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JOB QUALITY AMONG THE NON-WAGE
WORKERS IN THE AGRICULTURE AND
NON-AGRICULTURAL SECTORS IN EGYPT

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Job Quality among the Non-Wage Workers in the Agriculture and Non-Agricultural Sectors in Egypt

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Abstract

It is quite challenging to operationalize the notion of job quality for wage and salary employment, and even 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 for 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 the workplace into an index of job quality for each of the agriculture and the non-agriculture sectors. The developed indices are used to identify workers and enterprise-specific determinants of job quality. The results of this paper confirm the profile of workers with bad jobs that emerged from 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, in enterprises with some capital and are seldom in Rural Upper Egypt. While in the agriculture sector, high quality jobs are more likely to be available in enterprises that have some capital and in those working in the farm related activities.

1. Introduction

In recent years, since the concept of “decent work” was introduced by the ILO in 1999, there has been an increased interest in this notion. 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, voice and representation. As challenging as it is to put this notion into operation for wage and salary employment, the difficulty pales in comparison to devising a measure of job quality for self-employed and unpaid family workers. In Egypt, the difficulty is further compounded by the fact that there are no statistical sources that provide a reliable measure of non-wage workers’ earnings.

Recent studies have shown that household enterprise workers have one of the highest incidences of poverty in Egypt and that their proportion among the total number of 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 each of the agriculture and the non-agriculture sector 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 acquisition, access to social security, regularity of employment, work hours, and nature of the 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 also enterprise characteristics such as the size of the enterprise, its capital assets, its age and its sector of economic activity. A separate analysis is undertaken for each of the agricultural enterprises and the non-agricultural enterprises, to account for the different enterprise and worker-specific characteristics in each sector.

This paper relies on data from Egypt’s Labor Market Panel Survey 2006 (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. It includes data on employment status, unemployment, job mobility, earnings, migration and household enterprises. However, it does not include a full consumption and income module and thus cannot provide direct measures of household income poverty. Moreover, no data is collected directly 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 subsequent 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 additional sections. Section 2 presents a brief background and a review of the 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 the agriculture and non-agriculture sector. Section 6 concludes the paper.

2. Literature Review

In what follows, we briefly review and discuss different methodologies that have been proposed by 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 Consideration

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 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, with the main aim of collecting data on employment and income security. This was followed by People’s Security Surveys (PSS) (Standing, 2002). In particular, the PSS differ from traditional household surveys in that they combine objective, attitudinal and normative questions on the actual socio-economic situation of respondents, their perception of security and insecurity, 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 PSS to compile different Decent Work Indices (DWIs).

Besides the ILO’s PSS of individual job quality, the most comprehensive attempt to measure 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 et al. (2003) divides indicators into: *input indicators* (such as the enactment of basic laws and ILO Conventions), *process indicators* (which are mechanisms whereby legal provisions are translated into reality, e.g. public spending on a particular form of security) and *outcome indicators* (that indicate 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 notion of job quality.

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 a significant link between job quality and workers' quality of life. Beyond the obvious 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 assigned 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 focused on industrial countries (for example the United States (Freeman, 1978; Borjas, 1979), Canada (Meng, 1990) and the United Kingdom (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 a strong relationship with job satisfaction as job safety and job security.

3. Data Sources and Measurements Challenges

The analysis in this paper mainly relies on data from ELMPS 06, which 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. In addition, the paper uses Egypt's Labor Market Survey (ELMS 98) as well as new households that have formed as a result of splits of 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, some 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.¹ The 2006 sample contains an additional 19,743 “new” individuals. Of these 2,663 individuals joined the original 1998 households, another 4,880 joined the split households, and 12,200 were part of the refresher sample.

