

## Inequality Decomposition in the Arab Region: Application to Jordan, Egypt, Palestine, Sudan and Tunisia

Racha Ramadan (Cairo University) Vladimir Hlasny (Ewha Womans University, Seoul and UN-ESCWA) Vito Intini (UN-ESCWA)

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## Inequality Decomposition in the Arab Region: Application to Jordan, Egypt, Palestine, Sudan and Tunisia\*

Racha Ramadan, Vladimir Hlasny and Vito Intini<sup>1</sup>

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## Abstract

Inequality across demographic groups is high and growing across the Arab region. This has implications for intergenerational mobility, poverty traps for large fractions of population, social polarization, tension and even political instability. This paper evaluates the differentials in household expenditures across rural/urban areas, female/male-headed households, non-educated/educated-headed households and non-employed/employed-headed households, in eleven Household Income and Expenditure surveys from five Arab countries: Egypt, Jordan, Palestine, Sudan and Tunisia. Unconditional quantile regressions are used to analyze the differentials across the population distribution and to decompose them by source. Household characteristics and returns to them that are responsible for the expenditure differentials are identified. Systematic trends over time are also evaluated.

We find that Egypt, Sudan and Tunisia exhibit relatively high expenditure gaps across urban/rural and educated/non-educated groups, while the gaps in Jordan and Palestine, and those across employed/non-employed and male/female headed households are moderate. Changes in the gaps over time vary across countries and social groups, suggesting that the evolution of inequality is complex. Between 2008 and 2012 the rural/urban and education gaps decreased in Egypt while the gender and employment gaps increased, especially for the highest population decile. In Jordan, between 2006 and 2010, the rural/urban gap decreased across population quantiles, while the employment gap increased. The education gap increased for the poor but decreased for the rich, while the household-gender gap fell for the poor but increased for median and high expenditure households. In Palestine, between 2007 and 2011, the rural/urban gap decreased for the rich while it increased for the poor. The gender and employment gaps decreased for both the poor and the rich, but the education gap increased. In Tunisia, between 2005 and 2010, the rural/urban gap increased both for the rich and the poor. The education gap increased for the poor but decreased for the rich. The employment and gender gaps fell significantly for poor and median-expenditure households but increased slightly for the rich.

Overall, education and its return, geographic location, and household composition play an important role in the drive to reduce expenditure differentials across social groups in the

<sup>&</sup>lt;sup>1</sup> Racha Ramadan: Assistant professor at the Faculty of Economics and Political Science- Cairo University. E-mail: <u>racha.ramadan@feps.edu.eg</u>.

Arab region. Public policy should focus on investing in human capital, facilitating equal access to developmental opportunities across regions and shaping family composition using better family planning programs.

*Keywords*: Economic inequality; Unconditional quantile regression; Blinder-Oaxaca decomposition; Arab region

JEL Classification: D31, D63, N35

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## 1. Introduction

Various studies have confirmed that inequality and poverty are increasing in the Arab World, particularly among vulnerable socio-demographic groups such as rural or uneducated households. This is not only fairness and social-justice concern but also a problem for countries' development. According to different United Nations organizations (ECA, ILO, UNCTAD, UNDESA and UNICEF, 2012), high inequality hampers economic growth and increases government costs for ensuring minimum level of security. Above a certain threshold, inequality undermines good-quality growth and poverty alleviation efforts (Belhaj Hassine, 2014). Inter-group inequality, poverty traps for entire social groups, polarization, social tension and political instability. The low level of inequality in the Arab region reflected by low values of the Gini index may hide severe regional inequality and inter-group inequalities (Salehi-Isfahani et al., 2012). Proper measurement, understanding and eradication of inter-group inequalities are thus priorities for regional scholars and policymakers especially amid the flux following the Arab Spring.

Inter-group inequality is thought to be driven by differences in households' human capital, socio-demographic characteristics and geographic location. Differences in households' endowments, such as human capital, socio demographic characteristics and households' geographic location, are considered as main determinants explaining the expenditure differentials between social groups.

Hence, this paper aims at measuring inter-group inequalities across Arab countries, decomposing them by source, and evaluating trends in the inequalities and their sources over time. More precisely, inequalities between the different geographic areas and socio-economic groups are measured in order to estimate the effect of circumstances people live in on overall inequality. In particular, expenditure differentials across rural/urban areas, female/male-headed households, non-educated/educated-headed households and non-employed/employed-headed households are evaluated, using eleven Household

Income and Expenditure surveys from five Arab countries: Egypt, Jordan, Palestine, Sudan and Tunisia. The paper follows Belhaj Hassine (2014) in applying unconditional quantile regression decompositions to analyze the expenditure gaps across the population distribution and to decompose them by source. Endowments of various household characteristics and returns to these endowments that are responsible for the expenditure gaps are identified. Data permitting, systematic trends across survey waves are analyzed.

The paper is organized as follows: Section 1 reviews the literature of inequality measurement in the Arab region. Sections 2 and 3 describe the data and methodology used respectively. Section 4 presents estimated results, and section 5 discusses main lessons, their robustness and their implications for policymakers.

## 2. Literature Review

With high poverty rate, income and expenditure inequality and significant unemployment rate, Arab countries still have a long path to achieving social justice and prosperity. Economic growth and economic equality are the key mottos in the drive toward social justice in Arab countries (Azour, 2014; Tessler, Jamal & Robbins, 2015).

Income distribution plays an important role in the interplay between development and poverty. According to Son & Kakwani (2004), initial levels of economic development and income inequality can significantly influence the extent to which economic growth reduces poverty. Moreover, inequality slows down growth, worsens education and health outcomes, and negatively impacts productivity. All these factors may yield social and political instability as well as outbreaks of conflict (Ncube & Anyanwu, 2012; UN-ESCWA, 2015).

The Arab region is characterized by high and volatile economic growth (driven significantly by oil production and prices) that is not pro-poor. Inequality in economic distribution yields disconnect between economic growth and wellbeing of the poor. However, this inequality is not reflected well in standard measures of aggregate inequality such as the Gini coefficient.

The Gini coefficient has been decreasing or stagnating in the Arab countries during the past decade. It does not account explicitly for inequalities between different groups based on observable characteristics such as gender, region or education level. Inequality in its various dimensions (wealth and income inequality, unemployment, and unequal access to education, health and employment) was partly responsible for the political instability and uprisings in the Arab region (Kanbur 2013). Hence, the answer of "*Inequality between whom?*" is very relevant when studying inequality in the Arab region. Managing and mitigating the inequalities between social groups matter for economic growth and development (Kanbur, 2013).

Gender inequality is an important dimension of inequality tackled in existing literature. Gender inequality has consequences for poverty and growth. For instance, in Egypt, poverty has a 'female face.' Having a female head increases the household's probability of falling into poverty. Hence, decreasing gender inequality and empowering women should be a top concern of Arab region policymakers (Kanbur, 2013). Rural/urban and cross-region inequalities have also been recognized as a significant component of overall inequality (Bibi & Nabli, 2010; Boutayeb and Helmert, 2011; Belhaj Hassine, 2014). Understanding of inequalities across other socio economic groups is limited, but may be as important as understanding gender, rural/urban and cross-region inequalities.

Decomposing inequality among different groups/regions allows a better understanding of inequality in the Arab countries. Methodological literature provides a variety of approaches to decompose inequality. A well-established approach consists of decomposing inequality measures such as the Generalized Entropy (GE) inequality indices into within-group and between-group components, as these indices satisfy desirable principles for decomposition including the Pigou-Dalton transfer principle (Bibi & Nabli, 2009, 2010).

Using such approach, to decompose inequality in the Arab region reveals the existence of within-region inequality (Bibi & Nabli, 2010). Using micro-data from 1995/1996 and 1999/2000, El-Laithy et al. (2003) found that 87 percent and 82 percent, respectively, of inequality at the national level can be explained by within-region disparities, while 13 percent and 18 percent can be attributed to lack of fairness between regions. Shahateet (2006), using raw data from two Jordanian national household surveys on expenditure and income for 1997 and 2002, identified serious regional economic inequality and called for a more space-balanced approach to tackling inequality.

Another approach is the regression-based inequality decomposition using the commonly known Oaxaca-Blinder decomposition. Said and El-Hamidi (2005) explore the changes in the distribution of returns to education and gender wage premia in Egypt and Morocco using joint models of educational choice and wage determination. Using Oaxaca-Blinder decompositions of sector and gender wage gaps, and controlling for education, experience and regional indicators, they found that the unexplained component in public sector wage premia and gender gaps – or the differential in returns – have declined in Egypt, but substantially increased in Morocco over the 1990s.

Biltagy (2014) examined the determinants of a gender wage gap in Egypt by applying the Oaxaca decomposition to the 2006 wave of the Egyptian Labor Market Panel Survey (ELMPS 2006). Biltagy (2014) found that the male–female wage gap is 25% and that the gap can, for the most part, be attributed to discrimination against women.

One drawback of the standard decomposition method is that it only provides an estimate of the mean effect of a given variable. In fact, the effects of covariates can differ along the income/expenditure/wage distribution. An alternative technique that allows estimating the impact of explanatory variables at different points on the welfare-aggregate distribution is the unconditional quantile regression (UQR) technique proposed by Firpo *et al.* (2009) and Fortin *et al.* (2010), evaluated by Fournier and Koske (2012).

