ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية
2016

working paper series

DECOMPOSING WELFARE INEQUALITY IN EGYPT AND TUNISIA: AN OAXACA-BLINDER BASED APPROACH

Yosr Abid, Cathal O'Donoghue and Denisa Sologon

Working Paper No. 1015

DECOMPOSING WELFARE INEQUALITY IN EGYPT AND TUNISIA: AN OAXACA-BLINDER BASED APPROACH

Yosr Abid, Cathal O'Donoghue and Denisa Sologon

Working Paper 1015

June 2016

Send correspondence to:
Yosr Abid Fourati
Technical and Practical Assistance to Development, Tunisia
yosraf@tpadoffice.com

First published in 2016 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Abstract

In order to understand the main drivers of welfare inequality in Egypt and Tunisia, the present paper presents an Oaxaca-Blinder decomposition approach used to decompose differences across distributions of household expenditures, based on counterfactual distributions in the two countries of analysis. Taking Tunisia as a reference country, we find that changes in the expenditures structure and demographics are inequality decreasing. Changes in the characteristics of the labor market has, however, no, or very limited, impact on inequality as captured by the Gini Index.

JEL Classification: I2

Keywords: Inequality, Decomposition, Household Expenditures, Gini Index

ملخص

لفهم الدوافع الرئيسية لعدم المساواة الاجتماعية في مصر وتونس، تقدم هذه الورقة مقاربة لتحلل أواكساكا-بليندر والتي تستخدم لتحلل الاختلافات عبر توزيع النفقات المنزلية، على أساس التوزيعات المغايرة للواقع في البلدين موضوع التحليل. نأخذ تونس كبلد إشارة، نجد أن التغيرات في هيكل النفقات والتركيبة السكانية وعدم تكافؤ في تناقص. التغييرات في خصائص سوق العمل محدودة ولكن، يكاد يكون لا أثر لها على عدم المساواة كما أوضح مؤشر جيني.

1. Introduction

Recently, the MENA region has been experiencing what has come to be called the "Arab Spring." The Tunisian revolution quickly sparked a wave of major uprisings in the region, starting from Egypt and spreading to other countries as Libya and Syria, among others.

In this paper, we purposefully take as case studies Tunisia and Egyptian order to perform a cross-country welfare inequality analysis. In each of these countries, large-scale protests took place beginning from late 2010 in Tunisia and spreading to Egypt in January 2011. Even though it is difficult to precisely identify the sources of these discontents, certainly due to a mix of socio-economic and political factors, and despite the observation that Tunisia and Egypt display very diverse characteristics, it is recognized that inequality has been a catalyst of these anti-regime social movements (Abdel Meguid et al. 2011, Tinoco, 2013, Ncube and Anyanwu, 2012). Besides, in Egypt and Tunisia, inequality has a strong regional component. These features, combined with a very small space for people to express their needs, have ended up in frustrations among the population, essentially youth, and a lack of trust in the future development of countries.

Even though the transition since the revolutions is different in each of the countries of the analysis[1], this recent period saw large political changes in both countries. The latter have been accompanied by little economic oriented strong policies despite the challenges of inequality, recognized as being among the main causes of discontents. The way current governments will address the issue of inequality and the impact that it will have on policymaking is a great concern today. Understanding the determinants of welfare inequality will help in designing the right policy measure for reducing it.

In this paper, we apply a comparative inequality analysis to two countries: Tunisia and Egypt. We focus on welfare inequality as captured by the level of household expenditures' distribution in each of the two countries of the analysis. Despite their socioeconomic, geographic, historical and cultural differences, both countries have been going through important changes since January 2011, when the revolution took place. While inequality in Tunisia, as measured by household surveys, was high but stable in the pre-revolution period, in Egypt, inequality is rather low and has been declining during that same period[2]. According to the World Bank database (World Bank, 2013, World Data Bank), the Gini coefficient in Egypt has declined from 32.8 in 2000 to 30.8 in 2008. Even if inequality is higher in Tunisia, it has also been declining from 40.8 in 2000 to 35.8 in 2010[3].

Inequality has short-term and long-term implications on several dimensions in a society (Wilkinson and Pickett, 2009). Inequality has implications on the welfare of individuals. Second, it also shapes the future institutional developments of countries and their economic prospects. Third, as witnessed by the revolutions several countries in the Arab region have experienced, inequality might have a strong impact on the level of satisfaction of the society as a whole. Current levels of inequality might consequently also have an impact on social cohesion and social unrest.

[1] See Kienle for a detailed description of the socioeconomic policies that have been implemented in Tunisia and Egypt since 2011.

[2] According to Hlasny and Verme (2014), the low level of inequality in Egypt might be explained by a poor measurement of top incomes in the household surveys. The authors estimate this underestimation to around 1.3 percentage points in the Gini Coefficient.

[3]Using the Gini Index, Zouari-Bouattour and Jallouli (2001) show that inequality of expenses in Tunisia decreased between the two periods 1975-1980 and 1985-1990, notably because of the decrease in food expenses inequality. Bibi and Nabli (2008) and Ayedi and El Lahga (2005) show a rise of polarization measures in Tunisia in the 1980's which coincides with the bread riots. Kheir-El-Din and El-Laithy (2006) showed that the real per capita expenditure in Egypt has been declining over the period 1991-2004.

The fact that the level of inequality has repercussions on the future institutional developments of countries gives it a high level of significance and importance because it might have a direct impact on the future development process (Engerman and Sokoloff, 1997). This is particularly relevant for Tunisia and Egypt, whereby the current period of transition following the "Arab Spring" is meant to set the basis of policies in favor of social, economic and political stability. Despite this, little is known about the sources of the differences in household welfare inequality across MENA region countries.

Our paper aims to understand the main sources of differences in welfare inequality between Tunisia and Egypt. These countries display very diverse characteristics, notably in terms of access to the labor market and employment choices. Differences are also observed in relation to the welfare systems, the level of education and demographics. While Tunisia is a small country of only 163,610 km^2 and almost 11 million inhabitants, Egypt represents a surface of 1,002,450 km^2 and accounts for almost 88 million inhabitants. In the period 2010-2014, GDP per capita is equivalent to US $3,314.5, and is evaluated to equal US $4,316.7 in Tunisia during the same period[4]. The fact that geography, natural resource endowments, economic structures, human capital and skills, social structures and labor market characteristics, economic policies and institutions are different, may affect differently poverty and inequality. It is consequently relevant to explore the extent to which these factors explain the cross-national differences in welfare inequality between these two countries.

Empirical studies that explore the sources of inequality in the countries of analysis are particularly relevant for policymakers. Designing relevant policies to increase welfare is a priority today, as the different measures undertaken in both countries since the revolutions do not seem to have achieved more equality and better economic and social conditions. The analysis of their nature represents a real opportunity to understand the transformation process and the desired direction of policy intervention concerning the distributional issues.

In general, the driving forces of income inequality, especially in an inter-temporal perspective, have extensively been studied in the literature. Departing from the "Kuznetz hypothesis" (Kuznetz, 1955), economic growth is identified as being a main determinant cause of long term changes in the distribution of income (Freeman and Katz 1994; Card &DiNardo, 2002). This literature suggests that cross-national differences in household disposable income inequality are mainly explained by country differences in institutions and market forces. This certainly explains that at the same time, each country has its own level of household disposable income inequality.

Macroeconometric cross-country regressions, relying primarily on aggregated data, can inform us about average relationships between measures of income dispersion and other indicators of economic performance (such as economic growth). By contrast, the microeconometric approach, relying on fully disaggregated data from household surveys, allows for more specific country analysis. Since the seminal work by Atkinson (1970) on inequality measurement, microeconometric empirical literature has evolved into several distinct approaches. The most commonly used empirical methodology to assess the nature of differences in income inequality across countries is mainly based on comparing decompositions inequality measures by population subgroups and income sources(Bourguignon et al. 2007).The first one relies on decomposing the differences in the Generalized Entropy inequality measures between subgroups of the population (Shorrocks, 1984). Total inequality is presented as the sum of "within groups" and "between groups" levels of inequality. See for instance Bourguignon (1979) and Shorrocks (1980).The second approach consists of decomposing income sources into different factors, with an emphasis on the contribution of these components to total income inequality (Shorrocks, 1982). Both methods, however, do not tell the contribution of individual

[4] World Bank Data, http://data.worldbank.org/indicator/NY.GDP.PCAP.CD.

determinants to income inequality, while considering multiple factors, such as demographic and labor market characteristics.

As highlighted by Bourguignon et al. (2007), the main reason behind the limited literature exploring why and how countries differ with respect to their income inequality has been the limited methodological development. However, the growing availability of household surveys enables more advanced methodological inequality studies that go beyond the comparison of decompositions of the General Entropy indices (e.g.,Theil). These are mainly based on approaches that generalize the Oaxaca-Blinder decomposition of differences in mean wages to decompose changes in the entire distribution of wages (Oaxaca, 1973, Blinder, 1973).

Bourguignon et al. (2007) and Sologon et al., (2015) build structural household income distribution models that enable the simulation of counterfactual distributions on income in each country and the decomposition of the cross-country differences in income inequality into the corresponding effect of the each factors considered. Sologonet. al., (2015) extend the Bourguignon et al., (2007) approach by enhancing the level of complexity of the household income distribution model and by incorporating the complexity of the tax-benefit rules in the decomposition. This allows exploring not only the impact of the labor market, income and demographic structure, but also the effect of the tax-benefit systems and their interactions with the different factors.

The present paper focuses on the determinants of the differences in welfare inequality between Tunisia and Egypt. As far as we know, there is no study thatexplores the sources of the differences in welfare inequality across such countries using comparable data and applying a decomposition analysis based on a full distribution of welfare. For this purpose, we extend the approach developed by Bourguignon et al., (2007) and Sologon et al., (2015) to explore the differences in welfare inequality between countries. In similarity to the decomposition approach used by Bourguignon et al. (2007) and Sologon et al., (2015), the differences in welfare inequality between the two countries are decomposed into the contribution of labor market, expenditures and demographic factors. This is achieved by generating sequences of counterfactual distributions of welfare in each country if these factors were imported from the other country. The comparisons of welfare distributions are based on household level datasets from the nationally representative surveys, harmonized by the Economic Research Forum (ERF), namely: (1) Egypt - Household Income, Expenditure, and Consumption Survey, 2010/2011(HIECS, 2010/2011) and (2) Tunisia - National Survey on Household Budget, Consumption and Standard of Living, 2010 (EBCNV, 2010).