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’ demographics 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 ELMS 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, ELMS do not include a full consumption and income module and therefore cannot provide direct measures of household income poverty. To overcome this limitation HIECS 05 is used in combination with the ELMPS 06. The HIECS 05 is a household budget survey implemented by CAPMAS. It contains information of consumption expenditures on more than 550 items of goods and services. HIECSs are generally considered the major source of information on household income and expenditure in Egypt. The ELMS and the HIECS contain a great deal of similar information on household members’ demographic and socioeconomic characteristics, housing conditions, ownership of durables, access to basic services and the neighborhood infrastructure. However, detailed information on total household income and expenditure is only provided in the HIECS. While detailed information on labor market conditions, employment status, different aspects of job quality and household enterprises is only available in the ELMS. 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 ELMS is the lack of any information on the earnings of non-wage workers, since ELMS 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 in each of the agriculture and non-agriculture sectors. The general framework for measuring job quality in this paper is mainly based on Anker’s (2002) framework discussed above.

¹ 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.

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 (see Table A1 in the appendix for the descriptive statistics of this 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. For the non-agriculture sector, 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 *toc toc* (a three wheel vehicle used for transporting people in less developed districts) as workplaces. Under the fourth group comes shop, kiosk, room or number of rooms as workplaces. Finally; the fifth group includes those working in offices, flats, buildings or factories. However, the workplace of workers in the agriculture sector is either home or field/farm, which is included under one group. Thus the nature of workplace is not included among the components of the JQI for workers in the agriculture sector.

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 Tables A1 in the Appendix. The rest of the chosen sets of indicators are binary variables, which take the value one if the characteristic is satisfied and zero otherwise.

Each of the non-binary indicators is normalized using the formula: $[\text{value} - \text{Minimum}] / [\text{Maximum} - \text{Minimum}]^2$, 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

² 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 employment measure varies between one in case the individual is fully employed and declines as the number of working hours below 40 decreases.

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.³ In the following we use factor analysis techniques to produce a weighted JQI separately for workers in each of the agriculture and the non-agriculture sectors.⁴

The factor analysis produced a single factor in both the agriculture and non-agriculture set.⁵ Table A2 in the Appendix shows the resulting scoring coefficients of the factor analysis. Also, the descriptive statistics (Table A3) and correlation matrix (Table 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. The JQI of the non-agriculture sector (NonAgrJQI) has a remarkable trimodal distribution that clearly distinguishes between workers falling on the high levels of the job quality distribution and those on the lower levels of the distribution. A thorough investigation of Tables A2, A3 and A4 reveals that the institutional variables (access to social security and access to medical care) and nature of work place are mainly what drives this trimodal distribution of the non-agricultural workers' JQI. Moreover, surprisingly, earning plays a smaller role in capturing job quality than the effect of the social security and nature of work place dimensions.⁶ In contrast, the JQI of the agriculture sector (AgrJQI) has a unimodal distribution that is quite skewed to the right. Thus, most of the non-wage workers in the agriculture sector fall on the high levels of the produced job quality distribution.

In the next section, we turn to answering two central questions which are: *who gets the good job?* And *where are the good jobs?* We explore in detail the expected determinants of job quality in each sector 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 in both the agriculture and non-agriculture sectors. 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 enterprise characteristics discussed in the following (see Tables A5-A8 in the Appendix for the descriptive statistics and the correlation matrices of this selected set of variables). Data availability was also an important constraint in this analysis.

³ 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).

⁴ In a previous paper we conducted a comparison between several unweighted and weighted JQIs for non-wage workers in the non-agriculture sector only. The results show that there is a great correspondence between the weighted JQI produced from the factor analysis and the unweighted JQI produced from averaging the normalized scores (their correlation coefficient exceeds 0.92). Nevertheless, the weighted JQI has an interesting distribution that is more consistent with expectations (see Assaad and Roushdy 2007).

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 lower than 1.

⁶ This has been investigated in detail in Assaad and Roushdy (2007). In that paper we conduct a detailed comparison between the results of the NonAgrJQI when consecutively excluding the institutional variables and earnings from its components. The results show that the institutional variables are not only the cause of this trimodal distribution of the NonAgrJQI, but also the nature of work place. However, when these different JQIs are used to identify the workers and enterprise-specific determinants of job quality, they produced quite similar results.

Worker-specific characteristics, which are common for both the agriculture and non-agriculture sectors, include the six variables: age, gender, marital status, education, employment status and years of experience. Additional worker-specific characteristics valid only for workers of the non-agriculture sector are: union membership, occupation and whether the individual uses computers at work.