The UQR technique estimates the impacts of explanatory variables on individual quantiles of the unconditional distribution of an outcome variable – per-capita annual

household expenditure here. It measures how the whole distribution, not only the average, of the outcome variable will be affected by changes in explanatory variables. Using this approach, the expenditure differential between any two social groups in any quantile of the expenditure distribution is decomposed into two effects: the *endowment* effect and the *returns* effect. The endowment effect is the "explained" part of the differential associated with the difference in values of household characteristics between the two groups of households, imputed using returns to these characteristics received by the advantaged group. The returns effect is the "unexplained" part of the differential interpreted as the effect of the difference in returns to individual characteristics between the two social groups, imputed at values of characteristics possessed by the advantaged group (Ndoye, 2015).

This approach allows us to identify the determinants of the difference in expenditure distribution between any two groups; urban/rural, male/female, educated/non-educated, employed/non-employed, etc. This approach has not been used sufficiently in decomposing inequality in Arab countries. To our knowledge, only Belhaj Hassine (2014) studied the determinants of inequality in the Arab region using this approach, by applying UQRs to harmonized household surveys from twelve Arab countries. Using a rural/urban decomposition, she found that the endowment effects dominate the returns effects and that both effects are larger at higher quantiles in most countries, which reveals that the wealth gap is wider for high-expenditure groups. Decomposition of metropolitan/non-metropolitan inequality revealed different patterns in the endowment and returns effects across Arab countries. Another important finding of Belhaj Hassine's was that human capital and community characteristics are the most important factors responsible for the gaps between the rural/urban middle class and better-off households.

## 3. Data

Inequality analysis in this paper is based on eleven harmonized household surveys from five Arab countries: Egypt, Jordan, Palestine, Sudan and Tunisia. Provider of these data, Economic Research Forum (ERF), harmonized the surveys by standardizing all household characteristics and flow variables such as expenditure and income components according to their conceptual content, coding structure, and international standard definitions and classifications (Belhaj Hassine, 2014).

Based on data availability, for Egypt, Jordan, Palestine and Tunisia we are able to use multiple survey waves. This allows us to follow the evolution of expenditures and of inequality over time, and in the case of Egypt before and after the Arab Spring. For Egypt the three available surveys are the Household Income, Expenditure and Consumption Surveys (HIECS) for 2008/2009, 2010/2011 and 2012/2013, the most recent wave. For Jordan, two rounds of the Household Expenditure and Income Survey (HEIS) are used – the 2006 and 2010 waves. For Palestine, the three available surveys are the Palestine Expenditure and Consumption Surveys (PECS) for 2007, 2010 and 2011. For Tunisia, the 2005 and 2010 rounds of the National Survey on Household Budget, Consumption and Standard of Living (EBCNV) are used. Finally, for Sudan, a single wave of the National Baseline Household Survey (NBHS) is available for year 2009. These datasets differ in their sample size, as well as levels and variation in the included variables.

Annual total household expenditure per capita, the welfare aggregate of interest and a proxy for income in this study, is subject to particular differences across surveys. Refer to table A1 in the Appendix. From 2008 to 2012, average total expenditure per capita increased in Egypt by 21% during 2008–2012 (from 1,425.38 to 1,719.77, in international dollars PPP). At the same time, there was a decrease in expenditure on food per capita during the Arab Spring, before it started increasing again in 2012/2013. The increase in total expenditure per capita was accompanied by a decrease in the average share of food among total expenditure, or Engel coefficient, from 49% in 2008 to 41% in 2012.

In Jordan, average total expenditure per capita increased by 24% during 2006–2010 (from \$2,500 to \$3,109). Food expenditure per capita rose by 37% (from \$762 to \$1,046). Share of food in total expenditure surprisingly increased even as households' purchasing power improved, from 33% to 36%. In Palestine, both total household expenditure per capita and food expenditure per capita increased from 2007 to 2011 by 28% and 27% (from \$3,759 to \$4,826, and from \$1,123 to \$1,422), respectively. Share of food expenditure per capita increased from 35% in 2007 to 34% in 2011. In Tunisia, average total expenditure per capita increased by 28% during 2005–2010 (from \$2,601 to \$3,332). At the same time, food expenditure per capita rose by only 11% (from \$906 to \$1,005), making its share in average total expenditure slide from 41% to 34%. Finally, in Sudan, total expenditure per capita is at the lowest level among the evaluated countries, at \$1,165 in year 2009. Average food expenditure per capita is on a similar level as in Egypt, at \$667, making up 60% of average total expenditure per capita. Refer to table A2 in the Appendix.

To study inequality in household expenditures between various demographic groups, we split households according to their residence in rural versus urban areas, and according to the education level, employment status and gender of the heads of households. In Palestinian surveys, the binary split of households into rural versus urban areas results in the omission of up to 900 households (21% of the sample) residing in refugee camps. With regard to education, we distinguish household heads who have completed no education or who are illiterate, and those with any educational achievement. In Sudan and in the Tunisian 2005 survey, a substantial number of households have information on educational achievement missing. We impute the binary education indicator for some of them using information on literacy of household heads (in the case of Sudan) and on ownership of computer connected to the internet, employment sector, and education of the spouse (Tunisia 2005). With regard to employment status, we distinguish household heads who are currently employed against those who are unemployed or currently not seeking work (i.e., out of formal labor force). These specifications of education and employment status are selected according to conceptual considerations regarding important cutoffs in the variables, and the variables' empirical distributions. Across surveys and segments of population by wealth, between 5% and 85% of households are classified as educated, and between 43% and 88% are classified as employed (refer to table A5 in the Appendix).

Determinants of expenditures inequality across households include individual and households' characteristics. Explanatory variables include household heads' age, age

squared, gender and marital status. Five binary indicators of household heads' specific education level (illiterate/no education; primary to lower secondary; secondary; post-secondary through post-graduate), four indicators of employment status (employee; employer; self-employed; other) and five indicators of employment sector (government; public; private; foreign/cooperative; other/missing) are used. Household size, ratio of those below 14 years and those above 65 years of age in the household, and geographic-region indicators are controlled for.

#### Characterization of expenditure quantiles

We proceed by evaluating household characteristics and outcomes across different wealth strata of survey samples. Refer to table A3. Dividing households according to their total expenditure per capita into five distinct groups (expenditure quintiles), we find that expenditures per capita vary significantly between the wealthiest and the poorest households, and the wealthiest and poorest groups contribute very different portions to aggregate expenditures.

Among our sample of surveys, Palestine, Sudan and Tunisia had a higher degree of inequality between the richest one-fifth and the poorest one-fifth of households, since the aggregate-expenditure share of the 5<sup>th</sup> quintile (47.6%, 46.3% and 48.0%) has been approximately eight times as high as the share of the 1<sup>st</sup> quintile (6.1%, 6.0% and 5.9%). In Jordan and particularly in Egypt this ratio of aggregate-expenditure shares is much lower, at 6.27 (44.6%/7.7%) and 4.15 (39.7%/9.6%), respectively. In the 2008 and 2010 waves of the Egyptian data, the aggregate-expenditure share of the 5<sup>th</sup> quintile (9%). In 2012 the ratio of aggregate-expenditure shares declined to 4.15, a slight decrease in inequality between the poorest and the richest households. Such improvement can be explained by the different policies applied after the political instability of 2011, including the increase of subsidies budget and public sector wages.

Same as Egypt, the aggregate-expenditure share of the 5<sup>th</sup> quintile to the aggregate-expenditure share of the 1<sup>st</sup> quintile decreased in Jordan, where the ratio of aggregate-expenditure shares fell from 6.42 to 6.27. The fall in this ratio was greater in Palestine (and Tunisia) where the aggregate-expenditure share of the 5<sup>th</sup> quintile was 7.74-times as high as the aggregate-expenditure share of the 1<sup>st</sup> quintile in 2007 (8.25 in Tunisia in 2005), but by 2011 the ratio decreased to 6.70 (7.20 in Tunisia 2010).

Repeating the analysis at the level of deciles, the same patterns emerge. Table A4 in the Appendix presents the shares of total expenditure by population decile. For instance, Egypt saw the distribution of expenditures narrowing during 2008–2012. The share of total expenditure received by the poorest decile increased from 3.88% to 4.1% while the share of the richest 10% decreased from 27.14% to 25.86%. In Palestine, similarly, the aggregate-expenditure share of the poorest 10% increased from 2.39% in 2007 to 2.76% in 2011, while the expenditure share of the richest 10% decreased from 31.85% to 30.15%.

Households' characteristics also differ markedly across the expenditure quintiles. For

instance, in Egypt, around 75% of the lowest quintile live in rural areas, while around 78% (70%) of the highest quintile live in urban areas in 2008 (2012, respectively). This concentration of the poor in rural areas motivates the common labeling of rural areas as poverty pockets. Regarding the education level and employment status of household heads, table A5 in the Appendix shows that in Egypt only 32% of households in the poorest quintile had an educated head in 2008. This rate increased over the years to 41% in 2012, compared to 66% in the highest expenditure quintile. With respect to household's employment status, the situation is conceptually and empirically different. Heads of poor households cannot afford staying out of labor force, and often accept underemployment or informal jobs with low wages. Hence, in Egypt, around 82% of household heads in the poorest quintile.<sup>2</sup>

These patterns are common across the countries included in this study. Over time we observe a decline in the disparity between the lowest and highest expenditure quintiles in terms of urbanization, education and gender of household heads. On the other hand, in terms of employment status, the prevalent pattern is that of divergence, with stagnating employment status among the poor and declining employment among the richest.<sup>3</sup> A similar analysis at the level of expenditure-decile groups is reported in table A6 in the Appendix. In most countries, similarly to the findings for expenditure quintiles, the poor households are disproportionally concentrated in rural areas, with a female head, with no education, and a high propensity to be employed.