This paper is organized as follows. Section two describes the decomposition methodology. Section three presents some descriptive statistics related to the distribution of expenditures in Tunisia and Egypt. Section four presents the main simulation results and section five concludes.

2. Decomposing Distributional Changes: Methodology

As stated in Alesina and Glaeser (2005), different countries have specific institutional, economic and social characteristics. This statement also holds for Tunisia and Egypt, even though they share the same recent political transition. These variations can help to explain the differences in household welfare inequality between the two countries. Understanding the drivers of the differences in welfare inequality can help inform about relevant policy measures aimed to reduce such disparities. These issues are of great relevance today, given that designing better redistributive policies is on the agendas of both countries[5].

Conventionally, decomposing income inequality is based on decompositions by population subgroups and by income. In line with these empirical techniques, a number of recent studies have analyzed inequality in the MENA region. Such contributions include Bibi and El-Lahga

[5]See the World Bank 2014 Development Policy Review for Tunisia and Verme et al., (2014) for Egypt.

(2010), Zouari-Bouattour and Jallouli (2001) for Tunisia, El Laithy et al. (2003) for Egypt, Said and El-Hamidi (2005), Kheir El-Din and El-Laithy (2008) for Egypt and Ayadi et al., (2005) for Tunisia. Bibi and El-Lahga (2010) analyze income distribution in six Arab countries (Jordan, Mauritania, Morocco, Syria, Tunisia, United Arab Emirates and Yemen) by means of decomposing overall inequality indices by population subgroups. Bibi and Nabli (2010) provide a comprehensive picture of inequality in the Arab region.

These techniques proved, however, to be constraining, as they do not allow the integration of multiple factors in the analysis. On the contrary, the regression-based methodology used in this paper enables simulating counterfactual welfare distributions if one or more components changes between countries. This method allows us to study how labor market structures, expenditure structures and demographics determine the distribution of household welfare and to assess the contribution of several components to the differences between countries. We focus on three components, namely the labor market, expenditure and demographics.

The literature on inequality decomposition started from the Oaxaca-Blinder parametric approach of decomposing the differences in mean wages (Oaxaca, 1973, Blinder, 1973). Oaxaca (1973) and Blinder (1973) attempted to explain how much in the differences in mean outcomes are accounted for by group differences in the observed characteristics between two groups.

The decomposition methodology developed by Oaxaca (1973) and Blinder (1973) uses statistical models to decompose wage differentials. It is essentially based on explaining differences between two groups. If we consider a linear regression model as follows:

$$Y_i = X_i\beta_i + \varepsilon_i \ \forall i \in \{A, B\} \quad (1)$$

Where *X* are explanatory variables, β_i the parameters' estimates and ε_i the error term.

The methodology aims to explain the mean outcome difference given by equation (2):

$$R = E(Y_A) - E(Y_B) \quad (2)$$

Expanding (2), we obtain:

$$R = E(Y_A) - E(Y_B) = E(X_A)\beta_A - E(X_B)\beta_B \text{ as } E(\varepsilon_i) = 0, \forall i \quad (3)$$

Adding and subtracting $E(X_A)\beta_B$ and $E(X_B)\beta_A$ we get:

$$R = \beta_B(E(X_A) - E(X_B)) + (E(X_A) - E(X_B))(\beta_A - \beta_B) + E(X_B)(\beta_A - \beta_B)$$

The first expression: $\beta_B(E(X_A) - E(X_B))$ refers to the endowment effect, that is, the component that is linked to the differences in characteristics. The second expression: $(E(X_A) - E(X_B))(\beta_A - \beta_B)$ measures the contribution of differences in the coefficients and the third part: $E(X_B)(\beta_A - \beta_B)$ is the price effect, that is, an interaction term accounting for the fact that differences in endowments and coefficients exist simultaneously between the two groups. That is, the first component measures the expected change in Group *B's* mean outcome, if Group *B* had Group *A*'s predictor levels. Similarly, for the second component, the differences in coefficients are weighted by Group *B*'s predictor levels. That is, the second component measures the expected change in Group *B*'s mean outcome if Group *B* had Group *A*'s coefficients. The third component is interpreted as the part of the difference in means that is linked to the differences in returns to individual characteristics. The decomposition above is formulated from the viewpoint of Group *B*. That is, the group differences in the predictors are weighted by the coefficients of Group *B* to determine the endowments effect. $E(X_B)\beta_A$ is added

and subtracted to define the two effects. This counterfactual mean represents a statistical estimate of the mean wage that people with the characteristics observed in distribution *B* would have, if remunerated according to the returns prevailing in *A*.

An extensive literature further used the Oaxaca-Blinder technique to decompose the differences in mean wages across population subgroups with different characteristics (Juhn et al., 1993). Juhn et al (1993) and Blau and Khan (1996) used this method combining data from one distribution with parameters from another to simulate counterfactual distributions to understand differences in earnings distributions. DiNardo, Fortin and Lemieux (1996) used a semi-parametric method based upon kernel density estimators rather than regression parameters to look at changing distributions over time. Following this strand of the literature, one can resume that the differences in mean wages reflect differences in the income generation process, that is, differences in the wage regression parameters, and the differences in the joint distributions of observed characteristics between the subgroups. Counterfactual wages are simulated to decompose wage differentials, first into an explained part due to group differences in productivity factors, such as education or experience, and second, a residual, unexplained part that is often used as a measure for discrimination, although it includes all unobserved reasons.

This methodology further evolved with Bourguignon et al., (2007) who propose an alternative methodology and apply it for decomposing the difference in household income inequality between the US and Brazil. In order to decompose the differences in household income inequality between the two countries into the effect of several components, the authors use a household income generation model combining parametric and non-parametric approaches. Bourguignon et al., (2008) used a parametric method by simulating counter factual distributions to understand differences in in inequality across countries, namely Brazil, Mexico and the USA[6].

Sologon et al., (2015) extend the household income distribution approach by enhancing the complexity of the modelling strategy for the income components and by incorporating the tax-benefit rules in the simulations, which enables looking at differences in household disposable income inequality. They explore not only the impact of the market, income and demographic factors, but also the impact of the tax-benefit systems and their interactions with the different factors in driving of the cross-country differences in household disposable income inequality.

In the present paper, different distributions of household welfare, tackled by consumption levels (or expenditures), in country (*1*)and (*2*), can be formulated as f1(E) and f2(E). The distribution of expenditures observed in country 1 if factor *x* was imported from country 2 can be formulated as $f^{sim}1(E)$. Extending the Oaxaca-Blinder approach, the difference between the two distribution of welfare f1(E)-f2(E) can be decomposed in the effect of factor $x[f1(E) - f^{sim}1(E)]$and a residual effect$[f^{sim}1(E) - f2(E)]$. Depending on the order in which the factors are imported from one country to the other, the effect of each factor may differ. To circumvent this limitation, we use the Shapley-Shorrocks decomposition approach (Shorrocks, 1999, Shapley, 1953), which averages the effects of each factors across all possible combinations. The Shapley value approach yields an exact additive decomposition of any inequality measure into its contributing factors.

[6]Fiorio (2011) and Daly and Valetta (2006) respectively decompose changes in inequality in Italy and the USA using semi parametric methods. Bourguignon et al., (2001) developed a more sophisticated method based on an income generation model, which is a set of equations, in order to decompose changes in the distribution of market income over time into participation, occupation and income inequality components. DiNardo, Fortin and Limieux (1996) used a semi parametric method based upon kernel density estimators to investigate changing wage distributions over time. Bargain and Callan (2010) decompose changes in inequality into policy and other changes utilizing tax-benefit microsimulation models to simulate counterfactual incomes.

For simulating the counterfactual distributions of household welfare, we build a parametric household welfare generation model (WGM)for each country, in the same way that Bourguignon et al., (2008) and Sologon et al., (2015) did it for income. The estimation of the WGM allows us to obtain estimated coefficients about the contribution of different explanatory factors into total welfare distribution. We use welfare rather than income as we use expenditures distributions for the analysis.

The WGM includes household expenditures functions, occupational and industrial structure, labor market participation components as well as other household characteristics. Given the resulting computational complexity, we use estimates from a simple parametric WGM at the household level, which allows us to separate the observed changes in the distribution of expenditures into three main key factors/sources. The first comprises the changes in the socio-demographic structure of the population, as characterized by area of residence, age, education, family background, and household composition. The second comes from changes in the returns to factors of production, including the various components of human capital, such as education and experience. The third has to do with changes in the occupational structure of the population, in terms of employment, unemployment, and inactivity. The regression-based method proposed allows us to quantify the contribution to the welfare inequality of various factors, while taking into account the correlations among them. These factors are introduced as explanatory variables in the WGM, which is estimated through several regression models, allowing us to understand the process that generates the distribution of consumption expenditures in both countries.

The WGM represents the first step in the decomposition analysis proposed in this paper. In a second step, the WGM is used to simulate counterfactual distributions of household expenditures under alternative labor market characteristic, demographic and expenditure structures. Finally, the counterfactual distributions are used to decompose the differences in welfare inequality between countries using the Oaxaca-Blinder approach. The WGM typically involves three types of models:

- Binary model for binary choices;
- Multivariate choice model;
- Mincer-type regression model for the level of consumption expenditures

In each case the method involves estimating regression model parameters β and a measure of the error ε.

The method developed in this paper goes beyond the Oaxaca-Blinder types of models in that we include in the analysis the full range of expenditures which sources go beyond employee income. The distribution of household expenditures depends not only on the returns and characteristics of employed members, but also on other income sources. In addition, the unit of analysis at the household level is more complicated than the Oaxaca-Blinder approach.

In order to perform our simulation analysis, the WGM has been structured into two parts. The first estimates and stores the parameter estimates of the models included in the Welfare Generation Model. The second simulates the counterfactual distributions under alternative factors. These steps are repeated when implementing the swap in the labor market and expenditure structures between countries. The demographic characteristics are swapped together with the data.

