MEASURING AND EXPLAINING JOB QUALITY FOR HOUSEHOLD ENTERPRISE WORKERS

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Working Paper No. 127
January 2008

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Abstract

It is quite challenging to operationalize the notion of job quality for wage and salary employment, and in turn more challenging to devise a measure of job quality for non-wage workers. This paper takes up this challenge and attempts to provide a measure of job quality among the self-employed and unpaid family workers in Egypt. We combine estimated earnings with information on skill acquisition, access to social security, regularity of employment, work hours, and nature of workplace into several composite indices of job quality. The developed indices are used to identify the workers- and enterprise-specific determinants of job quality. The results of this paper confirm the profile of workers with bad jobs that emerged in previous studies. Married men in the middle of their life cycle get the good jobs, but not married women. Also, the results show that higher quality non-wage, non-agricultural jobs are more often available in formally registered enterprises, in the manufacturing economic activity, and are seldom in Rural Upper Egypt.

ملخص

يعد مفهوم جودة الوظائف بالنسبة للمشتغلين بأجور ورواتب أمرا يصعب وضعه موضع التطبيق، وبالتالي يكون من الصعوبة بمكان تصميم مقياس لجودة الوظائف لغير المشتغلين بأجر. وفي هذا الصدد، تحاول هذه الدراسة تقديم مقياس لجودة الوظائف بين المشتغلين لحساب أنفسهم والمشتغلين بدون أجر لدى الأسر المصرية. ونقوم بالجمع بين العوائد المقدرة والمعلومات حول اكتساب المهارات، والنفاذ إلى الضمان الاجتماعي، وانتظام التشغيل، وساعات العمل، وطبيعة مكان العمل في صورة أرقام قياسية مركبة لجودة الوظائف. وتستخدم الأرقام القياسية التي يتم إعدادها في توضيح محددات جودة الوظائف المرتبطة بالمشتغلين والمشروعات. وتؤكد نتائج الدراسة هيكل المشتغلين في الوظائف الرديئة الذي ظهر في دراسات سابقة، والذي يشير إلى أن المتزوجين يحصلون في منتصف أعمارهم على الوظائف الجيدة، وذلك خلافا للمتزوجات. كما توضح النتائج أن الوظائف غير الأجرية ذات الجودة الأعلى في القطاعات غير الزراعية غالبا ما تكون متاحة في المشروعات المسجلة بصورة رسمية، وفي أنشطة الصناعة التحويلية، ونادرا ما تتوافر في المناطق الريفية في صعيد مصر.

1. INTRODUCTION

There has been increasing concern in recent years with the notion of "decent work" since the ILO introduced the concept in 1999. According to the ILO, decent work covers a number of dimensions, including income security, opportunities for skill acquisition, job security, job safety, regularity of employment, and voice and representation. As challenging as it is to operationalize this notion for wage and salary employment, the difficulty pales in comparison to devising a measure of job quality for self-employed and unpaid family workers. The difficulty is further compounded in Egypt by the fact that there are no statistical sources that provide a reliable measure of the earnings of non-wage workers.

Recent studies have shown that household enterprise workers have one of the highest incidences of poverty in Egypt and that their proportion among all workers has increased in recent years (Assaad and Roushdy 2007). However, there is clearly significant heterogeneity among family-run and operated enterprises in terms of output, productivity and the assets at their disposal. There is therefore a need to measure the quality of employment that such enterprises provide and the factors that determine that quality.

This paper, therefore, has two objectives: (i) to define and operationalize a measure of job quality for non-wage workers in the non-agricultural sector[1] and (ii) to investigate the worker and enterprise-specific determinants of job quality. A central part of the notion of job quality is clearly the level of income that the worker is able to secure from that job. This is often far from being a straightforward exercise for non-wage workers. The first step in this paper is to estimate earnings from non-wage work. This methodology relies on using estimates of household consumption and other individual characteristics to infer the earnings of each non-wage worker in the household. The information on earnings is then combined with information on skill

[1] A separate analysis should be undertaken for non-wage jobs in agriculture (which constitute about half of all non-wage employment in Egypt), to take into account the size of the land being cultivated and the size of physical and natural resources used on the farm. This is left for future work.

acquisition, access to social security, regularity of employment, work hours, and nature of workplace into a composite measure of job quality.

Under the second objective of the paper, the derived measure of job quality is explained as a function of worker characteristics, such as education, training, occupation and experience, and enterprise characteristics, such as the size of the enterprise, its capital assets, its age, and its sector of economic activity.

This paper relies on data from the 2006 Egypt Labor Market Panel Survey (ELMPS 06), which was conducted by the Economic Research Forum (ERF) in cooperation with the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). The ELMPS 06 is the second round of what is intended to be a periodic longitudinal survey that tracks the labor market and demographic characteristics of the households and individuals interviewed in the 1998 Egypt Labor Market Survey (ELMS 98). The ELMPS 06 is a rich source of information on labor market conditions in Egypt, including employment status, unemployment, job mobility, earnings, migration and household enterprises. However, it does not include a full consumption and income module and therefore cannot provide direct measures of household income poverty. Moreover, no data is collected directly in the ELMPS 06 on the earnings of self-employed and household enterprise workers. To overcome these limitations, an additional dataset is used in this paper. The 2004/2005 Household Income and Expenditure Consumption Survey (HIECS 04) is combined with the ELMPS 06 using a two-stage estimation technique to estimate household consumption for the ELMPS 06 sample. In a further step, these consumption estimates are combined with estimates of non-labor income and wage earnings to produce earnings estimates for non-wage workers.

The rest of the paper is organized in six sections. Section 2 presents a brief background and a review of related literature on job quality and its determinants. In Section 3, we describe the data sources and the encountered measurement challenges. Section 4 lays out our framework for measuring job quality among non-wage workers. Section 5 relates the developed index to other information from the survey to examine the determinants of job quality. In Section 6, we explore whether earnings alone can adequately measure job quality. Section 7 concludes the paper.

2. LITERATURE REVIEW

In what follows, we review and discuss briefly different methodologies that have been proposed in the literature for measuring job quality. This section also discusses expected determinants of job quality in light of the results of previous studies.

2.1. Job Quality: Theoretical and Empirical Considerations

The 87th Session of the International Labour Conference formalized the definition of decent work as "opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity" (Anker et al. 2003). Following this definition, a first series of discussions about the creation of a decent work index started in late 1999 when the ILO established the InFocus Programme on Socio-Economic Security to compensate for the absence of systematic data that could monitor the dynamics and the causal mechanisms of, above all, workers' insecurity (Standing 2002).

In fact, the initial intent of the ILO was to provide measurements of job security, but subsequently their intent was broadened to include measurements of "decent work" that extended beyond the traditional exclusive focus on wages and hours of work. The first effort undertaken was the Enterprise Labour Flexibility and Security (ELFS) Surveys, aimed at collecting data on employment and income security, which was followed by People's Security Surveys (PSSs) (Standing 2002). In particular, the PSSs differ from traditional household surveys as they combine objective, attitudinal and normative questions on the actual socio-economic situation of respondents, their perception of security and insecurity, the resources available to them for coping with insecurity and their opinions on social justice and norms regarding security and insecurity (Anker 2002). Different studies emanating from ILO officials have used data from different PSSs to compile different Decent Work Indices (DWIs).

Besides the ILO's PSSs of individual job quality, the most comprehensive attempt at measuring quality of jobs was by Statistics Finland, which carried out five Quality-of-Work-Life Surveys between 1977 and 2003 (Sutela 2005). Most other studies, including the present one, use

traditional Household Panel Surveys (e.g., the British Household Panel Survey (BHPS) in Clark 2001).

