concludes that participation in the social insurance system is hindered by labor market factors, such as instability of employment and job mobility, as well as voluntary opt-out and a poor understanding of how social insurance works. Said (2012) has focused on the impact of privatization and trade liberalization on wages and job quality outcomes between 1998-2006 using labor survey data and macroeconomic variables. The findings suggest that as trade liberalization progresses, public policy should focus on promoting "higher labour standards and 'decent jobs'" (Said, 2012, p. 159).

Regarding wages, Tansel et al. (2020) estimated the public-private formal wage gap between women and men using data from the Egypt Labor Market Panel Survey (ELMPS) over a 20-year period. They base the quality of workers on observable attributes and unobservable time-invariant attributes which include ability, motivation and socioeconomic status. Under this classification, they find that "the public sector fails to attract better-qualified men throughout the conditional wage distribution while it manages to attract better-qualified women in the lower parts of the conditional wage distribution but not at the top" (p. 2).

Regarding Egypt, to the authors' knowledge, there have not been any local empirical studies conducted to examine employment quality comprehensively using a composite indicator. However, for South Africa, Yu (2020) derives a composite, multidimensional employment quality index by taking 18 indicators from seven dimensions including wage, work hours, employment security and social benefits, among others. Moreover, the article also suggests that the Quarterly Labour Force Survey (QLFS 2010-16) should include more questions on employment quality, such as training and skills development opportunities at work, as well as workplace relations. Mackett (2020) uses South African data from the February 2000 Labour Force Survey to estimate a composite 'Decent Work Index'; she found that some indicators suggested in the academic and 'decent work' literature are unavailable and therefore require adjustments. This suggests the need for further inclusion of indicators that measure job quality in labor market surveys for the region. In Sub-Saharan Africa, Blanas et al. (2019) use firm-level data to analyze the difference in job quality among foreign-owned and domestic firms and identify how these differences relate to country-level institutional factors; some of their findings suggest that governance and social policy standards affect differences in job quality across the region.

3. Methodology

This paper constitutes the first attempt to compute a QoE index for Egypt using three waves of the ELMPS (2006, 2012 and 2018). The ELMPS is publicly available on the Economic Research Forum (ERF) website. The survey covers a nationally representative sample and a wide range of topics, including individual labor market characteristics, time use, female employment and family reactions to it, fertility and parental background, among others. The 2006 wave includes a sample of 8,351 households with 37,140 individuals. The second wave used (2012) located 12,060 households and 49,186 individuals. Lastly, in 2018 there were 15,746 households with 61,231 individuals.[4]

The QoE index for Egypt uses the AF method following Sehnbruch et al. (2020), which has been tried and tested in the construction of nationally and internationally comparable multidimensional poverty indices. These types of indices have been used in public policy and by academics. For example, the Multidimensional Poverty Index (MPI) has been calculated for 104 countries, identifying multiple deprivations at the household level (Alkire, 2015; Alkire & Santos, 2014; UNDP, 2016).[5] Moreover, various articles have been published on measuring multidimensional concepts with this methodology and how these indices complement traditional indicators (Acharya & Roemer, 2015; Angulo et al., 2016; Atkinson, 2003; Díaz-Chao et al., 2016; García-Pérez et al., 2017; Huneeus et al., 2015; Wagle, 2014; Yalonetzky, 2014).

The QoE index's structure reproduces the family of AF indicators (Alkire, 2007; Alkire & Foster, 2011) and adapts the steps undertaken by Alkire and Foster, which are neatly summarized in Alkire and Santos (2014).[6]

3.1. Dimensions of the index

The first dimension of the index considers the daily earnings reported by each employed individual from his or her primary employment. To establish the deprivation cut-offs, we have used the extreme poverty line, also referred to as the food poverty line (Tsuchiya, 2016; World Bank, 2007). As workers in Egypt—specifically men—have at least four dependents on average for all years, a worker must earn a minimum of four food baskets to live above the food poverty line. Therefore, an indicator cut-off of four food baskets is proposed.[7]

The second dimension included is employment stability; this dimension is crucial as the ability of a worker to realize basic functionings and develop capabilities depends not only on having a job but also on the stability of this job (Sehnbruch, 2006, 2008; Cazes & Tonin, 2010; Muñoz de Bustillo, 2011; Eurofound, 2012; OECD, 2014). This dimension, therefore, considers the key component of job stability, namely the occupational status of a worker. The occupational status of a worker serves as an indicator of the legal rights associated with a job, while contracts serve as an indicator of its stability. Together, these variables combine to serve as a proxy for unemployment risk (Sehnbruch et al., 2018).[8]

Occupational status categorizes workers as deprived if they are wage-earners in permanent, temporary, intermittent or seasonal work without a contract, or self-employed, or employers employing up to four workers. Individuals who fall into this category are not protected by employment legislation, have no employment rights and would therefore find it challenging to sustain any legal recourse in case of

4 For more information on the ELMPS' methodology and data recollection see Krafft et al. (2019), Assaad & Krafft (2013) and Barsoum (2007).

5 National multidimensional poverty indicators are used by countries as diverse as Armenia, Bhutan, Bangladesh, Chile, Colombia, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Mozambique, Nepal, Pakistan, Panama, and Vietnam.

6 This is the initial undertaking into measuring employment quality through a composite index in Egypt. Thus, future research will include revising the ELMPS to incorporate the index for workers' transitions, as is being done with Chilean panel data. Additionally, a multidimensional employment index will be measured with other LMPS of the region (i.e., Tunis, Jordan and Sudan).

7 Robustness tests have been done using three other specifications in Section 5.

8 Note that unemployment risk based on the OECD's methodology (2014) cannot be calculated in Latin America as we do not have consistent information on unemployment spells.

any work-related conflict.[9] Moreover, employers from establishments which employ less than five workers are considered to be part of the informal economy (World Bank, 2014).

Wage-earners in permanent employment with contracts and employers with five or more workers are not deprived according to this cut-off line. This supposes that workers with contracts are governed by labor market regulation which should give them access to employment rights (i.e., paid holidays, employment protection) and legal recourse in case of disputes. Employers with a larger number of workers generally adopt formal employment contract agreements.