#### Measures of overall inequality

For a different measure of inequality in expenditures, table A7 reports Gini coefficients estimated for total expenditure per capita and food expenditure per capita across the eleven surveys. In general, these Ginis are modest across the evaluated countries, and are typically further falling over time. In Egypt from 2008 to 2012, inequality in both total expenditure and food expenditure, as measured by the Gini, decreased from 31.3 to 29.6 and from 25.8 to 24.9, respectively. In Palestine, the Gini for total expenditure per capita similarly decreased from 40.8 to 38.4, while the food expenditure per capita Gini decreased from 33.4 to 31.5. In Tunisia, the total expenditure Gini fell from 41.4 to 38.5, and the food expenditure Gini fell from 33.3 to 32.3. The only exception to this trend is

<sup>&</sup>lt;sup>2</sup> Statistical measurement issues probably contribute to this low employment rate in the highest quintile. Household heads in the richest quintile have a wider range of options for being economically active, may misreport their employment status, or may fail to respond to household survey, particularly when they are economically active.

<sup>&</sup>lt;sup>3</sup> In Palestine the demographic distribution is different because of the continuing Israeli-Palestinian conflict and the presence of refugees. These differences are worth noting. In 2007 households in both the poorest and the richest quintiles were concentrated in urban areas, with urbanization rates of 55% and 71%, respectively. The remaining households in the poorest quintile were distributed evenly between rural areas and refugee camps, while only 7% of the richest quintile lived in refugee camps. By 2011, the share of rich households living in refugee camps increased to 16%, while the share of poorest households living in refugee camps remained at the 2007 level of 24%. The share of households with an educated head is nearly the same for the poorest and highest quintiles with 78% and 80%, respectively, in 2007. These shares increased by 2011 to 80% and 81% for the lowest and highest quintiles, respectively. As in Egypt, status as employed is more prevalent in the poorest quintile (81% in 2011) than in the richest quintile (71% in 2011).

Jordan, where the two Ginis rose slightly between 2006 and 2010 from 35.8 to 36.2 and from 33.2 to 33.4, respectively.

Sudanese total-expenditure Gini coefficient is at the high end of the distribution among the five countries, and is only exceeded by the Ginis for Palestine 2007 and Tunisia 2005. The Gini for rural population, for the non-employed, for the non-educated and for female-headed households exceeds those in other groups (except for Palestine for the latter two groups). Sudanese Gini for food expenditure is far above those in the other four countries. Furthermore, this inequality is particularly high among rural, non-employed, non-educated and female-headed households.

In all surveys with the exception of Sudan, total-expenditure inequality is higher in urban areas than in rural ones. With the exception of Sudan and Tunisia, inequality in food expenditure is also higher in urban areas. Inequality in both total expenditures and food expenditures is higher among households with non-employed heads rather than employed heads. This is true across the vast majority of surveys, with the exception of Palestine 2007 and Tunisia 2005. Inequality is also typically higher among households with non-educated heads rather than educated heads, but there are some notable exceptions such as the experience in Egypt. In 2010, interestingly, the ranking of inequality between the educated and the non-educated groups changed in Jordan, Palestine and Tunisia.

With respect to sex of household heads, across the eleven surveys, inequality in both total expenditures and food expenditures is overwhelmingly higher among female-headed households. The single exception is Palestine 2007. These results show that households with female heads are more vulnerable and more likely to fall into poverty and be affected by inequality. This inter-group analysis illustrates that the profile of inequality differs somewhat based on which dimension we are tackling: total expenditure or food expenditure. Distinct demographic groups also experience different extent of inequality. Moreover, interestingly, residence in rural/urban areas, education and employment status have different bearing on the degree of inequality experienced by the respective demographic groups.

These trends in survey data can be contrasted with those in the countries' nationalaccounts data to gauge how representative they are of real conditions in the respective economies. In Egypt and Jordan, during 2000–2013 GDP per capita rose from 7,811 to 10,732 and from 7,695 to 11,407 constant 2011 international dollars, respectively. In Palestine, GDP per capita rose from 4,206 to 4,484, or by only 7%, during 2000–2013 (figure A1 in the Appendix). These increases in GDP per capita were not accompanied by decreases in poverty, at least in Egypt and Jordan. According to national poverty lines, 25.2% of the Egyptian population was poor in 2011 compared to 16.7% in 2000, and in Jordan poverty rate reached 14.4% in 2010. Even these rates mask significant differences across rural and urban areas, and much higher rates in rural areas. In 2011, poverty rates were 32.3% and 15.3% in rural and urban areas of Egypt, respectively. In Jordan, rural poverty rate was 16.8% compared to the urban rate of 13.9% (figures A2 and A3). In Palestine, poverty has been declining (figure A4). The national poverty headcount ratio stood at 25.8% in 2011 compared to 35.5% in 2003. Similar decreases in poverty were achieved in urban (from 32.0 to 26.1%) and rural (from 38.5 to 19.4%) areas. In Sudan, the rural poverty rate (57.6%) is more than the double of urban poverty rate (26.5%) in 2009 (figure A5). Only in Tunisia, poverty headcount ratio decreased from 32.4% in 2000 to 15.5% in 2010 (figure A6).

## 3. Methodology

To study welfare gaps across the entire population distribution and decompose them by source, we follow Belhaj Hassine (2014) in using unconditional quantile regression (UQR) decomposition implemented by a recently developed recentered influence function (RIF) method (Firpo *et al.*, 2009; Fortin *et al.*, 2010).

RIF is a simple regression-based procedure for performing a detailed decomposition of different distributional statistics across the distribution of the outcome variable. RIF allows us to decompose the welfare gap at various quantiles of the unconditional distribution of total expenditures per capita into two parts: the difference in households' endowment characteristics – such as age, education, employment of the head and geographic location – and the difference in the returns to these characteristics. The first part can be viewed as the part of inequality *explained* by various household characteristics, while the second part can be viewed as *unexplained*, attributable to some latent form of balkanization or discrimination in the market for human capital. The RIF is used in this paper to decompose the distribution of total expenditure by urban/rural, male/female head, employed/non-employed head, and educated/non-educated head.

The method consists of two stages. The first stage consists of estimating the UQR on log annual household expenditure per capita of the two groups of interest,<sup>4</sup> then constructing a counterfactual distribution that would prevail if group 1 (e.g., rural households) received the returns that pertained to the second group (urban households, respectively). The comparison between the counterfactual and the empirical distribution allows us to estimate the part of the welfare gap attributable to the differentials in household characteristics (*endowment effect*) and the part attributable to the differences in returns to these characteristics (*returns effect*).

The method can be expressed as follows:  $RIF(y, Q_{\theta}) = X\beta + \varepsilon$  (1)

where y is log annual expenditure per capita.  $RIF(y, Q_{\theta})$  is the recentered influence function of the  $\theta^{th}$  quantile of y estimated by computing the sample quantile  $Q_{\theta}$  and deriving the density of y at that point by Kernel method. X is a matrix of regressors that can be divided into five groups. The first group consists of household-head characteristics including age, age squared, gender and marital status. The second group consists of three binary indicators for the education level of the head. The third group includes binary indicators for the employment status and employment sector of the household head. The fourth group contains household characteristics including household size, and ratio of

<sup>&</sup>lt;sup>4</sup> In our case: Urban/rural, male/female, educated/non-educated, employed/non-employed.

those below 14 years and those above 65 years of age in the household. Finally, the fifth group includes geographic location indicators.

After estimating the RIF equation for individual deciles from the 10<sup>th</sup> percentile to the 90<sup>th</sup> percentile of the population, the predicted values for individual socio-economic groups are decomposed into the endowment and the returns effects as follows:

$$\hat{Q}^{i}_{\theta} - \hat{Q}^{j}_{\theta} = \{\hat{Q}^{i}_{\theta} - \hat{Q}^{*}_{\theta}\} + \{\hat{Q}^{*}_{\theta} - \hat{Q}^{j}_{\theta}\} \\
= (\bar{X}^{i} - \bar{X}^{j})\hat{\beta}^{i}_{\theta} + \bar{X}^{j}(\hat{\beta}^{i}_{\theta} - \hat{\beta}^{j}_{\theta})$$
(2)

for i=urban, male head, educated head, employed head; j= rural, female head, non-educated head, non-employed head; \*= counterfactual values.

where  $\hat{Q}_{\theta}$  is the  $\theta^{\text{th}}$  unconditional quantile of log annual expenditure per capita,  $\bar{X}$  is the vector of the means of covariates and  $\hat{\beta}_{\theta}^{k}$  is the estimate of the unconditional quantile partial effects of group k.  $\hat{Q}_{\theta}^{*} = X^{j}\hat{\beta}^{i}$  is the  $\theta^{\text{th}}$  quantile of the unconditional counterfactual distribution that would have prevailed for group j if they received group i's returns to their characteristics.

The first term of equation 2,  $\{\hat{Q}_{\theta}^{i} - \hat{Q}_{\theta}^{*}\}$ , is the endowment effect, it is the contribution of the differences in distributions of household characteristics to inequality at the  $\theta^{\text{th}}$  unconditional quantile. The second term,  $\{\hat{Q}_{\theta}^{*} - \hat{Q}_{\theta}^{j}\}$ , is the returns effect – the inequality due to differences in the returns to household characteristics at the  $\theta^{\text{th}}$  unconditional quantile (Belhaj Hassine, 2014).