As job quality is a multi-faceted concept, a wide range of indicators have been proposed by several studies. Bonnet, Figueiedo, and Standing (2003) divide indicators into *input indicators* (such as the enactment of basic laws and ILO Conventions), *process indicators* (mechanisms whereby legal provisions are translated into reality, e.g., public spending on a particular form of security) and *outcome indicators* indicating whether or not processes are effective in ensuring workers' protection. The following table is mainly based on Anker's (2002) identification of eight macro-areas that can account for the multi-faceted approach to job quality.

Table 1. Sub-indicators of Job Quality

Category	Indicators	Reference
(1) Basic security Basic work and non-work aspects of people's lives	* Basic needs (housing, education, safety/violence, health care, environment and food) * Debt and financial crises experienced * Perceived sufficiency of income * Excessive hours of work (more than 50 hours per week) and extreme hours (above 60 hours) * Insufficient hours of work	Anker (2002) Anker et al. (2003) Brown, Pintaldi (2005)
(2) Income security Presence of a sufficient income	* Cash and non-cash wages/benefits * Whether salary is below half the median national value * Fluctuations in income and wage arrears * Past income levels and future expectations * Savings measured as cumulative income * Availability of official income supports	Anker (2002) Anker et al. (2003) Mehran (2005)
(3) Labor market security Security of having income-generating work	* Unemployment experiences and presence of unemployment benefits * Recent changes in number of people employed at the respondent's workplace * Consequences of the possible loss of current work	Anker (2002)
(4) Employment security Security from loss of current work and the security/capability of keeping one's main job	* Contract type (written, oral or absent) * Occupation and place of work * Paid sick and annual leave * Employer's contributions to social security * Regularity/tenure of employment * Perceptions of work satisfaction * Likelihood of pregnant women losing their job * Effect of globalization on work	Anker (2002) Mehran (2005)

(5) Skills reproduction security Obtaining marketable skills	* Formal/informal training received * Mismatch between qualification and work content (skill-related underemployment) * Use of qualifications at work * Expectations for own children's education	Anker (2002) Brown and Pintaldi (2005)
(6) Job security Career possibilities and advancement	* Experiences with advances and setbacks in working life and future expectations * Perceived importance of following a particular profession	Anker (2002)
(7) Work security Occupational safety and working conditions	* Absence from work due to illness, stress and injuries * Overwork * Sexual harassment * Discrimination * Safety of working conditions * Provision for occupational injury compensation * Childcare availability	Anker (2002)
(8) Voice representation security Having a collective voice to represent one's rights and interests at work	* Presence of trade unions * Coverage by a collective wage bargaining coverage rate * Employer's concern of employees	Anker (2002) Anker et al. (2003)

Perhaps the main difficulty in measuring job quality is that it is not based solely on objective quantitative criteria (e.g., wage) but on a series of complex issues that involve qualitative and/or subjective aspects that are difficult to encapsulate in a quantitative indicator (for detailed discussion see Anker et al. (2003)).

2.2. Determinants of Job Quality in the Literature

The main reason behind constructing an index of job quality is to assess the interaction between job quality and other aspects of people's lives such as poverty, education, gender and age. Results from several studies show that there is indeed a link between job quality and workers' quality of life. Beyond the clear link between poor earnings and poverty, dangerous or unstable work environments can result in high levels of vulnerability (through lay-offs or work-related injuries). For instance, for small-scale operators in the informal sector the home usually becomes the workplace and, therefore, poor living standards result in dire working conditions and vice versa (ILO 1999).

Even though different studies employ different measures of bad jobs, a similar profile of workers with bad jobs emerges from a number of studies. Generally, women tend to have worse

jobs than men in both developing and developed countries. Young new entrants are also generally exposed to worse working conditions than older workers, especially when existing regulations provide excessive protection to incumbent workers at the expense of new entrants who are often relegated to informal types of employment. Informal employment is often associated with lower quality jobs and employees are more likely to have decent jobs than the self-employed. A negative relationship between job satisfaction and unionization has been found in several studies that focus on industrial countries (e.g., in the United States (Freeman 1978; Borjas 1979), Canada (Meng 1990) and the United Kigdom (Clark 1996)). Clark (2001) shows that unionism (that reduces both quits but either decreases or has little effect on job satisfaction) and tenure (associated with much lower quit rates but no effect on job satisfaction) may have an ambiguous effect on job satisfaction.

Based on the analysis of data from five countries, the study by Ritter and Anker (2002) shows how factors like pay, non-wage benefits, nature of work, autonomy, opportunities for promotion and skill-upgrading tend to move up and down together, meaning that good jobs tend to score high on most of them. The authors also highlight a positive correlation between education, earnings and total job satisfaction and a statistically significant positive relationship between acquisition of transferable skills and job satisfaction. These results suggest that in-firm skill upgrading increases the likelihood of finding a job in case of job-loss and, together with higher earnings, it has a beneficial impact on job satisfaction. Surprisingly, pay exhibits as strong a relationship with job satisfaction as job safety and job security.

3. Data Sources and Measurement Challenges

The analysis in this paper mainly relies on data from the 2006 Egypt Labor Market Panel Survey (ELMPS 06), which is a nation-wide labor force sample survey recently conducted by the Economic Research Forum (ERF) in cooperation with the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS). The ELMPS 06 is the second round of what is intended to be a periodic longitudinal survey that tracks the labor market and demographic characteristics of the households and individuals interviewed in the 1998 Egypt Labor Market Survey (ELMS 98) as well as new households that have formed as a result of splits in the original households, and a refresher sample of entirely new households. The ELMPS 06 sample consists of a total of

8,349 households distributed as follows: (i) 3,684 households from the original ELMS 98 survey, (ii) 2,167 new households that emerged as a result of splits in the original households, and (iii) a refresher sample of 2,498 households. Of the 23,997 individuals interviewed in 1998, 22,987 were still alive or in the country in 2006 and 17,357 of those (75.5 percent) were successfully re-interviewed in 2006, forming a panel that can be used for longitudinal analysis.[2] The 2006 sample contains additional 19,743 "new" individuals. Of these, 2,663 individuals joined the original 1998 households, 4,880 joined the split households, and 12,200 were part of the refresher sample of households.

The ELMPS 06 is a rich source of information on labor market conditions in Egypt, including employment status, unemployment, job mobility, wage earnings, migration and household enterprises. It also contains a great deal of information on the household members' demographic and socioeconomic characteristics, housing conditions, ownership of durable goods, access to basic services and infrastructure. More specific to the objective of this paper, the data from the Egypt labor market surveys (ELMSs) address a number of job quality issues. The surveys collect information on the presence of a legal contract, social security coverage, health insurance, paid vacations, paid sick leave, unionization, regularity of employment, hours of work, whether the work is in a fixed establishment, the form of the workplace, the enterprise size, the proportion of women in the workplace, and the incidence of training opportunities.

However, as mentioned previously, the ELMSs do not include a full consumption and income module and therefore cannot provide direct measures of household income poverty. To overcome this limitation, the 2004/2005 Household Income and Expenditure Consumption Survey (HIECS 04) is used in combination with the ELMPS 06. The HIECS 04 is a household budget survey implemented by CAPMAS. It contains information of consumption expenditures on more than 550 items of goods and services. The Household Income and Expenditure Consumption Surveys (HIECSs) are generally considered a major source of information on household income and expenditure in Egypt. The ELMSs and the HIECSs contain a great deal of

[2] An analysis of the attrition from the sample showed that it was essentially due to the random loss of identifying records rather than any systematic attrition process. No significant association was found between the probability of attrition and household and individual characteristics in 1998. Weights based on the probability of non-response were used to correct for attrition in the panel data.

information, in common, on the household members' demographic and socioeconomic characteristics, housing conditions, ownership of durables, access to basic services and the neighborhood infrastructure. However, detailed information on the household total income and expenditure is only provided in the HIECSs. While detailed information on labor market conditions, employment status, different aspects of job quality, and household enterprises is only available in the ELMSs. Accordingly, we use a two-stage estimation technique to combine information from the HIECS 04 with the ELMPS 06 in order to estimate per capita consumption for the ELMPS 06 samples. The detailed information of this two-stage estimation technique is summarized in Appendix B.

