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**INEQUALITY OF OPPORTUNITY IN INCOME
AND CONSUMPTION: THE MIDDLE EAST AND NORTH
AFRICA REGION IN COMPARATIVE PERSPECTIVE**

**Ragui Assaad, Caroline Krafft, John Roemer
and Djavad Salehi-Isfahani**

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Send correspondence to:

Caroline Krafft

St. Catherine University

cgkrafft@stkate.edu

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Abstract

Social justice has been a central theme in the political turmoil affecting the Middle East and North Africa (MENA). Perplexingly, standard measures of inequality are not particularly high for MENA countries. One possible explanation for this apparent contradiction is that observed inequality may be masking a large share of inequality of opportunity, the unjustifiable type of inequality associated with social class or other circumstances over which an individual has no control. In this paper we extend the literature on inequality of opportunity in the MENA region by providing estimates of inequality of opportunity in incomes and consumption for Egypt, Jordan and Tunisia. Our results show low levels of inequality of opportunity, as well as inequality, in income measures in the countries examined.

JEL Classifications: D63, D31, E24, O15

Keywords: Inequality of opportunity, Wages, Consumption, Middle East and North Africa

ملخص

العدالة الاجتماعية هي موضوعا مركزيا في الاضطرابات السياسية التي تؤثر على الشرق الأوسط وشمال أفريقيا. وبشكل مريب، فإن القياسات المعيارية لعدم المساواة ليست مرتفعة ولا سيما بالنسبة لبلدان المنطقة. أحد التفسيرات المحتملة لهذا التناقض الواضح هو أن عدم المساواة الملحوظة يمكن أن تخفي جزءا كبيرا من عدم تكافؤ الفرص، ونوع غير مبرر من عدم المساواة المرتبطة بالطبقة الاجتماعية أو الظروف الأخرى التي تقع للفرد والتي تخرج عن سيطرته. في هذه الورقة نتقدم الأدبيات الخاصة بعدم تكافؤ الفرص في منطقة الشرق الأوسط من خلال تقديم تقديرات عدم تكافؤ الفرص في الدخل والاستهلاك بالنسبة لمصر والأردن وتونس. نتائجنا تظهر مستويات منخفضة من عدم تكافؤ الفرص، فضلا عن عدم المساواة في تدابير الدخل في البلدان التي تم فحصها.

1. Introduction

In the past thirty years, economists have refined their study of income inequality to focus on its different sources. To wit, some inequality is due to circumstances beyond the control of individuals, and some is due to choices individuals make that society wishes to hold them responsible for. Among circumstances are the socio-economic status of the family in which the child was raised, his or her gender, ethnicity, race, and the birth region of the child. Choices that individuals make include how much education to achieve, what occupation to enter, how hard to study and to work, and so on. If we call these choices 'effort,' then we would attempt to decompose total inequality of income into inequality due to circumstances and due to effort. Many would think that inequality due to circumstances is unjustifiable, and governments should design policies to eliminate it, while inequality due to differential effort is ethically admissible.

The distinction between unjustifiable and admissible inequality has particular relevance for the countries of the Middle East and North Africa (MENA). Several of these countries have been engulfed in social and political turmoil in which social justice has been a central theme. Perplexingly, the level of inequality as measured by the standard Gini index is not particularly high for MENA countries (Bibi & Nabli, 2009; Hassine, 2015). One possible explanation for this apparent incongruity is that observed inequality may be masking a large share of the unfair and unjustifiable type of inequality associated with social class or other circumstances over which the individual has no control.

There is a small but growing literature on inequality of opportunity in the MENA region that indicates this might be the case. Because of data limitations, so far evidence of high levels of inequality of opportunity (IOp) is available mainly for health and education. Assaad et al. (2012) investigated the sources of inequality in child health as reflected in the standard anthropometric measures of health, such as height for age and weight for height. They find that relatively high proportions of the inequality in child health can be attributed to circumstances in the four countries they studied -- Egypt, Jordan, Morocco and Turkey. They also found that a high level of overall inequality in health outcomes was generally associated with a high share of inequality due to circumstances. The most important circumstances contributing to inequality of opportunity in child health, as measured by height-for-age, were region in Egypt, demographics in Jordan, demographics and parental wealth in Morocco, and relatively equal shares for region, demographics, parental wealth and parental education in Turkey. El-Kogali and Krafft (2015) examine inequality in early childhood development, including health care, nutrition, and social, emotional, and cognitive development. They find wide variations in the extent of inequality across MENA countries and across different dimensions of early childhood development. Salehi-Isfahani, Hassine and Assaad (2014) studied inequality of opportunity in student achievement in mathematics and science in 16 MENA countries. In several of the countries they study the proportion of inequality in test scores of 8th graders that is due to the characteristics of the family and the community in which these children grew up is alarmingly high, higher than levels observed in similar studies for Latin America, a region famous for its high levels of inequality. A few countries in their sample (Algeria, Morocco, and Syria) recorded low levels of IOp. In several countries for which data were available over time, inequality of opportunity had increased. Finally, Assaad, Salehi-Isfahani and Hendy (2014) show alarming degrees of inequality of opportunity in schooling attainment. To varying degrees, in the eight countries they study, the likelihood of ever entering school and reaching secondary school are dependent on parental education and income.

Beyond health and education, studies of inequality of opportunity in income and consumption, which capture economic mobility more broadly, are very rare. What evidence is available does not

corroborate the high levels of IOp observed in health and education. Hassine (2011) investigates inequality of opportunity in wages in Egypt and finds that the share of inequality attributable to circumstances was rather low in Egypt and declining, from 22 percent in 1988 to 15 percent in 2006, while overall wage inequality mostly increased. Father's characteristics and geographic origin were the most important circumstances shaping inequality in earnings. Estimates of economic mobility based on wages may be misleading because wages account for at most one half of all household incomes in MENA countries. Interestingly, a recent extension of the analysis of economic mobility in Egypt based on total household income and consumption by Assaad, Krafft, Roemer and Salehi-Isfahani (2016) finds a declining trend in inequality of opportunity in Egypt.

In this paper we extend the literature on inequality of opportunity in the MENA region by providing estimates of inequality of opportunity in incomes and consumption for Egypt, Jordan and Tunisia. Our estimates provide a wider perspective for a comparative analysis of income mobility in MENA and other developing countries. Our results generally confirm the low levels of IOp in income measures relative to health and education in the countries under study. In particular, we find that Jordan, which appears fairly opportunity unequal in educational achievement (Salehi-Isfahani, Hassine, & Assaad, 2014), is the least unequal of the three countries in this study. Tunisia still appears fairly unequal, though not topping the chart as it did in education. Comparisons with several eastern European countries for which similar measures of inequality are available also indicate that IOp in the countries under study is moderate.

Before estimating the level of inequality of opportunity, we make extensive use of graphical techniques to assess economic mobility in the three countries we study. The graphical methods we employ do not rank the countries in the same way as the (non-parametric) estimates. Additional parametric methods have the advantage of yielding estimates for the contribution of different sets of circumstances to IOp. As expected, these results indicate substantial influence from parental background, especially for wages and income. An important lesson we draw from this study is that the ranking of countries according to the degree of equality of opportunity can change depending on the specific measure of inequality of opportunity employed and the set of circumstances used in the estimation.

The rest of the paper proceeds as follows. In section 2 we discuss the challenges of empirically decomposing inequality into components due to circumstances and effort and how we address these challenges. In section 3, we describe the data sets that we employ and the specification of our outcome variables and circumstances. Section 4 presents our results, including comparisons of inequality of opportunity in Egypt, Jordan and Tunisia with the poorest countries in the European Union. Section 5 concludes.

1. Conceptual Framework

1.1 Decomposition of inequality into components due to circumstances and effort

The decomposition of the inequality of an outcome of interest into components due to effort and circumstances poses two immediate problems. The first is to decide what aspects of the individual's situation comprise her circumstances, and what choices she makes comprise her effort. For instance, the education an individual achieves is a function of both her circumstances and effort. We know that individuals from families where the parents' education and income are low tend to receive less education. Thus the *distribution* of years of education of those from families of a particular socio-economic type is itself a function of those circumstances. If we wish to compensate individuals for their circumstances, but hold them responsible for their effort, we must recognize that some variables typically associated with effort, such as the level of education

a child achieves, are themselves in part due to circumstances. We must take account of this important fact when thinking about how to compensate individuals for their disadvantaged circumstances.

Although what, exactly, is beyond the control of a person may be a subtle question in some cases, we can surely agree that family background and place of birth fall into this category. More generally, from a policy viewpoint, it suffices to define circumstances as those aspects of a person's environment that the society in question believes are beyond his control, or for which it believes he should be compensated. What about the native ability of the child, measured, for example, by cognitive and non-cognitive tests? Many believe that this should be taken to be a circumstance – after all, the measured ability is a result of complex interaction of nature and nurture, which in either case is beyond control of the child. Some, however, would not compensate individuals for having low ability, believing that persons deserve to benefit (or suffer) from their native abilities.

In this paper, we take as circumstances the socio-economic status of the family in which a child was raised and his or her birth region. It does not seem contentious to say that these all lie outside the individual's orbit of control, and if they induce disadvantage in income-producing capacity, that disadvantage is unfair -- it gives rise to inequality of opportunity.

Having defined a set of circumstances, we define a *type* as the set of persons having the same circumstances. Thus, any set of circumstances will induce a partition of the relevant population into types, which we call a *typology*. The finer the typology, the more inequality will be attributed to circumstances. We call the objective for which we wish to equalize opportunities the *objective*; in this article, the objective is either wages, income, or consumption. Given a policy by the state, within each type there will ensue a distribution of the objective. We say that what accounts for the fact that this distribution is not a single point is *differential effort* of individuals within the type. This nomenclature is, however, subject to misuse. It is, of course, the case that the set of circumstances that we can account for, and have information about in our data set, is limited, and so the distribution of the objective within types is due not only to what we think of as differential effort but also to the effect of *unobserved circumstances*. We therefore often refer to *residual inequality* instead of inequality due to effort, by which we mean inequality in the objective that is not due to the *listed* circumstances.

We believe that the effect of unobserved circumstances is very important. For example, we employ in this article a typology based upon the levels of education of the parents of the individual in question. We partition parental education into four categories, the lowest is one where both parents are illiterate, the highest is one where at least one parent has university education or both parents have upper secondary education. The two middle types have various other combinations of parents' education (see footnote 3). This aggregation certainly hides differences that may be important. For instance, we do not have information on the *quality* of the parents' education, and that may be significant. It matters whether the father attended an elite secondary school in Cairo or a poor one in a rural area: both are coded the same way in our data set. We do not have other pertinent information on how the parents treated the child and other aspects of the home environment. These are unobserved circumstances.