This paper consequently extends the decomposition methodology from income to welfare, which allows us to understand the nature of the differences in the distribution of household welfare in two countries that recently witnessed revolutions, mainly attributed to a perceived high level of inequality (Abdel Meguid et al. 2011, Tinoco, 2013, Ncube and Anyanwu, 2012).

3. Household Expenditure Distribution in Tunisia and Egypt

3.1 Data

Heterogeneity across individuals and countries are accounted for by two datasets: 1) Egypt - Household Income, Expenditure, and Consumption Survey, 2012/2013 (HIECS, 2010/2011) and (2) Tunisia - National Survey on Household Budget, Consumption and Standard of Living, 2010 (EBCNV, 2010). Both datasets have been harmonized by the Economic Research Forum (ERF) to allow for more systematic comparative research and cross-country comparisons. These household budget and consumption surveys provide information about households' characteristics: households' composition and size, socioeconomic characteristics of the household head, ownership of durables, livestock and land, region and area of residence, education status, occupation and labor status…) and consumption of goods and services. The household sample size is 11,281 for Tunisia and 7,528 for Egypt. Individuals' sample size is 50,371 for Tunisia and 32,732 for Egypt. Inequality Decomposition results.

3.2 Background statistics

As already mentioned in the introduction, inequality is one of the main sources of social unrests in Tunisia and Egypt. Still, inequality trends, and consequently the distribution of welfare, are also different between the two countries. According to Table 1 below, in 2010, inequality was higher in Tunisia than in Egypt with corresponding Gini coefficients of 0.36 and 0.28 respectively. The other indices reported in the table confirm the country ranking.

Table 2 describes the differences in the level of expenditures over the expenditures distribution in Tunisia and Egypt. The share of total expenditures of those at the bottom quantiles are higher in Egypt than in Tunisia. This trend changes, however, for those at the top quantile.

Both Tunisian and Egyptian uprisings shed light on poor performance in terms of social and economic conditions and the high regional disparities due to inadequate public policies and the high centrality of the State. At the same time, specific economic and social conditions might have specific impact on welfare and inequality. Because of regional disparities, there is a significant variability in consumption levels and poverty across regions. In Tunisia, inequality is the highest in the Center-West and the North-West with a corresponding Gini coefficient of 0.36 (EBCNV, 2010). In Egypt, the variability in equality levels is even more pronounced, with a Gini ranging from 0.35 in Cairo (the highest level) to 0.16 in Luxor (HIECS, 2010/2011). We hence observe a greater variability in inequality across regions in Egypt than in Tunisia. However, this result must be interpreted with caution, as the territorial division in Tunisia and Egypt is not similar.

Figure 1 and Figure 2 below show the population share as compared to expenditures share in Tunisia and Egypt. We observe that in Tunisia, apart from the South West, which holds similar shares of both population and expenditures, the North East, North West and Centre West are more populous but hold smaller expenditures shares, whereas the Grand Tunis, the Centre East and the Southeast are less populous but hold a larger expenditures shares. In Egypt, the great majority of regions hold the same shares of both population and expenditures. One of the exceptions includes Cairo, which is less populated but holds a larger expenditures share.

In both countries, unequal income distributions led to high spatial disparities, even within cities. Welfare inequality is consequently also a geographic function. In Egypt, the North has been advantaged by the government in relation to the rural South (Abdel Meguid et al., 2011). In Tunisia, the coastal regions (North-East and Center-East) have had more attention than the interior regions of the country (North-West, Center-West and South), where the essence of the revolution took place. Jemmali and Amara (2014) in an attempt to assess the inequality in basic services distribution at the regional level in Tunisia using the Human Opportunity Index (HOI),

notice important disparities in access to these services between the coastal and the interior regions.

Inequality also varies between rural and urban areas. However, the trends are different between the two countries. While in Tunisia inequality is slightly higher in rural areas (a Gini coefficient of 0.34 as compared to 0.33 in urban areas), it is the inverse in Egypt where the Gini coefficient is equivalent to 0.23 in rural areas and 0.30 in urban areas. As shown in Figure 3, differences are also observed in relation to the population share (higher in urban areas in Tunisia and in rural areas in Egypt) and the expenditures share (higher in the urban areas in Tunisia and only slightly higher in the urban areas in Egypt). In both countries, inequality by the residence area (rural/urban) and by region is mainly explained by within group inequality.

The composition of the top quintiles in relation to the area of residence (rural or urban) is quasi similar in both countries (Table 3). However, major differences are observed in the two top quintiles, where the share of those living in rural areas in Tunisia are much lower than in Egypt. On the contrary, the share of those living in urban areas in Egypt is notably lower than Tunisia for the 4^{th} and 5^{th}quintiles. These results confirm that spatial inequality, as a function with the area of residence (Rural/Urban) is essentially an issue in Tunisia.

Different levels of inequality are also observed along different levels of education. The inequality (Theil) decomposition by education groups reveals that, in Egypt, the aggregated within-group inequality amounts to 91.4 percent of the overall inequality, which shows that there are great disparities in expenditure levels within each education group. Similar findings emerge for Tunisia, where 92.6 percent of overall inequality differences are due to within-group disparities.

Figure 4 and Figure 5 below show the population share as compared to expenditures share in Tunisia and Egypt by education level as well as the Gini coefficients. In both countries, the Gini coefficient increases with the level of education. Concerning the population share as compared to the expenditures share, the trends are similar in both countries.

The tables below report how households with different characteristics (as measured by the share within households with particular individual level characteristics) are located within the welfare distribution (as proxied by the level of total household expenditures) of both Tunisia and Egypt. We consequently compare how individuals are in the expenditures' distribution.

As shown in table 4, the distribution of the population across the distribution quintiles by gender is not very different across countries. However, we notice that in Tunisia, the share of the female population in all quintiles, apart the top one, is higher than for males, with the highest gap in the first quintile. This is, however, not true for Egypt, where the share of the female population is only higher in the bottom quintile.

In relation to the individual education characteristics (Table 1 in the appendix), we don't notice particular differences in terms of trends. As expected, the distribution of the illiterate population is the most concentrated in the two bottom quintiles. The distribution of the population, which "can read and write" displays the opposite trend. As for the education level, the sample population, which displays "no education", is distributed similarly in the two countries with the highest share in the bottom quintiles. The shares of those holding an education degree, starting from primary and lower/secondary are rather higher in the top quintiles. In relation to the way, individuals in each country are located with the welfare distribution according to their job status (Table 2 in the appendix); we observe that the distribution differs between countries as regards the active population. While in Egypt, the share of the active population is higher in the three bottom quintiles, in Tunisia the highest shares are in the 4^{th} and 5^{th} quintiles. The same result holds the distribution among the inactive

population. The distribution of the population across the distribution quintiles by employment status is almost similar across countries.[7]

4. Inequality Decomposition Results

The Welfare Generation Model (WGM) developed for our decomposition analysis is used to understand the driving forces of inequality change between Tunisia and Egypt. The change in inequality is decomposed into the effect of labor market, demographics and expenditures. The parameter estimates from the WGMare swapped between the two countries to generate counterfactual distributions of household consumption expenditures. Swapping parameters between countries allows to quantify the impact of the different determinants of inequality.

The WGM described above is used to understand the driving forces of the distribution of expenditures (as an approximation of the level of income) in Tunisia and Egypt. In order to understand how different individual and household characteristics explain the distribution of welfare in both countries, the model presented in Table 5 shows the log of household total consumption expenditures in both Tunisia and Egypt as a function of demographics, human capital, work status, location and region (as captured by the regional employment rates) and household composition.

As expected, significant consumption expenditures gaps are due to education. The more educated (holding a university degree) enjoy higher levels of household total expenditures. This result is also true for those holding an upper secondary level, but only in Tunisia. Those who are illiterate enjoy lower levels of consumption expenditures; however, this result is only significant at the one percent significance level in Tunisia. The employment status also has a different impact on the level of household characteristics. While being in work[8] increases the level of welfare in Tunisia, it plays the inverse role in Egypt. Both results are significant at the one percent significance level.

Household characteristics are also significant and play an equal role in both countries. In line with theoretical expectations, being married, the highest the number of children over 4 years old, the highest the number of adults and the highest the number of elderly living in the household, the highest the level of household expenditures.

As compared to the occupation legislators, senior officials and managers, the other occupations imply a lower level of household expenditures. This is true for both Tunisia and Egypt. Concerning the industrial classification of the main job, almost all industrial classifications, apart from Construction, Commerce and Transportation, Storage and Communication, imply a higher level of consumption as compared to the base outcome, which is agriculture and fishing.

The location (rural, urban) and region of the household are also significant in explaining the level of the household's consumption. Nevertheless, we observe a difference between countries in relation to the regional employment rate[9]. While in Egypt a higher regional employment rate doesn't imply a higher level of household expenditures (the associated parameter is not significant), the contrary is observed in Tunisia, where a higher regional employment rate entails a lower level of household expenditures. This unexpected result is certainly due to multicollinearity. The variable regional employment rate might be correlated with other stronger variables, as for instance employment status. There are thus conditional relationships

[7]Table 3 of the Appendix gives the distribution of households in both countries according to the household composition. Table 4 and Table 5 in the appendix displays how individuals are located in the expenditures' distribution according to the sector of employment and the industrial classification.

[8] "In work" individuals include: employees, employers, self-employed and classified belonging to the age group 16-80 years old.

[9] The "regional employment rate" is used as an indicator of regional disparities, where a region with a highest employment rate offers more opportunities to work and is considered as "more developed."

with other characteristics[10].Besides, the positive impact of the "regional employment rate" seems to be related to the positive impact of the "female regional employment rate" on the level of spending: the corresponding parameter estimates are positive and significant in both countries. This result might indicate that the positive repercussions of the regions' favorable labor environment are absorbed by the ability of the regions to integrate women into the labor market. From the WGM results, we learn that a highest regional employment rate in Tunisia increases individuals' probability to be in work. This result is notably true for women (single and in-couple). In Egypt, a higher regional employment rate only increases the probability of being in work for women in couple. However, a higher regional employment rate doesn't seem to have an impact on people's probability on being unemployed. This is true for both countries and both men and women.