A second major data limitation of the ELMSs is the nonexistence of any information on the earnings of non-wage workers; since ELMSs collected earnings data from only the wage and salaried workers. Nevertheless, to overcome this limitation, we developed a methodology to estimate monthly earnings for individual self-employed and household enterprise workers. This methodology basically assumes that total household income is equal to total household consumption (predicted according to the methodology outlined above and discussed in detail in Appendix B), and allocates the total household income (excluding non-labor income and wage earnings) over the household enterprise workers based on the number of hours worked.

The following section takes on the challenge of measuring job quality for non-wage workers. The general framework for measuring job quality in this paper is mainly based on Anker's (2002) framework discussed above.

4. MEASURING JOB QUALITY

Based on a careful assessment of the different methodologies that have been proposed in the literature for measuring decent work and given the limitation of available data, we decided to employ the following set of indicators, which can be grouped into four broad categories, to develop a composite measure of job quality for the household enterprise and individual self-employed workers:

1. Income security: defined in terms of having an adequate income, access to social security and access to medical care.

2. Employment security: defined in terms of the regularity of employment.

3. Skill acquisition: defined in terms of having received formal/informal training.

4. Work security: defined in terms of having adequate working hours, workplace, and reasonable commuting distance to work.

The greatest challenge in measuring job quality for non-wage workers often lies in estimating earnings. As discussed in the previous section, since the ELMPS 06 includes no information on earnings of the non-wage workers, we estimate their earnings from household non-wage income using the methodology outlined above.

The nature of workplace is provided under quite detailed categories in the ELMPS 06. We grouped these categories into five groups that vary from worst to best. The first group includes all mobile workers who mentioned streets, mobile carts or huts as their place of work. The second group includes those who work at their own home, in another house or in a field/farm. The third group consists of truck, pickup truck, taxi or auto rickshaw as workplaces. Under the fourth group comes shop, kiosk, room or number of rooms. Finally, the fifth group includes those working in offices, flats, buildings or factories.

There is no official ILO definition of full-time work largely because the definition of full-time work varies substantially across countries or is even left undefined in some. In this paper, we take full-time work as 40 hours per week. Since adequate working hours and more importantly finding a full-time job if wanted are important elements of job quality, among the components of the job quality indices (JQI) is a measure of the degree of involuntary underemployment. We measure the degree of underemployment by number of hours worked below 40 hours if the individual is involuntarily working less than 40 hours. Thus, the full employment indicator will take on the value 0 in case the individual is fully employed and a negative value in case the individual involuntarily works less than 40 hours. The descriptive statistics of the chosen set of indicators are summarized in Table A1 in the Appendix.

The rest of the chosen set of indicators is binary variables. Each of the non-binary indicators is normalized using the formula: [value-Minimum]/[Maximum-Minimum],[3] to allow us to gauge the worker's situation in comparison to other non-wage workers. Once a series of job quality indicators have been identified and normalized, these normalized scores can be combined into a single index by averaging the normalized set of indicators into an unweighted score that varies from 0 to 1; or by using available data reduction techniques such as factor analysis. In the following, we use both methods to produce a weighted JQI (JQI1) and unweighted JQI (UJQI), and compare their results.[4]

The factor analysis produced a single factor. Table A2 in the Appendix shows the resulting scoring coefficients.[5] Also, the correlation matrix (Table A5) and descriptive statistics (Tables A3 and A4) of the job quality indices (JQIs) and their normalized components are presented in Appendix A.

The distributions of the developed JQIs are shown in Figures 1 and 2. Figure 3 shows a scatter plot of the correspondence between the two JQIs. As shown in Figure 3 and Table A5, there is great correspondence between the two JQIs. The correlation of the weighted JQI produced from the factor analysis and the unweighted JQI produced from averaging the normalized scores exceeds 0.92. However, by comparing Figures 1 and 2, we see that the weighted JQI gives a more interesting distribution that is more consistent with expectations. The weighted JQI (Figure 2) has a remarkable trimodal distribution that clearly distinguishes between workers falling on the high levels of the job quality distribution than those on the lower levels of the distribution. This is expected, since, in contrast to an unweighted index, the factor analysis usually plays a good role in capturing and quantifying the tendency of the normalized scores to move up and down together.

[3] Note that since the full employment indicator takes the value 0 in case the individual is fully employed and a negative value in case the individual involuntarily works less than 40 hours, the standardized full employement measure varies between one in case the individual is fully employed and declines as the number of working hours below 40 decreases.

[4] Although any such procedure may produce a seemingly simple measure of job quality, it should be carefully interpreted since it may in fact obscure the real complexity underlying the job quality concept (Ritter and Anker 2002).

[5] The factor analysis produced a single factor in the sense that its eigenvalue exceeds one, while the eigenvalues associated with all the next factors are less than 0.8.

A thorough investigation of Tables A2, A4 and A5 reveals that the institutional variables (access to social security and access to medical care) and nature of workplace are mainly what drives this trimodal distribution of the weighted JQI1. Moreover, surprisingly, earning plays a smaller role in capturing job quality than the effect of the social security and nature of workplace dimensions.

One could argue that the institutional variables are not part of the job quality, but instead they are choice alternatives, which the individual can bring to himself/herself and that highly depend on individual characteristics and preferences. Accordingly, to investigate this further, we develop two additional weighted JQIs using factor analysis; the first (JQI2) does not include the institutional variables while the second (JQI3) consists of neither the institutional variables nor the nature of workplace. The descriptive results of these two JQIs are summarized in Tables A2–A5 with those of JQI1, while the relationship between those indices and the individual characteristics are discussed in detail in the next section. The distributions of JQI2 and JQI3 are graphed in Figures 4 and 5. The figures show that not only the institutional variables are the cause of the above discussed trimodal distribution of JQI1, but also the nature of workplace. The JQI distribution no longer has the trimodal distribution, when all these three variables are simultaneously removed from the index (Figure 5).

In the next section, we turn to answering two central questions in this paper, which are: *who gets the good job?* and *where are the good jobs?* We explore in detail the expected determinants of job quality in light of the results of previous studies.

5. Determinants of Job Quality among Household Enterprise Workers

This section is devoted to investigating the workers and enterprise-specific determinants of job quality among non-wage workers. After reviewing the literature and carefully examining the correlations among the existing variables, we decided to explore the interlinkage between the developed JQIs and the set of workers and the enterprise characteristics discussed in the following (see Tables A6 and A7 in the Appendix for the descriptive statistics and the correlation matrix of this selected set of variables). Data availability was also an important constraint in this analysis.

Worker-specific characteristics include the eight variables: age, gender, education, marital status, years of experience, union membership, occupation, employment status and whether the individual uses computers at work. The individual's education is measured by five dummy variables for whether the individual can read and write but has no certificate, has less than an intermediate education, has an intermediate education, has above intermediate education, or has a university or higher education. Illiterate is the omitted category in the regression. Union membership is a dummy variable for whether the individual is a member of any trade or professional union. The individual employment status is captured by two dummies: whether the individual is an employer, or whether the individual is self-employed with no other household workers. The unpaid family worker is the omitted category.