How do we treat the fact that circumstances influence the degree of effort that the child takes – for instance, the number of years of education acquired? We do so by proposing a measure of effort within a type that is *unit-free*: we measure an individual's effort by his rank on the distribution of the objective in his type. Thus, if two individuals are each at the median (say) of the distribution

of the objective of their types, we say they have expended the same degree of effort: equality of opportunity dictates that they should enjoy the same outcome (say, income). The logic here is that if two individuals have the same circumstances, and face the same policy, then any difference in their outcomes is due to differential effort and ‘luck,’ which we cannot measure.

Thus, consider Figure 1, which plots the cumulative distribution functions of wages for four types of worker in Egypt, where types are defined by level of parental education. There is clear first-order stochastic dominance among these four types, with the most advantaged type comprising workers with at least one parent having university education or both parents having upper secondary education, and the least advantaged type comprising those whose parents were both illiterate. Since we identify two individuals of different types but at the same rank as having expended equivalent effort, the fact that the *horizontal distance* between these CDFs is not zero indicates inequality of opportunity. For instance, the median worker in the most advantaged type has a wage approximately triple that of the median worker of illiterate parents. We hold this inequality to be unjust.

In other words, the *distribution* of wages within a type comprises the wage opportunities accessible to members of that type, and the fact that these distributions differ comprises inequality of opportunity. Although that inequality looks quite significant in Figure 1, we will observe below that it actually is surprisingly small according to a common statistical way of measuring it. We therefore believe that the typology of Figure 1 ignores many important circumstances, and we think of the inequality of opportunity as measured by this statistic as being only a lower bound on the true degree of opportunity inequality.

One additional point requires mention. Many believe (including the present authors) that children should not be held responsible for any aspect of their accomplishments before an ‘age of consent’ is reached. Up until the age of fourteen or sixteen – different societies may choose different ages -- what the child accomplishes is due to nature and nurture. If the law does not hold children responsible for their acts, neither should we. If this is so, then ideally we should take measures of child accomplishment, say at the age of fourteen, as revealed by cognitive and non-cognitive tests, to be *circumstances* with respect to his or her later outcomes. Unfortunately, we do not have these data in our surveys. Were we to have and use such data in defining circumstances and types, we would deduce much more inequality of opportunity than we find with available data sets.

A recent survey of the theoretical and empirical literature on inequality of opportunity, and how the approach emerged from work of political philosophers during the last half of the twentieth century, is available in Roemer and Trannoy (2014).

2.1 General entropy measures of inequality and their decomposition

To assess inequality of opportunity empirically, we must first measure inequality and then the part of inequality that is due to unequal opportunities as compared to the part due to effort or unobserved circumstances. Measuring inequality requires, first, an inequality index. We use the general entropy class of inequality measures, which is the best and most commonly used index for assessing inequality of opportunity (Ferreira & Gignoux, 2011).

Explaining the decomposition of inequality into circumstances and effort requires some notation. Denote by y some continuous or discrete outcome (such as wages), with mean μ . The inverse of the distribution function F of y is the quantile function, $Q(p)$, which denotes the outcome level below which we find p proportion of the population, for $p \in [0, 1]$. Thus $F(Q(p)) = p$. For reasons

that are discussed below, we employ one of the general entropy (GE) indices of inequality, $GE(0)$. This index is defined as:

$$GE(0) = \int_0^1 \ln\left(\frac{\mu}{Q(p)}\right) dp$$

$GE(0)$ is also known as Theil's-L or the mean logarithmic deviation (MLD). This measure weights the lower end of the distribution more heavily in measuring inequality.

In order to decompose inequality into the part due to circumstances and that due to effort, we assign individuals to types, k , where each type consists of those individuals with the same circumstances. We then decompose inequality into within- and between-type inequality (Duclos & Araar, 2006):

$$GE(\theta, F) = \sum_{k=1}^K \phi(k) \left(\frac{\mu_k}{\mu}\right)^\theta GE(\theta, k) + GE(\theta, \tilde{F}) \quad (2.1)$$

Within Between

where $\phi(k)$ is the fraction of the population in type k , μ_k is the mean outcome of type k , and $GE(\theta, k)$ is the GE index of type k . $GE(\theta, k)$ is the measure of within group inequality. $GE(\theta, \tilde{F})$ is the GE index of a counterfactual distribution \tilde{F} where each member of type k is assigned μ_k , their type's mean. \tilde{F} is sometimes called the smoothed distribution associated with F . In the hypothetical counterfactual there is no inequality within types, thus, $GE(\theta, \tilde{F})$ is a measure of between group inequality (Duclos & Araar, 2006). The hypothetical distribution function \tilde{F} is a step function, with one step for each type. One important feature of this decomposition into within-type inequality, which is attributed to effort, and between-type inequality, which is attributed to circumstances, is that only with $\theta = 0$ will the two kinds of inequality add to exactly $GE(\theta)$. That is, for $\theta = 0$, (2.1) reduces to:

$$GE(0, F) = \sum \phi(k) GE(0, k) + GE(0, \tilde{F}) \quad (2.2)$$

All of the analyses incorporate bootstrapped standard errors around the estimated $GE(0)$ statistics (and other statistics for inequality). Standard errors are clustered for all estimates.

2.2 Parametric estimation

To assess the contribution of more than just a few circumstances using survey data, it is simpler to use parametric assumptions about how outcome y depends on the vector of circumstances C . The parametric approach relies on a linear estimate of this relationship:

$$y = C\psi + \varepsilon.$$

With estimated coefficients, $\hat{\psi}$, the parametrically smoothed distribution is estimated by replacing y_i with (Ferreira & Gignoux, 2011):

$$\tilde{z}_i = C_i \hat{\psi}$$

Essentially, predicted values are used as estimates of type means. The inequality among these type means is a measure of between-type inequality. If the linear relationship holds and there are no missing interaction terms, the results would be the same as with a non-parametric estimate. This smoothed distribution allows for a direct, parametric estimate of inequality of opportunity as:

$$\theta_d = \frac{GE(0, \{\tilde{z}_i\})}{GE(0, \{y_i\})}$$

Alternatively, with estimated residuals, $\hat{\varepsilon}_i$, the parametrically standardized distribution can be estimated as:

$$\tilde{y}_i = \bar{C}_i \hat{\Psi} + \hat{\varepsilon}_i,$$

where \bar{C} is the vector of sample mean circumstances. Only within-type inequality remains, and thus we may calculate inequality of opportunity as:

$$\theta_r = 1 - \frac{GE(0, \{\tilde{y}_i\})}{GE(0, \{y_i\})}$$

2.3 Partial effects in parametric estimation

We might ask how much inequality each of the elements of the circumstance vector C contributes to total inequality. For instance, we might find that most of inequality of opportunity is driven by regional differences, which would have substantially different policy implications than if inequality of opportunity were driven by parents' socio-economic status. Estimating the "partial effects" of different circumstances in total inequality requires a counterfactual standardized distribution, removing the effects of some circumstances, and estimating partial effects residually. It is not possible to predict outcomes (generate a smoothed distribution) for just some circumstances without making assumptions about the distributions of the others.

The counterfactual standardized distribution involves neutralizing a circumstance, or set of circumstances (Ferreira & Gignoux, 2011):

$$\tilde{y}_i^J = \bar{C}^J \hat{\Psi}^J + C_i^{j \neq J} \hat{\Psi}^{j \neq J} + \hat{\varepsilon}_i$$

Then the share of total inequality due to circumstance set J is:

$$\theta_r^J = 1 - \frac{GE(0, \{\tilde{y}_i^J\})}{GE(0, \{y_i\})}$$

It must be kept in mind that the sums of the contributions of all the partial effects of circumstances C do not add up precisely to total inequality of opportunity. Neutralizing the effect of various sets of circumstances allows us to estimate the contribution of these particular circumstances to inequality of opportunity.

3. Data

3.1 The labor market panel surveys

We use a series of similar labor market panel surveys from Egypt, Jordan, and Tunisia. In Egypt we employ the 2012 round of the Egypt Labor Market Panel Survey (ELMPS), carried out by the Economic Research Forum (ERF) in collaboration with Egypt's Central Agency For Public Mobilization and Statistics (CAPMAS).¹ A companion paper (Assaad, Krafft, Roemer, & Salehi-Isfahani, 2016) presents results for Egypt over time. The data for Jordan and Tunisia come, respectively, from the first rounds of the Labor Market Panel Surveys of Jordan (JLMPS, 2010) and Tunisia (TLMPS, 2014). The JLMPS was carried out in partnership with the Jordanian

¹ Reports on ELMPS data collection, sample design, tracking of households, and sample weighting are available (Assaad & Barsoum, 2000; Assaad & Krafft, 2013; Barsoum, 2009).

Department of Statistics (DOS) and the TLMPS was carried out in partnership with the Tunisian National Institute of Statistics (INS). The design of these surveys is comparable to the ELMPS, including many identical or very similar questions. All of the surveys are designed to be nationally-representative, after the application of sample weights.

3.2 Outcomes

For the purposes of this paper, we are interested in analyzing and comparing the unequal opportunities individuals and households face in the Egyptian, Jordanian, and Tunisian economies. We use three different measures of individual and household wellbeing:

- Individual wages
- Individual earned income
- Per capita household consumption (imputed)

All of these outcomes are presented in 2012 PPP international dollars, after converting into constant 2012 local currency units using local CPIs and PPP international dollars from nominal local currency units.

Household consumption (expenditure) data are not collected in the panel surveys themselves. However, we use methods and software (POVMAP2) designed to map consumption from one data source onto another, recovering the original variance (the latter being crucial for inequality measurement purposes). Specifically, we model the predictors and variance of household consumption in contemporaneous household income expenditure and consumption surveys (HIECS) for the various countries.² These are used to predict consumption and recover the variance of consumption in the LMPSs based on the same set of covariates (for instance, durable assets).

Individual wage data are collected directly in the LMPSs for wage workers. All elements of wages (basic wages, supplemental wages, bonuses, incentives, overtime, and other wages from across all primary and secondary jobs) are aggregated into a monthly wage. Wage data are available in all surveys and rounds.

Individual earned income includes a number of non-wage types of income, specifically:

- Non-labor rental and financial investment income, and
- Household (non-agricultural) enterprise take-home net earnings, and
- Agricultural enterprise net earnings.

These additional income sources require some assumptions to calculate net earnings and also to assign income sources to individuals. These assumptions are discussed, along with descriptions of the distribution of different elements of income, in Krafft (2016). The only rounds of data with the earned income measure are the ELMPS 2012 and TLMPS 2014.

3.3 Sample

The sample for our analyses of per capita consumption is all household heads with data on circumstances. Individuals are our unit of analysis for the consumption analyses. For the wage and earned income outcomes, we use a sample of men ages 30-49 only. We exclude women and men outside this range because including them would add substantial problems of selection to our analysis. The labor force participation of women is low, and very selective (Assaad, Hendy, & Yassine, 2014; Assaad & Krafft, 2015; Hendy, 2014; Mryyan, 2014). In addition, unemployment

² No contemporaneous HIECS was available for 1988.

is often a strategic, government-job-queuing behavior (Assaad, 1997), almost exclusively a youth/entrant phenomenon (Amer, 2014, 2015; Assaad & Krafft, 2015a; Mryyan, 2014), and related to circumstances (Assaad & Krafft, 2014; Krafft & Assaad, 2014).