Living in an urban area generates a positive impact for expenditures in both countries. This result is completely in accordance with theoretical expectations. In Tunisia, welfare inequality is slightly higher in rural areas. Results are consequently completely consistent. In Egypt, the Gini index is highest in urban areas, which should entail a different result. However, looking closer at the data, the observation that living in an urban area generates a positive impact forth level of expenditures becomes justifiable. Indeed, about 56.5 percent of the sample Egyptian population lives in rural areas (as compared to 37 percent in Tunisia). Figure 3 above shows how in Egypt the population share is much higher in rural than in urban areas, whereas at the same time, the difference in expenditures' share between the rural and urban areas is much less pronounced with the latter being slightly higher. On the contrary, in Tunisia, both the population and the expenditures' shares are much higher in urban than rural areas.

As for the other models in the WGM, the Chow test results confirm that the parameters of the explanatory variables in the household expenditures regression are significantly different between both countries[11].

In a following step, we use a decomposition approach based on the Oaxaca-Blinder method in order to understand the drivers of inequality across the two countries. The decomposition approach is used to compare inequality indices under different counterfactual distributions. The decomposition is assessed using the Shapley-Shorrocks decomposition approach. In this way, the decomposition of any inequality measure will allow us to assess the contribution of the set of explanatory variables in the welfare generation model, which sum accounts for the inequality indicator.

In order to decompose the change in inequality between the two countries, we simulate the labor market, demographic and expenditures models on each data set, altering one component at a time, comparing each of the two countries. We have eight possible combinations of the components.

Averaging the change in Gini associated with each individual change as per the Sharpely transformation, we produce in Table 8 the average contribution change to inequality of each of the components. The sum of the contributions equals the total change in Gini from one country to another. In these simulations, Tunisia is taken as the reference country for each component (expenditure, labor market and expenditures). We look at all order states -- a total of four possible changes for each component.

As indicated in Table 6, on average, the three components are inequality decreasing. Demographics, as with the change in the population structure, family background, education,

[10] In order to deal with multicollinearity, we need to include interactions in the regression.

[11]The large F and Prob>F = 0.0000 for all variables in the model rejects the null hypothesis of equal slope and intercept.

age etc., has a decreasing effect on inequality. The labor market changes also decrease inequality, but at a much lower degree. Expenditures distribution is also inequality decreasing.

The order of the simulations can also be important. If Egypt were to be taken as the reference country, the results would be opposite as we will see below in the decomposition analysis.

We are interested in the variability of these routes to understand the sources of variability in inequality. Figure 6shows the average change across the eight potential combinations across countries and the three drivers considered under the Sharply transformation.

We first note that the range is small. The potential impact of each component is less than 1 percentage point. Demographics and expenditures are unambiguously reducing inequality when we swap the demographic and expenditures parameters between countries. We notice that the impact of each component is clear cut. The change induced by the population (demographic and data) component ranges from a reduction of 5.2 points to 5.8 points. Changes in the expenditures distribution have the next largest change. Indeed, related variability displays a reduction from 6.5 points to 7.4 points, which is also the widest range. Finally, the labor market change depends on the pathway, as it ranges from a reduction of 0.01 points to 0.38 points.

It is important to mention that every possible order has been simulated, and we consequently look at all possible combinations. The results are consequently robust to the results of the order that we take.

Figure 7 plots each of the six pathways of inequality levels (given changes in the components) between the two countries, with Tunisia being the reference country. With three different components, there are six possible transitions: 3! (3 x 2 x 1). For instance, departing from Tunisia, it is possible to have three initial possible moves to Egypt, first demography and data, labor market or expenditures variability. In transition 2, there are two potential changes, excluding the first change, then finally one change excluding the first two.

We obtain unambiguous results. The change from Tunisia to Egypt in terms of demographics reduces inequality (that is the Egyptian demographic parameter estimates are transferred to the Tunisian data).The changes in inequality due to the labor market characteristics are rather flat although we observe a slight increase in the two middle pathways. Swapping the expenditures structure from Tunisia to Egypt clearly decreases inequality.

In table 7, we report the Gini for each of the eight combinations between countries. The first combination gives the Gini for Tunisia -- it equals 0.391 and is higher than in Egypt (option 8) where the Gini equals 0.264.

Importing the Egyptian labor market structure would reduce inequality in Tunisia, as shown in option 3. However, the difference is small -- equivalent to a decrease of one percent in the Gini index (from 0.391 to 0.388). Comparing options 4 and 2, we notice that moving from Tunisia with the Egyptian expenditures structure to Tunisia with the Egyptian expenditures distribution and labor market structure would not change the level of inequality as the Gini would remain at a level of 0.316. However, moving from options 3 to 4, meaning moving from Tunisia with the Egyptian labor market structure to Tunisia with the Egyptian labor market and expenditure structure, we notice that inequality would notably decrease (19 percent).The Egyptian inequality level would, on the contrary, remain similar if Egypt would import the Tunisian labor market and expenditures structure. This implies that the characteristics of the expenditures distributions of Egypt have an inequality decreasing effect if they we imported in Tunisia. The structure of the Egyptian labor market has, on the contrary, a low inequality decreasing impact. In the inverse transition, inequality would remain constant in Egypt if the latter would import the Tunisian labor market structure (comparing options 8 and 6).

As for the impact of demographics on inequality, if the other components remain the same, the change from Tunisian demography to the Egyptian one would decrease inequality by as much as 15 percent (option 5). Moving from transition 5 to 6, that is, changing the Tunisian expenditures structure to the Egyptian one, further decreases inequality by 21 percent.

The effect of the changes in the expenditures structure on the distribution of welfare in Tunisia and Egypt is shown in options 2 and 7. Unambiguously, the Egyptian expenditures structure, if it had to prevail in Tunisia, would reduce the level of inequality in Tunisia from 0.391 to 0.316 as given by the Gini Index (19 percent). Swapping the parameter estimates from Tunisia to Egypt would increase the Egyptian inequality level from 0.264 to 0.330.

Moving from transition 2 to 6, that is, moving from an option with the Tunisian demographics and labor market structure and the Egyptian expenditures distribution and further swapping the demographic parameters of Egypt to option 2, would reduce inequality by 16 percent. The transition from option 3 to 7 would reduce inequality by 15%, confirming that the Egyptian demographics have an inequality reducing effect.

Moving from options 5 to 7 reduces inequality by only 1 percent, confirming that the inequality reducing impact of labor market structure is very low.

Comparing option 8 (the three components have the Egyptian characteristics) to option 4 (Tunisian demographics, Egyptian labor market and expenditures) we notice that inequality decreases by 16 percent. If we compare option 8 to 6, we notice that the level of inequality remains the same, as swapping labor market parameters has low or no effect on inequality. Finally, comparing option 8 to 7 confirms the inequality reducing effect of expenditures as the Gini index decreases by 20 percent.

The decomposition analysis clearly shows that at least two of the Egyptian components, the demographics and the expenditure structure, have a decreasing inequality effect on the Tunisian welfare distribution. First of all, these results are not surprising, given that inequality is effectively higher in Tunisia than in Egypt, but also, as mentioned in section 3 above, spatial inequality is more pronounced in Tunisia than in Egypt. Importing the demographic structure from Egypt to Tunisia would decrease inequality in Tunisia, mainly because of the regional inequality in Egypt, essentially between rural and urban areas, being lower in Egypt. However, other characteristics might also have a decreasing inequality effect. As for the effect of the structure of expenditures on inequality, the model estimation results presented in Table 7 above also show major differences between Tunisia and Egypt in terms of the impact of several household characteristics on the distribution of welfare. These differences explain the fact that the expenditures structure is inequality decreasing. Finally the labor market structure has a very little impact on inequality, when Tunisia is taken as a reference country.

Overall, the decomposition results show that all effects are negative. The relative contribution of each factor can be presented as follows:

- the difference in welfare inequality between Egypt and Tunisia is 43 percent (-0.055/-0.127) due to differences in demographics;
- the difference in welfare inequality between Egypt and Tunisia is 1.5 percent (-0.002/-0.127) due to differences in the labor market structure;
- the difference in welfare inequality between Egypt and Tunisia is 55 percent (-0.070/-0.127) due to differences in returns to the expenditures structure.

5. Conclusion

Our decomposition analysis is used to simulate counterfactual expenditures distributions in Tunisia and Egypt. The cross-national differences in welfare inequality, captured by the levels of consumption, are decomposed into differences due to labor market factors and

demographics. The decomposition approach is based on the generation of sequences of counterfactual distributions of household consumption that would prevail in each country, if each of these factors were swapped between countries, first keeping the others unchanged, and second by sequentially replacing each factor. The decomposition analysis is done through the generation of counterfactual means and inequality measures for the household consumption distributions. This analysis allowed us to compare actual welfare distributions in each country with counterfactual distributions in which parameters (capturing returns to various characteristics) are imported from one country to the other.

The regression's results show that spending gaps are due to education, working status and sector of employment. The distribution of total household expenditures is also partly explained by the place of residence (region, rural/urban).

From a policy-making point of view, the decomposition approach presented in this paper, as compared to the traditional decomposition methods (by income sources and by subgroups), is very useful as it can inform about what measures to implement to address inequality problems. Indeed, as results show, the structure of the Egyptian expenditures and demographics have an important inequality decreasing effect when they are transferred to Tunisia. Swapping the labor market characteristics between countries, however, has a very low impact on the distribution of expenditures and, consequently, on inequality. At first glance, and given the major differences between countries as shown by the WGM and the descriptive statistics, implementing public policies to reduce spatial inequality might have an important equalizing effect on the distribution of revenues, especially in Tunisia where the issue of regional inequality is more pronounced. Policy reforms related to some demographic characteristics, such as education, might have an important welfare equalizing effect. On the contrary, reforms to the labor market structure need to follow a different model than the one currently prevailing either in Egypt or in Tunisia.

References

Aaberge, R. and Colombino, U., (2012) "Using a Microeconometric Model of Household Labour Supply to Design Optimal Income Taxes, (forthcoming) *Scandinavian Journal of Economics*.

Abdel Meguid, N., Al Banna, S., Korayem, R. and Salah El Din, H. (2011) "The Economic Causes of the Egyptian Revolution "January 25, 2011"', The American University of Cairo, School of Global Affairs and Public Policy, Public Policy and Administration Department.