The set of the enterprise-specific characteristics consists of seven variables: the region where the enterprise is located, legal status, enterprise age in years, capital, economic activity, size, and percent of women to total workers. The ELMPS 06 divides Egypt into six regions: Greater Cairo, Alexandria and the Canal governorates, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt and Rural Upper Egypt. Accordingly, in the regression models, region is measured by five dummies where Greater Cairo is the excluded category. The enterprise legality status is measured by a dummy variable that takes the value one if the enterprise has either a commercial registration or an official license. In the ELMPS 06, the enterprise capital is measured in Egyptian pounds and is grouped into seven categories: < LE 1, LE 1-499, LE 500-999, LE 1000-4999, LE 5000-9999, LE 10000-49999 and LE 50000 or more. These capital groups are captured in the regressions by six dummy variables (<LE 1 is the omitted category). The economic activity is captured by four dummies (taking mining and quarrying, manufacturing, electricity, gas and water supply as the reference economic activity group): whether the enterprise belongs to the cconstruction economic activity, whether the enterprise works in the wholesale and retail trade activities, whether the enterprise belongs to the hotel and restaurants economic activity; whether the enterprise works in transportation, storage and communications; or whether it belongs to other services.

Columns 2-5 of Table 2 show the regression results of each of the four JQIs. The four JQIs show quite a few similar results. Job quality has an inverse U-shaped relationship with age. Thus,

as expected, workers in the middle age groups are more exposed to better quality jobs. White collar and blue collar workers tend to have significantly lower job quality in comparison to professionals in all regressions. Also, employers have significantly higher job quality in comparison to unpaid family workers. Surprisingly, the individual's experience and computer usage at work show no significant effect on job quality (except in the JQI3 model). On the other hand, the common significant enterprise-specific determinants of job quality are location, formality status, economic activity, and capital.[6]

Nevertheless, several interesting differences are observed among the results of each of the weighted JQIs. The coefficient of the female dummy gains significance and increases in magnitude, respectively, as the institutional variables and the nature of workplace are removed from the index. As clear from Table A3, when the institutional variables and the nature of workplace are removed, the job quality index (JQI3) mainly reflects the earning dimension of job quality; and as often observed, females generally end up in low-earning jobs than males.

On the other hand, the coefficient on marriage is positive and significant while the coefficient of the female interaction term with marriage is negative and significant. This reveals that marriage is an asset for males; however, it has a negative effect on job quality for females.[7] However, once again, the effect of marriage and the interaction terms increases in magnitude and significance as we move from the JQI1 regression results to JQI3 results; since, as one expects, married females are less likely to be involved in non-wage jobs that offer social and medical benefits, and are more likely to work in low earning jobs and in low ranked working places (such as own home or someone else's home).

Job quality significantly increases with education levels. However, a weakening effect of education is observed as the institutional variables and the nature of workplace dimensions are removed from the JQI (i.e., as we move from columns 3 to 5). This is expected, since the more educated are more likely to insist on having social security and medical insurance and are more likely to work in a better working place. Similarly, a weaker effect of union membership both in

[6] One should be careful when interpreting some of the enterprise-specific characteristics, specifically the enterprise capital, age, size and formality status. These variables are potentially endogenous. Since earning is part of the JQI, but at the same time it is highly determined by the enterprise development, growth and productivity.

[7] We also checked education interaction terms with sex, and showed no additional effect.

magnitude and significance is observed as we move from the JQI1 to JQI3 regression results. Since members of unions are more likely to be the professionals and the highly educated individuals, who in turn care more about the social and medical benefits and the adequacy of the workplace, and are more likely to afford waiting for a job that offers these benefits. The coefficient on employer declines in magnitude and significance when the social benefits are excluded from the JQI; since, as one would expect, employers are more likely to care about getting social security and medical benefits to themselves.

On the enterprise characteristics, the magnitude and significance of the coefficient on the enterprise formal registration dummy substantially decline when the institutional variables are removed from the job quality index, and decline even further when the workplace is removed. Since a formally registered enterprise is more likely to provide social benefits and to be accompanied with a better type of workplace. The effect of the enterprise capital seems to substantially decline in magnitude and significance as the nature of workplace is removed from the job quality dimension (JQI3). This result is consistent with expectations, since capital usually leads to a certain type of workplace.

6. Earning Dimension of Job Quality

There is no debate in the literature on job quality that earning is a central part of the notion of quality. In this section, we are interested in exploring whether job quality for non-wage workers in Egypt can be adequately measured by earnings only, or whether it is a more complex notion.

Figure 6 presents the distribution of earnings among household enterprise workers. The earning distribution is relatively symmetric in contrast to the trimodal distribution of the weighted JQI1 and JQI2. The correlation matrix (Table A5) shows that the correlations between earning and each of the weighted JQIs and the unweighted JQI are quite weak (around 0.50). The JQI3 has the highest correlation with earnings (0.55) and its distribution (Figure 5) is more similar to the distribution of earnings than that of the other JQIs. Tables A2 shows that the factor analysis scoring coefficient on earning substantially declines as the institutional variables and the nature of workplace are included among the job quality indicators.

Let us turn now to comparing the determinants of earnings and JQIs. The last column of Table 2 presents the regression results of the earning equation. Once again, the regression results of earning are quite similar to the results of JQI3 in comparison to the results of the other JQIs.

Age, gender and marital status have quite similar effects on both earnings and all four job quality indices. However, education, occupation and member of a union show weaker effects, both in magnitude and significance level, on earnings than on JQI1 and JQI2. In contrast, worker's years of experience and employment status have a stronger effect, both in magnitude and significance, on earning than on job quality.

On the other hand, the enterprise-specific characteristics show different effects on earning than the pattern observed for job quality. Earnings and JQI3 are significantly lower in all regions in comparison to Greater Cairo—not only in Rural Upper Egypt as the full-indicator job quality indices (UJQI and JQI1). Surprisingly, the enterprise formality status shows no effect on earnings, although it has a significant effect on all the four JQIs. The enterprise economic activity has no significant effect on earning. The effect of the enterprise capital on earnings is weaker than its effect on job quality—except when capital exceeds LE 50,000.

To sum up, this discussion reveals that earning is among the important dimensions of job quality but it is not appropriate to accept it as the only dimension.

7. CONCLUSION

Job quality is a multi-faceted concept. It is quite challenging to operationalize the notion of job quality for wage and salary employment, and in turn more challenging to devise a measure of job quality for non-wage workers. In Egypt, where there are no statistical sources that provide a reliable measure of the earnings of non-wage workers, this difficulty is further compounded. This paper takes up this challenge and attempts to provide a measure of job quality among the self-employed and unpaid family workers. We combine estimated earnings with information on skill acquisition, access to social security, regularity of employment, work hours, and nature of workplace into several composite indices of job quality. Afterwards, the developed indices are used to identify the workers- and enterprise-specific determinants of job quality.

The results of this paper are consistent with the profile of workers with bad jobs that emerged in previous studies. Married men in the middle of their life cycle get the good jobs, but not married women. Also, among those who get the good jobs are the better educated, employers, those in professional/technical occupations, and members of professional syndicates.

On the other hand, higher quality non-wage, non-agricultural jobs are more often available in formally registered enterprises, in the manufacturing economic activity, in enterprises with some capital, and are seldom in Rural Upper Egypt. However, the enterprise characteristics that do not matter are enterprise age, number of workers and proportion of female workers.