This definition of the employment stability dimension is different from the methodology used by Sehnbruch et al. (2020), which also included the variable tenure. This is because the ELMPS does not include the question of tenure in every survey year used for this paper.[10]

The third dimension of the QoE index comprises indicators that serve as proxies for employment conditions. As the ELMPS does not include variables that are normally used to measure employment conditions (such as job intensity, health risks or safety issues), this paper uses substitutes such as contributions to social insurance, excessive working hours and type of establishment to function as proxies for the risks and benefits normally associated with a job. Including these variables follows the international literature.[11]

Social security affiliation also relates to formality or occupational status in work relationships. Workers who are not affiliated with a social security system are therefore considered deprived in this indicator. This variable is included in this dimension as it relates to employee benefits rather than a worker's legal rights (which are an essential component of the occupational status).

Excessive working hours constitutes a proxy for measuring whether workers have a minimum of work-life balance. The cut-off used is based on statutory working hour limits established by individual countries as well as on the ILO's Hours of Work Convention, which introduced a maximum standard working time of 48 hours per week and eight hours per day as an international norm.[12]

The third indicator in this dimension is whether workers are working outside and/or in a non-fixed establishment, such as a private home, a field or on a moving vehicle. Non-deprived workers are those who work inside in a fixed establishment (i.e., shops, offices, factories).

Table (1) presents the dimensions, indicators, cut-offs and weights for the Multidimensional Employment Index.

9 The ILO's "Transition from the Informal to the Formal Economy" Recommendation No.204 (ILO, 2015) describes informality as referring to all economic activities by workers and economic units that are in law or in practice not covered or insufficiently covered by formal arrangements. A standard employment relationship arises from contracts between an employer and employee.

10 2006 and 2012 do not include tenure variables, although using longitudinal specifications of each survey could enable the construction of labor tenure dynamics.

11 See for example, the ILO's document on Social Protection Floors (2012). Social security affiliation is also linked to SDG 3, which aims to achieve universal health coverage.

12 The principle underlying this dimension of "decent working time" is that unhealthy working hours should not be a means of improving firms' profitability, a principle which underlies the EU Directive on Working Time (93/104/EC). The protection of workers' health through limitations on working hours also underlies the ILO's Hours of Work (Industry) Convention, 1919 (No. 1) and the Hours of Work (Commerce and Offices) Convention, 1930 (No. 30), which both stress the limits of the 8-hour workday and the 48-hour work week (with certain exceptions).

Table 1
Dimensions, Indicators, Cut-Offs and Weights

Dimensions (weight)	Indicator (weight)	Indicator deprivation	Description
Labor income (1/3)	Income (1/3)	Less than four basic food baskets (monthly calculation)	All occupied individuals between the ages of 15-64 who report wage earnings from their occupations
Employment stability (1/3)	Occupational status (1/3)	Wage-earners without contract, self-employed	All occupied individuals between the ages of 15-64 who answer type of occupational status, regarding contract status, type of employee (for self-employed)
Employment conditions (1/3)	Social security (1/9)	No affiliation to social insurance	All occupied individuals between the ages of 15-64 who report affiliation to social insurance
	Excessive working hours (1/9)	More than 48 hours per workweek	All occupied individuals between the ages of 15-64 who report the hours they have worked during the past week
	Establishment (1/9)	Non-fixed establishment and/or outside work	All occupied individuals between the ages of 15-64 who do not work in a fixed location or establishment

Overall, the indicators used in this index overlap to a certain degree with the ILO's definition of informal employment (ILO, 2015). However, the method presented above also goes beyond this definition to include formal workers with poor employment conditions. As Sehnbruch et al. (2020) and Apablaza et al. (forthcoming) showed, the proportion of workers who are deprived in terms of their QoE is higher than the proportion of workers classified as informal.

3.2. Cut-offs and the direction of the index

The deprivation cut-off (k) refers to the cut-off score of the weighted indicators in which a person is considered as multidimensionally deprived. This suggests that for this index, any individual who holds a score equal or higher than the threshold (k) is multidimensionally QoE-deprived. This paper uses a cut-off of 33.3%,[13] which implies that if an individual is deprived in one or more dimensions, he or she is considered multidimensionally deprived.

A multidimensional index such as the one presented in this paper, and each of its component indicators could take on one of two orientations: a positive or negative one (IADB, 2017). Following Sehnbruch et al. (2020), this index is oriented negatively, meaning a higher QoE index (M_o - Adjusted Multidimensional Headcount Ratio) implies lower employment quality. Similarly, a higher H (Multidimensional Headcount Ratio) reflects the percentage of individuals living with poor employment quality. Conversely, this means that 1-M_o must be understood as a positive measure of QoE.

3.3. Data and sample used

For this study, we use repeated cross-sectional data and restrict the sample to all 15-64 wage earners.[14] We exclude unpaid family workers (or those who report working yet receive no payment). We also include informal workers who report daily income wages.[15]

Table (2) shows the descriptive statistics for the sample. Included are the number of households and

13 See Appendix for robustness checks for different cut-offs.
14 Following Tansel et al. (2020), we focus on this particular age group.
15 As this is an initial analysis of employment quality in Egypt, only a repeated cross section has been used to focus on changes over time. Future research will include exploring the panel features of the ELMPS.

the number of individuals (n) that relate to those households and fall within our selected sample. In each year, men have higher participation rates in the labor market than women, and this trend increases significantly from 2006 to 2012, yet remains relatively stable from 2012 to 2018. The average working age for the selected samples has remained relatively constant, at around 36 years of age on average for the whole 12 years. Regionally, there is more participation of rural workers from Lower and Upper Egypt than those from urban areas and Greater Cairo, Alexandria and Suez Canal. Our sample also presents higher participation rates of individuals with lower educational attainment. Over time, formal work (characterized by having a contract and social insurance) has decreased. Moreover, average working hours have decreased among the sample.