Alesina A. And E.L. Glaeser (2005*): Fighting Poverty in the U.S. and Europe: A World of Difference*. Oxford University Press 2005

Atkinson, A.B. (1970)."On the Measurement of Inequality." *Journal of Economic Theory*. 2, 244-263.

Ayadi, M. et al (2005) 'Pro-Poor Growth in Tunisia', Paris: International Development and Strategies, March. http://siteresources.worldbank.org/INTPGI/Resources/342674-1115051237044/oppgtunisia11.pdf

Bibi, S. and A. El-Lahga (2010) 'Decomposing Income Inequality in the Arab Region', ERF Working Paper No. 557, Cairo: Economic Research Forum, October. http://www.erf.org.eg/CMS/uploads/pdf/1287902290_557.pdf

Blinder, Alan S. (1973): Wage discrimination: Reduced Form and Structural Estimates. *Journal of Human Resources.* 8, 436–455

Bourguignon, F. (1979): Decomposable Income Inequality Measures. *Econometrica* 47, 901–920

Bourguignon F., Ferreira F.H.G and LeiteP.G (2007): Beyond Oaxaca–Blinder: Accounting for Differences in Household Income Distributions, *Journal of Economic Inequality*, DOI 10.1007

Card, D. and J. E. DiNardo (2002): Skill Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles, *Journal of Labor Economics* 20, 4, 735.

DiNardo, J., Fortin, N. and T. Lemieux (1996): Labor Market Institutions and the Distribution of Wages, 1973–1992: A Semi-Parametric Approach. *Econometrica* 64(5), 1001–1044.

El-Laithy, H. et al (2003) 'Poverty and Economic Growth in Egypt: 1995-2000', World Bank Policy Research Working Paper No. 3068, Washington: World Bank, June. http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-3068

Engerman and Sokoloff (1997).Factor Endowments, Institutions, and Different Paths of Growth Among New World Economies. In: Haber Stephen (ed.) *How Latin America Fell Behind*. Stanford University Press, 1997

Fortin, N., Lemieux, T. And S. Firpo (2010): Decomposition Methods in Economics, NBER Working Paper 16045.

Freeman, R. B. and Katz, L. F. (1994): Rising wage Inequality: The United States vs. Other Advanced Countries, in *`Working Under Different Rules', Russel Sage Foundation,* New York, pp. 29-62.

Gottschalk, P. and Smeeding, T. M. (1997): Cross-National Comparisons of Earnings and Income Inequality, *Journal of Economic Literature* 35(2), 633-687.

Hlasny, V. and Verme, P. (2014) "Top Incomes and the Measurement of Inequality in Egypt," Economic Research Forum, Working Paper Series, WP. N° 874.

Jemmali, H. and Amara, M. (2014) “Assessing Inequality of Human Opportunities: A New Approach for Public Policy in Tunisia”, Economic Research Forum, Working Paper Series, WP. N° 871.

Juhn, C., Murphy, K. and P. Brooks (1993): Wage Inequality and the Rise in Returns to Skill, *Journal of Political Economy*, 101(3), 410–442

Katz, L. F. and Autor, D. H. (1999): Changes in the wage structure and earnings inequality, in O. Ashenfelter and D. Card, eds, `Handbook of Labor Economics', Vol. 3 of *Handbook of Labor Economics*, Elsevier, chapter 26, pp. 1463-1555.

Kheir-El-Din, H. and H. El-Laithy (2008) ‘An Assessment of Growth, Distribution, and Poverty in Egypt: 1990/91-2004/05’ in Kheir-El-Din, H. Ed., *The Egyptian Economy: Current Challenges and Future Prospects*, Chapter 2, pp. 13-52, Cairo: The American University Press.

Kienle, E. (2015) “Changed Regimes, Changed Priorities? Economic and Social Policies after the 2011 Elections in Tunisia and Egypt”, Economic Research Forum, Working Paper Series, WP N° 928.

Kuznets, S. (1955) “Economic Growth and Income Inequality”, The American Economic Review, Vol XLV, N° 1.

Li, J. and C. O'Donoghue, (2012). A Methodological Survey of Dynamic Microsimulation Models, UNU-MERIT working paper.

Ncube, M. and Anyanwu, J.C. (2012) “Inequality and the Arab Spring: Revolutions in North Africa and the Middle East’, African Development Bank, Africa Economic Brief, Vol 3, issue 7.

OAMDI, 2014. Harmonized Household Income and Expenditure Surveys (HHIES), http://www.erf.org.eg/cms.php?id=erfdataportal. Version 2.0 of Licensed Data Files; HIECS 2010/2011 - Central Agency for Public Mobilization and Statistics (CAPMAS). Egypt: Economic Research Forum (ERF).

OAMDI, 2014. Harmonized Household Income and Expenditure Surveys (HHIES), http://www.erf.org.eg/cms.php?id=erfdataportal. Version 2.0 of Licensed Data Files; EBCNV 2010 - National Institute of Statistics (INS),Tunisia. Egypt: Economic Research Forum (ERF).

Oaxaca, R. (1973): Male–Female Wage Differentials in Urban Labor Markets. *Int. Econ. Rev.* 14, 673–709.

Said, M. and F. El-Hamidi (2005) ‘Wage Inequality by Education and Gender in MENA: Contrasting the Egyptian and Moroccan Experiences in the 1990s’, 12th Annual Conference of the Economic Research Forum (ERF), Cairo: ERF, December. http://d-scholarship.pitt.edu/5761/1/2-El Hamidi_Said_Education_ERF_2005_(2).pdf

Shapley, L. S. (1953): A Value for n-person Games, in: ‘‘*Contributions to the Theory of Games,* II,’’ H. Kuhn and A. W. Tucker, eds., Princeton: Princeton University Press.

Shorrocks, A.F. (1980): The Class of Additively Decomposable Inequality Measures. *Econometrica* 48, 613–625

Shorrocks, A.F. (1982) “Inequality Decomposition by Factor Components”, *Econometrica*, 50, pp. 193-211.

Shorrocks, A.F. (1984), “Inequality Decomposition by Population Subgroups”, *Econometrica*, 52, pp. 1369-85.

Shorrocks, A. F. (1999): Decomposition Procedures for Distributional Analysis: A Unified Framework Based on the Shapley Value, Wivenhoe Park: University of Essex and Institute for Fiscal Studies.

Sologon Denisa, Philippe Van Kerm, Cathal O'Donoghue (forthcoming 2015).Inequality Decomposition with Policy, Composition, Returns and Demographics Effects During the Crisis: A Comparison Between the UK and Ireland, LISER Working Papers (paper presented at the ECINEQ Conference http://www.ecineq.org/ecineq_lux15/FILESx2015/CR2/p257.pdf)

Tinoco, E. (2013) "Inequality and its Role in the Egyptian Revolution, Political Economy of MENA region, Final research paper, Spring.

Verme, P., Milanovic, B., Al-Shawarby, S., El Tawila, S., Gadallah, M. and El-Majeed, Enas Ali A., (2014). Inside Inequality in the ArabRepublic of Egypt, Facts and Perceptions across People,Time, and Space.The World Bank.

Wilkinson, R. and Pickett, K. (2009). The Spirit Level: Why More Equal Societies Almost Always Do Better. London: Allen Lane.

World Bank, "The Unfinished Revolution, Bringing Opportunity, Good Jobs And Greater Wealth To All Tunisians."*Development Policy Review* N° 86179-TN, May 2014.

Zouari-Bouattour, S. and K. Jallouli (2001) 'Inequality of Expenses: The Tunisia Case' ERF Working Paper No. 0118, Cairo: ERF. http://www.erf.org.eg/CMS/uploads/pdf/0118_ZouariJalouli.pdf