In the non-agriculture sector regression, the individual's education is measured by five dummy variables: 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. While in the agriculture sector regression, the worker education is measured by only three dummies. Since very few cases of non-wage workers in the agriculture sector have above intermediate education, we combined the intermediate and higher education under one category. Illiterate is the omitted category in both regression models.

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. Union membership is a dummy variable for whether the individual is a member of any trade or professional union.

The set of the enterprise-specific characteristics, common for both the agriculture and non-agriculture sector, consists of three variables: the region where the enterprise is located, the enterprise capital amount and the economic activity. Additional enterprise-specific characteristics available in the survey for only the non-agricultural enterprises are: the enterprise's legal status, enterprise age in years, total number of workers (or size) and percentage of women to total workers. 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. Also, in the agricultural enterprises model only, an additional dummy variable is included to account for whether the household cultivates its owned land; where rented land is the omitted category.

The ELMPS 06 divides Egypt into the six regions: Greater Cairo, Alexandria and the Canal governorates, Urban Lower Egypt, Urban Upper Egypt, Rural Lower Egypt, and Rural Upper Egypt. Hence, in the non-agriculture workers regression model, region is measured by five dummies where Greater Cairo is the excluded category. In the agriculture sector sample, Greater Cairo, Alexandria and the Canal governorates, and Urban Lower Egypt constitute together less than 3 percent of the worker sample. Accordingly, we grouped these three regions together under one Urban Governorates and Urban Lower category, which is the excluded category in the agricultural enterprises regression.

In the ELMPS 06 a non-agriculture enterprise capital is reported directly 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 regression by six dummy variables (<LE 1 is the omitted category). In contrast, the agriculture enterprise capital is not directly available in the ELMPS 06, instead there is a list of questions on agriculture equipment and livestock owned, either fully or partially, by the household and their current estimated values as reported by an elderly member of the household who is most knowledgeable about agriculture. Accordingly, from this set of questions we develop an estimate of the agricultural enterprises capital to use in the regression. The agricultural enterprises capital is measured as a simple sum of the reported values of all equipment and livestock owned by the household.

In the non-agricultural enterprises regression, the enterprise's economic activity is captured by the five dummies: whether the enterprise belongs to the construction economic activity, whether the enterprise works in the whole sale and retail trade activities, whether the enterprise belongs to the hotel and restaurants economic activity; whether the enterprise works in transportation, storage and communication; and whether it belongs to other services. The mining and quarrying, manufacturing, electricity, gas and water supply activities constitute together the reference economic activity group. On the other hand, in the agriculture sector, the enterprise economic activity is captured in the regression model by a dummy variable of whether the enterprise works in farm related activities, where the off-farm related activities is the reference group.

Table 1 and 2 show the regression results of the NonAgrJQI and AgrJQI, respectively. The two JQIs show several interesting similar results. Job quality has an inverse U-shape relationship with age in both regressions. Thus, as expected, workers in the middle age groups are more exposed to better quality jobs in both sectors. Although the coefficient on marriage is positive and significant only in the NonAgrJQI model, the coefficient of the female interaction term with marriage is negative and significant in both regressions. This reveals that marriage might be an asset for males, particularly for those working in the non-agriculture sector; however, it has a negative effect on job quality for females working in both sectors.⁷ Also, in both sectors, employers have significantly higher job quality in comparison to unpaid family workers. Surprisingly, the individual's experience at work shows no significant effect on job quality in both sectors.

On the other hand, the common significant enterprise-specific determinants of job quality are the enterprise economic activity and capital. As expected, in both sectors, job quality increases with the enterprise capital.⁸ In the non-agriculture sector, job quality is lower in all economic activity groups in contrast to the broad manufacturing group. While in the non-agriculture sector, workers in the off-farm enterprises have substantially lower quality jobs than those working in farm related enterprises.