Table 2

Samples' Sociodemographic and Descriptive Data

		2006		2012		2018	
		Employed individuals (15-64)	QoE sample (15-64)	Employed individuals (15-64)	QoE sample (15-64)	Employed individuals (15-64)	QoE sample (15-64)
Number of households		7073	4848	9843	7688	11932	9447
n		11332	6697	13911	10034	15842	11553
Sex (%)	Male	77	78	81	82	82	85
	Female	23	22	19	18	18	15
Age	Average age	35.8	35.9	36.1	35.3	36.8	36.3
Region (%)	Gr. Cairo	13	17	11	13	8	9
	Alx, Sz C.	10	13	9	10	6	7
	Urb. Lwr.	13	14	12	12	10	11
	Urb. Upp.	18	19	14	15	13	14
	Rur. Lwr.	24	24	29	28	30	30
	Rur. Upp.	22	13	26	23	32	30
Educational attainment (%)	Up to preparatory	45	30	67	64	39	34
	Up to secondary	32	36	19	19	38	40
	Any post secondary studies	23	33	14	17	23	26
Formality (%)*	No	50	31	54	43	56	57
	Yes	50	69	46	57	44	43
Hours per week	Average working hours	48.4	50.3	47.0	46.8	45.6	45.7

* Formality refers to having a contract and social insurance

4. Index Results

This section analyzes the basic deprivations (uncensored headcount results) in each indicator;[16] it then presents the headcount ratios, average intensity shares and adjusted headcount ratios derived from these results; the relationship between the headcount ratios and employment rates; dimensional sub-compositions; and censored versus raw headcount ratios for the Egyptian sample.

Table (3) displays how deprived the labor force is in each dimension and indicator. It shows that since 2006, the share of deprived Egyptian workers has increased across all indicators, except for excessive working hours, which decreased from 38.4% in 2006 to 34.1% in 2018. In 2012, larger increases in deprivation for occupational status and income indicators can be identified, while the share of deprived workers in the establishment and social security indicators were higher in 2018 than 2012 and 2006. Furthermore, after the drastic increase of deprivation in the income dimension in 2012 (from 54.9% in 2006 to 72%), this dimension stabilized in 2018, evidencing a much smaller increase from 72% to 73.3%.

Table 3
Dashboard Results

	2006	2012	2018
Income (4 poverty lines)	54.9%	72.0%	73.3%
	(0.0123)	(0.00855)	(0.00671)
Occupational status	45.9%	83.2%	61.3%
	(0.0116)	(0.00683)	(0.00806)
Social security	36.5%	48.6%	61.3%
	(0.0107)	(0.0112)	(0.00813)
Excessive working hours	38.4%	32.5%	34.1%
	(0.0102)	(0.00755)	(0.00672)
Establishment	19.5%	30.1%	37.1%
	(0.00983)	(0.0117)	(0.00751)
Observations	6,697	10,034	11,553

Standard errors in parentheses.

Although the year 2018 shows an improvement on 2012, the QoE in Egypt has deteriorated during the 2006-2018 period overall. As detailed in Table (4), the share of deprived Egyptian workers (Multidimensional Headcount Ratio) increased by 23.3 percentage points between 2006 and 2012, followed by a reduction of 4.5 percentage points between 2012 and 2018. Although the intensity of this multidimensional deprivation (Intensity Ratio – A) increased less dramatically than the headcount ratio, it still increased from 60.4% in 2006 to 67.7% in 2012, and then dropped slightly to 65.8% in 2018. Overall, the QoE index increased from 0.430 in 2006 to 0.591 in 2018 and peaked in 2012 with 0.639.

16 For associations among indicators see Appendix.

Table 4
Multidimensional Indicator Results

	2006	2012	2018
H (Multidimensional Headcount Ratio)	71.1%***	94.4%***	89.9%***
	(0.0104)	(0.00443)	(0.00447)
Observations	6,697	10,034	11,553
A (Intensity Ratio)	60.4%***	67.7%***	65.8%***
	(0.00500)	(0.00436)	(0.00365)
Observations	4,700	9,479	10,509
Mo (QoE Index – Adjusted Multidimensional Headcount Index)	0.430***	0.639***	0.591***
	(0.00799)	(0.00600)	(0.00466)
Observations	6,697	10,034	11,553

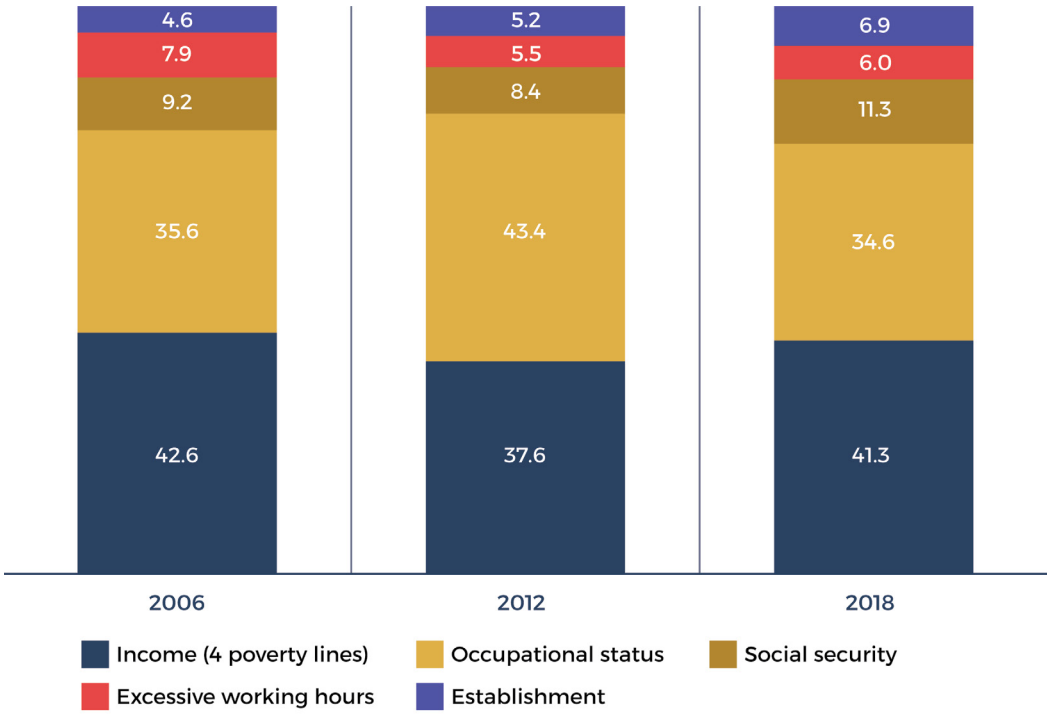
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4.1. Percentage contributions

Income and occupational status are the two most relevant dimensions of the QoE index (Mo) in Egypt. The combined contribution to the QoE index of these two dimensions was 78.2% in 2006, 81% in 2012 and 75.9% in 2018. As detailed in Figure (1), which presents the percentage contributions of each indicator to the index, the contribution of income and occupational status remained steady for the 2006-2018 period, at averages of 42% and 35% respectively. Furthermore, in 2018, the third most relevant dimension was social security (11.3%), followed by establishment (6.9%) and excessive working hours (6%).