3.4 Circumstances

Assessing inequality of opportunity is essentially quantifying the share of an outcome driven by circumstances beyond an individual's control. Empirically, the extent of inequality of opportunity that can be measured is limited by the set of observable circumstances. This section discusses the different circumstance variables used in estimating inequality of opportunity under various specifications.

The core circumstance we investigate is based on the mother's and father's education. Education is categorized for each parent as (1) illiterate (2) reads and writes (3) basic (4) intermediate and above intermediate (upper secondary and two-year higher education programs) or (5) university (four-year higher education programs) and above. The sum of parents' education, as specified above, is calculated, ranging from two to ten. Upon examination, we determined that a number of parental education types were similar in their relationships with outcomes, and thus we clustered together some types, resulting in four categories of what we refer to as "basic types:" parental education of (1) sum of 2, (2) sum of 3-5, (3) sum of 6-7, or (4) sum of 8-10.³ These types are used in both parametric and non-parametric estimation. Some of the parametric estimates also distinguish between the five different mother's and father's education levels.

The other circumstances we investigate in a non-parametric context are region of birth and father's occupation. Region of birth is defined as metropolitan, provincial urban, or provincial rural.⁴ Father's occupation (when the respondent was 15) is defined as white collar, blue collar, or agricultural. Those whose fathers were not working or were absent at that point were assigned to the blue-collar circumstance. The combination of four parental education types, three regions, and three father's occupations generated a finer partition of 36 types.

In the parametric models, we first assess the same set of circumstances as in the basic types. We refer to this as specification 1. Specification 2 includes controls for the four parental education types, birth region, urban versus rural, and the three-category father's occupation. We also control for work experience and its square to avoid omitted variable bias, but do not treat work experience as a circumstance, allowing it to contribute to within-group but not between-group inequality. Specification 3 allows mother's and father's education to have separate effects (five categories each), uses six birth regions, and an eight-category father's occupation: (1) white collar wage, (2) white collar non-wage, (3) blue collar regular wage, (4) blue collar irregular wage, (5) blue collar non-wage, (6) agricultural regular wage, (7) agricultural irregular wage, and (8) agricultural non-wage. Irregular work is a substantially more precarious and vulnerable form of employment (Assaad & Krafft, 2015b), while non-wage work is likely to vary across occupations, with white collar non-wage work (owning a company, for example) being very different than blue collar or agricultural non-wage work (unpaid family work, for instance). Work experience is also included as in specification 2.

³ Sum of 2 means both parents are illiterate. Sum of 3-5 means one of the following combinations: Illiterate and Read & Write, both Read & Write, Basic and Illiterate, Basic and Read & Write, Secondary and Illiterate. Sum of 6-7 means one of the following combinations: University and Illiterate, Secondary and Read & Write, Basic and Basic, University and Read & Write, Secondary and Basic. Sum of 8-10 means one of the following combinations: University and Basic, Secondary and Secondary, University and Secondary, or University and University.

⁴ In Jordan, data on region of birth was not distinguished by urban vs. rural.

4. Results

4.1 Descriptive statistics on sample characteristics

4.1.1 Distribution of types

We first examine outcomes by type as defined by combinations of parental education. Table 1 presents the distribution of types for each country and round, as well as for the different samples and outcomes we examine. The distribution of types is quite important for understanding both how large and how select a type is within a country.

The distribution of types in the household heads sample for the consumption analyses shows substantial differences by country. The most common type was the most disadvantaged in Egypt (58%), followed by the second most disadvantaged (sum of parent education levels 3-5, 32%). In Egypt, there were similar shares, 5% each, from the most advantaged type (sum of 8-10) and the second most advantaged (sum of 6-7) type. In contrast, in Jordan the most disadvantaged type was the second most infrequent (43%), while the second most disadvantaged type was the most common (47%). Jordan had a slightly larger share of the second most advantaged type (7%) than Egypt, and a slightly smaller share (3%) of the most advantaged type. Tunisia had the largest share (73%) from the most disadvantaged type, followed by the second most disadvantaged type (20%). A similar share were in the second most advantaged type (5%) as in Egypt, but Tunisia had the smallest share from the most advantaged type (2%).

While in Egypt about half of male wage workers aged 30-49 were in the most disadvantaged type (both parents illiterate), this share is only one-third in Jordan but surprisingly high (two-thirds) in Tunisia. These facts are consistent with the timing of the expansion of education in these countries, as Jordan had the earliest and most rapid acceleration of education (Campante & Chor, 2012). In Jordan, the majority of the wage sample (53%) has parents with some mix of low levels of education. Although Jordan has the highest share of individuals from the third type, 9%, it is Egypt that has the most workers in the most advantaged type, although their share only ranges from 4-6% for the most recent surveys in each of the countries. Quite similar patterns are observed for the distribution of types for income earners as for wage earners in Egypt and Tunisia.

4.1.2 Distribution of outcomes

One concern in examining inequality of opportunity is selectivity of the outcome of interest – wage or income -- which may mean that the sample is not fully representative of the general population. This is partially true for wages but not income. As Table 2 shows, around two-thirds of men 30-49 years old are wage workers in Jordan, rising to 71% in Egypt and 74% in Tunisia. In the two samples for which we have income data, 95% of men were income earners in Egypt in 2012, and almost 99% in Tunisia in 2014. Thus, we capture almost our entire sample with the income measures, and the share of wage-workers is relatively similar across countries, allowing comparisons that are not unduly contaminated by selection.

The levels of outcomes across countries, as well as their inequality, are important measures of well-being. As we see in Table 3, there is substantial variation across countries in the average level of different outcomes. Median household consumption in Jordan in 2010 was \$256 in PPP dollars per month, nearly twice that of Egypt (\$141). Likewise, median wages in Egypt, at \$282 in PPP dollars per month, are substantially lower than those in Jordan (\$529) or Tunisia (\$564). Jordan in particular has high mean wages, 50% higher than in Tunisia and nearly double that in Egypt. Comparisons across outcomes are also noteworthy; in Egypt and Tunisia, the median wage is nearly identical to the median income, but the mean income and standard deviation are higher for income than wages, indicating greater dispersion.

4.2 Cross-country comparisons

In this section, we present our measures of inequality of opportunity across the three countries. We use three different outcomes: monthly consumption, wages, and incomes. Wages and consumption are available for three countries (Egypt, Jordan and Tunisia) while income is only available only for Egypt and Tunisia.

We begin with an examination of the CDFs of consumption by parental education groups (Figure 2). These graphs present CDFs of consumption per person for household heads for four parental-education groups, from the lowest category -- both parents illiterate -- to the highest -- at least one parent has university education or both have completed secondary school. In all three countries there is strict stochastic dominance of the distribution of consumption by type. The ordering is tighter in Jordan than in Egypt and Tunisia, indicating a lower level of inequality of opportunity in consumption per head. Comparing the bottom and top types across the three countries, there appears to be a greater gap in Egypt and Tunisia than in Jordan.

Turning to wages (Figure 3), three observations are worth making. First, in all three countries the greatest disparity is between wage earners whose parents belonged to the highest education category and the rest. Second, this gap is larger in Egypt than in Jordan or Tunisia. In Egypt the median wage earner in the most advantaged type earned nearly three times as much as those in the least advantaged type, whereas this ratio is two in the other countries. Third, Jordan stands out in that parental education below the highest category does not constitute much of an advantage in terms of the wage earning power of the children. The median wages for the three most disadvantaged types are much closer in Jordan than in Egypt and Tunisia. This is particularly true for wages above the median for the lowest two categories. In Tunisia, this advantage diminishes for the higher percentiles of the wage distribution.

The comparison of full incomes is limited to Egypt and Tunisia (Figure 4). The positions of the CDFs for incomes are very similar to those for wages, with Egypt exhibiting greater differentiation across types, and in Tunisia the lowest two CDFs are less dispersed. Notably, in Tunisia, for the most advantaged type, we observe greater advantage in full income than in wages.

Before turning to quantifiable measures of inequality of opportunity, we examine one more graphical representation of inequality of opportunity, this time viewing it from the viewpoint of intergenerational mobility. In this representation (Figure 5), we show the quintile distribution of wages for each type. For example, in Egypt one quarter of the children of illiterate parents belong to the lowest wage quintile compared to only 7% of the children of the most educated parents. This gap is widest in Jordan (30% to 7%) followed by Tunisia (27% to 7%). Unsurprisingly, these charts reproduce closely the observations made from the CDFs. The most advantaged type bestows greater advantage to children in Jordan and Tunisia than in Egypt. In Tunisia, 79% of the most advantaged type occupy the top wage quintile compared to 62% in Jordan and 52% in Egypt. This particular view suggests a ranking, from least to most mobile or opportunity-egalitarian: Tunisia, Jordan, and Egypt. Looking at the second most advantaged type also indicates that Tunisia is the least opportunity-egalitarian of the three countries: about two-thirds of individuals belonging to this type are in the top 40% of the wage distribution, compared to 53% in Egypt and 46% in Jordan. This ranking is not consistent across types, however. Tunisians from the least advantaged type have the same one-third chance of landing in the top 40% of the wage distribution as the least advantaged wage earners in Egypt or Jordan.

The view from the CDFs and the mobility charts, while providing a detailed description of how education of one generation affects the earnings of the next, does not provide a single measure

with which inequality of opportunity in these three countries can be ranked. For this we will use non-parametric decompositions of the total inequality in earnings.

4.2.1 Measures of inequality of opportunity

Working with these same four types, we get a clearer ranking of the countries by looking at the relative outcomes of the types (see Table 4). In Egypt, the ratio of the least to the most advantaged type's consumption is 0.50, compared to 0.54 in Jordan and 0.47 in Tunisia (differences are not significant). Comparing the bottom to the rest, the ratio is 0.71 in Egypt compared to 0.81 in Jordan, and 0.73 in Tunisia. Evidently, Jordan is closer to opportunity equality in consumption than the other two.

Wage disparity across the three countries is somewhat lower than disparity in consumption. The ratio of the average wage earned by the least to the most advantaged is lower than the same in consumption: 0.42 in Egypt, 0.45 in Jordan and 0.49 in Tunisia, though these estimates are also not statistically different from each other. The ratio of the most disadvantaged to the rest is slightly different (still not statistically different from each other): 0.73 in Egypt, 0.86 in Jordan, and 0.77 in Tunisia. Individual income inequality is similar in Egypt and Tunisia as with wages, with the exception of greater income inequality comparing the bottom to the rest in Tunisia. The graphical depiction of these results in Figure 6, taken from Table 6, confirm the lack of a particular ranking of the countries.