Nevertheless, several interesting differences are observed between the determinants of job quality in the agriculture and non-agriculture sectors. Job quality significantly increases with education levels in the non-agriculture sector; however, education shows no significant effect on job quality in the agricultural sector. This might be due to the fact that the more educated individuals often prefer working in the non-agriculture sector. The coefficient of the female dummy is only significant in the AgrJQI model. Hence, females generally end in lower quality jobs compared to males in the agriculture sector.⁹

As expected, on the enterprise characteristics front, location has no significant effect on job quality in the agriculture sector; however, for the non-agriculture sector, non-wage workers in rural Upper Egypt have significantly lower quality jobs than those working in Greater Cairo.

⁷ We also checked education interaction terms with sex but that showed no additional effect.

⁸ 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.

⁹ In the NonAgrJQI regression model, the coefficient of the female dummy gains significance and increases in magnitude, respectively, as the institutional variables and the nature of work place are removed from the components of the job quality index. This might be because when the institutional variables and the nature of work place are removed, the job quality index mainly reflects the earning dimension of job quality; and as often observed, females generally end up in lower earning jobs than males do. For a detailed discussion on this issue see (Assaad and Roushdy (2007)).

Regarding the worker- and enterprise-specific variables which are available only for the non-agricultural enterprises, Table 1 shows that white collar and blue collar workers tend to have significantly lower job quality in comparison to professionals. Also, as expected, formal registration has a substantial positive effect on job quality.

6. 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 an index of job quality in each of the agriculture and the non-agriculture sectors. Afterwards, 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. In both the agriculture and non-agriculture sectors, married men in the middle of their life cycle get the good jobs, but not married women. Additionally, in the non-agriculture sector, among those who get the good jobs are the better educated, the employers, those in professional/technical occupations and members of professional syndicates.

On the other hand, high 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. In the agriculture sector, high quality jobs are more likely to be available in enterprises that have some capital and in those working in the farm related activities.

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Figure 1 Distribution of Non-agriculture JQI