Figure 1. Distribution of Unweighted JQI (UJQI)

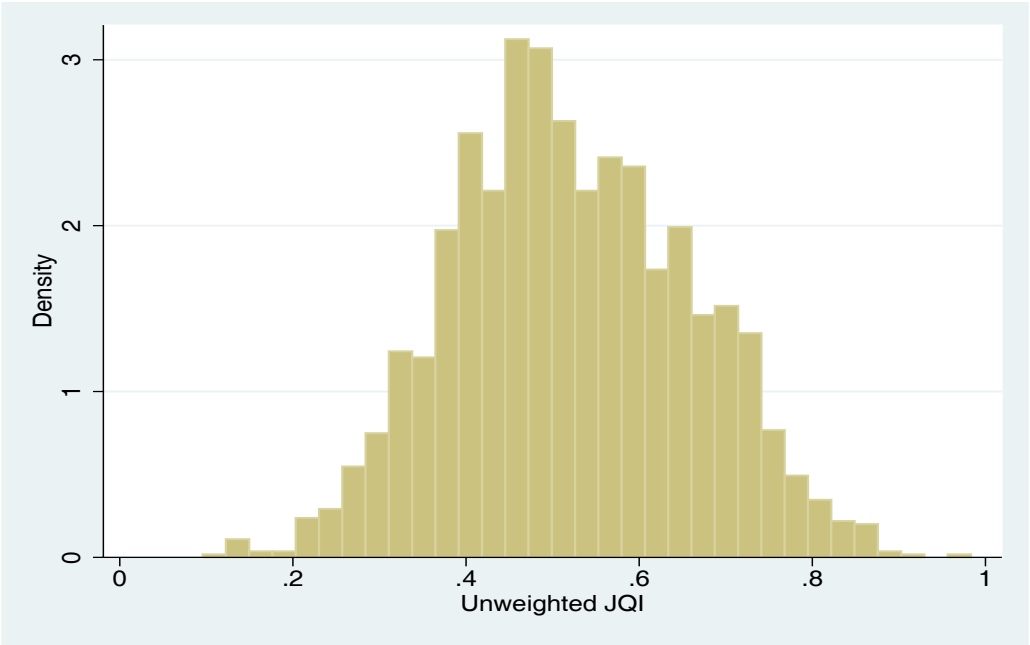

Figure 2. Distribution of JQI1

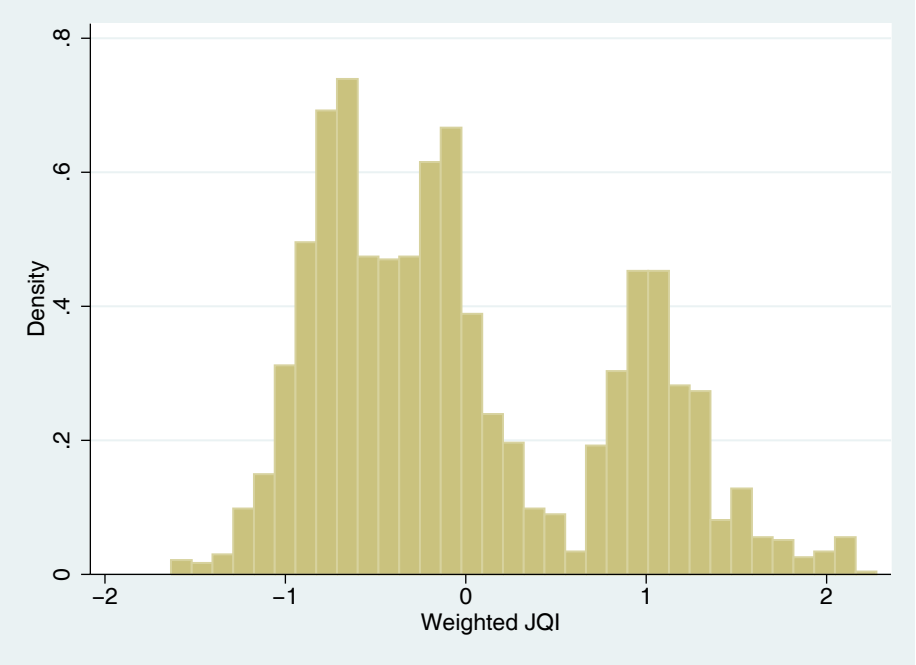

Figure 3. Weighted and Unweighted JQIs Scatter Plot

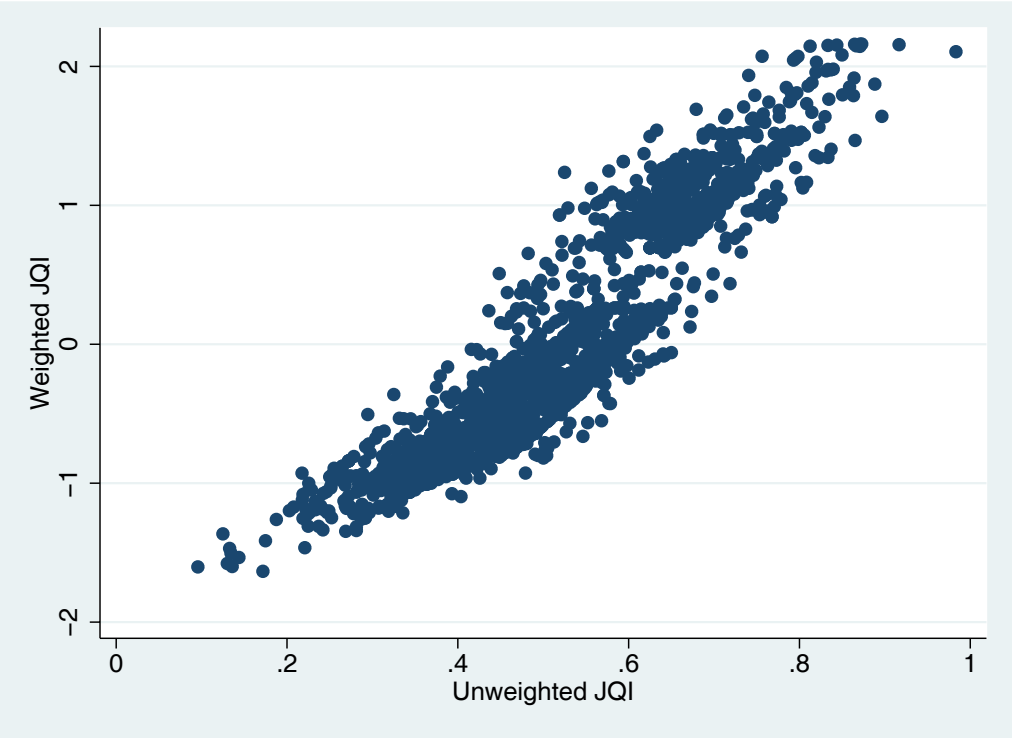

Figure 4. Distribution of JQI2

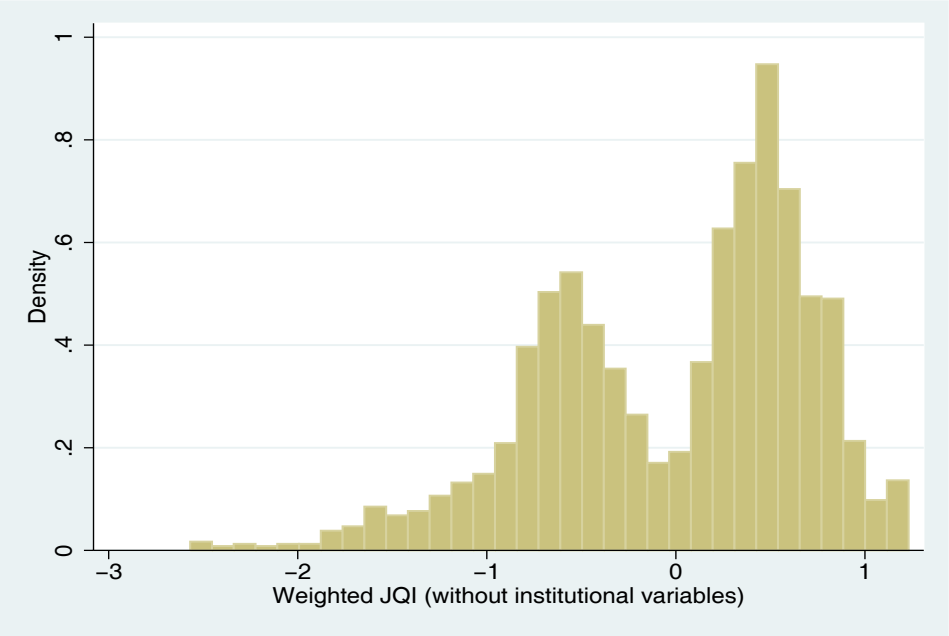

Figure 5. Distribution of JQI3

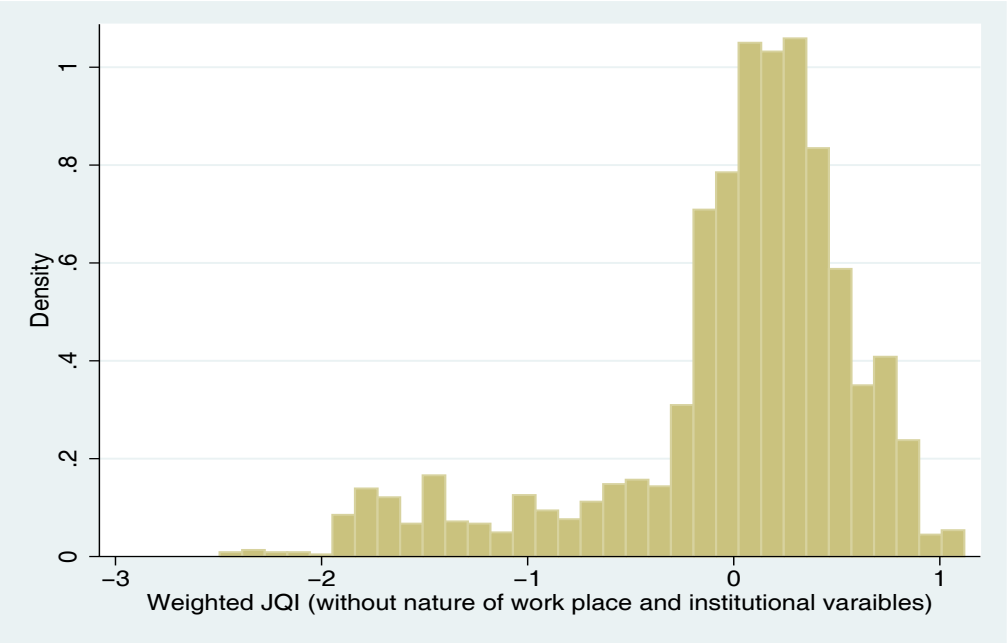

Figure 6. Distribution of Earning

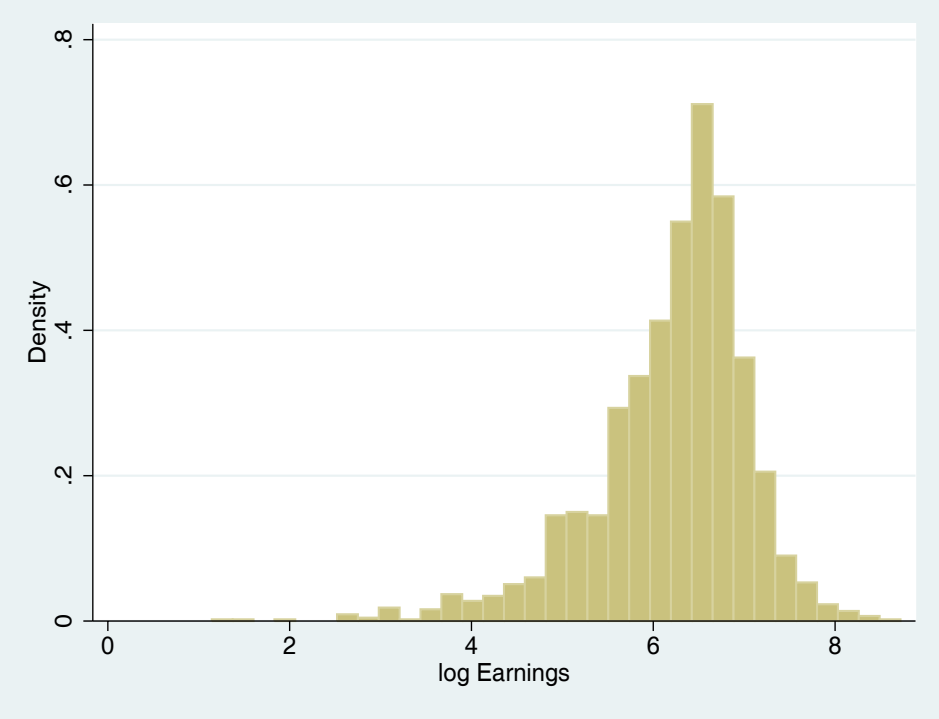

Table 2. Regression Results of Weighted JQIs and Earning

Variables	UJQI	JQI1	JQI2	JQI3	Earning
Worker characteristics					
Age	0.0052***	0.0272***	0.0271***	0.0417***	0.0370***
Age^2	-0.0001***	-0.0003***	-0.0003***	-0.0005***	-0.0005***
Female	-0.018	-0.0749	-0.1610*	-0.2976***	-0.2544*
Married	0.0217**	0.1339**	0.0626	0.2156***	0.5221***
Female x married	-0.024	-0.1578*	-0.1108	-0.2768***	-0.6183***
Education (Illiterate=omitted category)					
Read & write	0.0151	0.1351**	0.0544	0.02	0.1304*
Less than intermediate	0.0197**	0.1234**	0.0683	-0.0182	0.0865
Intermediate	0.0182*	0.1572***	0.1102**	0.0073	0.1351**
Above intermediate	0.0070	0.1480*	0.0752	-0.0576	0.0641
University & higher	0.0098	0.1350*	0.0894	-0.0182	0.2104**
Worker's age of entry to labor market	0.0000	0.0023	0.0038	0.0047*	0.0118***
Use computer at Job	-0.0097	-0.0179	-0.041	0.0042	-0.0586
Occupation (professional/technical=omitted category)					
White collar	-0.0042	-0.034	-0.013	0.0415	-0.0385
Blue collar	-0.0096	-0.1187***	-0.1159***	-0.0963**	-0.0196
Member of a union	0.0790***	0.5648***	0.1553**	0.099	0.1746*
Employment Status (Unpaid family worker=omitted category)					