Non-parametric decompositions allow a finer division of the wage and income earners into types. But we begin the discussion of non-parametric results with the basic four types to keep the non-parametric results comparable with our graphical results above. To start with, note from Figure 7 that Jordan has by far the highest level of wage inequality; the GE(0) is 0.446 in Jordan, 0.276 in Egypt, and 0.185 in Tunisia. Income inequality in Egypt and Tunisia, the two countries for which we have data on full incomes, is more similar -- 0.480 in Tunisia and 0.403 in Egypt.

Moving on to the decomposition of these inequalities, Figure 8 compares the share of total inequality that is due to inequality between the types for four and 36 types. Interestingly, whereas the graphical representation of IOp in wages in Figure 5 showed Tunisia as the least opportunity equal country among the three, a different picture emerges from the nonparametric results. When looking at the ratio of between inequality to total inequality using 4 types, Egypt appears as the least equal; 13.2% for consumption and 10.3% for wages, compared to 3.7% and 4.0% for Jordan and 7.6% and 8.4% for Tunisia. Perhaps the most consistent finding is that Jordan is most opportunity equal of the three countries in terms of consumption and wages for which all three countries have data. IOp in income is only measurable for Egypt and Tunisia that have full income information; Tunisia has a much higher level of IOp (17.0%) than Egypt (6.5%).

Expanding the set of circumstances and increasing the number of types from 4 to 36, the picture changes somewhat again, though the differences in the estimates are rarely significant. With the 36 types, Tunisia is the least opportunity equal country of the three across all the outcomes. In consumption, Jordan's level of IOp is lowest (6.4%) followed by Egypt (19.6%) and Tunisia (25.1%). A similar pattern occurs for wage inequality. Jordan is the most opportunity equal in both wages and consumption. Tunisia remains less equal than Egypt in income mobility with both the small and larger sets of circumstances, though with the latter (36 types) IOp for Tunisia is not precisely estimated (Table 10).

The above examination of the evidence on consumption, wages, and incomes does not produce a definitive ranking of the countries in terms of inequality of opportunity. Given the size of the standard errors of our quantitative estimates, we are not able to draw sharp distinctions between

the degrees of equality of opportunities in these countries. However, the graphical representation offers a few interesting distinctions. As noted earlier, the mobility graphs (Figure 5) show clearly that in Tunisia the most advantaged types are much more likely to be in the top quintile of earnings than in Egypt or Jordan. There is much less distinction when we focus on the least advantaged types. Clearly, societies that treat their least advantaged in similar ways but award unequal advantages to the most advantaged can be said to have different levels of inequality of opportunity. On this basis the ranking, from least opportunity egalitarian to most, would be Tunisia, Jordan and Egypt. The quantitative measures fail to capture this distinction with precision because they place much more weight on the more numerous disadvantaged groups, which are relatively more equally treated. This is the reason why in Jordan, where the top type is only 5% of the wage earners but has a much higher distribution of earnings, the share of inequality due to circumstances with four types is estimated to be only 4%. One lesson that we can draw from this analysis is that comparisons based on a single measure may fail to offer a realistic view of inequality of opportunity.

Finally, to examine the contribution of different circumstances to IOp we turn to Figure 11, where we use the parametric models to estimate the partial effects of parents' education, parents' occupation, and regional differences. As expected, parental education plays a large role in all three countries, especially in wages and income; it is by far the most important source of variation in income in Tunisia. Geographic differences are largest in consumption, with particularly large shares in Egypt (14.7%) and Tunisia (12.7%). Parents' occupation is at most 5% of inequality across outcomes and countries.

While the typologies we have used here give rise to a maximum contribution of circumstances to inequality of around 30%, we conjecture that the *true* contribution of circumstances to wage and income inequality may well be at least twice that. Hufe, Peichl, Roemer and Ungerer (2015) have used two data sets, one for the United States, and one for the United Kingdom, which contain information on the circumstances we have employed here, as well as many other measures of childhood performance and health, in addition to the adult income of the individual⁵. As we have said above, we believe all childhood attributes and accomplishments should be treated as due to circumstances. Hufe et al. find that, while the fraction of income inequality due to the more *limited* set of circumstances in these two data sets is about 20%, the fraction due to the *entire* set of circumstances, calculated using the parametric method we have described, is close 46% in the US and 31% in the UK. It therefore seems reasonable to conjecture that, were data on the extended set of circumstances describing childhood accomplishments and abilities available for the MENA countries, we would find that the responsibility for circumstances in income inequality is about double what we have calculated here. We will not have reliable estimates of the fraction of inequality that is unjust for most countries until we have panel data sets that collect rich information on childhood performance, which we are able to link to income later in life.

4.3 Global comparison

To put the results of this paper in perspective, we compare the degree of inequality of opportunity of the three MENA countries with those of the eastern European countries that are members of the EU for which we have comparable estimates (EU-SILC 2005). In Figure 12, we plot the ratio of the income of the least advantaged type to the average income of the rest (other types) and the income level of the lowest type. Clearly, the MENA countries we study here are much poorer than

⁵ They use the National Longitudinal Study of Youth 1979 (US) and the British Cohort Study (1970). These are, apparently, the only data sets extant that include rich measures of childhood cognitive ability, academic performance, and health, and income later in life.

the Eastern European countries, and the characteristics of the least advantaged types are quite different, but there does not appear to be a significant difference in the relative income of the least advantaged type between the MENA countries and those in Eastern Europe. However, when we consider the share of inequality attributable to circumstances, using $GE(0)$, while Egypt and Jordan are comparably opportunity equal to the EU group, Tunisia is an outlier (Figure 13).

5. Discussion & Conclusions

This paper presents a number of graphical and numerical representations of inequality of opportunity in three countries in the Middle East and North Africa for several outcome variables: individual wages and income, and per capita household consumption. Our results do not offer strong conclusions about the relative ranking of the three countries in terms of the extent of inequality of opportunity. However, they do suggest that the various measures are sensitive to the nature of the inequality in each country. For instance, in Jordan, and to a lesser extent in Tunisia, the major opportunity gap appears to be between the most advantaged type (about 5% of the population) and the rest of the society. Because the most advantaged group is so small, this does not show up as a high share of total inequality being explained by circumstances, the main measure used to assess inequality of opportunity. Having said that, some of the standard measures of inequality of opportunity suggest that, at least with regard to wages, opportunities are least equal in Egypt, followed by Tunisia and then by Jordan. Egypt has the lowest ratio of the average wage of the bottom type to that of the top type and to that of all other types, although the estimated differences are not statistically significant. Egypt also has the highest share of wage inequality due to circumstances, followed by Tunisia and then by Jordan, but again the differences are not statistically significant. The relative ranking of Egypt and Tunisia also depends on whether 4 or 36 types are used. However, when we focus on measures that focus on the extent of social mobility, the extent to which members of the lowest type can climb to the upper end of the wage distribution or the extent to which members of the highest type can fall, the ranking looks different. Using those measures, Egypt looks like the most opportunity equal of the three countries, with Tunisia and Jordan in fairly similar positions. In Egypt, 25% of the lowest type end up in the bottom quintile of the wage distribution, as compared to 30% in Jordan and 27% in Tunisia. At the other end, 52% of the most advantaged type in Egypt end up in the top quintile of the wage distribution, compared to 62% in Jordan and 79% in Tunisia. By this measure, Egypt appears to offer more opportunities for social mobility than the other two countries.

With regard to full income, we only have the data to assess inequality of opportunity in Egypt and Tunisia. Here the ranking is even less conclusive, given the degree of imprecision in the estimates for Tunisia in particular. Egypt has a lower ratio than Tunisia of the average income of the lowest type to that of the highest type, but a higher ratio when the income of the lowest type is compared to all other types. Tunisia appears to have a much higher share of income inequality explained by circumstances than Egypt, but that share is not measured with a high level of precision.

We cannot emphasize sufficiently our view that the data sets available give us gross underestimates of the degree of economic inequality that is due to circumstances beyond the control of the individual. If we seriously accept the view that childhood is a period of intellectual and physical formation during which children are massively influenced by the resources to which they have access, we therefore cannot hold children responsible for their accomplishments up to an appropriate age of consent. As recent estimates of inequality of opportunity have shown using the rare data sets that do exist that enable us to measure childhood characteristics of adult workers, a rich set of circumstances in highly advanced countries account for between a third and a half of all economic inequality (Hufe, Peichel, Roemer, & Ungerer, 2015). We should expect these numbers

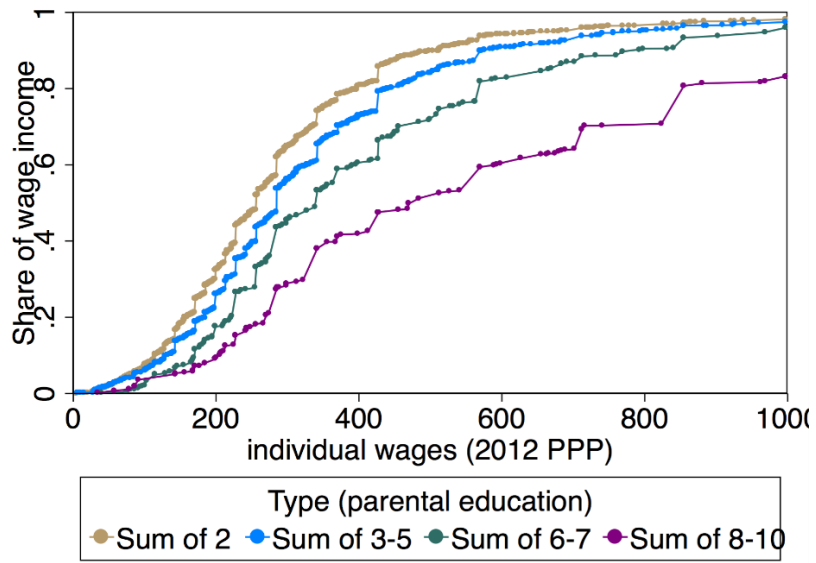
for developing countries to be significantly higher. In other words, a very substantial fraction of economic inequality is unjust. The first step to tackling this injustice is to convince national statistical services to collect the data that are required to measure it, for measurement and publicity are the *sine qua non* to policy reform.