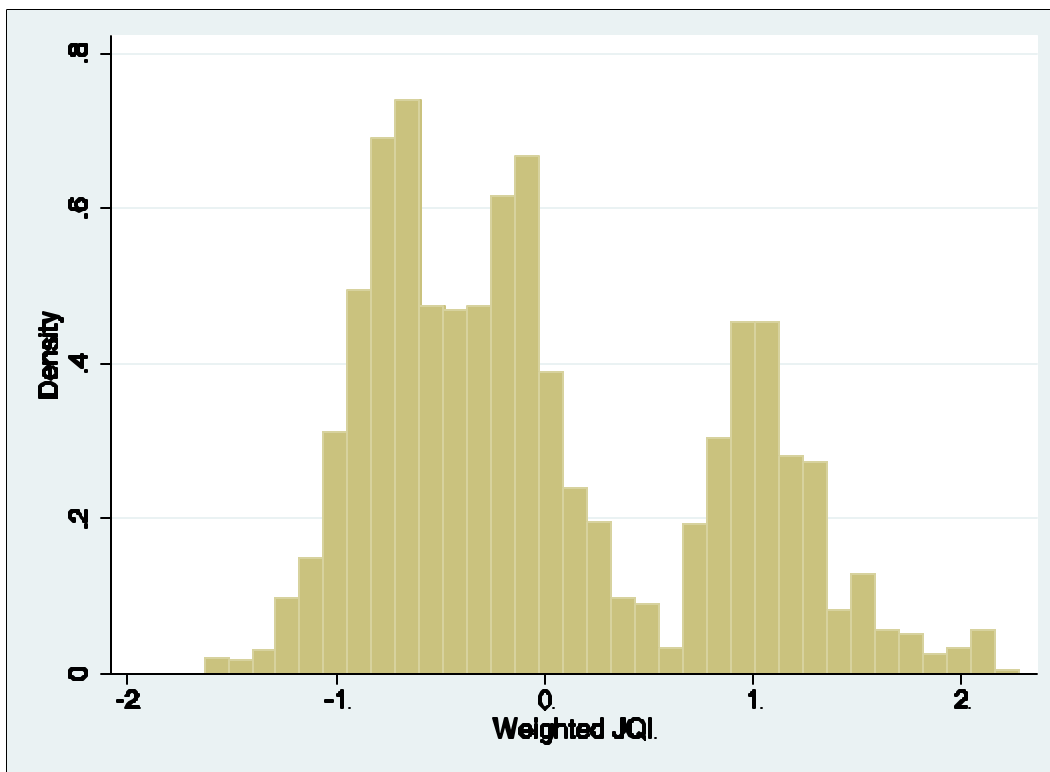


Figure 2 Distribution of Agriculture JQI

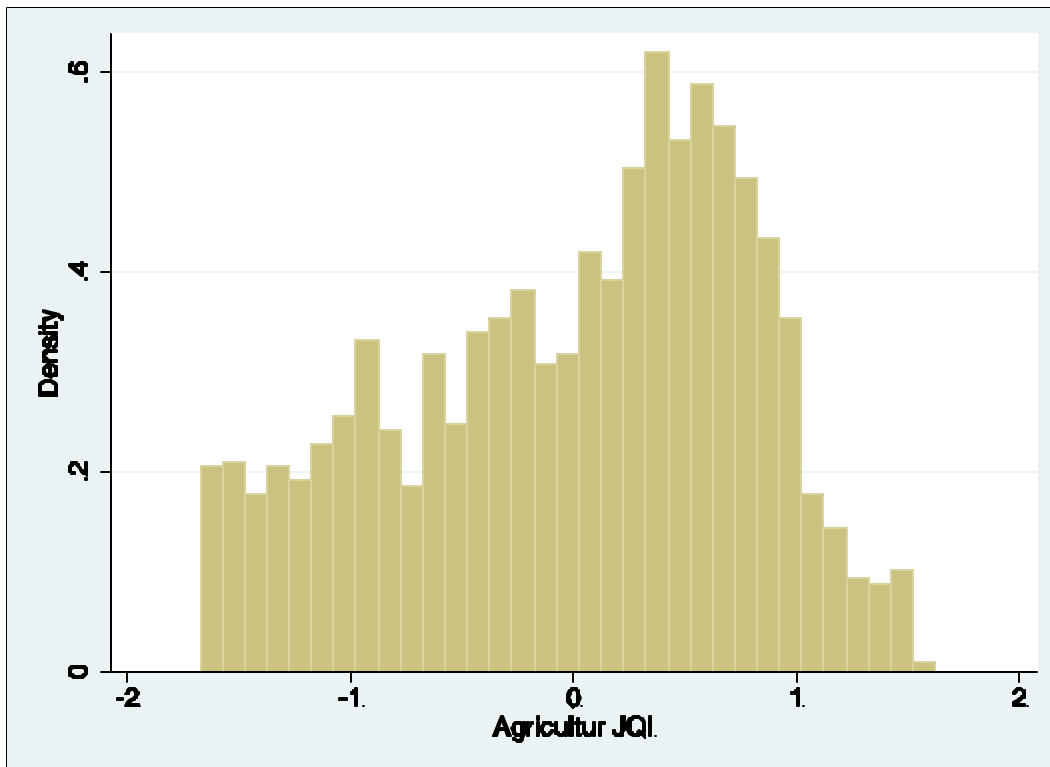


Table 1: Sub-indicators of Job Quality

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 work place *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 advancements	*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 only based on objective quantitative criteria (such as 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)).

Table 2 : Regression Results of JQI for Non-Wage Workers in Non-Agricultural Sector

Variables	Non Agriculture JQI
<i>Worker Characteristics</i>	
Age	0.0272***
Age ²	-0.0003***
Female	-0.0749
Married	0.1339**
Female x Married	-0.1578*
Education (Illiterate=omitted category)	
Read & write	0.1351**
Less than intermediate	0.1234**
Intermediate	0.1572***
Above intermediate	0.1480*
University & higher	0.1350*
Worker's Age of entry to labor market	0.0023
Use computer at Job	-0.0179
Occupation (professional/technical=omitted category)	
White collar	-0.034
Blue collar	-0.1187***
Member of a union	0.5648***
Employment Status (Unpaid family worker=omitted category)	
Employer	0.2111***
Self employed with no HH workers	0.1343**
<i>Enterprise Characteristics</i>	
Region (Greater Cairo=omitted category)	
Alexandra & Suez Canal	0.0648
Urban Lower	-0.0182
Urban Upper	-0.0565
Rural Lower	-0.0531
Rural Upper	-0.1684***
Formal registration	0.5827***
Enterprise Economic Activity (Mining & quarry., manuf., electr., gas & water supply=omitted category)	
Construction	-0.3897***
Whole s.& retail trade, hotel & restaurant	-0.1236**
Transp., storage & communication	-0.2051***
Other services	-0.1057
Enterprise age in years	-0.0186
Total number of workers	0.0001
% of Female workers	-0.0008