## 4. Estimation Results

Over all, we found that the rural/urban gap is widening over the years in favor of the rural households, especially in Egypt and Tunisia. Poor rural households' expenditure per capita is lower than their urban counterparts especially after the political instability in countries like Egypt. Hence any public policies aiming to reduce inequality and poverty should target the rural areas where vulnerable households live.

Surprisingly, female-headed households have higher per capita expenditure in Egypt, Palestine and Jordan. This gap increased with the income level. While in Tunisia and Sudan, male-headed households are favored in the lowest decile. Such interesting results require more investigation.

In Egypt, Palestine, Tunisia and Jordan; non-employed head are favored compared to the employed ones. Such results may be driven by statistical measurement issues as household heads in the richest quintile have a wider range of options for being economically active, may misreport their employment status, or may fail to respond to household survey, particularly when they are economically active.

Education is an important aspect of inequality in the Arab countries. Households with educated head, whatever the education level of the head, have higher expenditure per capita compared with their non-educated counterparts.

Decomposing expenditure inequality into endowment effects and returns effect shows that the favored group has higher endowment, especially among the low-income strata. While for the high-income groups, the inequality can be explained by the return effects. In other words, urban poor households have higher endowment compared with rural poor, moreover, the return to the characteristics of the urban rich is higher than the return to the rural rich characteristics. Hence, inequality policies should aim to improve access to endowments and their returns for the less favored groups.

Finally, as found by Belhaj Hassine (2014), our results show that education of the household head, in addition to the size and composition of households, are the main determinants of the expenditure gap between the different income groups.

Concerning country specific estimates of decomposition of expenditure inequality for non-educated/educated rural/urban, female/male headed. headed. and nonemployed/employed headed households (equation 2) for the eleven surveys are presented in tables 1–16. Results for Egypt and Palestine are presented first, because three survey waves are available for these countries, and the results for them are the most informative about the form and evolution of inequality in their real national economies. Results for Jordan and Tunisia- with two survey waves each - follow, and results for the single Sudanese survey are presented last. Figures A5-A15 in the Appendix illustrate the endowment effects and the returns effects of inter-group inequality at all expenditure deciles of the population distributions for all eleven surveys.

## Egypt

Table 1 reports on rural/urban inequality decomposition for the three Egyptian survey waves. Rural households are shown to have lower expenditures than urban households across all population deciles and all three years. In 2010, the gap between the urban poor and the rural poor decreased. However, the situation worsened after the Arab Spring in 2012, showing that the rural poor are the main group affected by the deterioration of the economic situation post 2011.

The endowment effect dominates the returns effect indicating that urban households are better off because they have superior characteristics than their rural counterparts. This corresponds to the findings by Belhaj Hassine (2014). Figures A7–A9 illustrate the decomposition into the endowment and the returns effects in all expenditure deciles of the Egyptian population

Household heads' characteristics, their education, their employment status and the household's composition are the main significant determinants explaining the rural/urban gap in Egypt in 2008. However, the head's characteristics and their employment became less significant in 2010 and 2012. Between 2008 and 2010, the returns to the head's

education remain a significant determinant in explaining the expenditure difference between rural and urban households, especially for the highest income group.

Gender gap in expenditures, shown in table 2, is surprisingly positive over the three survey waves shown. In other words, for all expenditure groups; expenditure per capita of female-headed households is higher than expenditure per capita of male-headed households. From 2008 to 2010, gender gap increased for both low expenditure and high-expenditure groups. In 2012, gender gap decreased for the low-expenditure class while it continued increasing for the high-expenditure group. Gender gap remained nearly constant for the middle-expenditure class.

Decomposition of the gender gap shows that for all expenditure groups, especially the lowest and highest deciles, female-headed households have lower endowments than their male counterparts (negative endowment effect). However, the return to these characteristics is higher for female-headed households. Such results suggest that looking only at the inequality measure may be misleading. A deeper analysis of the main reasons for inequality is required in the effort to usher in equality across social groups.

Household heads' characteristics, education level, household composition and geographic location are important determinants of the gender gap. While household heads' characteristics, education and geographic location decreases the gender gap, household composition worsens it.

Returns to education increase gender gap at the middle and high-expenditure classes significantly. This means that educated male heads are rewarded more than educated female heads. Similarly for returns to household composition, this significantly increases the gap in the high-expenditure group.

Table 3 shows that the expenditure differential between educated and non-educated heads increased over the years for all expenditure deciles. This gap can mainly be explained by the difference in characteristics between educated and non-educated heads. The difference of returns of these characteristics between non-educated and educated heads increased among the highest expenditure decile group. This means that characteristics of rich educated heads are rewarded more than characteristics of the non-educated rich.

Both household head characteristics and geographic location had an important role in explaining the educated/non-educated gap, particularly for the low-expenditure class, compared to the high-expenditure group. Household head characteristics affect this gap positively, but this contribution decreased in 2012 compared to 2008.

For the returns effects, the results show that the returns to geographic location have a positive significant impact on inequality for the middle and high-expenditure class. Hence, location where the educated rich and the non-educated rich live contributes to widening expenditure differential between the two groups. The returns to household composition are positive significant for the low, middle and high-expenditure classes in 2008 and 2012.

Table 4 reports on inequality between households with non-employed versus employed heads. Similarly to the gender gap, the difference between expenditure per capita for non-employed and employed household heads is positive. For the low-expenditure group, this difference increased from 2008 to 2010 but decreased in 2012. For the high-expenditure group, the difference decreased in 2010 but increased in 2012. As we observed for gender gap, the employment differential among the middle-expenditure class remained almost unchanged over the three survey waves.

Decomposition of expenditure differentials shows that characteristics of the nonemployed are higher than characteristics of the employed heads, at all expenditure levels and especially among the high-expenditure decile. However, these characteristics appear rewarded more highly among the employed. The positive gap between non-employed and employed heads can be explained by the dominance of the positive endowment effect over the negative returns effect.

Among the highest decile, the endowment effect attributable to household heads' characteristics, household composition and geographic location increase the gap significantly over the three survey waves. Among the lowest decile, the endowment effect of household heads' characteristics is negative in 2012, compared to a positive contribution in 2008. At the same time, the endowment effect of household composition is positive in both years.

Education of the household head decreases the expenditure gap between the nonemployed and the employed over the three survey waves and across all expenditure groups significantly. The return to education has a positive significant impact, particularly for middle and high-expenditure groups. Similarly, the return to household composition has a positive significant impact on the expenditure gap.

			2008			2010			2012	
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	-0.246***	-0.344***	-0.635***	-0.215***	-0.331***	-0.588***	-0.232***	-0.284***	-0.518***
		(0.00938)	(0.00737)	(0.0149)	(0.0168)	(0.0128)	(0.0262)	(0.0152)	(0.0123)	(0.0280)
	Endowment	-0.0382***	-0.0762***	-0.186***	-0.0811***	-0.0794***	-0.123***	0.0209	-0.0395***	-0.0998***
		(0.0123)	(0.00823)	(0.0139)	(0.0215)	(0.0152)	(0.0267)	(0.0211)	(0.0137)	(0.0262)
	Returns	-0.207***	-0.268***	-0.449***	-0.134***	-0.252***	-0.465***	-0.253***	-0.245***	-0.418***
		(0.0147)	(0.00992)	(0.0189)	(0.0261)	(0.0180)	(0.0351)	(0.0246)	(0.0164)	(0.0360)
	Head char	0.00278*	-0.00170*	-0.0044***	-0.00570*	-0.00388*	-0.00648	-0.00235	-0.00238	-0.0152***
S		(0.00144)	(0.00102)	(0.00166)	(0.00325)	(0.00226)	(0.00410)	(0.00343)	(0.00214)	(0.00449)
ect	Head edu	-0.0283***	-0.0461***	-0.0776***	-0.0325***	-0.0437***	-0.0682***	-0.0287***	-0.0338***	-0.0615***
ed)		(0.00392)	(0.00274)	(0.00470)	(0.00582)	(0.00437)	(0.00759)	(0.00561)	(0.00383)	(0.00746)
ain	Head empl	0.0153***	0.00286	0.000185	0.0127**	0.00481	0.00619	0.00492	-0.000211	-0.00681
'me xpl	_	(0.00433)	(0.00273)	(0.00460)	(0.00632)	(0.00425)	(0.00746)	(0.00675)	(0.00409)	(0.00799)
(E) low	Hh comp	-0.0676***	-0.0755***	-0.103***	-0.0538***	-0.0700***	-0.0794***	-0.0595***	-0.0623***	-0.0815***
, nn nn	-	(0.00325)	(0.00280)	(0.00504)	(0.00498)	(0.00513)	(0.00893)	(0.00549)	(0.00479)	(0.00824)
щ	Geo.location	0.0396***	0.0442***	-0.00144	-0.00184	0.0333**	0.0250	0.106***	0.0591***	0.0652***
		(0.0113)	(0.00724)	(0.0122)	(0.0200)	(0.0136)	(0.0242)	(0.0192)	(0.0119)	(0.0234)
	Head char	-0.563***	-0.0346	-0.424**	0.217	-0.192	-0.490	-0.435**	-0.396**	0.0506
		(0.131)	(0.0952)	(0.211)	(0.223)	(0.155)	(0.345)	(0.219)	(0.163)	(0.408)
	Head edu	-0.0895***	-0.116***	-0.223***	-0.0191	-0.0788***	-0.224***	-0.0470**	-0.0878***	-0.269***
1) its		(0.0127)	(0.00912)	(0.0197)	(0.0241)	(0.0168)	(0.0369)	(0.0221)	(0.0162)	(0.0401)
ffec	Head empl	0.00635	-0.0166	-0.0145	-0.0217	-0.0429	0.0337	0.0191	-0.0414	-0.0391
i Ef		(0.0246)	(0.0174)	(0.0371)	(0.0418)	(0.0289)	(0.0623)	(0.0399)	(0.0283)	(0.0679)
ext	Hh comp	0.137***	0.191***	-0.0709	0.328***	0.196***	-0.173	0.0699	0.203***	0.218*
letu Un		(0.0463)	(0.0326)	(0.0690)	(0.0769)	(0.0532)	(0.116)	(0.0700)	(0.0506)	(0.123)
$\mathbf{R}$	Geo.location	0.103***	0.134***	0.155***	0.0778***	0.140***	0.230***	0.143***	0.138***	0.253***
		(0.0127)	(0.00868)	(0.0169)	(0.0216)	(0.0149)	(0.0296)	(0.0212)	(0.0143)	(0.0320)
	Constant	0.200	-0.427***	0.128	-0.715***	-0.275*	0.158	-0.00354	-0.0599	-0.631
		(0.138)	(0.100)	(0.220)	(0.235)	(0.163)	(0.361)	(0.228)	(0.169)	(0.421)
	Observations	23,415	23,415	23,415	7,713	7,713	7,713	7,525	7,525	7,525
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## Table 1: Quantile decomposition for Egypt (2008-2010-2012) by rural/urban