Figure 1: Population and Expenditures Share by Region in Tunisia

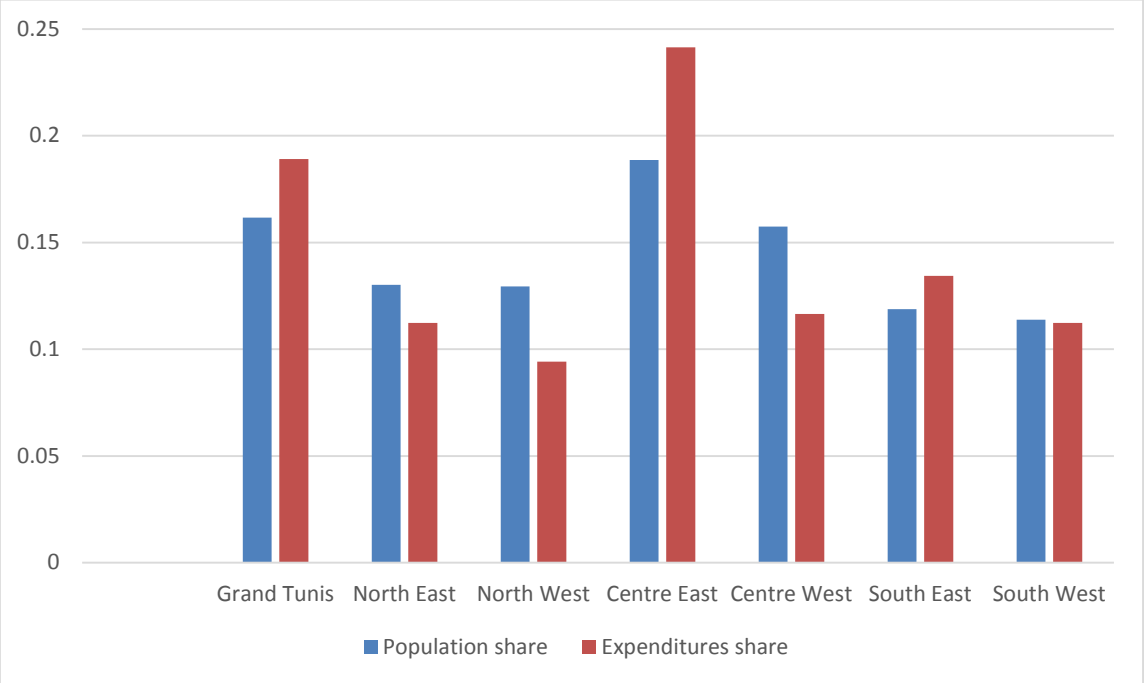


Figure 2: Population and Expenditures Share by Region in Egypt

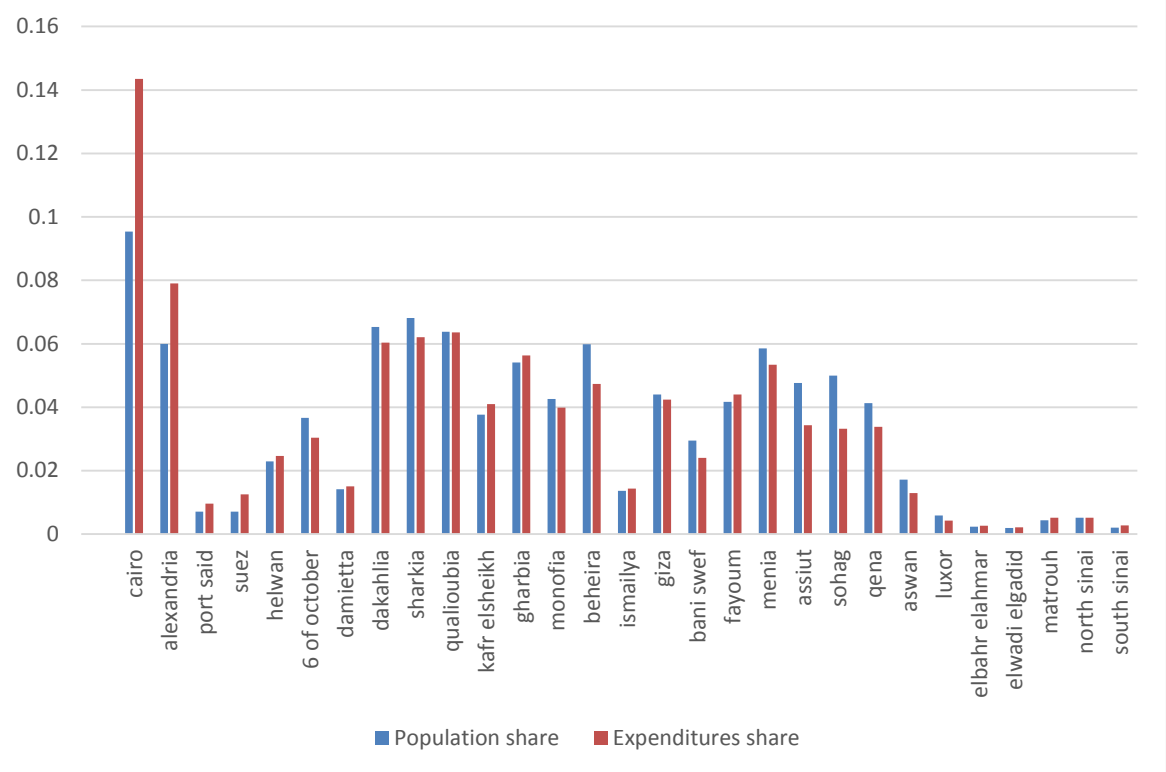


Figure 3: Population Share, Expenditures Share and Gini in Tunisia and Egypt, by Place of Residence (Urban/Rural)

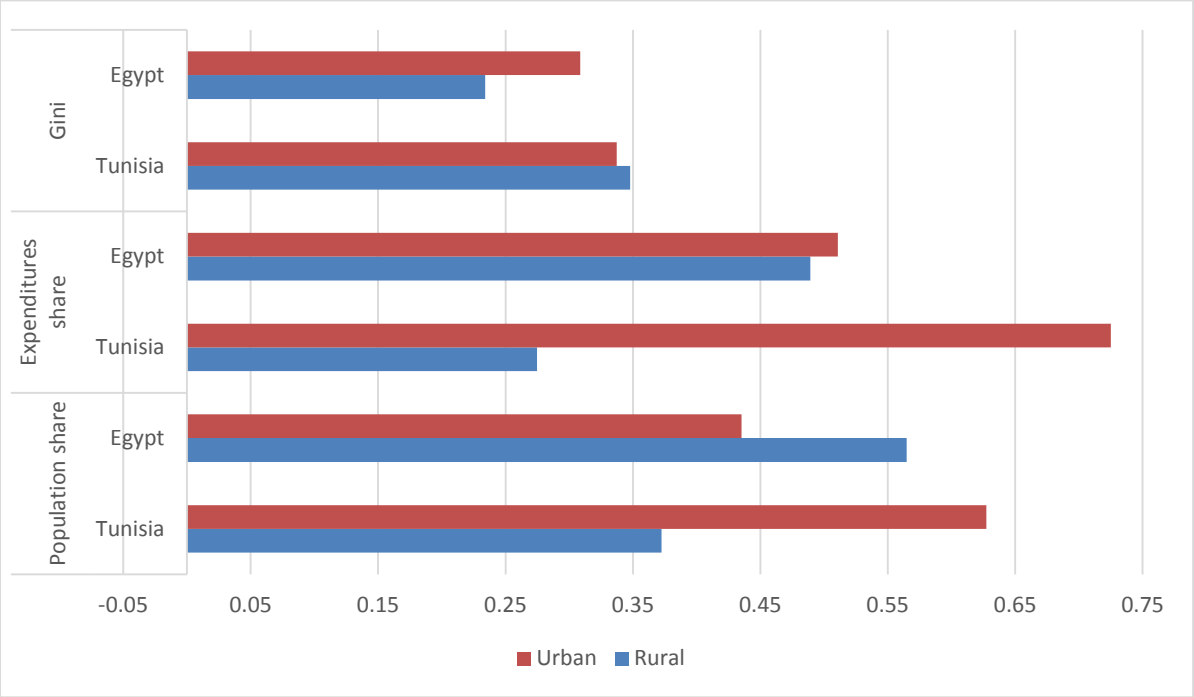


Figure 4: Population and Expenditures Share and Gini by Education Level in Tunisia