Table 2 : Regression Results of JQI for Non-Wage Workers in Non-Agricultural Sector – Continued

Capital (none=omitted category)	
LE 1- 499	0.0691
LE 500-999	0.1678**
LE 1000-4999	0.2485***
LE 5000-9999	0.3749***
LE 10000-49999	0.4137***
> LE 50000	0.4593***
Constant	-1.2313***
Number of workers	1945

* p<0.05; ** p<0.01; *** p<0.001

Table 3: Regression Results of JQI for Non-Wage Workers in Agricultural Sector

Variables	Agriculture JQI
<i>Worker Characteristics</i>	
Age	0.0393***
Age ²	-0.0005***
Female	-0.5806***
Married	0.0834
Female x Married	-0.1683**
Education (Illiterate=omitted category)	
Read & write	0.0196
Less than intermediate	-0.0629
Intermediate and Higher	0.0160
Worker's Age of entry to labor market	-0.0021
Employment Status (Unpaid family worker=omitted category)	
Employer	0.1607***
Self employed with no HH workers	0.0669
<i>Enterprise Characteristics</i>	
Region (Urban Governorates & Urban Lower=omitted category)	
Urban Upper	-0.0309
Rural Lower	0.0338
Rural Upper	-0.032
Enterprise Economic Activity (Farm agriculture=omitted category)	
Off Farm Agriculture	-0.4690***
Capital (<3000=omitted category)	
LE 3000-7099	0.1552***
LE 7100-11519	0.1474***
LE 11520-23349	0.1420***
> LE 23350	0.1469***
Household own the land cultivated	-0.0409
Constant	-0.4159***
<i>Number of workers</i>	2138

* 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
<i>Non-agriculture Sector</i>				
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
Work place: street/mobile worker, mobile cart, hut/fridge, basket/table & other	0.257	0.437	0.000	1.000
Work place: own home, house or field/farm	0.132	0.338	0.000	1.000
Work place: truck, taxi or toctoc	0.055	0.228	0.000	1.000
Work place: shop, kiosk or room(s)	0.427	0.495	0.000	1.000
Work place: office, flat, building or factory	0.130	0.336	0.000	1.000
<i>Agriculture Sector</i>				
Earnings	292.163	260.149	0.000	3563.103
Has social security	0.021	0.145	0.000	1.000
Has medical insurance	0.009	0.094	0.000	1.000
No training	0.320	0.467	0.000	1.000
Informal training	0.674	0.469	0.000	1.000
Formal training	0.006	0.075	0.000	1.000
Regular worker	0.993	0.083	0.000	1.000
Involuntary under employment hours	-6.970	9.311	-26.000	0.000
Commuting time to work in minutes	14.869	21.632	0.000	615.000

Table A2 : Factor Analysis Scoring Coefficients

Normalized Variables	Non-agriculture JQI	Agriculture JQI
Earnings	0.176	0.275
Has social security	0.497	0.027
Has medical insurance	0.138	0.004
Training	0.000	0.021
Has a regular job	0.070	0.009
Full employment	0.094	0.445
Commuting time to work	0.008	-0.313
Nature of work place	0.262	

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

Normalized Variables	Mean/percent	Std. Dev.	Min	Max
<i>Non-agriculture Sector</i>				
NonAgrJQI	0.000	0.805	-1.634	2.161
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 work place	0.510	0.363	0.000	1.000
<i>Agriculture Sector</i>				
AgrJQI	3.42E-11	0.779	-1.676	1.623
Earnings	0.370	0.292	0.000	1.000
Has social security	0.021	0.145	0.000	1.000
Has medical insurance	0.009	0.094	0.000	1.000
Training	0.680	0.467	0.000	1.000
Has a regular job	0.993	0.083	0.000	1.000
Full employment	0.732	0.358	0.000	1.000
Commuting time to work	0.569	0.351	0.000	1.000