			2008			2010			2012	
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	0.0377***	0.0669***	0.181***	0.0628***	0.0693***	0.205***	0.0200	0.0728***	0.216***
	-	(0.0136)	(0.0109)	(0.0224)	(0.0191)	(0.0187)	(0.0358)	(0.0220)	(0.0170)	(0.0403)
	Endowment	-0.122***	-0.104***	-0.219***	-0.173***	0.00687	-0.265**	-0.110**	-0.0458	0.166*
		(0.0340)	(0.0247)	(0.0526)	(0.0567)	(0.0509)	(0.104)	(0.0527)	(0.0360)	(0.0941)
	Returns	0.160***	0.171***	0.399***	0.235***	0.0624	0.470***	0.130**	0.119***	0.0493
		(0.0358)	(0.0254)	(0.0545)	(0.0588)	(0.0517)	(0.107)	(0.0553)	(0.0369)	(0.0976)
	Head char	-0.104***	-0.102***	-0.143***	-0.0956***	-0.00861	-0.0726	-0.0712*	-0.0654**	0.0563
$\mathbf{s}$		(0.0255)	(0.0181)	(0.0388)	(0.0343)	(0.0302)	(0.0627)	(0.0390)	(0.0260)	(0.0689)
ect	Head edu	-0.0347***	-0.0938***	-0.245***	-0.0465***	-0.101***	-0.27***	-0.0573***	-0.0927***	-0.316***
Eff ed)		(0.00936)	(0.00710)	(0.0159)	(0.0149)	(0.0138)	(0.0296)	(0.0141)	(0.0102)	(0.0299)
ain	Head empl	-0.0115	0.0210	0.0101	-0.0597	0.0328	-0.0534	-0.0763**	-0.0202	0.205***
'me xpl	_	(0.0221)	(0.0157)	(0.0336)	(0.0436)	(0.0385)	(0.0796)	(0.0346)	(0.0229)	(0.0610)
(E) M	Hh comp	0.0559***	0.0902***	0.161***	0.0497***	0.0977***	0.126***	0.122***	0.153***	0.221***
- Encire -	_	(0.00689)	(0.00622)	(0.0118)	(0.00932)	(0.0106)	(0.0178)	(0.0163)	(0.0124)	(0.0292)
Ι	Geo.location	-0.0279***	-0.0198***	-0.00262	-0.0206***	-0.0144***	0.00558	-0.0275***	-0.0201***	-0.000298
		(0.00401)	(0.00320)	(0.00551)	(0.00552)	(0.00546)	(0.00796)	(0.00599)	(0.00430)	(0.00972)
	Head char	-0.0739	0.213	0.586**	0.370	-0.219	1.494***	0.205	0.186	0.210
		(0.195)	(0.137)	(0.294)	(0.270)	(0.230)	(0.482)	(0.311)	(0.211)	(0.544)
	Head edu	-0.0405**	0.0427***	0.176***	0.000434	0.0445*	0.217***	0.00839	0.0645***	0.348***
t) (t		(0.0177)	(0.0125)	(0.0269)	(0.0287)	(0.0247)	(0.0515)	(0.0300)	(0.0202)	(0.0528)
fec	Head empl	-0.0497	-0.0712***	0.0154	0.0139	-0.0556	0.0863	0.0938*	0.00335	-0.212**
s Ef olai		(0.0339)	(0.0236)	(0.0508)	(0.0571)	(0.0484)	(0.102)	(0.0523)	(0.0359)	(0.0905)
ext	Hh comp	-0.0493	-0.0454	0.170**	0.132*	0.0170	0.387***	-0.114	-0.173***	0.394***
letu Un		(0.0523)	(0.0363)	(0.0782)	(0.0727)	(0.0597)	(0.127)	(0.0837)	(0.0575)	(0.145)
$\mathbf{R}$	Geo.location	-0.00857	-0.0127	-0.0321	0.0454	-0.00143	0.0545	-0.00865	0.0455*	-0.108*
		(0.0236)	(0.0166)	(0.0357)	(0.0311)	(0.0264)	(0.0554)	(0.0357)	(0.0242)	(0.0625)
	Constant	0.382*	0.0442	-0.515*	-0.326	0.277	-1.77***	-0.0542	-0.00863	-0.583
		(0.201)	(0.141)	(0.303)	(0.282)	(0.241)	(0.504)	(0.321)	(0.218)	(0.561)
	Observations	23,428	23,428	23,428	7,713	7,713	7,713	7,525	7,525	7,525
	a	TIELOG AGOO	00 0010/11			<b>a</b> 1 1		1 0.04	0.05	

## Table 2: Quantile decomposition for Egypt (2008-2010-2012) by female/male

Notes: Computed using HEICS 2008/09, 2010/11 & 2012/13 (OAMDI, 2014a,b,c). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

			2008		2010				2012	
		10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile
	Overall Gap	-0.252***	-0.275***	-0.483***	-0.211***	-0.248***	-0.428***	-0.217***	-0.210***	-0.356***
		(0.00911)	(0.00723)	(0.0151)	(0.0151)	(0.0123)	(0.0255)	(0.0154)	(0.0122)	(0.0259)
	Endowment	-0.0656***	-0.0522***	-0.0286***	-0.00641	-0.0227**	0.0108	-0.0342**	-0.0192*	0.0248
		(0.00870)	(0.00628)	(0.0108)	(0.0137)	(0.0107)	(0.0197)	(0.0149)	(0.0108)	(0.0197)
	Returns	-0.186***	-0.223***	-0.454***	-0.204***	-0.226***	-0.438***	-0.183***	-0.191***	-0.380***
		(0.0116)	(0.00822)	(0.0168)	(0.0189)	(0.0137)	(0.0287)	(0.0195)	(0.0137)	(0.0296)
	Head char	0.0245***	0.0259***	0.0322***	0.0368***	0.0216***	0.0340**	0.0189*	0.0139**	0.0289**
scts		(0.00590)	(0.00395)	(0.00698)	(0.0102)	(0.00710)	(0.0138)	(0.0105)	(0.00696)	(0.0137)
Effe	Head empl	-0.00213	-0.00714	0.00291	0.00426	0.00166	0.00369	0.00522	-0.0106	-0.00724
ent] aine		(0.00728)	(0.00486)	(0.00853)	(0.0114)	(0.00793)	(0.0153)	(0.0129)	(0.00855)	(0.0166)
vme Xpl	Hhd comp	-0.0527***	-0.0370***	-0.0113	-0.0155*	-0.00755	0.0298**	-0.0150	0.0132*	0.0409***
op E		(0.00558)	(0.00422)	(0.00740)	(0.00855)	(0.00709)	(0.0134)	(0.00961)	(0.00740)	(0.0135)
En	Geo.location	-0.0353***	-0.0339***	-0.0524***	-0.0320***	-0.0385***	-0.0567***	-0.0433***	-0.0357***	-0.0378***
		(0.00348)	(0.00245)	(0.00386)	(0.00512)	(0.00409)	(0.00702)	(0.00568)	(0.00400)	(0.00664)
	Head char	-0.474***	-0.0696	-0.397*	-0.409*	-0.328**	0.148	0.0374	-0.473***	0.0274
		(0.134)	(0.100)	(0.229)	(0.211)	(0.160)	(0.355)	(0.225)	(0.168)	(0.385)
s o	Head empl	0.00954	-0.0273	-0.0768	0.0679	-0.00652	0.00658	-0.0120	0.0338	0.0366
fect		(0.0286)	(0.0213)	(0.0484)	(0.0451)	(0.0340)	(0.0751)	(0.0460)	(0.0343)	(0.0790)
s Ef olai	Hhd comp	0.144***	0.183***	0.284***	0.194***	0.218***	0.0367	0.154**	0.0952*	0.615***
urns next		(0.0460)	(0.0342)	(0.0772)	(0.0714)	(0.0541)	(0.120)	(0.0713)	(0.0536)	(0.125)
(Ur	Geo.location	0.0194	0.111***	0.214***	0.0227	0.114***	0.235***	0.0385	0.109***	0.303***
		(0.0142)	(0.0103)	(0.0224)	(0.0235)	(0.0175)	(0.0377)	(0.0246)	(0.0179)	(0.0401)
	Constant	0.115	-0.420***	-0.478**	-0.0800	-0.224	-0.864**	-0.401*	0.0447	-1.362***
		(0.139)	(0.102)	(0.230)	(0.217)	(0.163)	(0.358)	(0.232)	(0.171)	(0.390)
	Observations	23,415	23,415	23,415	7,713	7,713	7,713	7,525	7,525	7,525