Employer	0.0380***	0.2111***	0.1319**	0.1473**	0.2552***
Self-employed with no HH workers	0.0166	0.1343**	-0.0225	0.0611	0.2621***
Enterprise characteristics					
Region (Greater Cairo=omitted category)					
Alexandria & Suez Canal	0.0151	0.0648	-0.063	-0.1642**	-0.1856**
Urban Lower	0.0037	-0.0182	-0.0581	-0.1813***	-0.3337***
Urban Upper	0.0002	-0.0565	-0.1886***	-0.2645***	-0.3601***
Rural Lower	0.0047	-0.0531	-0.072	-0.2153***	-0.3941***
Rural Upper	-0.0254**	-0.1684***	-0.2844***	-0.3024***	-0.5793***
Formal registration	0.0897***	0.5827***	0.4261***	0.1003**	0.0596
Enterprise Economic Activity (Mining & quarry, manuf., electr., gas & water supply=omitted category)					
Construction	-0.0909***	-0.3897***	-0.6584***	-0.016	0.1267
Whole s. & retail trade, hotel & restaur.	-0.0422***	-0.1236**	-0.1291***	0.0734	0.0056
Transp., storage & communications	-0.0285**	-0.2051***	-0.3797***	0.0718	-0.0858
Other services	-0.0310**	-0.1057	-0.0726	0.0045	0.0116
Enterprise age in years	-0.0024	-0.0186	-0.0067	-0.0370**	-0.0583***
Total number of workers	-0.0004	0.0001	-0.0016	0.0092*	0.0084
Percentage of female workers	-0.0001	-0.0008	-0.0001	0.0000	-0.0008
Capital (none=omitted category)					
LE 1- 499	0.0175	0.0691	0.0476	0.0676	-0.0066
LE 500-999	0.0412***	0.1678**	0.2281***	0.1304*	0.1622*
LE 1,000-4,999	0.0547***	0.2485***	0.3128***	0.1224*	0.0805
LE 5,000-9,999	0.0790***	0.3749***	0.4470***	0.2147***	0.1723*
LE 10,000-49,999	0.0848***	0.4137***	0.4206***	0.2479***	0.3758***
> LE 50,000	0.0846***	0.4593***	0.4037***	0.2555***	0.5597***
Constant	0.3213***	-1.2313***	-0.8005***	-0.7731***	5.2823***