Overall, for the 2006-2018 period, social insurance and establishment increased their contribution to the Egyptian QoE index by 2%, while the income, occupational status and excessive working hours dimensions reduced their contribution by 1.3, 1 and 1.9 percentage points, respectively.

Figure 1
Percentage Contributions to the QoE Index (Mo)



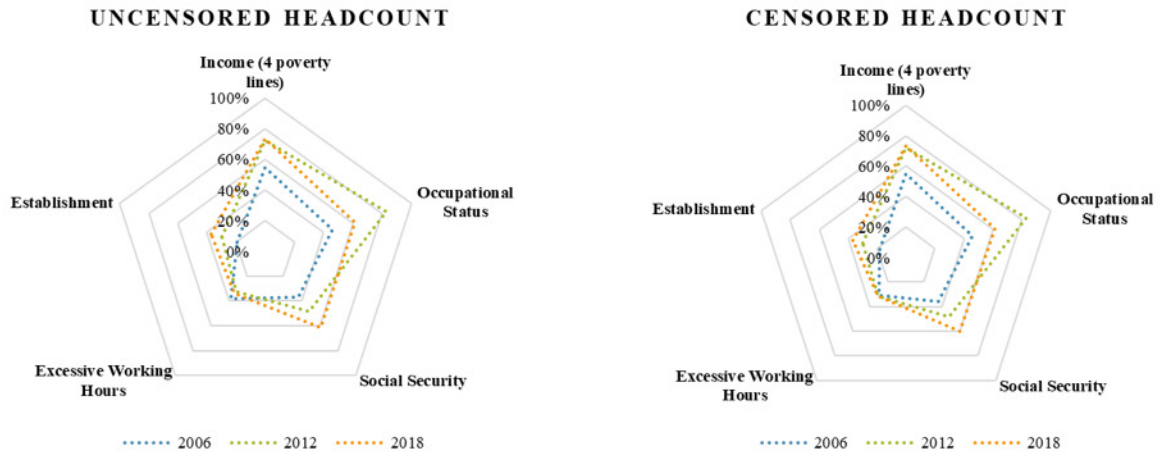
4.2. Censored and uncensored headcounts

Uncensored and censored headcounts are quite similar due to the high percentages of multidimensionally deprived workers (H). Censored headcounts represent the percentage of deprivation per indicator of those who are deprived in each of the indicators and are multidimensionally QoE-deprived (Alkire & Santos, 2014), while uncensored headcounts examine workers who are classified as deprived by each indicator, regardless of whether they meet the cut-off (k) to be considered multidimensionally QoE-deprived. This allows policymakers to focus only on the most deprived workers.

Figure (2) shows changes over time in uncensored and censored headcounts. Examination of the censored headcounts reveals that the income indicator worsened from 2006 (55%) to 2012 and then remained relatively stable between 2012 and 2018 (72% and 73%, respectively). Occupational status shows an increase in deprivation between 2006 and 2012 (46% to 83%), however we see an improvement between 2012 and 2018 (83% to 61%) which does not reach 2006 levels. Social security shows an increase in deprivation over time, increasing by 12 percentage points in each period (from 36% in 2006 to 60% in 2018). The establishment indicator similarly shows a worsening trend; however, it increases from 18% in 2006 to 30% in 2012 and slightly stabilizes from 2012 to 2018 (37%). The excessive working hours indicator remains stable throughout the whole period, although the results represent one out of three workers in the censored sample. Figure (2) provides insights for policymakers in terms of how deprivation has worsened over time and how related policies could improve employment quality.

Figure 2

Uncensored (Raw Headcounts) and Censored Headcounts



4.3. Subgroup analysis

The QoE index is not homogenous among Egyptian workers. Systematically, men, formal and public employees and workers living in the Greater Cairo, Alexandria and Suez Canal urban areas have better multidimensional employment than women, informal and private employees, and workers living in rural areas.

4.3.1. Formal and informal employment

As displayed in Table (5), the average score of deprivations (Intensity Ratio [A]) of informal workers is nearly double the score of formal workers in 2018. This gap has continuously increased since 2006. Furthermore, the difference between the QoE index (Mo) of informal and formal workers decreased between 2006 and 2012 and increased between 2012 and 2018.

Table 5

Multidimensional Employment Quality Among Formal and Informal Workers

	Subgroup	2006	2012	2018
H	Informal	100.0%	1	100.0%
		(0.000469)	(0)	(0.0000692)
	Formal	57.7%	89.5%	78.3%
		(0.0125)	(0.00749)	(0.00779)
A	Informal	77.3%	80.5%	80.2%
		(0.00537)	(0.00450)	(0.00289)
	Formal	46.8%	55.5%	44.4%
		(0.00478)	(0.00407)	(0.00332)
M0	Informal	0.77	0.81	0.80
		(0.00537)	(0.00450)	(0.00289)
	Formal	0.27	0.50	0.35
		(0.00713)	(0.00643)	(0.00432)

Standard errors in parentheses. All indices p<0.01.

4.3.2. Public and private employment

Differences in QoE deprivation levels between public and private employees are significant in Egypt. The Headcount Ratio (H) of public employees with low multidimensional quality of employment was lower than the share of private employees in the three examined samples. Table (3) shows that, despite similar results in 2012, the proportion between the Headcount Ratios (H) of private and public employees was 1.2 for both years 2006 and 2018. Furthermore, the Intensity Ratios (A) of the deprivation were higher among private employees in all the examined years and proportion of the A scores of private and public employees slightly increased from 1.5 in year 2006 to 1.8 in 2018. In consequence, the Adjusted Multidimensional Headcount Index (Mo) was also systematically higher among private-sector workers, since the QoE index of public workers was nearly half of private workers' in 2006 and 2018.

Table 6

Multidimensional Quality of Employment Among Private and Public Workers

	Subgroup	2006	2012	2018
H	Private	73.7%	96.3%	94.9%
		(0.0138)	(0.00473)	(0.00402)
	Public	60.2%	90.9%	78.5%
		(0.0127)	(0.00692)	(0.00714)
A	Private	67.5%	74.1%	74.3%
		(0.00591)	(0.00491)	(0.00409)
	Public	44.8%	55.1%	42.0%
		(0.00605)	(0.00467)	(0.00251)
M0	Private	0.50	0.71	0.71
		(0.0108)	(0.00680)	(0.00497)
	Public	0.27	0.50	0.33
		(0.00731)	(0.00634)	(0.00366)

Standard errors in parentheses. All indices p<0.01.