## Table 3: Quantile decomposition for Egypt (2008-2010-2012) by non-educated/educated

Notes: Computed using HEICS 2008/09, 2010/11 and 2012/13 (OAMDI, 2014a,b,c). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

			2008			2010			2012	
		10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile
	Overall Gap	0.0365***	0.103***	0.283***	0.0474**	0.120***	0.263***	0.0373*	0.137***	0.312***
	_	(0.0118)	(0.00975)	(0.0208)	(0.0188)	(0.0158)	(0.0327)	(0.0195)	(0.0154)	(0.0343)
	Endowment	0.115***	0.165***	0.195***	0.112***	0.162***	0.163***	0.0719**	0.104***	0.221***
		(0.0182)	(0.0145)	(0.0327)	(0.0280)	(0.0222)	(0.0476)	(0.0297)	(0.0225)	(0.0532)
	Returns	-0.0787***	-0.0620***	0.0882**	-0.0651**	-0.0422*	0.100*	-0.0347	0.0322	0.0908
		(0.0205)	(0.0153)	(0.0356)	(0.0316)	(0.0235)	(0.0523)	(0.0329)	(0.0240)	(0.0578)
$\mathbf{s}$	Head char	0.0954***	0.111***	0.184***	0.0455	0.109***	0.135***	-0.0552*	0.0121	0.126**
ect		(0.0193)	(0.0146)	(0.0339)	(0.0303)	(0.0226)	(0.0501)	(0.0309)	(0.0225)	(0.0546)
Eff ed)	Head edu	-0.0368***	-0.0769***	-0.192***	-0.0558***	-0.0796***	-0.167***	-0.0346***	-0.0726***	-0.192***
ent ain		(0.00523)	(0.00471)	(0.0119)	(0.00906)	(0.00795)	(0.0194)	(0.00864)	(0.00747)	(0.0214)
/mer xpla	Hhd comp	0.0676***	0.116***	0.151***	0.127***	0.129***	0.153***	0.167***	0.164***	0.243***
E lo		(0.0107)	(0.00858)	(0.0188)	(0.0177)	(0.0141)	(0.0292)	(0.0198)	(0.0151)	(0.0343)
Enc	Geo.location	-0.0110***	0.0152***	0.0533***	-0.00424	0.00437	0.0409***	-0.00481	0.00123	0.0440***
		(0.00411)	(0.00310)	(0.00597)	(0.00634)	(0.00494)	(0.00919)	(0.00676)	(0.00451)	(0.00894)
	Head char	-0.278*	-0.429***	-0.419	0.248	0.0661	0.237	0.227	-0.0488	-0.0448
		(0.155)	(0.112)	(0.256)	(0.238)	(0.176)	(0.391)	(0.252)	(0.183)	(0.426)
t) ts	Head edu	0.00456	0.0699***	0.233***	0.0426*	0.0732***	0.200***	-0.00711	0.0722***	0.270***
fec		(0.0134)	(0.00992)	(0.0229)	(0.0237)	(0.0176)	(0.0392)	(0.0239)	(0.0174)	(0.0415)
s Ef olai	Hhd comp	-0.0266	-0.107***	0.221***	0.0181	-0.00521	0.483***	-0.134*	-0.119**	0.714***
exp		(0.0502)	(0.0357)	(0.0803)	(0.0769)	(0.0566)	(0.126)	(0.0774)	(0.0562)	(0.130)
Un	Geo.location	-0.00845	-0.0304**	-0.00291	-0.00133	0.000874	0.0675	-0.0580*	0.0546**	-0.0915*
$\mathbf{R}$ $\sim$		(0.0189)	(0.0138)	(0.0316)	(0.0291)	(0.0215)	(0.0479)	(0.0298)	(0.0217)	(0.0509)
	Constant	0.230	0.434***	0.0570	-0.372	-0.177	-0.886**	-0.0632	0.0732	-0.757
		(0.170)	(0.124)	(0.282)	(0.260)	(0.192)	(0.427)	(0.272)	(0.198)	(0.462)
	Observations	23,428	23,428	23,428	7,719	7,719	7,719	7,525	7,525	7,525

## Table 4: Quantile decomposition for Egypt (2008-2010-2012) by non-employed/employed

Notes: Computed using HEICS 2008/09, 2010/11 and 2012/13 (OAMDI 2014a,b,c). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

#### Palestine

The other country for which we have access to three survey waves – and thus rich data to evaluate trends across demographic groups, expenditure deciles and years – is Palestine. Tables 5 through 8 show decomposition of inequality in household expenditures in the 2007, 2010 and 2011 waves of the Palestinian Expenditure and Consumption Survey. Decomposition is conducted by rural/urban, <sup>5</sup> and by male/female, non-educated/ educated and non-employed/employed household heads. Situation in Palestine is different from that in Egypt.

For the rural/urban gap, table 5 reveals that the expenditure gap is positive for the lowest expenditure decile while it is negative for the highest decile. This means that expenditure per capita for the rural poor is higher than expenditure per capita for the urban poor. For the rural rich, expenditure per capita is lower than that for the urban rich. For poor households, the rural/urban gap can for the most part be explained by the endowment effect. Endowments of the rural poor are higher than endowments of the urban poor. This positive difference is higher in the lowest decile than in the top decile. In the top decile group, the returns effect is dominated by the endowment effect, and the return to the characteristics of the rural rich is lower than the return to the characteristics of the rural rich. Figures A10–A12 illustrate.

Education of the household head and geographic region are the main determinants of the expenditure gap. In 2010 and 2011, education of the household head contributed significantly to decreasing the gap for the poor, while education had no significant impact in 2007. The return to education decreased the gap in 2008 and 2010 significantly, while it had no significant impact in 2011.

From 2007 to 2011, geographic location contributed to increasing the rural/urban gap. In 2010 and 2011, the return to geographic location increased the rural/urban gap for the poor, with no significant impact in 2007. Moreover, in 2011, the endowment effects attributable to the employment status of household heads and household composition were significant in decreasing and increasing the gap for the poor, respectively. The return to employment increased the gap. Regarding the differential between the rural rich and the urban rich in 2011, characteristics of household heads and geographic location increased the differential significantly, but the returns to education and to geographic location decreased it.

Table 6 reports on inequality between households with female versus male heads. Similarly to what we observed for Egypt, gender gap in Palestine is positive in favor of female-headed households. However, this gap decreased in 2011 compared to 2007 for all expenditure groups. Decomposition of this gap shows that in 2007 the positive returns effect dominated the positive endowment effect for the poorest decile. In other words, female heads' characteristics and returns to them were higher than those of their male counterparts. For the top decile, however, female heads' characteristics were inferior to

<sup>&</sup>lt;sup>5</sup> Households residing in refugee camps (16.4%, 14.1%, and 20.9% of household observations in the three waves) are excluded from this decomposition.

those of their male counterparts but returns to them were higher for female heads. In 2010, women's endowments of characteristics were higher than those of male heads for all expenditure groups, while the returns to men's endowments were higher across the vast majority of expenditure deciles (with the exception of the sixth and seventh deciles). Finally, in 2011, the endowment effect was positive and dominated the negative returns effect from the lowest to the seventh decile. For high-expenditure deciles (from the eighth to the tenth) the endowment of rich female heads decreased but the return to it increased. This means that rich female-headed households received higher returns to their attributes than rich male-headed households.

Household heads' education and household composition and their returns are the main factors contributing to gender gap, especially in the high-expenditure class. However, the importance of these factors decreased in 2011 compared to 2007. Among the poor, differential in the return to education was adding to gender gap in 2007. However, this effect became negative in 2010 and 2011. Among the rich, the return to education was adding to gender gap in the two years.

Table 7 shows that from 2007 to 2010, the differential in per capita expenditure between households with non-educated versus educated heads increased, particularly in the richest and the poorest deciles. This increase can be explained by a widening gap in the endowments and the returns to endowments for the educated and non-educated household heads.

Household composition and geographic location are the main factors contributing to the widening of the expenditure gap between the non-educated and the educated households. Returns to household characteristics and to geographic location were important factors contributing to the gap in the lowest decile. Returns to household composition increased the gap between households with non-educated versus educated heads among the highest expenditure group.