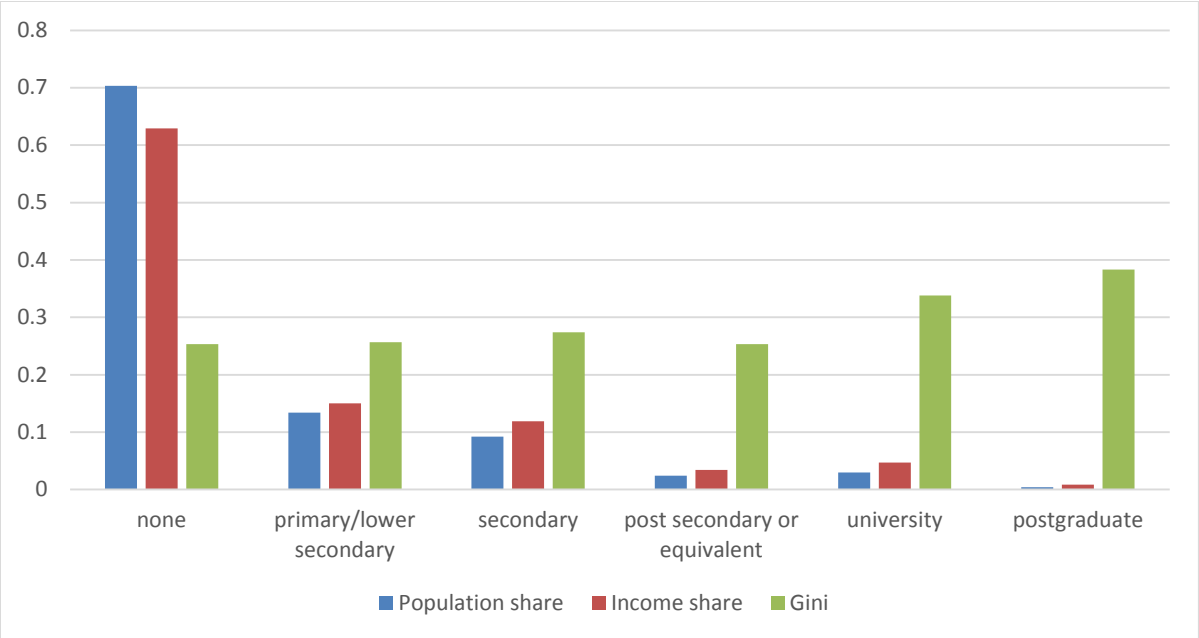


Figure 5: Population and Expenditures Share and Gini by Education Level in Egypt

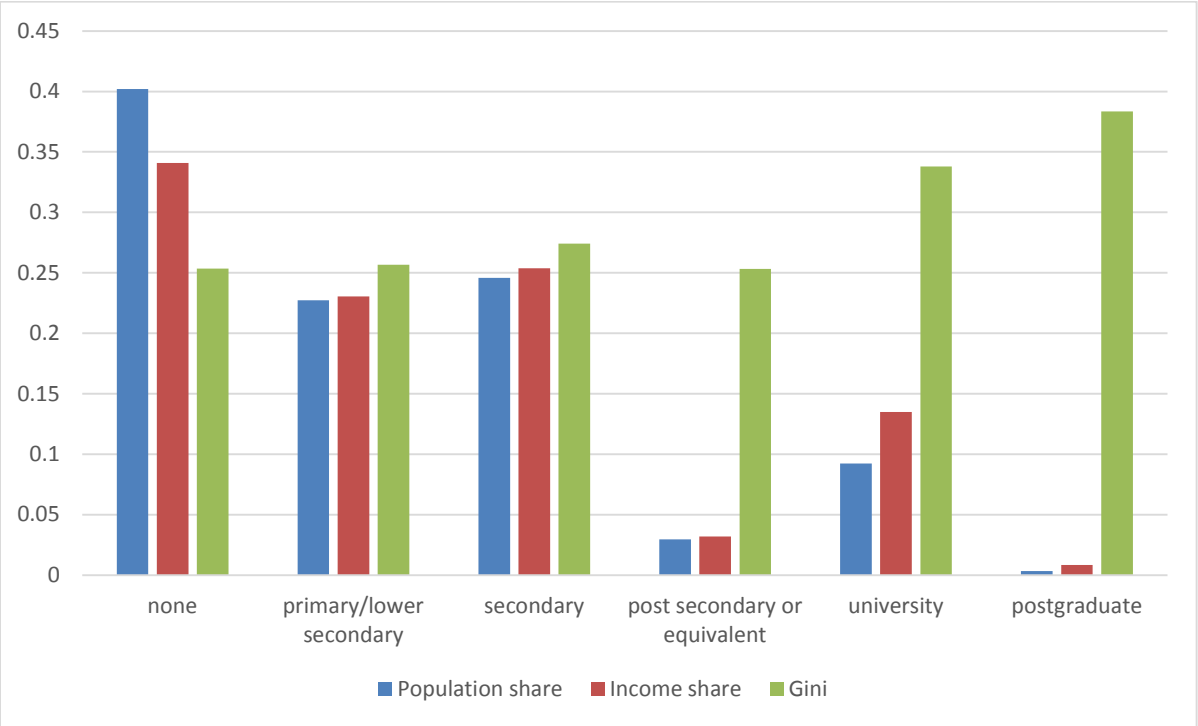


Figure 6: Decomposition Ranges

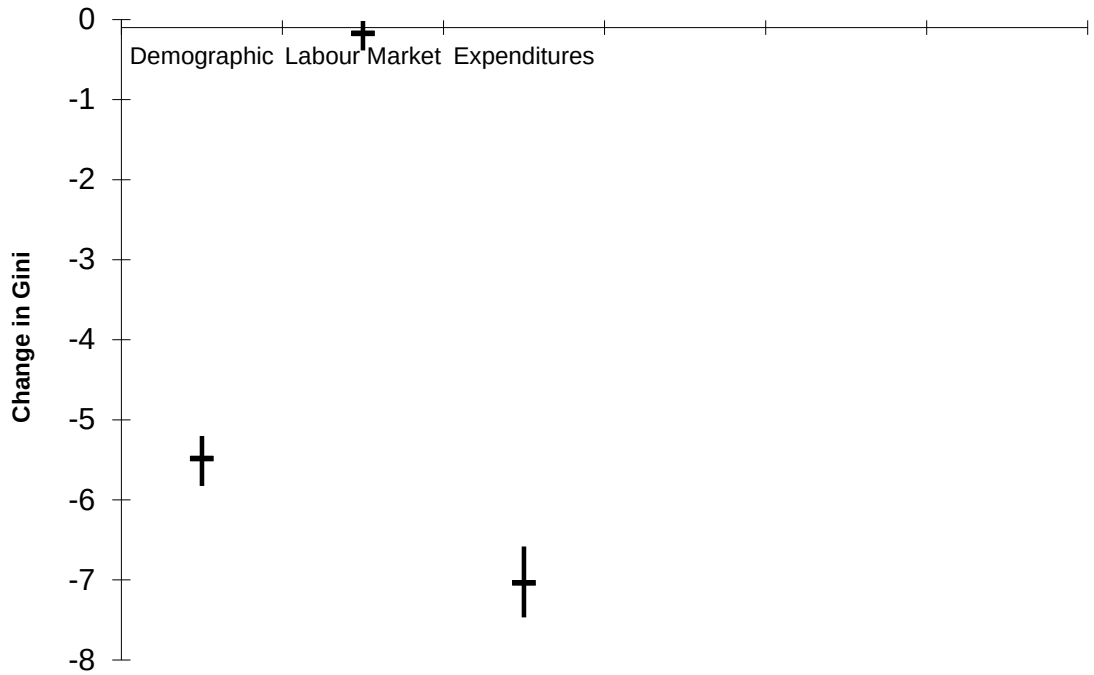
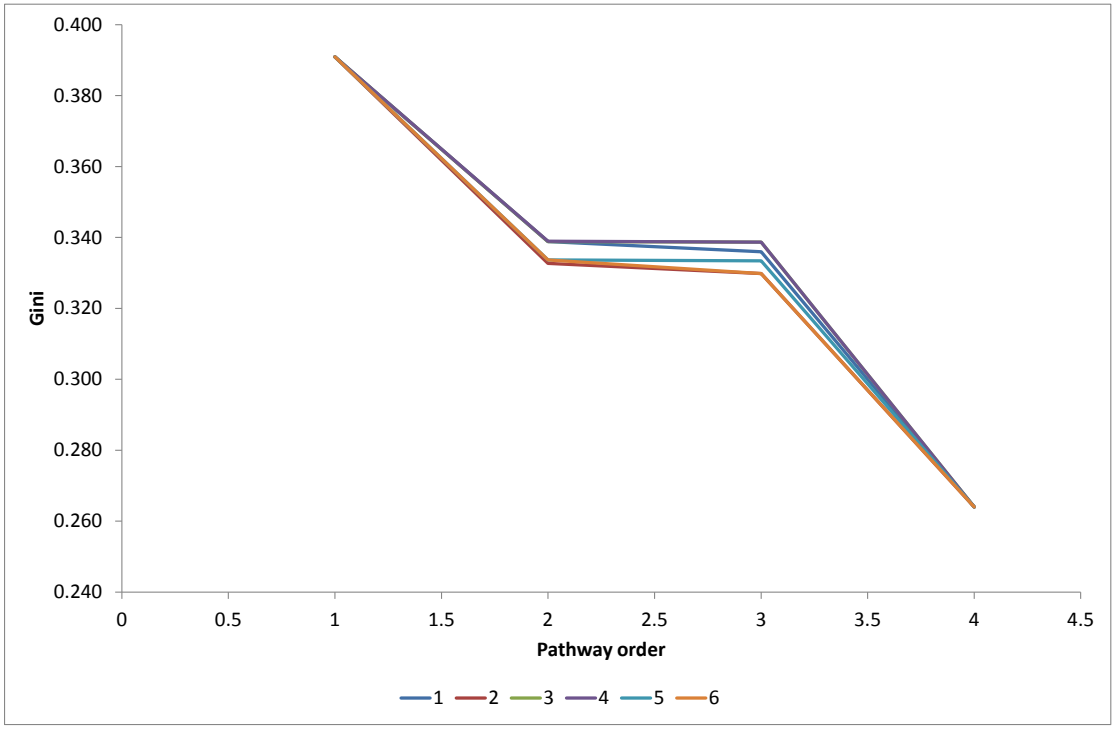


Figure 7: Inequality Pathways, Tunisia-Egypt



Note: 1: Inequality in Tunisia; 2: change due to demography and data; 3: change due to the labor market; 4: inequality in Egypt due to change in expenditures.

Table 1: Summary Measures of Inequality in Tunisia and Egypt

Inequality indices	GE(-1)	GE(0)	GE(1)	GE(2)	Gini
Egypt	0.14	0.13	0.16	0.25	0.28
Tunisia	0.27	0.22	0.23	0.32	0.36

Source: Authors' calculations based on HIECS, 2010/2011 EBCNV, 2010.

Table 2: Distributional Summary Statistics, 10 Quantile Groups

Quintile group	Quintile		% of median		Share, %		L(p), %		GL(p)	
	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt
1	3909.57	12109.8	43.93	60.18	2.66	4.13	2.66	4.13	293.05	983.33
2	5161.01	14453.5	57.99	71.82	4.13	5.61	6.79	9.74	748.67	2320.6
3	6406.87	16314	71.99	81.07	5.25	6.46	12.04	16.2	1327.3	3859.53
4	7603.53	18215	85.44	90.51	6.35	7.25	18.39	23.45	2027.23	5585.31
5	8899.37	20124	100	100	7.45	8.05	25.84	31.5	2848.77	7503.29
6	10399.6	22413.6	116.86	111.4	8.76	8.95	34.6	40.45	3815.08	9634.03
7	12395.4	25432	139.28	126.4	10.29	10	44.89	50.45	4949.54	12015.43
8	14984.9	29509	168.38	146.6	12.36	11.46	57.25	61.91	6312.79	14746.14
9	19866.2	37492.8	223.23	186.3	15.54	13.84	72.8	75.75	8026.58	18042.79
10					27.2	24.25	100	100	11026.2	23818.4

Notes: Share = quantile group share of total expenditures; L(p)=cumulative group share; GL(p)=L(p)*mean(totexp)

Table 3: Population Structure by Consumption Quintile, Are of Residence (urban/rural)

	Rural		Urban	
	Egypt	Tunisia	Egypt	Tunisia
1st Q	0.696	0.653	0.304	0.347
2nd Q	0.646	0.430	0.354	0.570
3rd Q	0.596	0.343	0.404	0.657
4th Q	0.527	0.260	0.473	0.740
5th Q	0.359	0.176	0.641	0.824
Total	0.565	0.372	0.435	0.628

Table 4: Population Structure by Consumption Quintiles, Gender

	Gender			
	Egypt	Tunisia	Egypt	Tunisia
	Male		Female	
1st Q	0.475	0.455	0.525	0.545
2nd Q	0.504	0.486	0.496	0.514
3rd Q	0.512	0.495	0.488	0.505
4th Q	0.514	0.495	0.486	0.505
5th Q	0.515	0.502	0.485	0.498
Total	0.504	0.487	0.496	0.513