4.3.3. Educational attainment

Unsurprisingly, individuals with higher levels of education have higher levels of employment quality. However, the three subgroups in Table (7) all deteriorated between 2006 and 2012. Between 2012 and 2018, only the lowest educational group saw a further deterioration; improvement in indices for the remaining educational groups were slight.

Table 7

Multidimensional Quality of Employment Among Educational Attainment Groups

Subgroup	H			A			M0		
	2006	2012	2018	2006	2012	2018	2006	2012	2018
Up to preparatory	88.3%	95.0%	97.3%	67.1%	69.3%	74.7%	0.59	0.66	0.73
	(0.00834)	(0.00495)	(0.00373)	(0.00679)	(0.00476)	(0.00416)	(0.00917)	(0.00657)	(0.00470)
Up to secondary	74.0%	97.9%	91.5%	59.1%	70.5%	66.0%	0.44	0.69	0.60
	(0.0103)	(0.00437)	(0.00497)	(0.00675)	(0.00643)	(0.00570)	(0.00812)	(0.00721)	(0.00584)
With any post-secondary studies	49.9%	88.3%	78.8%	50.4%	57.5%	52.2%	0.25	0.51	0.41
	(0.0164)	(0.0109)	(0.00915)	(0.00768)	(0.00714)	(0.00538)	(0.00903)	(0.00868)	(0.00671)

Standard errors in parentheses. All indices p<0.01.

4.3.4. Regional analysis

The QoE index also evidenced regional disparities. As detailed in Table (4), the six Egyptian regional samples that can be constructed with ELMPS data show three consolidated groups for years 2006, 2012 and 2018. First, workers of the Greater Cairo area had better QoE levels than any other region, with the lowest headcount, intensity and QoE index. Moreover, Alexandria and Suez Canal, urban Lower and Upper Egypt show similar scores in the headcount, intensity and QoE index, with higher deprivation levels than Greater Cairo, but lower levels than rural regions. Finally, workers living in rural Lower Egypt and rural Upper Egypt have the highest levels of deprivation in terms of their headcount, intensity and QoE index scores than the two other groups. Although the gaps between these three groups decreased in 2018, regional QoE disparities have not been reversed.

Table 8

Multidimensional Quality of Employment Among Regions

Subgroup	H			A			M0		
	2006	2012	2018	2006	2012	2018	2006	2012	2018
Greater Cairo	56.4%	88.4%	83.1%	58.2%	62.8%	60.0%	0.33	0.56	0.50
	(0.0275)	(0.0160)	(0.0170)	(0.0124)	(0.00966)	(0.0101)	(0.0193)	(0.0158)	(0.0126)
Alexandria and Suez Canal	59.7%	88.9%	90.9%	57.5%	63.4%	61.5%	0.34	0.56	0.56
	(0.0255)	(0.0149)	(0.0120)	(0.0163)	(0.0126)	(0.0111)	(0.0201)	(0.0168)	(0.0130)
Urban Lower Egypt	69.5%	95.3%	89.4%	58.3%	64.8%	63.7%	0.41	0.62	0.57
	(0.0260)	(0.00813)	(0.00965)	(0.0113)	(0.00818)	(0.00779)	(0.0179)	(0.0100)	(0.00977)
Urban Upper Egypt	59.0%	92.8%	87.9%	58.3%	64.2%	60.4%	0.34	0.60	0.53
	(0.0277)	(0.0121)	(0.0130)	(0.0120)	(0.0126)	(0.00920)	(0.0180)	(0.0169)	(0.0123)
Rural Lower Egypt	82.8%	97.9%	91.5%	61.2%	70.4%	66.4%	0.51	0.69	0.61
	(0.0107)	(0.00304)	(0.00703)	(0.00926)	(0.00643)	(0.00606)	(0.0116)	(0.00708)	(0.00817)
Rural Upper Egypt	86.0%	97.9%	93.5%	64.5%	72.5%	73.0%	0.56	0.71	0.68
	(0.0178)	(0.00376)	(0.00495)	(0.0119)	(0.00865)	(0.00593)	(0.0167)	(0.00904)	(0.00728)

Standard errors in parentheses. All indices $p<0.01$.

4.3.5. Gender analysis

Table (9) shows that male workers experience higher levels of deprivation across their headcount, intensity and QoE index results than women in all the analyzed samples. This can be explained by the low employment rates among Egyptian women and the limited number of working women in the ELMPS samples. The results show that women participate more in the public sector,[17] which has been associated with better job quality (Tansel et al., 2020). Women from lower socioeconomic groups also have a higher probability of working in public employment than their male counterparts, which in turn means they would not be generally deprived in most indicators of the QoE index. Furthermore, women from higher socioeconomic status groups and who work in the private sector tend to be highly educated and therefore have higher incomes, which means that they would not be deprived in terms of their QoE index. However, the pooled regression results presented in Section 4.3.6. below show that when variables such as education level and socioeconomic status are controlled for, the QoE of women is below that of men.

In 2006, the share of employees with low multidimensional QoE (Headcount Ratio) was higher among men and increased by 17.8 percentage points by 2018. Furthermore, although the Headcount Ratio of female workers remained lower

17 See Hendy (2020) which uses the ELMPS to measure men and women's probability of being in employment and how that may differ due to different sociodemographic characteristics. Among the author's findings, poorest women work in the public sector, which correlates to better job conditions in Egypt. The most educated and richest women do work in the private sector, yet this relates to higher earnings which would associate lower levels of deprivation in terms of employment quality for women on average.

than among men in all years, it did experience a higher increase between 2006 and 2018 (21.9 percentage point increase for women). The intensity of deprivations was systematically higher among men than women in the three years examined. Indeed, unlike male workers, the Intensity Ratio (A) of female workers remained stable between 2006 and 2018. Overall, men presented a higher QoE index than women. Although the Adjusted Headcount Index (Mo) increased for both cases between 2006 and 2018, the increase of the QoE index of men (16.6 percentage points) was higher than that of women (11.1 percentage points).