Table 8 reveals that the difference in expenditure between the non-employed and the employed households differed along the expenditure distribution. In the lowest decile, the gap was negative in 2007 and 2010, and then became positive in 2011. This means that among the poor, non-employed-headed households had lower expenditure per capita than their employed counterparts in 2007 and 2010, but in 2011 the expenditure of the non-employed group increased. However, the employment-status differential in expenditure was not significant. Among the highest decile of households, the employment-status gap was positive for the three survey waves but decreased over the years. For the three waves, the endowment differential between the employed and the non-employed dominated the returns effect to the endowment of employment status for all expenditure deciles. The only exception is the seventh decile in 2010, in which the returns effect dominated the endowment effect. Figures A10–A12 illustrate these patterns across the pairs of comparison groups (rural/urbar; female/male; non-educated/educated; non-employed/ employed), expenditure deciles, and the two effects (endowment/returns).

For the three survey waves in Palestine, the results reveal that education of the household head decreased the expenditure differential among the rich while household composition increased it among the poor. The returns to household composition increased the gap among the rich with no significant impact among the poor.

			2007		2010			2011		
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	0.216**	0.0756	-0.276***	0.128***	0.0275	-0.159**	0.266***	0.0938***	-0.187***
		(0.0890)	(0.0512)	(0.0812)	(0.0364)	(0.0294)	(0.0624)	(0.0326)	(0.0262)	(0.0415)
	Endowment	0.250***	0.0669	0.0331	0.391***	0.118***	0.0293	0.319***	0.159***	0.0782**
		(0.0633)	(0.0477)	(0.0711)	(0.0459)	(0.0345)	(0.0827)	(0.0345)	(0.0313)	(0.0391)
	Returns	-0.0333	0.00880	-0.309***	-0.263***	-0.0909**	-0.188*	-0.0532	-0.0652*	-0.265***
		(0.101)	(0.0612)	(0.0987)	(0.0537)	(0.0410)	(0.0976)	(0.0441)	(0.0365)	(0.0531)
	Head char	-7.44e-05	-0.00130	0.00289	0.00197	0.000486	0.00591	-0.00549	0.000962	0.00889*
S		(0.00449)	(0.00525)	(0.00854)	(0.00275)	(0.00230)	(0.00808)	(0.00412)	(0.00342)	(0.00480)
ect	Head edu	-0.00884	-0.00268	0.000740	-0.0122*	-0.00814	-0.0117	-0.0130**	-0.0120**	-0.00690
Eff ed)		(0.00973)	(0.0115)	(0.0160)	(0.00643)	(0.00577)	(0.0123)	(0.00509)	(0.00521)	(0.00469)
ain	Head empl	-0.0236	-0.00744	0.0561**	0.000579	-0.0127	-0.00738	-0.0177**	-0.00325	0.00248
/m(		(0.0169)	(0.0126)	(0.0250)	(0.0117)	(0.00884)	(0.0239)	(0.00865)	(0.00810)	(0.0102)
E low	Hh comp	-0.00324	0.0104	0.0134	-0.00730	-0.00590	-0.0143	0.0137*	0.00274	-0.00916
Enc		(0.0184)	(0.0181)	(0.0261)	(0.00658)	(0.00955)	(0.0206)	(0.00739)	(0.00996)	(0.0134)
-	Geo.location	0.285***	0.0679	-0.0400	0.408***	0.145***	0.0568	0.341***	0.171***	0.0829**
		(0.0601)	(0.0425)	(0.0643)	(0.0438)	(0.0316)	(0.0768)	(0.0343)	(0.0297)	(0.0376)
	Head char	0.719	1.041	-0.0996	0.188	-0.508	1.514	-0.675	-0.440	0.378
		(1.324)	(0.672)	(1.155)	(0.581)	(0.456)	(1.016)	(0.530)	(0.407)	(0.671)
	Head edu	-0.440**	0.0362	-0.216	-0.157*	-0.0993	-0.00156	-0.00586	-0.0117	-0.228**
ts (1		(0.213)	(0.113)	(0.191)	(0.0892)	(0.0698)	(0.157)	(0.0796)	(0.0603)	(0.101)
Tec	Head empl	0.134	-0.0167	0.108	-0.0818	-0.138*	0.353*	0.150*	0.0650	0.00326
i Ei		(0.251)	(0.139)	(0.231)	(0.105)	(0.0817)	(0.187)	(0.0838)	(0.0642)	(0.106)
ext	Hh comp	0.776	0.445	-0.150	0.163	0.399**	-0.116	0.372*	-0.0585	0.990***
letu Un		(0.693)	(0.350)	(0.603)	(0.230)	(0.180)	(0.406)	(0.211)	(0.163)	(0.266)
$\mathbf{x}$	Geo.location	0.0841	-0.296***	-0.435***	0.484***	-0.0325	-0.163	0.314***	0.0394	-0.126*
		(0.133)	(0.0813)	(0.131)	(0.0729)	(0.0558)	(0.134)	(0.0585)	(0.0493)	(0.0705)
	Constant	-1.307	-1.201	0.485	-0.859	0.288	-1.775*	-0.208	0.340	-1.283*
		(1.481)	(0.742)	(1.281)	(0.608)	(0.476)	(1.068)	(0.555)	(0.428)	(0.702)
	Observations	1,029	1,029	1,029	3,227	3,227	3,227	3,413	3,413	3,413

## Table 5: Quantile decomposition for Palestine (2007-2010-2011) by rural/urban

			2007		2010			2011		
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	0.340***	0.196***	0.409*	0.0756	0.132**	0.208***	0.0959***	0.0977***	0.242***
		(0.0862)	(0.0563)	(0.244)	(0.0642)	(0.0529)	(0.0800)	(0.0342)	(0.0350)	(0.0643)
	Endowment	0.0739	0.412***	-0.672	0.632***	0.300*	0.528**	0.233***	0.304***	0.0613
		(0.212)	(0.134)	(0.657)	(0.204)	(0.155)	(0.252)	(0.0749)	(0.0830)	(0.169)
	Returns	0.266	-0.216	1.080	-0.556***	-0.168	-0.319	-0.137*	-0.207**	0.181
		(0.219)	(0.138)	(0.668)	(0.211)	(0.159)	(0.262)	(0.0785)	(0.0856)	(0.177)
	Head char	0.0614	0.321***	0.770	0.228	0.00336	0.157	0.120*	0.166**	0.195
S		(0.186)	(0.117)	(0.574)	(0.180)	(0.135)	(0.223)	(0.0685)	(0.0761)	(0.157)
ect	Head edu	-0.174***	-0.0474	-0.501***	0.120**	-0.0259	-0.0766	-0.0338*	-0.0140	-0.177***
Eff ed)		(0.0624)	(0.0354)	(0.192)	(0.0565)	(0.0414)	(0.0685)	(0.0205)	(0.0225)	(0.0481)
ent ain	Head empl	-0.0575	-0.0182	-1.253***	-0.00387	0.0469	0.231*	-0.0387	0.000190	-0.0828
vm(		(0.132)	(0.0818)	(0.410)	(0.0974)	(0.0734)	(0.121)	(0.0411)	(0.0456)	(0.0941)
Ю Е	Hh comp	0.237***	0.152***	0.254	0.297***	0.258***	0.213**	0.187***	0.143***	0.107*
Enc		(0.0828)	(0.0542)	(0.234)	(0.0723)	(0.0563)	(0.0879)	(0.0301)	(0.0320)	(0.0582)
	Geo.location	0.00623	0.00402	0.0585	-0.0102	0.0174	0.00371	-0.00262	0.00897	0.0191
		(0.0175)	(0.00708)	(0.0621)	(0.0127)	(0.0164)	(0.0190)	(0.00307)	(0.00702)	(0.0121)
	Head char	-1.430	-1.508*	2.287	-1.725	-0.0207	-2.193	0.762	1.793***	2.600**
		(1.357)	(0.831)	(3.792)	(1.217)	(0.917)	(1.534)	(0.585)	(0.591)	(1.215)
	Head edu	0.400**	-0.0184	1.209**	-0.692***	-0.102	-0.124	-0.171**	-0.181***	0.252*
cts d)		(0.182)	(0.110)	(0.476)	(0.135)	(0.102)	(0.173)	(0.0720)	(0.0683)	(0.139)
ffec	Head empl	0.0174	-0.0661	1.555***	-0.122	-0.159	-0.366**	0.0221	-0.0741	0.0578
s E pla		(0.209)	(0.125)	(0.539)	(0.141)	(0.107)	(0.181)	(0.0748)	(0.0708)	(0.145)
nrn	Hh comp	0.202	0.560**	2.506**	-0.205	-0.0702	1.422***	-0.0752	0.203	1.396***
(Ur		(0.453)	(0.266)	(1.030)	(0.248)	(0.188)	(0.329)	(0.155)	(0.128)	(0.257)
ще	Geo.location	-0.217	-0.373***	-0.509	-0.234**	0.0728	0.0139	-0.361***	-0.0712	-0.0784
		(0.138)	(0.0852)	(0.387)	(0.0937)	(0.0706)	(0.118)	(0.0449)	(0.0446)	(0.0914)
	Constant	1.294	1.189	-5.968	2.422*	0.111	0.929	-0.313	-1.876***	-4.047***
		(1.456)	(0.889)	(4.015)	(1.282)	(0.966)	(1.615)	(0.618)	(0.627)	(1.287)
	Observations	1,231	1,231	1,231	3,757	3,757	3,757	4,317	4,317	4,317