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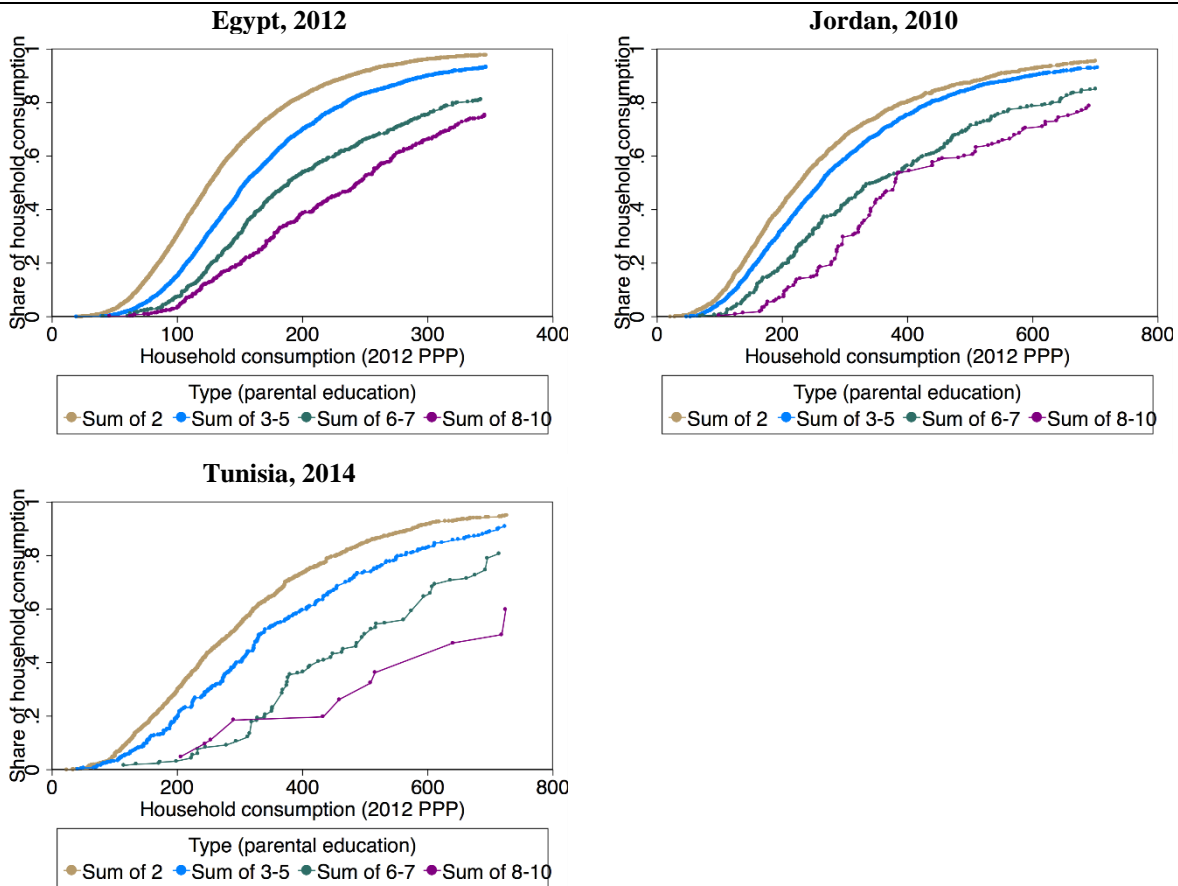
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Figure 1: Cumulative Distribution Functions of Individual Wages, Male Wage Earners 30-49, Egypt 2012



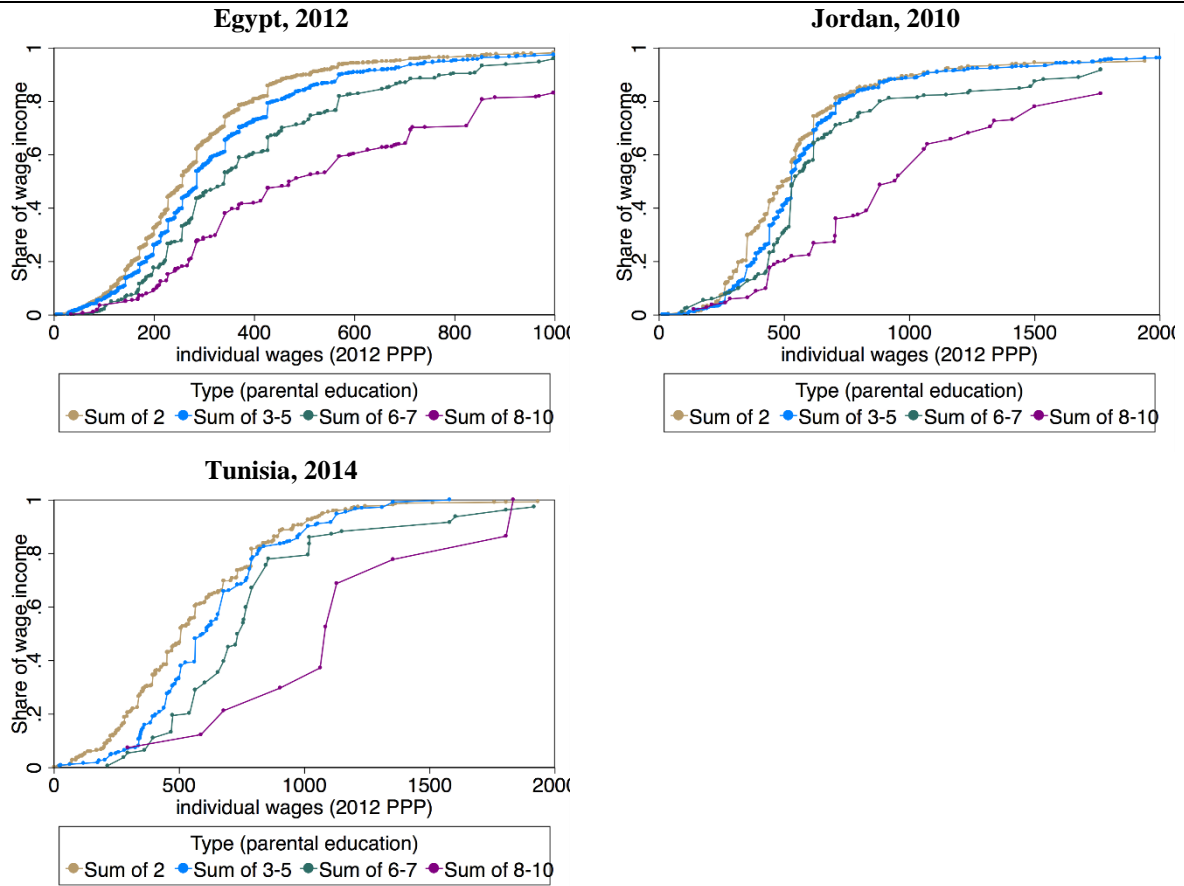
Source: Authors' calculations based on ELMPS 2012

Figure 2: Cumulative Distribution Functions of Individual Consumption by Country



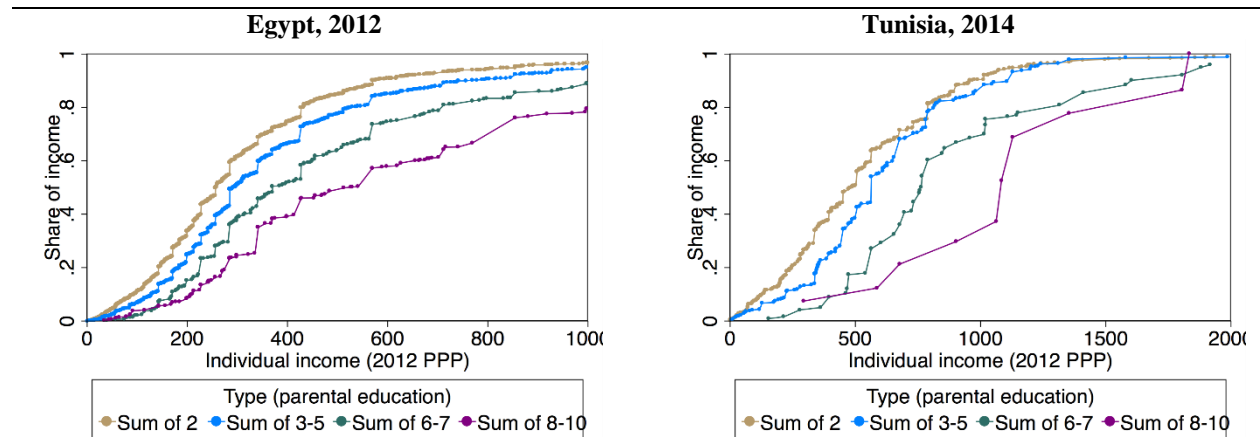
Notes: Sum of 2 means both parents are illiterate. Sum of 3-5 means one of the following combinations: Illiterate and Read & Write, both Read & Write, Basic and Illiterate, Basic and Read & Write, Secondary and Illiterate. Sum of 6-7 means one of the following combinations: University and Illiterate, Secondary and Read & Write, Basic and Basic, University and Read & Write, Secondary and Basic. Sum of 8-10 means one of the following combinations: University and Basic, Secondary and Secondary, University and Secondary, or University and University.
 Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Figure 3: Cumulative Distribution Functions of Individual Wages, Male Wage Earners 30-49, By Country



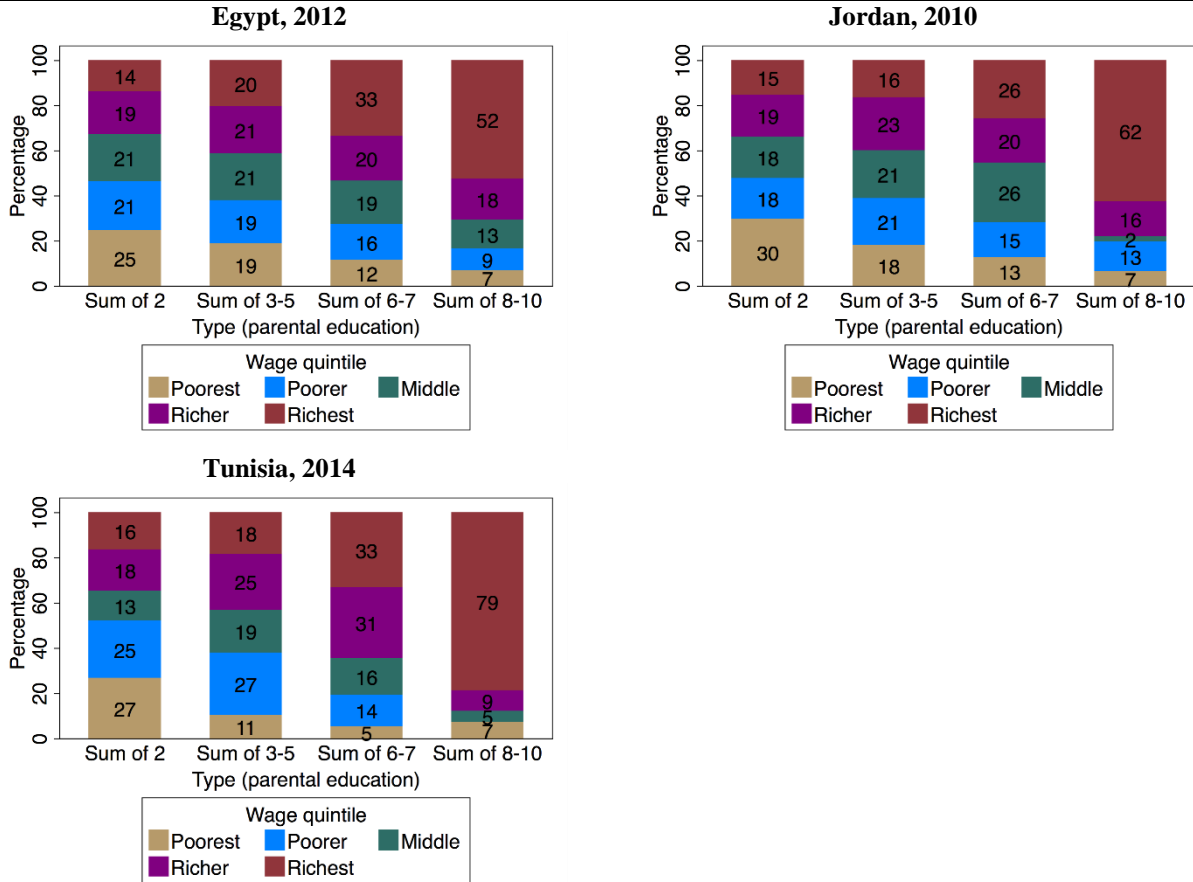
Notes: Sum of 2 means both parents are illiterate. Sum of 3-5 means one of the following combinations: Illiterate and Read & Write, both Read & Write, Basic and Illiterate, Basic and Read & Write, Secondary and Illiterate. Sum of 6-7 means one of the following combinations: University and Illiterate, Secondary and Read & Write, Basic and Basic, University and Read & Write, Secondary and Basic. Sum of 8-10 means one of the following combinations: University and Basic, Secondary and Secondary, University and Secondary, or University and University.
 Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Figure 4: Cumulative Distribution Functions of Individual Earned Income, Male Income Earners 30-49, by Country