Table 9

Multidimensional Quality of Employment Among Males and Females

Subgroup	H			A			MO		
	2006	2012	2018	2006	2012	2018	2006	2012	2018
Males	72.4%	95.2%	90.2%	62.4%	70.0%	68.5%	0.452	0.666	0.618
	(0.0103)	(0.00408)	(0.00483)	(0.00501)	(0.00426)	(0.00366)	(0.00808)	(0.00576)	(0.00499)
Observations	5,197	8,273	9,773	3,699	7,882	8,918	5,197	8,273	9,773
Females	66.6%	90.9%	88.5%	52.7%	56.9%	52.3%	0.351	0.517	0.462
	(0.0175)	(0.00939)	(0.00963)	(0.00906)	(0.00654)	(0.00603)	(0.0110)	(0.00855)	(0.00684)
Observations	1,500	1,761	1,780	1,001	1,597	1,591	1,500	1,761	1,780

Standard errors in parentheses. All indices $p<0.01$.

4.3.6. Regression results

Table (10) presents the estimated coefficients and average marginal effects for a pooled probit regression model. For this model we have pooled data from 2006, 2012 and 2018. The binary dependent variable characterizes multidimensional poor-quality employment (1=having poor-quality employment). Independent variables include year, sex, marital status, educational levels, sector of employment (public or private), economic sector of employment and area (urban or rural). The probit regression was estimated for three models, in which the Final Model[18] includes the complete set of independent variables. Average marginal effects (ME) exemplify the probability, controlling for the other predictors, of being in multidimensional poor-quality employment. This means that positive values of ME suggest a positive relationship with being in poor-quality employment.

The predictor variable year refers to the year in which each survey was gathered. Results suggest that workers in 2012 have an 18.9% higher probability, ceteris paribus, of being in poor-quality employment than the reference category (2006). Workers in 2018 have an 18.5% higher probability of being in poor-quality employment than the reference category. Results are statistically significant ($p<0.01$) and suggest that the trend between 2006 and 2012 worsened and then, between 2012 and 2018 improved slightly.

In terms of sex, results suggest that women, when controlling for all other variables, have a 3.8% higher probability of being QoE-deprived than men. ME for age shows that each increase in unit of year of age suggests a 0.5% probability reduction of being in poor-quality employment. This result indicates that as workers age, their probability of being in poor-quality employment is reduced. Results regarding education show, ceteris paribus, that workers with educational attainment up to preparatory have a 14.6% higher probability of being deprived than those that report having any post-secondary studies. Workers with secondary studies are 10% more probable of being deprived than those with post-secondary studies.

Concerning the employment sector, individuals working within the private sector are 6.7% more likely to be deprived in employment quality than those in the public sector. Workers in the agriculture, forestry and fishing sector are more likely to be deprived than every other economic sector category.

18 A Likelihood Ratio Test was performed, and results suggest that the Final Model with all the predictors fits significantly better than Model 1 or Model 2.

Workers in information and communications, financial and insurance activities, or manufacturing and industry are less likely to be deprived than those in the agriculture, forestry and fishing sector, at 16.8%, 14.5% and 10.5% respectively. Lastly, workers in rural areas are more likely to be deprived (3.4%), ceteris paribus.

Table 10

Probit Results for Multidimensional Headcount Ratio

		Model 1		ME for Model 1		Model 2		ME for Model 2		Final Model		ME for Final Model	
		β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.	β	S.E.
Variable	Category												
Year	Ref.: 2006												
	2012	0.853***	(0.030)	0.187***	(0.006)	1.072***	(0.042)	0.204***	(0.010)	0.938***	(0.045)	0.189***	(0.010)
	2018	0.929***	(0.032)	0.198***	(0.006)	0.691***	(0.042)	0.155***	(0.010)	0.902***	(0.046)	0.185***	(0.010)
Sex	Ref.: male												
	Female	0.155**	(0.048)	0.022***	(0.006)					0.289***	(0.053)	0.038***	(0.007)
Age	Years	-0.037***	(0.002)	-0.005***	(0.000)					-0.028***	(0.002)	-0.004***	(0.000)
Marital status	Ref.: married												
	Never married	0.137*	(0.061)	0.020*	(0.008)					0.129*	(0.063)	0.018*	(0.008)
	Contractually married	0.746*	(0.356)	0.076***	(0.021)					0.898*	(0.418)	0.083***	(0.020)
	Divorced	0.194	(0.176)	0.027	(0.022)					0.235	(0.190)	0.031	(0.022)
	Widowed(er)	0.021	(0.130)	0.003	(0.020)					-0.014	(0.132)	-0.002	(0.020)
Educational levels	Ref.: Any post secondary studies												
	Up to preparatory	1.217***	(0.050)	0.191***	(0.008)					0.990***	(0.056)	0.146***	(0.009)
	Up to secondary	0.645***	(0.046)	0.132***	(0.010)					0.549***	(0.050)	0.100***	(0.009)
Sector	Ref.: public												
	Private					0.719***	(0.056)	0.121***	(0.011)	0.449***	(0.059)	0.067***	(0.009)
Economic sector of employment	Ref.: agriculture, forestry and fishing												
	Manufacturing and other industry					-0.767***	(0.121)	-0.110***	(0.013)	-0.751***	(0.129)	-0.105***	(0.014)
	Construction					-0.334*	(0.130)	-0.036**	(0.013)	-0.342*	(0.139)	-0.038**	(0.014)
	Trade, transport & hotels etc.					-0.320**	(0.122)	-0.034**	(0.011)	-0.314*	(0.132)	-0.034**	(0.013)
	Information and communication					-1.226***	(0.168)	-0.228***	(0.038)	-1.038***	(0.178)	-0.168***	(0.033)
	Financial and insurance activities					-1.112***	(0.167)	-0.195***	(0.035)	-0.941***	(0.177)	-0.145***	(0.031)
	Business services					-0.448***	(0.132)	-0.052***	(0.014)	-0.266	(0.141)	-0.028*	(0.014)
	Public admin., education, human health and social work					-0.507***	(0.129)	-0.062***	(0.013)	-0.387**	(0.138)	-0.044**	(0.014)
	Other services					-0.134	(0.159)	-0.013	(0.015)	-0.080	(0.174)	-0.008	(0.016)
Area	Ref.: urban												
	Rural					0.334***	(0.040)	0.051***	(0.006)	0.240***	(0.042)	0.034***	(0.006)
Constant		1.278***	(0.088)			0.532***	(0.131)			1.110***	(0.171)		
N		28019		28019		26974		26974		26743		26743	
LR chi2		2115.108				2238.557				2296.597			
Prob > chi2		0.000				0.000				0.000			
Pseudo R2		0.185				0.150				0.221			

*** p<0.01, ** p<0.05, * p<0.1

5. Robustness Testing

As with any multidimensional measurement, there are various decisions to be made regarding the included indicators which can affect identification and aggregation (Alkire & Santos, 2014). Therefore, robustness testing on the QoE index was undertaken using alternative parameter specifications to test for sensitivity. All alternative QoE index specifications were tested at a range of plausible values of the deprivation k-cutoff, in this case between k=10% and k=100% (in 10% increments). This can be interpreted as including a test of dominance. Pearson's correlation and Kendall Tau-B were estimated, and results are presented as follows.