Table A4: Correlation Matrix of the Normalized Job Quality Indicators and JQIs

Normalized Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Non-agriculture Sector</i>									
(1) NonAgrJQI	1.000								
(2) Earnings	0.514	1.000							
(3) Has social security	0.878	0.307	1.000						
(4) Has medical insurance	0.430	0.099	0.301	1.000					
(5) Training	0.000	0.021	0.019	-0.070	1.000				
(6) Has a regular job	0.238	0.035	0.090	0.027	-0.050	1.000			
(7) Full employment	0.309	0.207	0.128	-0.018	-0.036	0.113	1.000		
(8) Commuting time to work	0.027	-0.115	0.013	-0.013	-0.008	0.048	-0.058	1.000	
(9) Nature of work place	0.661	0.193	0.365	0.154	0.014	0.214	0.193	0.120	1.000
<i>Agriculture Sector</i>									
(1) AgrJQI	1.000								
(2) Earnings	0.660	1.000							
(3) Has social security	0.087	0.001	1.000						
(4) Has medical insurance	0.013	-0.039	0.261	1.000					
(5) Training	0.069	-0.035	-0.036	0.001	1.000				
(6) Has a regular job	0.028	0.035	0.012	0.008	0.026	1.000			
(7) Full employment	0.836	0.338	0.031	-0.011	0.061	0.068	1.000		
(8) Commuting time to work	-0.710	-0.288	-0.085	-0.047	-0.051	0.088	-0.356	1.000	

Table A5 : Descriptive Statistics of Variables Included in the Regression Analysis of the Non-agriculture Sector

Variables	Mean/ percent	Standard deviation	min	max
<i>Worker Characteristics</i>				
Age	39.684	14.069	11.000	81.000
Males	0.839	0.368	0.000	1.000
Female	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
<i>Enterprise Characteristics</i>				
Region				
Greater Cairo	0.132	0.339	0.000	1.000
Alexandra & 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 & restaurant	0.568	0.495	0.000	1.000
Transp., storage & communication	0.083	0.276	0.000	1.000
Other services	0.084	0.278	0.000	1.000

Table A5 : Descriptive Statistics of Variables Included in the Regression Analysis of the Non-agriculture Sector- Continued

Variables	Mean/ percent	Standard deviation	min	max
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 1000-4999	0.203	0.402	0.000	1.000
LE 5000-9999	0.178	0.383	0.000	1.000
LE 10000-49999	0.179	0.384	0.000	1.000
> LE 50000	0.059	0.235	0.000	1.000

Table A6 : Descriptive Statistics of Variables Included in the Regression Analysis of the Agriculture Sector

Variables	Mean/ percent	Standard deviation	min	max
<i>Worker Characteristics</i>				
Age	37.626	16.525	8.000	90.000
Males	0.626	0.484	0.000	1.000
Female	0.374	0.484	0.000	1.000
Married	0.677	0.468	0.000	1.000
Education				
Illiterate	0.575	0.494	0.000	1.000
Read & write	0.080	0.272	0.000	1.000
Less than intermediate	0.138	0.345	0.000	1.000
Intermediate & higher	0.207	0.405	0.000	1.000
Worker's Age of entry to labor market	13.475	6.334	5.000	63.000
Employment Status				
Unpaid family worker	0.382	0.486	0.000	1.000
Employer	0.102	0.302	0.000	1.000
Self employed with no HH workers	0.516	0.500	0.000	1.000
<i>Enterprise Characteristics</i>				
Region				
Urban Governorates & Urban Lower	0.024	0.152	0.000	1.000
Urban Upper	0.126	0.332	0.000	1.000
Rural Lower	0.299	0.458	0.000	1.000
Rural Upper	0.551	0.497	0.000	1.000
Enterprise Economic Activity				
Farm agriculture	0.697	0.460	0.000	1.000
Off Farm Agriculture	0.303	0.460	0.000	1.000
Capital				
< LE 3000	0.200	0.400	0.000	1.000
LE 3000-7099	0.200	0.400	0.000	1.000
LE 7100-11519	0.202	0.402	0.000	1.000
LE 11520-23349	0.200	0.400	0.000	1.000
> LE 23350	0.198	0.399	0.000	1.000
Household own the land cultivated				
Yes	0.340	0.474	0.000	1.000
No	0.660	0.474	0.000	1.000