Number of workers	1945

Note: * p<0.05; ** p<0.01; *** p<0.001.

Appendix A: Descriptive Statistics

Table A1. Descriptive Statistics of Job Quality Indicators

Original Variables	Mean/Percent	Std. Dev.	Min	Max
Earnings	611.617	501.236	0.000	4866.847
Has social security	0.301	0.459	0.000	1.000
Has medical insurance	0.050	0.218	0.000	1.000
No training	0.439	0.496	0.000	1.000
Informal training	0.514	0.500	0.000	1.000
Formal training	0.047	0.211	0.000	1.000
Regular worker	0.970	0.171	0.000	1.000
Involuntary under employment hours	0.060	0.326	0.000	2.000
Commuting time to work in minutes	15.943	30.504	0.000	690.000
Workplace: street/mobile worker, mobile cart, hut/fridge, basket/table & other	0.257	0.437	0.000	1.000
Workplace: own home, house or field/farm	0.132	0.338	0.000	1.000
Workplace: truck, taxi or auto rickshaw	0.055	0.228	0.000	1.000
Workplace: shop, kiosk or room(s)	0.427	0.495	0.000	1.000
Workplace: office, flat, building or factory	0.130	0.336	0.000	1.000

Table A2. Factor Analysis Scoring Coefficients

Normalized Variables	JQI1	JQI2	JQI3
Earnings	0.176	0.185	0.266
Has social security	0.497		
Has medical insurance	0.138		
Training	0.000	-0.006	-0.024
Has a regular job	0.070	0.176	0.098
Full employment	0.094	0.213	0.485
Commuting time to work	0.008	0.035	-0.085
Nature of workplace	0.262	0.489	

Table A3. Descriptive Statistics of the Normalized Job Quality Indicators and JQIs

Normalized Variables	Mean/Percent	Std. Dev.	Min	Max
Unweighted: UJQI	0.521	0.137	0.096	0.983
Factor analysis: JQI1	0.000	0.805	-1.634	2.161
Factor analysis: JQI2	0.000	0.701	-2.569	1.231
Factor analysis: JQI3	0.000	0.632	-2.495	1.119
Earnings	0.399	0.272	0.000	1.000
Has social security	0.301	0.459	0.000	1.000
Has medical insurance	0.050	0.218	0.000	1.000
Training	0.304	0.288	0.000	1.000
Has a regular job	0.970	0.171	0.000	1.000
Full employment	0.872	0.290	0.000	1.000
Commuting time to work	0.765	0.236	0.000	1.000
Nature of workplace	0.510	0.363	0.000	1.000

Table A4. Means/Percent of the Normalized Job Quality Indicators by Intervals of JQI1

Normalized Variables	Weighted JQI1			
	$< \mu - \sigma$	$\mu \pm \sigma$	$> \mu + \sigma$	Total
Unweighted: UJQI	0.326	0.497	0.696	0.521
Factor analysis: JQI2	-1.160	0.039	0.575	0.000
Factor analysis: JQI3	-0.841	0.057	0.345	0.000
Earnings	0.190	0.373	0.585	0.399
Has social security	0.000	0.090	1.000	0.301
Has medical insurance	0.000	0.010	0.180	0.050
Training	0.297	0.306	0.302	0.304
Has a regular job	0.810	0.995	1.000	0.970
Full employment	0.535	0.916	0.960	0.872
Commuting time to work	0.709	0.777	0.765	0.765
Nature of workplace	0.067	0.508	0.773	0.510
Total	290	1245	500	2035

Table A5. Correlation Matrix of the Normalized Job Quality Indicators and JQIs

	Normalized Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	Unweighted: UJQI	1.000											
(2)	Factor analysis: JQI1	0.923	1.000										
(3)	Factor analysis: JQI2	0.817	0.751	1.000									
(4)	Factor analysis: JQI3	0.545	0.487	0.650	1.000								
(5)	Earnings	0.501	0.514	0.463	0.600	1.000							
(6)	Has social security	0.731	0.878	0.397	0.239	0.307	1.000						
(7)	Has medical insurance	0.378	0.430	0.134	0.037	0.099	0.301	1.000					
(8)	Training	0.247	0.000	-0.017	-0.064	0.021	0.019	-0.070	1.000				
(9)	Has a regular job	0.305	0.238	0.447	0.253	0.035	0.090	0.027	-0.050	1.000			
(10)	Full employment	0.425	0.309	0.519	0.881	0.207	0.128	-0.018	-0.036	0.113	1.000		
(11)	Commuting time to work	0.219	0.027	0.098	-0.220	-0.115	0.013	-0.013	-0.008	0.048	-0.058	1.000	
(12)	Nature of workplace	0.676	0.661	0.866	0.246	0.193	0.365	0.154	0.014	0.214	0.193	0.120	1.000

Table A6. Descriptive Statistics of Variables Included in the Regression Analysis

Variables	Mean/ Percent	Standard Deviation	Min	Max
Dependent Variables				
Unweighted JQI	0.520	0.137	0.096	0.983
JQI1	-0.005	0.802	-1.634	2.161
JQI2	-0.003	0.701	-2.569	1.231
JQI3	0.001	0.631	-2.495	1.119
Earning	612.839	500.427	0.000	4866.847
Worker Characteristics				
Age	39.684	14.069	11.000	81.000
Males	0.839	0.368	0.000	1.000
Females	0.161	0.368	0.000	1.000
Married	0.751	0.433	0.000	1.000
Education				
Illiterate	0.283	0.451	0.000	1.000
Read & write	0.106	0.308	0.000	1.000
Less than intermediate	0.202	0.402	0.000	1.000
Intermediate	0.257	0.437	0.000	1.000
Above intermediate	0.035	0.184	0.000	1.000
University & higher	0.116	0.321	0.000	1.000
Worker's age of entry to labor market	17.118	7.698	5.000	71.000
Use computer at Job	0.063	0.243	0.000	1.000
Occupation				
Professional/technical	0.400	0.490	0.000	1.000
White collar	0.206	0.404	0.000	1.000
Blue collar	0.394	0.489	0.000	1.000