5.1. Robustness to different deprivation cutoffs on income

There is a series of judgements that can be made on the income cutoff for any country. To test the sensitivity of the QoE index (baseline), three other cutoffs were estimated. In particular, (a) using three basic food baskets (3 poverty lines), (b) Egypt's minimum wage in each particular year, and (c) and a relative cutoff which considers individuals deprived if their labor income is below 60% of median income. Estimates are produced for each alternative QoE index (Mo), changing each indicator at a time and then Spearman and Kendall Tau-B correlations are estimated for each year. Pearson correlation coefficients are all above 0.91 across all deprivation cutoffs. Kendall's Tau-B results all exceed 0.9886 for every year and are all significant at the 5% level.

Table 11

Spearman Correlation Coefficients Between Alternative Specifications of the QoE Index

	Baseline QoE index	QoE index (3 food baskets)	QoE index (relative income)	Year
QoE index (3 food baskets)	0.9953	-	-	2006
QoE index (relative income)	0.9999	0.9945	-	
QoE index (minimum wage)	0.9109	0.9442	0.9092	
QoE index (3 food baskets)	0.9945	-	-	2012
QoE index (relative income)	0.9987	0.9985	-	
QoE index (minimum wage)	0.9588	0.9832	0.9719	
QoE index (3 food baskets)	0.9945	-	-	2018
QoE index (relative income)	0.9987	0.9985	-	
QoE index (minimum wage)	0.9588	0.9832	0.9719	

5.2. Robustness to changes in indicators

To test the sensitivity of the index to the inclusion of different indicators, estimates were undertaken that excluded one indicator at a time. Therefore, each QoE index was estimated and then Pearson and Kendall Tau-b correlations were estimated including different k-cutoffs. The correlations between the baseline QoE index and the excluded indices are quite high. The lowest Pearson correlation is 0.9329. The lowest value for Kendall's Tau-b is 0.9025. This suggests that the QoE index is highly robust to these changes in its component indicators.

Table 12

Correlation Coefficient Between Alternative Specifications of the Indicators in the QoE Index

	Baseline QoE index	Excluding income	Excluding occupational status	Excluding social security	Excluding excessive working hours	Year
Excluding income	0.9601	-	-	-	-	2006
Excluding occupational status	0.9571	0.9879	-	-	-	
Excluding social security	0.9605	0.9936	0.999	-	-	
Excluding excessive working hours	0.9594	0.9991	0.9895	0.994	-	
Excluding establishment	0.96	0.9972	0.9945	0.997	0.999	
Excluding income	0.9576	-	-	-	-	2012
Excluding occupational status	0.9507	0.9957	-	-	-	
Excluding social security	0.9547	0.9904	0.9941	-	-	
Excluding excessive working hours	0.9589	0.9959	0.9957	0.9986	-	
Excluding establishment	0.96	0.9956	0.9938	0.9981	0.9998	
Excluding income	0.9329	-	-	-	-	2018
Excluding occupational status	0.9405	0.9891	-	-	-	
Excluding social security	0.9405	0.9901	0.9999	-	-	
Excluding excessive working hours	0.9366	0.9961	0.9944	0.9957	-	
Excluding establishment	0.9395	0.9966	0.9977	0.9983	0.9986	

5.3. Robustness to changes in indicators' weights

To test whether the QoE index is robust to a plausible range of weights, estimates with four alternative weighting structures were calculated. First, 50% of the weight to each one of the dimensions and equally dividing the remaining 50% between the rest of the indicators, and equal weights to each indicator. Pearson's correlation is 0.9462 or higher. The correlation is 0.9404 using Kendall Tau-b. Thus, we find that the QoE results tend to be highly robust to significant changes in the indicators' weights.

Table 13

Correlation Coefficients Between QoE Index Using Alternative Weighting Structures

	Baseline QoE index	50% income, 25% employment stability, 25% working conditions	25% income, 50% employment stability, 25% working conditions	25% income, 25% employment stability, 50% working conditions	Year
50% income, 25% employment stability, 25% working conditions	0.9893	-	-	-	2006
25% income, 50% employment stability, 25% working conditions	0.9509	0.9607	-	-	
25% income, 25% employment stability, 50% working conditions	0.9898	0.9887	0.9355	-	
Equal weights for each indicator	0.9827	0.9762	0.9462	0.9908	
50% income, 25% employment stability, 25% working conditions	0.9985	-	-	-	2012
25% income, 50% employment stability, 25% working conditions	0.9876	0.9931	-	-	
25% income, 25% employment stability, 50% working conditions	0.9837	0.9816	0.9559	-	
Equal weights for each indicator	0.9853	0.9799	0.9597	0.9838	
50% income, 25% employment stability, 25% working conditions	0.9936	-	-	-	2018
25% income, 50% employment stability, 25% working conditions	0.9598	0.9654	-	-	
25% income, 25% employment stability, 50% working conditions	0.9948	0.9935	0.952	-	
Equal weights for each indicator	0.9871	0.9852	0.9637	0.9918	

6. Policy Discussion and Conclusions

This paper shows that an index developed to measure the QoE in the Latin American region can also be adapted and applied to other developing countries, such as Egypt. Overall, the results presented above show a significant deterioration of the QoE in Egypt, which is consistent with other studies and findings of the literature on the Egyptian labor market discussed above.

The benefit of the QoE index lies in the fact that we can observe the development of several aspects of the QoE simultaneously, observing how the combined levels of income deprivation, lack of employment stability and working conditions changed over time. Thus, we can conclude that the overall QoE in Egypt has deteriorated significantly since 2006 despite relatively high economic growth rates during the period of time observed. The subgroup and regression analysis also allow us to pinpoint which workers in the Egyptian labor market are the most vulnerable.