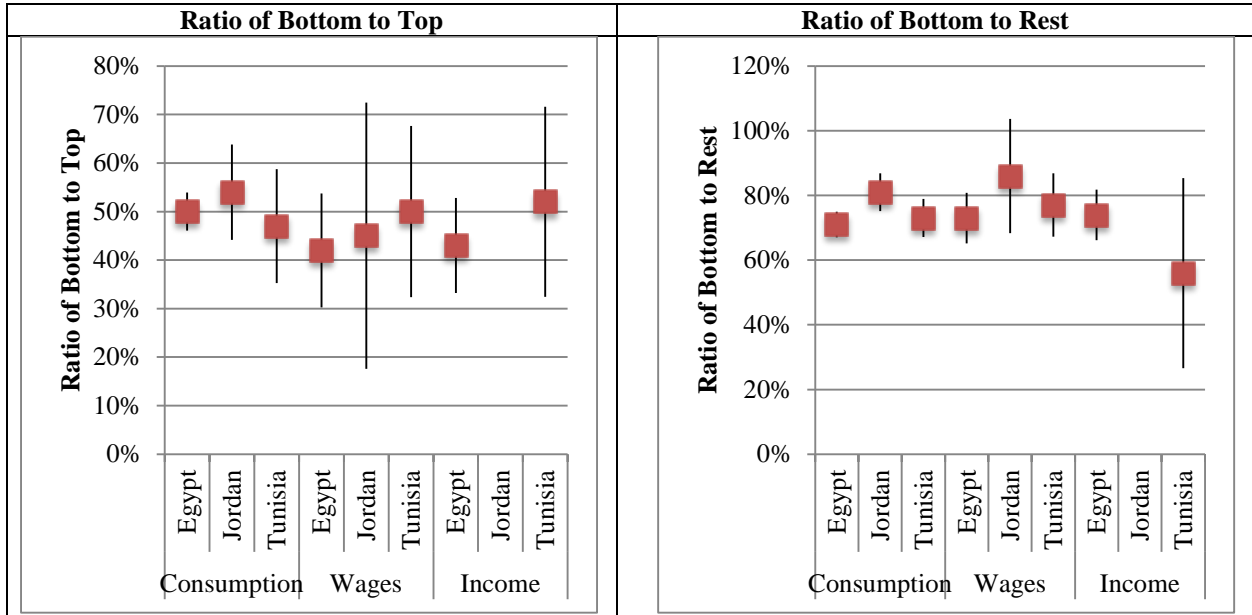
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 Source: Authors' calculations based on ELMPS 2012 and TLMPS 2014

Figure 5: Mobility by Type: Share of Each Type by Wage Quintile (Percentage), Male Wage Earners 30-49, by Country



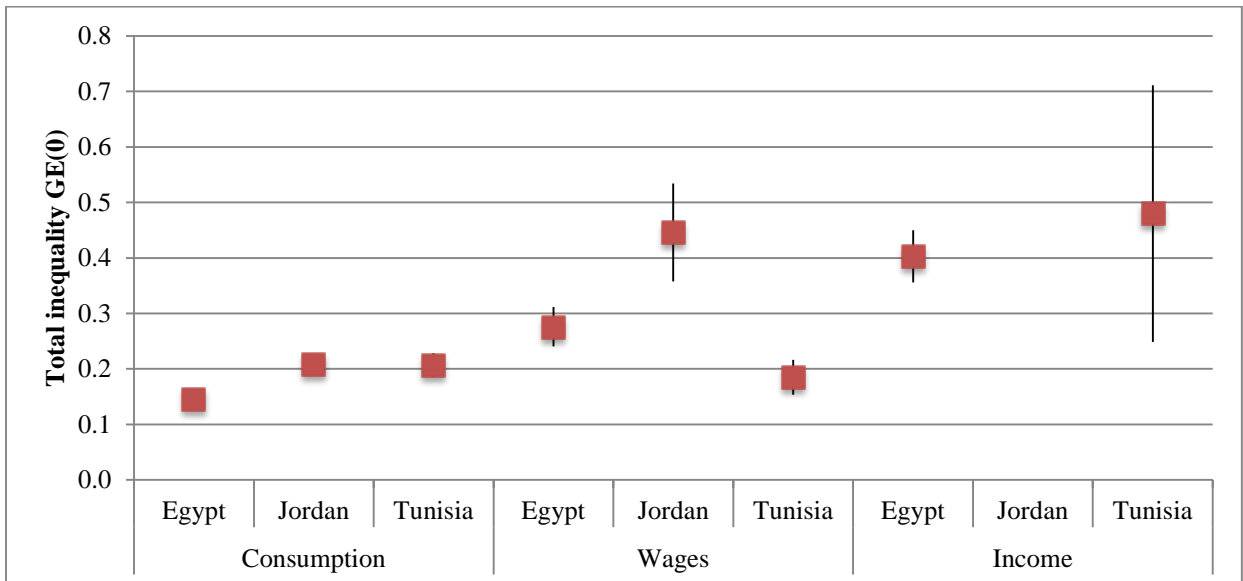
Notes: Sum of 2 means both parents are illiterate. Sum of 3-5 means one of the following combinations: Illiterate and Read & Write, both Read & Write, Basic and Illiterate, Basic and Read & Write, Secondary and Illiterate. Sum of 6-7 means one of the following combinations: University and Illiterate, Secondary and Read & Write, Basic and Basic, University and Read & Write, Secondary and Basic. Sum of 8-10 means one of the following combinations: University and Basic, Secondary and Secondary, University and Secondary, or University and University.
 Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Figure 6: Inequality of Opportunity in Per Capita Household Consumption, Individual Wages, and Individual Income By Country and Outcome



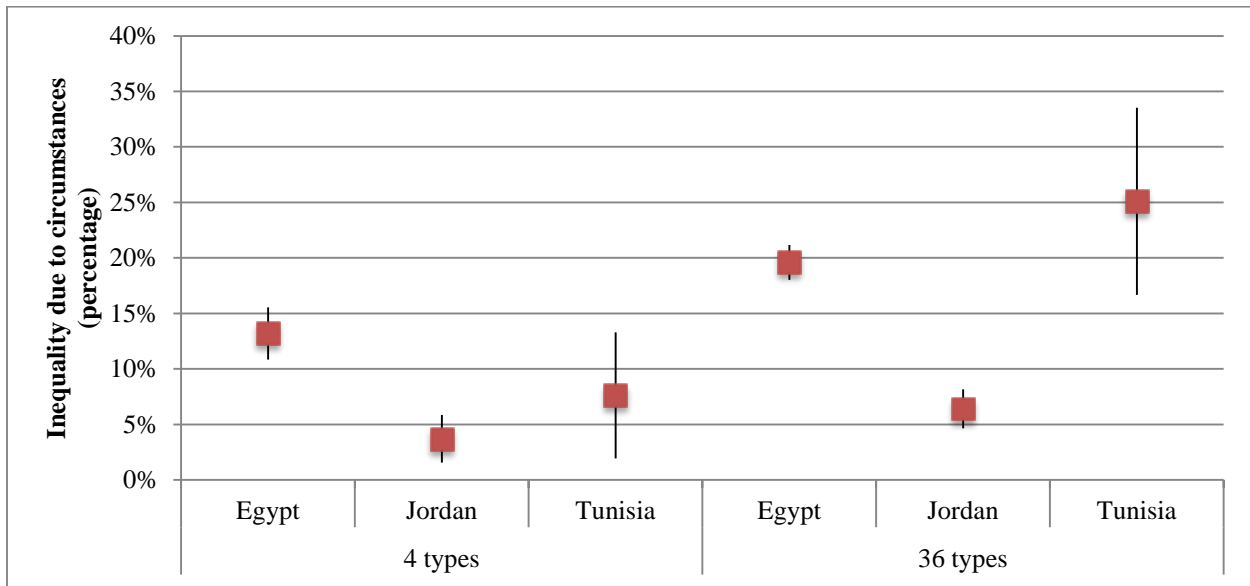
Note: Vertical bars indicate 95% confidence intervals
Source: Table 6

Figure 7: Total Inequality in Consumption, Wages, and Income by Country and Outcome



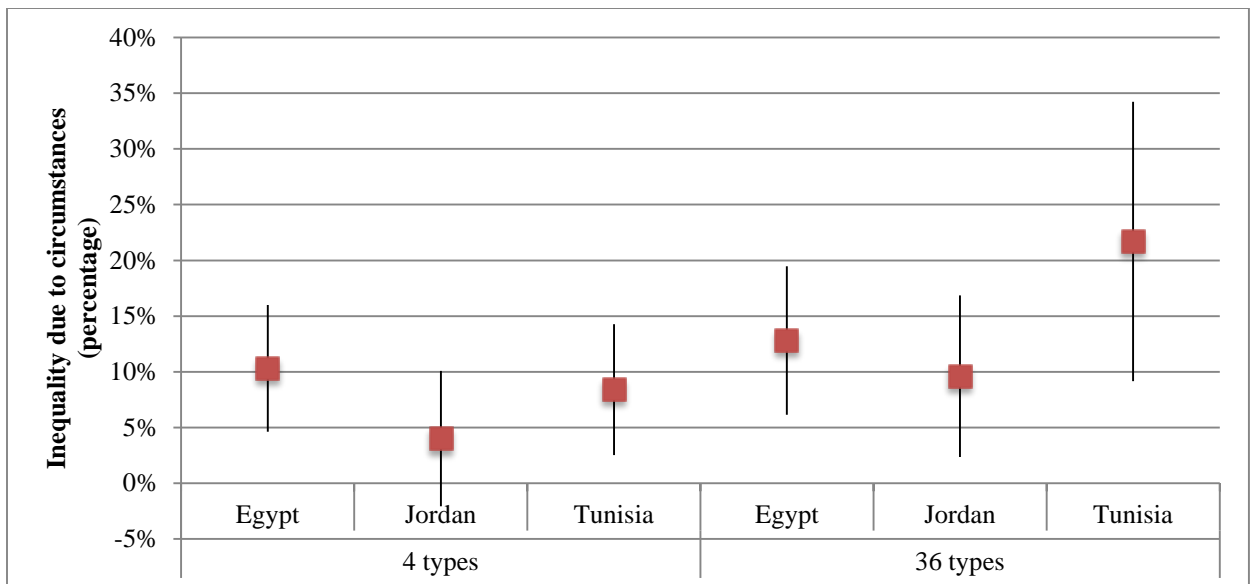
Note: Vertical bars indicate 95% confidence intervals.
Source: See Table 5, Table 6, and Table 7.