Member of a union	0.079	0.269	0.000	1.000
Employment status				
Unpaid family worker	0.420	0.494	0.000	1.000
Employer	0.462	0.499	0.000	1.000
Self-employed with no HH workers	0.119	0.324	0.000	1.000
Enterprise Characteristics				
Region				
Greater Cairo	0.132	0.339	0.000	1.000
Alexandria & Suez Canal	0.111	0.314	0.000	1.000
Urban Lower	0.202	0.401	0.000	1.000
Urban Upper	0.191	0.393	0.000	1.000
Rural Lower	0.207	0.405	0.000	1.000
Rural Upper	0.157	0.364	0.000	1.000
Formal registration	0.517	0.500	0.000	1.000
Enterprise economic activity				
Mining & quarry, manuf., electr., gas & water supply	0.185	0.388	0.000	1.000
Construction	0.080	0.271	0.000	1.000
Whole s.& retail trade, hotel & restaur.	0.568	0.495	0.000	1.000
Transp., storage & communications	0.083	0.276	0.000	1.000
Other services	0.084	0.278	0.000	1.000
Enterprise age in years	5.688	1.322	1.000	8.000
Total number of workers	2.251	3.450	1.000	95.000
% of Female workers	17.590	33.611	0.000	100.000
Capital				
None	0.083	0.276	0.000	1.000
LE 1- 499	0.176	0.381	0.000	1.000
LE 500-999	0.121	0.327	0.000	1.000
LE 1,000-4,999	0.203	0.402	0.000	1.000
LE 5,000-9,999	0.178	0.383	0.000	1.000
LE 10,000-49,999	0.179	0.384	0.000	1.000
> LE 50,000	0.059	0.235	0.000	1.000
Number of workers	1945			

Table A7. Correlation Matrix of Variables Used in the Regression Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1) Unweighted JQI	1.00																				
(2) Weighted JQI1	0.92	1.00																			
(3) Weighted JQI2	0.82	0.75	1.00																		
(4) Weighted JQI3	0.54	0.48	0.65	1.00																	
(5) Earning	0.46	0.49	0.44	0.55	1.00																
(6) Age	0.12	0.18	0.04	0.01	0.07	1.00															
(7) Female	-0.26	-0.26	-0.22	-0.33	-0.28	0.09	1.00														
(8) Married	0.18	0.19	0.11	0.22	0.29	0.30	-0.15	1.00													
(9) Education	0.27	0.32	0.31	0.20	0.31	-0.28	-0.23	-0.07	1.00												
(10) Worker's years of experience	0.12	0.15	0.02	0.03	0.05	0.87	-0.15	0.33	-0.39	1.00											
(11) Use computer at job	0.08	0.12	0.10	0.07	0.10	-0.03	-0.01	-0.02	0.22	-0.07	1.00										

(12) Occupation	-0.21	-0.30	-0.31	-0.18	-0.18	-0.17	-0.02	-0.06	-0.23	-0.05	-0.14	1.00									
(13) Member of a union	0.30	0.35	0.20	0.15	0.30	0.07	-0.09	0.08	0.32	0.00	0.21	-0.11	1.00								
(14) Self employed with no HH workers	0.21	0.25	0.19	0.20	0.33	0.15	-0.08	0.22	0.14	0.09	0.03	-0.11	0.12	1.00							
(15) Region	-0.19	-0.24	-0.23	-0.21	-0.30	-0.13	0.09	0.02	-0.16	-0.06	-0.13	0.15	-0.10	-0.28	1.00						
(16) Has formal registration	0.57	0.62	0.58	0.29	0.27	0.08	-0.21	0.05	0.32	0.05	0.10	-0.31	0.21	0.11	-0.23	1.00					
(17) Industry economic activity	0.04	0.11	0.12	0.07	0.01	0.06	0.07	-0.01	0.03	-0.01	0.07	-0.33	0.07	-0.02	-0.04	0.18	1.00				
(18) Enterprise age in years	-0.06	-0.08	-0.01	-0.02	-0.02	-0.46	0.04	-0.05	0.20	-0.50	0.06	-0.03	0.05	0.01	0.08	-0.07	0.06	1.00			
(19) Total number of workers	0.13	0.15	0.13	0.13	0.20	0.01	-0.07	-0.01	0.13	0.02	0.15	-0.11	0.17	-0.02	-0.08	0.15	-0.16	-0.06	1.00		
(20) % of female workers	-0.20	-0.20	-0.17	-0.26	-0.20	0.11	0.82	-0.12	-0.16	-0.11	0.03	-0.07	0.00	-0.07	0.07	-0.19	0.06	0.04	-0.03	1.00	
(21) Capital	0.50	0.50	0.50	0.28	0.30	0.03	-0.18	0.03	0.28	0.03	0.09	-0.21	0.19	0.03	-0.12	0.52	0.12	-0.02	0.20	-0.17	1.00

Appendix B

Estimating Per Capita Consumption in the Egypt Labor Market Surveys

The Egypt Labor Market Surveys (ELMSs) do not contain a full consumption module. We follow the methodology laid out below to estimate per capita consumption, and thus household poverty. The main idea behind the method is to combine information from the Household Income, Expenditure and Consumption Surveys (HIECS) with the Egypt Labor Market Surveys to obtain the consumption estimates. Household consumption is estimated in this study using a two-stage estimation technique. This technique allows us to combine detailed income and expenditure information available from the HIECSs, with the rich labor market information available from the ELMSs. The two-stage approach will combine the HIECS 1999-2000 with the ELMPS 98, and HIECS 04-05 with the ELMPS 06 to estimate per capita consumption for the ELMS samples. This will typically involve the following three steps:

Identifying household characteristics available in the HIECSs and the ELMSs

This stage involves comparing the HIECS and the ELMS questionnaires to identify common household variables found in the four datasets. This has not been a major constraint on the analysis, because a large set of common variables is available in all four datasets. In this paper, the choice of the final set of explanatory variables is based on a thorough review of the poverty literature and a careful investigation of the descriptive statistics of the common set of explanatory variables and their correlation with the poverty measures.

Estimating per capita consumption using the HIECSs data

This stage is the first step of the two-step estimation approach. In this first-step, each of the two HIECS data is used to estimate per capita consumption as a function of the chosen common set of household characteristics. A log-linear function of per capita consumption of household i, y_i, is estimated for each of the HIECS samples:[8]

[8] This paper uses consumption rather than income to measure household welfare. Consumption is often preferred over income when measuring welfare, since consumption data are likely to be subject to less fluctuation over time and to fewer measurement errors (see Deaton 1997).

$$\ln y_i = X_i'\beta + \varepsilon_i$$

where X_i is a vector of cluster-level characteristics of household *i*; and ε_i is a disturbance term that is distributed as N(0, σ^2). Of course, some of the explanatory variables selected in the first stage are endogenous, which would bias the estimation results. For instance, the ownership of durables is particularly among the set of endogenous variables, since it is closely determined by the household living standard and thus by the poverty status (Astrup and Dessus 2001). However, as discussed in Minot (2000), the possible endogeneity of some of the explanatory variables is less of a concern in the current analysis since the main objective here is to predict the level of poverty (or $ln\ y_i$), rather than to study the determinants of poverty or to assess the impact of each explanatory variable.

Predicting per capita consumption for the ELMSs samples

In this stage, the regression models developed in the previous step and the ELMSs data are used to predict per capita consumption for each of the two rounds of ELMs.

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