Table A7: Correlation Matrix of Variables Used in the Regression Analysis of the Non-agriculture Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)NonAgrJQI	1.00																
(2)Age	0.18	1.00															
(3)Female	-0.26	0.09	1.00														
(4)Married	0.19	0.30	-0.15	1.00													
(5)Education	0.32	-0.28	-0.23	-0.07	1.00												
(6)Worker's years of Experience	0.15	0.87	-0.15	0.33	-0.39	1.00											
(7)Use Computer at Job	0.12	-0.03	-0.01	-0.02	0.22	-0.07	1.00										
(8)Occupation	-0.30	-0.17	-0.02	-0.06	-0.23	-0.05	-0.14	1.00									
(9)Member of a Union	0.35	0.07	-0.09	0.08	0.32	0.00	0.21	-0.11	1.00								
(10)Employment Status	0.25	0.15	-0.08	0.22	0.14	0.09	0.03	-0.11	0.12	1.00							
(11)Region	-0.24	-0.13	0.09	0.02	-0.16	-0.06	-0.13	0.15	-0.10	-0.28	1.00						
(12)Has Formal Registration	0.62	0.08	-0.21	0.05	0.32	0.05	0.10	-0.31	0.21	0.11	-0.23	1.00					
(13)Economic Activity	0.11	0.06	0.07	-0.01	0.03	-0.01	0.07	-0.33	0.07	-0.02	-0.04	0.18	1.00				
(14)Enterprise Age in Years	-0.08	-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			
(15)Total number of workers	0.15	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		
(16)% of Female workers	-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	
(17)Capital	0.50	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

Table A8: Correlation Matrix of Variables Used in the Regression Analysis of the Agriculture Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) AgrJQI	1.000										
(2) Age	0.081	1.000									
(3) Female	-0.669	-0.047	1.000								
(4) Married	0.046	0.471	0.088	1.000							
(5) Education	0.136	-0.433	-0.276	-0.330	1.000						
(6) Worker's years of Experience	-0.167	-0.023	0.240	-0.047	0.263	1.000					
(7) Employment Status	-0.435	-0.532	0.475	-0.354	0.132	0.145	1.000				
(8) Region	-0.118	-0.025	0.111	0.010	-0.088	-0.065	0.091	1.000			
(9) Economic Activity	-0.633	-0.040	0.738	0.113	-0.195	0.179	0.366	0.137	1.000		
(10) Capital	0.119	-0.017	-0.088	0.024	0.041	-0.091	0.026	-0.015	-0.112	1.000	
(11) Household own the land cultivated	0.153	-0.001	-0.199	-0.017	0.155	-0.039	-0.047	0.035	-0.266	0.218	1.000

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 (ELMS) 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 HIECS, with the rich labor market information available from the ELMS. The two stage approach will combine the HIECS 99-00 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:

1. Identifying household characteristics available in the HIECS and the ELMS

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 poverty literature and a careful investigation of the descriptive statistics of the common set of explanatory variables and their correlation with poverty measures.

2. Estimating per capita consumption using the HIECS 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 samples¹:

$$\ln y_i = X_i' b + e_i$$

where X_i is a vector of cluster-level characteristics of household i ; and e_i is a disturbance term that is distributed as $N(0, \sigma^2)$. 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.

3. Predicting per capita consumption for the ELMS samples

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

¹ This paper uses consumption rather than income to measure household welfare. Consumption is often preferred over income when measuring welfare, since consumption data is less likely to be subject to fluctuation over time and to fewer measurement errors (see Deaton 1997).