Figure 8: Between Inequality in Consumption by Country and Specification



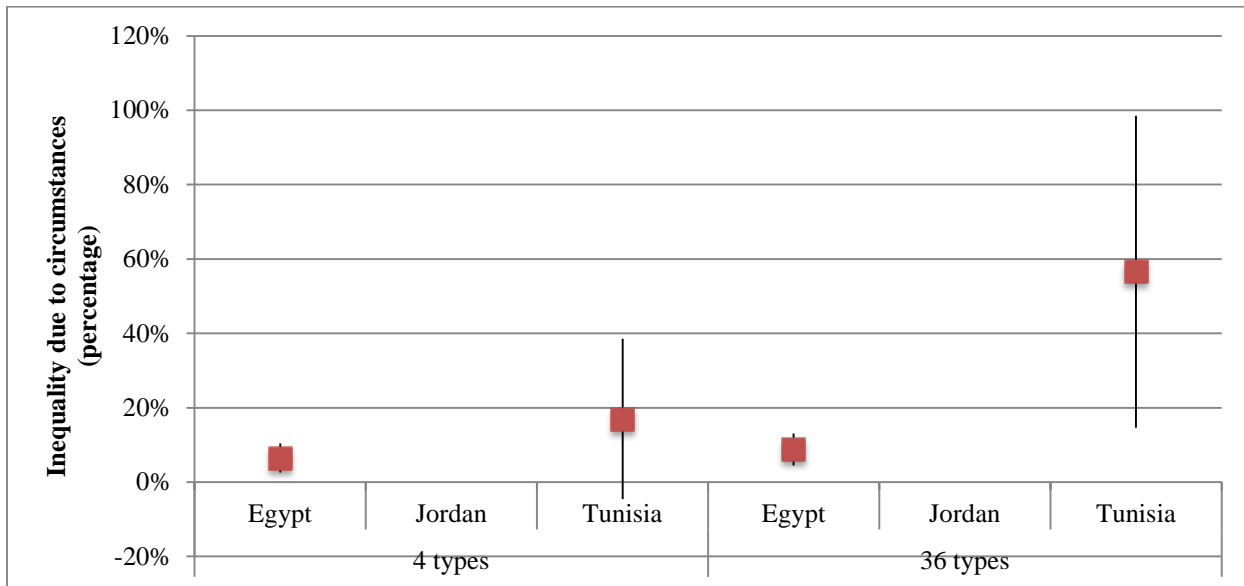
Source: Table 5 and Table 8.

Figure 9: Between Inequality in Wages by Country and Specification



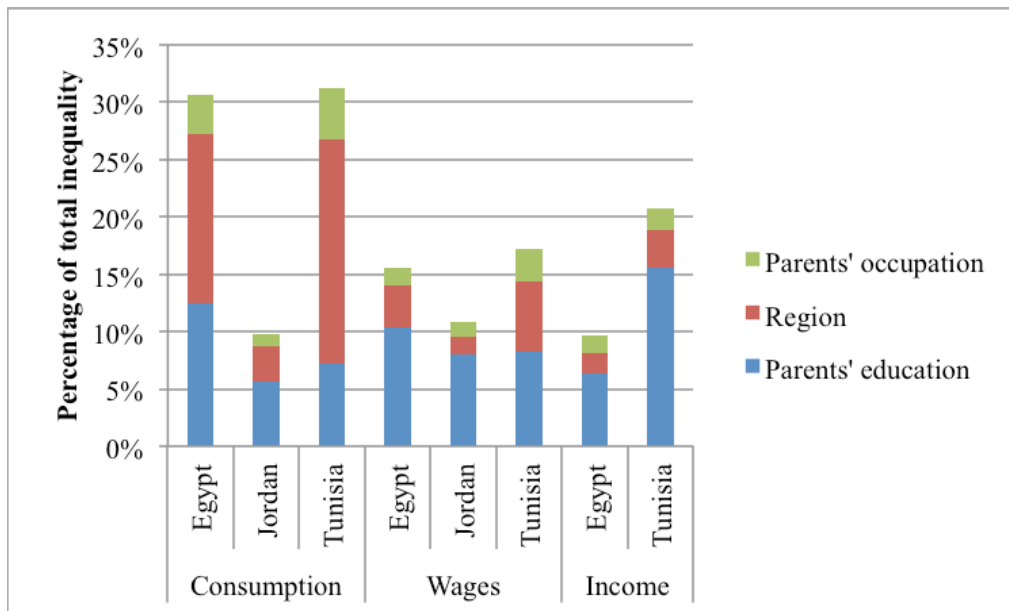
Source: Table 6 and Table 9.

Figure 10: Between Inequality in Income by Country and Specification



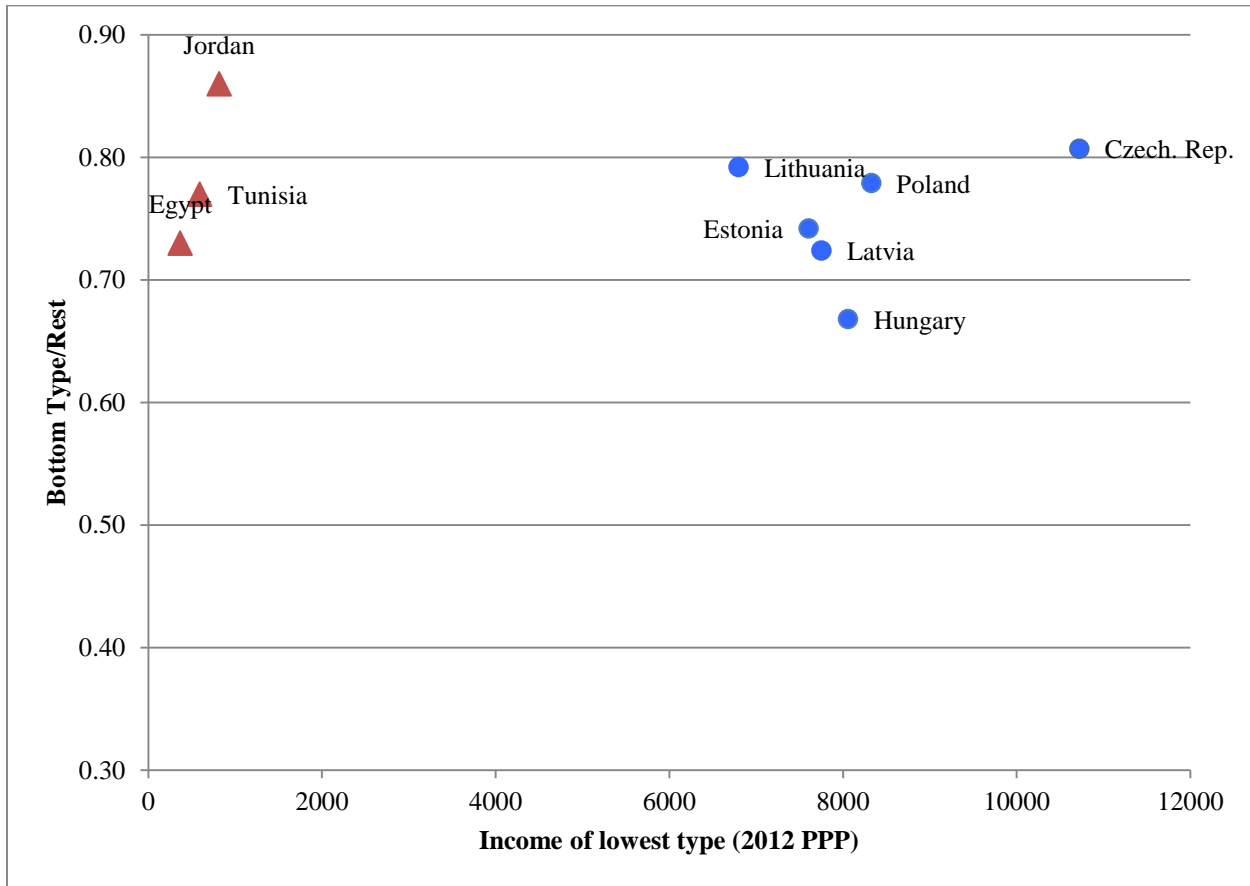
Source: Table 7 and Table 10

Figure 11: Partial Contributions of Circumstances to Total Inequality in Wages, Income and Consumption, Parametric Models



Source: Table 11, specification 3

Figure 12: Basic (Four Types) Income of Bottom Type and Ratio of Bottom Type to Rest by Country, Global Comparison



Notes: Jordan is wage income from 2010. Egypt (2012) and Tunisia (2014) are earned income. The data for the Eastern European countries are from EU-SILC 2005. Incomes are reported, for each man, in annual 2005 Euros, post-tax. The income is called 'net income,' and consists of labor earnings (and self-employed earnings), post-tax. It includes neither transfer payments nor the value of public goods. There are three types, defined by the education of the more educated parent: parent has less than high school, parent has high school, parent has more than high school. The data for Ecuador are household market incomes and seven types based on the sum of the head's education.
 Source: authors' calculations based on ELMPS 2012, JLMPS 2010, TLMPS 2014, Roemer (2014).