From this analysis, the question arises as to which policies would be most effective in improving the QoE results presented in this paper. The policy discussion that follows could draw on the experience of some Latin American countries, which are closer to Egypt's level of development than developed or industrialized countries, and where the QoE has improved overall (Farné & Vergara, 2015; Huneeus et al., 2015; Ocampo & Sehnbruch, 2015; Ramos et al., 2015; Ruiz-Tagle & Sehnbruch, 2015).

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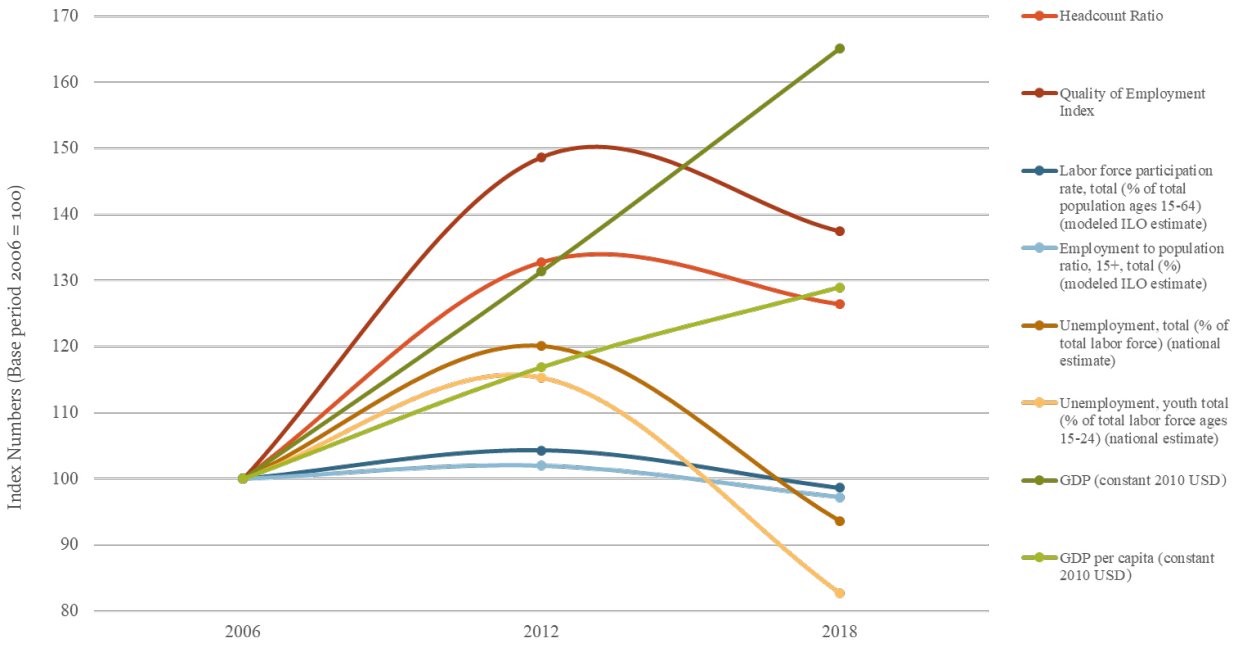
8. Appendix

Appendix Figure 1

Egyptian and Employment Quality Indicators



Appendix Table 1

Associations: Cramer's V and Coefficient P for Redundancy

	Labor income	Occupational status	Social security	Excessive working hours	Establishment	Year
Labor income	-	0.652	0.662	0.542	0.528	2006
Occupational status	0.189	-	0.933	0.664	0.797	
Social security	0.171	0.722	-	0.572	0.686	
Excessive working hours	-0.012	0.325	0.293	-	0.517	
Establishment	-0.021	0.335	0.328	0.135	-	
Labor income	-	0.844	0.737	0.712	0.659	2012
Occupational status	0.052	-	0.979	0.915	0.99	
Social Security	0.036	0.384	-	0.66	0.888	
Excessive working hours	-0.013	0.155	0.242	-	0.396	
Establishment	-0.09	0.278	0.527	0.099	-	

Labor income	-	0.731	0.739	0.715	0.678	2018
Occupational status	-0.007	-	0.896	0.747	0.952	
Social security	0.017	0.73	-	0.725	0.911	
Excessive working hours	-0.029	0.198	0.165	-	0.387	
Establishment	-0.097	0.534	0.47	0.024	-	

Note: Grey shading represents Cramer's V, which describes the association among indicators. White shading describes results for redundancy among indicators. The coefficient P is defined as the ratio between the proportion of people with simultaneous deprivation in any two indicators, and the lowest proportion of deprivation of those indicators independently. The coefficient P takes values 0 when no one is identified as deprived in both indicators being considered, and 1 when every individual who is deprived in the indicator with the lowest incidence of deprivation, is also deprived on the other indicator.

Appendix Table 2

Raw Headcount Ratios

	2006	2012	2018
Income (4 poverty lines)	0.549***	0.720***	0.733***
	(0.0123)	(0.00855)	(0.00671)
Occupational status	0.459***	0.832***	0.613***
	(0.0116)	(0.00683)	(0.00806)
Social security	0.365***	0.486***	0.613***
	(0.0107)	(0.0112)	(0.00813)
Excessive working hours	0.384***	0.325***	0.341***
	(0.0102)	(0.00755)	(0.00672)
Establishment	0.195***	0.301***	0.371***
	(0.00983)	(0.0117)	(0.00751)
Observations	6,697	10,034	11,553

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 3

Tetrachoric Correlations for Related Variables in Probit

	Sector (public or private)	Formality (contract or no contract)	Union membership (yes or no)
Sector (public or private)	1	-	-
Formality (contract or no contract)	0.9105	1	-
Union membership (yes or no)	0.7135	0.8529	1

Appendix Table 4

Effect Sizes for Models – ETA Squared

Sector and economic activity	
Source	Eta-Squared
Model	0.5744213
Union and economic activity	
Source	Eta-Squared
Model	0.2548614
Formality and economic activity	
Source	Eta-Squared
Model	0.421948

Like the R Squared statistic, Eta Square has the intuitive interpretation of the proportion of the variance accounted for. Eta Squared is calculated the same way as R Squared, and has an equivalent interpretation for R Squared: out of the total variation in Y, the proportion that can be attributed to a specific X.