Table 5: Total Household Expenditures Model Estimation

Dependent variable: log of total household expenditures

	Egypt		Tunisia	
	Coefficient	P>t	Coefficient	P>t
Explanatory variables[12]				
University degree	0.2566	0.000***	0.4288	0.000***
Upper secondary degree	0.0231	0.058	0.1219	0.000***
Illiterate	-0.1103	0.780	-0.2086	0.000***
Married	0.0840	0.000***	0.2150	0.000***
In work	-0.0044	0.000***	0.1718	0.000***
employed[13]	-0.0421	0.000***	-0.0716	0.000**
Number of rooms in the house	0.0841	0.000***	(omitted)	
Occupation classification of the main job				
professionals	-0.0796	0.001***	0.0798	0.056
technicians and associate professionals	-0.0873	0.000***	0.1487	0.000***
clerks	-0.1303	0.000***	0.0126	0.739
service workers and shop and market sales	-0.2022	0.000***	-0.1060	0.000***
skilled agricultural and fishery worker	-0.1611	0.000***	-0.2421	0.000***
craft and related trades workers	-0.2603	0.000***	-0.2803	0.000***
plant and machine operators, and assemblers	-0.2137	0.000***	-0.1279	0.000***
elementary occupations	-0.2518	0.000***	-0.3649	0.000***
Industry classification of the main job				
Mining	0.2279	0.017**	0.1642	0.001***
Manufacturing	0.1275	0.003***	0.1665	0.000***
Electricity and Utilities	0.1372	0.006***	0.1286	0.037**
Construction	0.0796	0.075	0.1899	0.053
Commerce	0.0747	0.083	0.0451	0.11
Transportation, Storage and Communication	0.1070	0.013**	0.0812	0.006***
Financial, Insurance and Real Estate	0.2583	0.000***	0.2604	0.000***
Other services (including public administration)	0.0284	0.493	0.1071	0.000***
Regional employment rate	0.1220	0.303	-2.1499	0.000***
Female regional employment rate	0.8654	0.000***	1.0066	0.000***
Place of residence: Urban	0.1986	0.000***	0.2087	0.000***
Number of inwork individuals	0.0030	0.684	0.0872	0.000***
Number of children less than 3 years old	-0.0076	0.289	0.0177	0.088
Number of children between 4 and 11 years old	0.0500	0.000***	0.0264	0.000***
Number of children between 12 and 15 years old	0.0731	0.000***	0.0608	0.000***
Number of adults in the household	0.1102	0.000***	0.1030	0.000***
Number of people over 65 years old in the household	0.0762	0.000***	0.0723	0.000***
Constant	8.8587	0.000***	9.5054	0.000***
Number of obs =	6033		7361	
F(32, 5710)=	158.78		173.68	
Prob> F=	0.000		0.000	
R-squared=	0.4662		0.4235	
Adj R-squared=	0.4633		0.4211	
Root MSE=	0.34606		0.48862	

Source: ***Significant at the 1% level. **Significant at the 5% level
Source: Model estimation from the welfare generation model, authors' calculations

[12]The unit of analysis for the explanatory variables is the head of household.

[13]Employed holds for all individuals who are employees in the sample.

Table 6: Decomposing Change in Gini of Household Expenditures

Average	Demographic and data	Labor Market	Expenditures	Total Change
Tunisia-Egypt	-0.055	-0.002	-0.070	-0.127

Note: Changes represent the Shapley values on average across each of the six possible transitions between the two countries.
Source: Authors' simulations based on HIECS, 2010/2011 EBCNV, 2010.

Table 7: Gini for Alternative Demographic, Labor Market and Market Income Data

Combination N°	Demographic	Labor Market	Expenditures	Gini
1	Tunisia	Tunisia	Tunisia	0.391
2	Tunisia	Tunisia	Egypt	0.316
3	Tunisia	Egypt	Tunisia	0.388
4	Tunisia	Egypt	Egypt	0.316
5	Egypt	Tunisia	Tunisia	0.334
6	Egypt	Tunisia	Egypt	0.264
7	Egypt	Egypt	Tunisia	0.330
8	Egypt	Egypt	Egypt	0.264
				-0.127

Appendix

Table 1: Population Structure by Consumption Quintiles, Education

	Illiteracy rate						Education level			
	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	Illiterate		can read and write		none		primary/lower secondary		secondary	
1st Q	0.419	0.393	0.581	0.607	0.570	0.860	0.172	0.080	0.208	0.032
2nd Q	0.275	0.232	0.725	0.768	0.450	0.767	0.224	0.132	0.240	0.060
3rd Q	0.238	0.185	0.762	0.815	0.411	0.714	0.242	0.142	0.250	0.089
4th Q	0.203	0.146	0.797	0.854	0.346	0.639	0.260	0.151	0.255	0.128
5th Q	0.143	0.102	0.857	0.898	0.254	0.537	0.234	0.166	0.271	0.149
Total	0.252	0.211	0.748	0.789	0.402	0.703	0.227	0.134	0.246	0.092

	Education level					
	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	secondary or equivalent		university		postgraduate	
1st Q	0.017	0.004	0.032	0.006	0.001	0.000
2nd Q	0.029	0.013	0.057	0.012	0.000	0.001
3rd Q	0.028	0.022	0.067	0.022	0.002	0.001
4th Q	0.036	0.033	0.102	0.034	0.002	0.003
5th Q	0.037	0.047	0.192	0.076	0.012	0.014
Total	0.030	0.024	0.092	0.030	0.003	0.004

Table 2: Population Structure by Consumption Quintiles, Labor Market Characteristics

	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	active		inactive		employed		unemployed	
1st Q	0.434	0.413	0.566	0.586	0.336	0.321	0.014	0.092
2nd Q	0.446	0.463	0.554	0.536	0.346	0.368	0.017	0.095
3rd Q	0.446	0.471	0.554	0.529	0.353	0.374	0.017	0.096
4th Q	0.429	0.481	0.571	0.518	0.349	0.391	0.018	0.090
5th Q	0.421	0.480	0.579	0.518	0.348	0.404	0.022	0.076
Total	0.435	0.462	0.565	0.537	0.346	0.373	0.017	0.090

	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	homemaker (housewife)		student		pensioners/retired/disabled	
1st Q	0.252	0.326	0.203	0.068	0.105	0.182
2nd Q	0.225	0.291	0.287	0.115	0.060	0.118
3rd Q	0.199	0.265	0.306	0.139	0.052	0.112
4th Q	0.182	0.242	0.324	0.156	0.057	0.109
5th Q	0.172	0.215	0.334	0.184	0.069	0.107
Total	0.205	0.267	0.292	0.134	0.068	0.125

	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	employee		employer		own-account, self-employed		contributing (unpaid) family worker	
1st Q	0.512	0.612	0.120	0.031	0.231	0.231	0.124	0.063
2nd Q	0.558	0.678	0.125	0.039	0.163	0.181	0.144	0.053
3rd Q	0.572	0.690	0.135	0.055	0.138	0.161	0.146	0.045
4th Q	0.568	0.687	0.136	0.076	0.136	0.155	0.149	0.043
5th Q	0.626	0.706	0.134	0.091	0.088	0.125	0.132	0.040
Total	0.568	0.677	0.130	0.060	0.151	0.168	0.139	0.048

Table 3: Population Structure in Tunisia and Egypt, by Expenditures Quintile, by Household Composition

	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	1-2 adults, no child		1-2 adults, 1-2 children		1-2 adult, 3 or more children		3 adults or more, 0-1 child		3 adults or more, 2-3 children		adults or more, 4 children or more	
1st Q	0.163	0.144	0.326	0.181	0.256	0.214	0.153	0.272	0.077	0.133	0.025	0.055
2nd Q	0.054	0.063	0.256	0.159	0.294	0.201	0.196	0.337	0.150	0.186	0.049	0.054
3rd Q	0.030	0.038	0.150	0.138	0.298	0.158	0.232	0.420	0.206	0.200	0.084	0.046
4th Q	0.022	0.026	0.108	0.117	0.221	0.137	0.259	0.433	0.260	0.236	0.130	0.052
5th Q	0.019	0.020	0.101	0.109	0.164	0.131	0.301	0.465	0.255	0.230	0.160	0.046
Total	0.058	0.058	0.188	0.141	0.247	0.168	0.228	0.385	0.190	0.197	0.090	0.050

Table 4: Population Structure in Tunisia and Egypt, by Expenditures Quintile, by Sector of Employment

	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	legislators, senior officials and managers		professionals		technicians and associate professionals		clerks		service workers and shop and market salaries	
1st Q	0.033	0.032	0.034	0.006	0.048	0.012	0.010	0.005	0.081	0.052
2nd Q	0.044	0.054	0.060	0.012	0.067	0.030	0.020	0.026	0.085	0.083
3rd Q	0.042	0.062	0.085	0.022	0.082	0.048	0.024	0.048	0.092	0.106
4th Q	0.067	0.092	0.120	0.048	0.094	0.102	0.035	0.050	0.094	0.109
5th Q	0.131	0.114	0.204	0.143	0.108	0.141	0.036	0.076	0.085	0.097
Total	0.064	0.073	0.101	0.049	0.080	0.070	0.025	0.043	0.087	0.091

	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	skilled agricultural and fishery worker		craft and related trades workers		plant and machine operators, and assembly		elementary occupations	
1st Q	0.418	0.245	0.209	0.113	0.078	0.045	0.090	0.428
2nd Q	0.356	0.161	0.189	0.139	0.090	0.111	0.088	0.337
3rd Q	0.323	0.133	0.171	0.155	0.111	0.123	0.070	0.255
4th Q	0.289	0.102	0.145	0.140	0.089	0.129	0.066	0.191
5th Q	0.201	0.072	0.110	0.115	0.075	0.083	0.051	0.122
Total	0.316	0.138	0.164	0.133	0.089	0.100	0.073	0.258

Table 5: Population Structure in Tunisia and Egypt, by Expenditures Quintile, by Industrial Classification of the Main Job

	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	agriculture and fishing		mining		manufacturing		electricity and utilities		construction	
1st Q	0.418	0.376	0.001	0.009	0.103	0.076	0.007	0.004	0.143	0.001
2nd Q	0.354	0.238	0.002	0.013	0.118	0.151	0.011	0.008	0.119	0.003
3rd Q	0.329	0.188	0.001	0.011	0.129	0.165	0.015	0.013	0.094	0.002
4th Q	0.291	0.128	0.000	0.013	0.119	0.188	0.017	0.012	0.088	0.003
5th Q	0.206	0.089	0.004	0.010	0.135	0.149	0.022	0.010	0.073	0.003
Total	0.319	0.196	0.002	0.011	0.121	0.148	0.014	0.010	0.103	0.002

	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia	Egypt	Tunisia
	commerce		transportation, storage and communication		financial, insurance and real estate		public administration and defense	
1st Q	0.104	0.229	0.076	0.109	0.002	0.001	0.040	0.129
2nd Q	0.102	0.216	0.094	0.160	0.002	0.006	0.057	0.155
3rd Q	0.104	0.185	0.108	0.185	0.004	0.009	0.073	0.184
4th Q	0.142	0.148	0.081	0.207	0.010	0.012	0.086	0.242
5th Q	0.142	0.123	0.102	0.190	0.016	0.032	0.091	0.350
Total	0.119	0.177	0.092	0.173	0.007	0.013	0.070	0.218