Figure 13: Basic (Four Types) Income of Bottom Type and Inequality Due to Circumstances Share, GE(0) by Country, Global Comparison



Notes: Jordan is wage income from 2010. Egypt (2012) and Tunisia (2014) are earned income. The data for the Eastern European countries are from EU-SILC 2005. Incomes are reported, for each man, in annual 2005 Euros, post-tax. The income is called 'net income,' and consists of labor earnings (and self-employed earnings), post-tax. It includes neither transfer payments nor the value of public goods. There are three types, defined by the education of the more educated parent: parent has less than high school, parent has high school, parent has more than high school. The data for Ecuador are household market incomes and seven types based on the sum of the head's education.
 Source: authors' calculations based on ELMPS 2012, JLMPS 2010, TLMPS 2014, Roemer (2014).

Table 1: Distribution of Parental-Education Types by Country and Round (Percentage)

	Egypt 2012	Jordan 2010	Tunisia 2014
Type (heads of household)			
Sum of 2	58	43	73
Sum of 3-5	32	47	20
Sum of 6-7	5	7	5
Sum of 8-10	5	3	2
Type (male wage workers 30-49)			
Sum of 2	51	33	63
Sum of 3-5	37	53	25
Sum of 6-7	6	9	8
Sum of 8-10	6	5	4
Type (male income earners 30-49)			
Sum of 2	53		63
Sum of 3-5	35		26
Sum of 6-7	6		7
Sum of 8-10	5		3
Total	100	100	100
N (household heads)	12,053	5,098	2,118
N (male wage workers 30-49)	4,092	1,968	627
N (male income earners 30-49)	5,426		800

Notes: Sum of 2 means both parents are illiterate. Sum of 3-5 means one of the following combinations: Illiterate and Read & Write, both Read & Write, Basic and Illiterate, Basic and Read & Write, Secondary and Illiterate. Sum of 6-7 means one of the following combinations: University and Illiterate, Secondary and Read & Write, Basic and Basic, University and Read & Write, Secondary and Basic. Sum of 8-10 means one of the following combinations: University and Basic, Secondary and Secondary, University and Secondary, or University and University.

Source: Authors' calculations based on LFSS 1988, ELMPS 1998-2012, JLMPS 2010, and TLMPS 2014

Table 2: Percentage of Males 30-49 Who Are Wage Workers or Income Earners by Country and Round

	Egypt 2012	Jordan 2010	Tunisia 2014
Wage workers	71.4	67.9	74.0
Income earners	95.2	--	98.5

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 3: Household Consumption, Individual Wages, and Individual Income Summary Statistics by Country and Round (in 2012 PPP)

		Egypt 2012	Jordan 2010	Tunisia 2014
Household consumption	Mean	169	325	359
	Median	141	256	306
	SD	116	250	229
Individual wages	Mean	364	902	626
	Median	282	529	564
	SD	441	1,850	371
Individual income	Mean	427		743
	Median	285		545
	SD	831		2,788

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 4: Descriptive Inequality of Opportunity in Household Consumption, Individual Wages and Income by Country

		Egypt 2012	Jordan 2010	Tunisia 2014
Outcome of bottom type (in 2012 PPP)	Household consumption	144	286	325
	Individual wages	309	816	570
	Individual income	367		591
Ratio of bottom to top	Household consumption	0.50	0.54	0.47
	<i>Bootstrapped SE</i>	(0.02)	(0.05)	(0.06)
	Individual wages	0.42	0.45	0.50
	<i>Bootstrapped SE</i>	(0.06)	(0.14)	(0.09)
	Individual income	0.43		0.52
	<i>Bootstrapped SE</i>	(0.05)		(0.10)
Ratio of bottom to rest	Household consumption	0.71	0.81	0.73
	<i>Bootstrapped SE</i>	(0.02)	(0.03)	(0.03)
	Individual wages	0.73	0.86	0.77
	<i>Bootstrapped SE</i>	(0.04)	(0.09)	(0.05)
	Individual income	0.74		0.56
	<i>Bootstrapped SE</i>	(0.04)		(0.15)

Note: Household consumption is per capita.

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 5: Basic (Four Types) Non-Parametric Individual Consumption Inequality by Country and Round, Males Age 30-49

	Egypt 2012	Jordan 2010	Tunisia 2014
Total inequality	0.146*** (0.004)	0.208*** (0.005)	0.207*** (0.011)
Observed between inequality	0.019*** (0.002)	0.008** (0.002)	0.016** (0.006)
Observed between/total	0.132*** (0.012)	0.037*** (0.011)	0.076** (0.029)
N	12053	5098	2118

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 6: Basic (Four Types) Non-Parametric Individual Wage Inequality by Country and Round, Males Age 30-49

	Egypt 2012	Jordan 2010	Tunisia 2014
Total inequality	0.276*** (0.018)	0.446*** (0.045)	0.185*** (0.016)
Observed between inequality	0.029** (0.010)	0.018 (0.015)	0.016** (0.006)
Observed between/total	0.103*** (0.029)	0.040 (0.031)	0.084** (0.030)
N	4092	1968	627

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 7: Basic (Four Types) Non-Parametric Individual Income Earner Inequality by Country and Round, Males Age 30-49

	Egypt 2012	Tunisia 2014
Total inequality	0.403*** (0.024)	0.480*** (0.118)
Observed between inequality	0.026** (0.008)	0.082 (0.072)
Observed between/total	0.065** (0.020)	0.170 (0.110)
N	5426	800

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 8: Full (Thirty-Six Types) Non-Parametric Individual Consumption by Country and Round

	Egypt 2012	Jordan 2010	Tunisia 2014
Total inequality	0.144*** (0.003)	0.208*** (0.007)	0.200*** (0.010)
Observed between inequality	0.028*** (0.002)	0.013*** (0.002)	0.050*** (0.011)
Observed between/total	0.196*** (0.008)	0.064*** (0.009)	0.251*** (0.043)
N	11947	5065	756

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 9: Full (Thirty-Six Types) Non-Parametric Individual Wage Inequality by Country and Round, Males Age 30-49

	Egypt 2012	Jordan 2010	Tunisia 2014
Total inequality	0.277*** (0.018)	0.447*** (0.044)	0.169*** (0.022)
Observed between inequality	0.035** (0.011)	0.043* (0.019)	0.037** (0.013)
Observed between/total	0.128*** (0.034)	0.096** (0.037)	0.217*** (0.064)
N	4038	1961	264

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 10: Full (Thirty-Six Types) Non-Parametric Individual Income Earner Inequality by Country and Round, Males Age 30-49

	Egypt 2012	Tunisia 2014
Total inequality	0.405*** (0.024)	0.581* (0.231)
Observed between inequality	0.036*** (0.010)	0.329 (0.222)
Observed between/total	0.088*** (0.022)	0.566** (0.214)
N	5364	345

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014

Table 11: Parametric Estimates of Inequality of Opportunity

	Specification 1								
	Consumption			Wages			Income		
	Egypt 2012	Jordan 2010	Tunisia 2014	Egypt 2012	Jordan 2010	Tunisia 2014	Egypt 2012	Tunisia 2014	
Total inequality	0.146*** (0.007)	0.208*** (0.004)	0.207*** (0.006)	0.276*** (0.019)	0.446*** (0.043)	0.182*** (0.016)	0.403*** (0.024)	0.479*** (0.115)	
Within inequality	0.127*** (0.004)	0.200*** (0.003)	0.191*** (0.003)	0.248*** (0.014)	0.429*** (0.040)	0.167*** (0.015)	0.377*** (0.026)	0.413*** (0.077)	
Observed between/total	0.132*** (0.017)	0.037*** (0.002)	0.075*** (0.016)	0.101*** (0.026)	0.038 (0.024)	0.080* (0.035)	0.064** (0.021)	0.138 (0.083)	
N	12053	5098	2118	4092	1968	645	5426	825	
	Specification 2								
	Consumption			Wages			Income		
	Egypt 2012	Jordan 2010	Tunisia 2014	Egypt 2012	Jordan 2010	Tunisia 2014	Egypt 2012	Tunisia 2014	
Total inequality	0.144*** (0.004)	0.208*** (0.004)	0.201*** (0.016)	0.277*** (0.017)	0.447*** (0.043)	0.165*** (0.023)	0.405*** (0.026)	0.591* (0.239)	
Within inequality	0.112*** (0.002)	0.197*** (0.003)	0.160*** (0.011)	0.245*** (0.013)	0.428*** (0.039)	0.139*** (0.017)	0.378*** (0.027)	0.474*** (0.131)	
Observed between/total	0.222*** (0.010)	0.053*** (0.005)	0.203*** (0.035)	0.115*** (0.028)	0.042 (0.024)	0.157** (0.059)	0.067** (0.022)	0.197 (0.143)	
Parent's education	0.114*** (0.009)	0.037*** (0.003)	0.088 (0.057)	0.093*** (0.026)	0.033 (0.022)	0.114 (0.061)	0.058*** (0.017)	0.189 (0.121)	
Region	0.150*** (0.013)	0.023*** (0.004)	0.133*** (0.024)	0.038*** (0.011)	0.005 (0.005)	-0.002 (0.034)	0.018* (0.009)	0.013 (0.033)	
Occupation	0.035*** (0.010)	0.015** (0.005)	0.039 (0.031)	0.007 (0.008)	0.007 (0.007)	0.074 (0.042)	0.026** (0.009)	0.004 (0.047)	
N	11945	5065	738	4035	1961	265	5360	350	
	Specification 3								
	Consumption			Wages			Income		
	Egypt 2012	Jordan 2010	Tunisia 2014	Egypt 2012	Jordan 2010	Tunisia 2014	Egypt 2012	Tunisia 2014	
Total inequality	0.144*** (0.004)	0.219*** (0.006)	0.196*** (0.008)	0.277*** (0.017)	0.439*** (0.049)	0.165*** (0.023)	0.405*** (0.026)	0.591* (0.236)	
Within inequality	0.111*** (0.002)	0.202*** (0.004)	0.160*** (0.008)	0.240*** (0.011)	0.394*** (0.045)	0.139*** (0.018)	0.378*** (0.028)	0.455*** (0.123)	
Observed between/total	0.230*** (0.011)	0.079*** (0.014)	0.182*** (0.016)	0.134*** (0.030)	0.101* (0.050)	0.157* (0.068)	0.069** (0.025)	0.230 (0.117)	
Parent's education	0.125*** (0.009)	0.056*** (0.008)	0.051*** (0.013)	0.104*** (0.029)	0.080 (0.049)	0.109 (0.071)	0.064** (0.020)	0.203 (0.136)	
Region	0.147*** (0.014)	0.031*** (0.006)	0.127*** (0.010)	0.036*** (0.011)	0.015 (0.010)	0.000 (0.032)	0.017* (0.009)	0.011 (0.033)	
Occupation	0.034*** (0.009)	0.011*** (0.003)	0.051* (0.025)	0.015 (0.012)	0.013 (0.011)	0.072 (0.053)	0.015 (0.010)	0.005 (0.090)	
N	11945	3737	734	4035	1435	265	5360	350	

Source: Authors' calculations based on ELMPS 2012, JLMPS 2010, and TLMPS 2014