## Table 6: Quantile decomposition for Palestine (2007-2010-2011) by female/male

			2007		2010			2011		
		10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile
	Overall Gap	-0.0572	-0.0578	-0.0860	-0.265***	-0.160***	-0.189***	-0.186***	-0.187***	-0.127**
		(0.0981)	(0.0713)	(0.0848)	(0.0399)	(0.0363)	(0.0678)	(0.0328)	(0.0333)	(0.0503)
	Endowment	0.0716	0.459***	0.159*	0.142***	0.189***	0.210***	-0.00761	0.0912**	0.0865
		(0.109)	(0.0791)	(0.0865)	(0.0440)	(0.0397)	(0.0756)	(0.0349)	(0.0380)	(0.0560)
	Returns	-0.129	-0.516***	-0.245**	-0.408***	-0.349***	-0.400***	-0.178***	-0.279***	-0.214***
		(0.137)	(0.0867)	(0.112)	(0.0520)	(0.0461)	(0.0915)	(0.0453)	(0.0423)	(0.0697)
	Head char	-0.124	0.156**	-0.103	0.0969**	-0.0359	-0.0461	-0.0132	0.0164	0.0553
ects		(0.124)	(0.0792)	(0.0987)	(0.0426)	(0.0378)	(0.0762)	(0.0342)	(0.0332)	(0.0538)
Effe ed)	Head empl	-0.0956	0.0643	0.0551	-0.0108	0.0630*	0.0372	-0.0302	-0.00568	-0.0647
ent] aine		(0.0837)	(0.0530)	(0.0644)	(0.0398)	(0.0349)	(0.0702)	(0.0326)	(0.0320)	(0.0511)
vme	Hhd comp	0.284***	0.182***	0.160**	0.00194	0.114***	0.178***	0.0233	0.0683**	0.0904*
op E)		(0.102)	(0.0655)	(0.0790)	(0.0332)	(0.0321)	(0.0617)	(0.0282)	(0.0311)	(0.0466)
En	Geo.location	0.00717	0.0561**	0.0465*	0.0540***	0.0472***	0.0409**	0.0125*	0.0122	0.00549
		(0.0231)	(0.0242)	(0.0250)	(0.0154)	(0.0117)	(0.0163)	(0.00703)	(0.00763)	(0.00881)
	Head char	-2.355	1.091	-0.0223	-1.395**	-0.550	-0.324	-1.306**	0.130	0.454
		(1.497)	(0.937)	(1.291)	(0.606)	(0.536)	(1.055)	(0.550)	(0.478)	(0.817)
s e	Head empl	-0.161	-0.208	-0.271	0.164*	-0.279***	-0.377**	-0.111	-0.0913	-0.105
fect ned)		(0.241)	(0.150)	(0.218)	(0.0966)	(0.0855)	(0.168)	(0.0809)	(0.0689)	(0.119)
i Efi olain	Hhd comp	0.111	-0.0988	1.234**	0.296	-0.0206	0.0688	0.278	-0.138	0.865***
urns lexp		(0.615)	(0.382)	(0.554)	(0.202)	(0.178)	(0.350)	(0.193)	(0.165)	(0.284)
CUr (Ur	Geo.location	-0.0343	-0.0658	-0.0877	0.263***	0.0455	-0.0101	-0.142***	-0.0357	-0.0133
Π		(0.152)	(0.0951)	(0.130)	(0.0523)	(0.0464)	(0.0918)	(0.0452)	(0.0402)	(0.0680)
	Constant	2.312	-1.235	-1.098	0.265	0.456	0.243	1.103*	-0.144	-1.415
		(1.682)	(1.054)	(1.441)	(0.652)	(0.577)	(1.139)	(0.581)	(0.512)	(0.870)
	Observations		1,231			3,757			4,317	

Table 7: Quantile decomposition for Palestine (2007-2010-2011) by non-educated/educated

			2007			2010			2011	
		10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile
	Overall Gap	-0.0254 (0.0746)	0.115 (0.0742)	0.308*** (0.101)	-0.0172 (0.0402)	0.0460 (0.0308)	0.168** (0.0666)	0.0174 (0.0321)	0.0107 (0.0304)	0.132** (0.0594)
	Endowment	0.132 (0.0932)	0.217** (0.0966)	0.353*** (0.129)	0.117* (0.0617)	0.0901** (0.0438)	0.162 (0.107)	0.151*** (0.0436)	0.160*** (0.0431)	0.182** (0.0918)
	Returns	-0.157 (0.112)	-0.103 (0.109)	-0.0452 (0.150)	-0.135* (0.0696)	-0.0441 (0.0481)	0.00585 (0.121)	-0.133** (0.0517)	-0.149*** (0.0461)	-0.0504 (0.104)
ects	Head char	0.0356 (0.110)	0.116 (0.110)	0.372** (0.151)	0.0949 (0.0688)	-0.0121 (0.0471)	-0.0548 (0.121)	-0.0247 (0.0494)	0.0585 (0.0456)	0.169 (0.104)
ent Eff ained)	Head edu	-0.0547 (0.0476)	-0.0995** (0.0483)	-0.220*** (0.0668)	-0.0834*** (0.0212)	-0.0535*** (0.0146)	-0.0524 (0.0356)	-0.0477*** (0.0155)	-0.0926*** (0.0156)	-0.126*** (0.0331)
dowm€ (Expl	Hhd comp	0.177** (0.0769)	0.226*** (0.0773)	0.161 (0.104)	0.133*** (0.0499)	0.190*** (0.0356)	0.281*** (0.0867)	0.227*** (0.0389)	0.206*** (0.0373)	0.142* (0.0809)
Enc	Geo.location	-0.0257 (0.0213)	-0.0242 (0.0281)	0.0405 (0.0366)	-0.0274** (0.0119)	-0.0340*** (0.00978)	-0.0117 (0.0214)	-0.00397 (0.00449)	-0.0124 (0.00835)	-0.00272 (0.0132)
	Head char	-0.0637 (1.102)	0.250 (0.966)	0.239 (1.403)	0.489 (0.660)	-0.275 (0.471)	-1.294 (1.113)	-0.538 (0.563)	0.199 (0.455)	1.863* (1.008)
fects ned)	Head edu	-0.0546 (0.163)	-0.0289 (0.142)	0.421** (0.207)	-0.0672 (0.0897)	-0.0829 (0.0643)	-0.124 (0.150)	-0.221*** (0.0737)	0.0406 (0.0566)	0.149 (0.124)
ırns Ef explai	Hhd comp	0.517 (0.456)	0.526 (0.377)	2.134*** (0.564)	-0.105 (0.214)	0.139 (0.155)	0.827** (0.356)	-0.142 (0.185)	-0.405*** (0.140)	0.562* (0.304)
Retu (Un	Geo.location	-0.0844 (0.115)	0.0291 (0.107)	-0.142 (0.151)	0.0778 (0.0538)	-0.0164 (0.0380)	0.0234 (0.0918)	-0.203*** (0.0442)	0.00302 (0.0368)	0.0282 (0.0824)
	Constant	-0.472 (1.247)	-0.879 (1.112)	-2.697* (1.601)	-0.530 (0.712)	0.191 (0.505)	0.574 (1.207)	0.971 (0.599)	0.0140 (0.492)	-2.653** (1.095)
	Observations		1,231			3,757			4,317	

## Table 8: Quantile decomposition for Palestine (2007-2010-2011) by non-employed/employed

#### Jordan

Tables 9 to 12 show decomposition of expenditure inequality in two Jordanian surveys: waves 2006 and 2010. For the rural/urban gap, table 9 reports that the overall expenditure gap is negative across all three expenditure deciles of interest, and increases in magnitude with the decile. This means that expenditure per capita in rural households is lower than that in urban households, and this differential is larger in absolute value the higher we get in the population distribution of expenditures. Overall expenditure gap between rural and urban households falls between 2006 and 2010, but its ranking across expenditure deciles persists.

In 2006, the rural/urban gap can be explained by the endowment effect, as the returns effects are small and insignificant. In 2010, the returns effect becomes nearly as important as the endowment effect in terms of both coefficient sizes and significance levels.

Endowments of rural households are lower than endowments of urban households across all expenditure deciles. This differential increases in magnitude nearly monotonically across expenditure deciles. Figures A13–A14 illustrate the endowment and returns effects graphically for all expenditure deciles.

Education of the household head and household composition are the main determinants of the rural/urban expenditure gap. Both contributed significantly to decreasing the gap. The returns effects attributable to education and household composition had no significant impacts. The returns effects for all forms of endowments have high standard errors and their signs must be taken with a grain of salt. Only characteristics of household heads and geographic location have two instances of statistically significant returns effects. The former has a positive effect in 2006 among the group of households at the median of the distribution, and in 2010 among the highest decile. Geographic location have significant returns effects in 2010 among the median and top-decile groups of households.

Table 10 shows that gender gap in Jordan is positive in favor of female-headed households across years and expenditure deciles. This gap decreased in 2010 among the lowest and middle decile groups, but increased in the highest decile. Decomposition of this gap into endowment and returns effects shows that in 2006 the positive returns effect dominated the negative endowment effect across all decile groups, but all these effects were statistically insignificant. In 2010, women's endowment of characteristics was higher than that of male heads in the lowest and middle decile, but lower in the highest decile. Differential returns to endowments were positive and insignificant in 2006, suggesting that the returns to households' endowments contributed to creating male/female expenditure gaps. In 2010, the returns effects were negative among the lowest expenditure decile – suggesting that they worked to decrease the male/female gap among the bottom of the expenditure distribution – while they were positive among the middle and highest deciles.

Household heads' education and household composition and the return to education appear to be the main factors contributing to gender gap. For education, both the endowment and the returns effects were especially large in the high-expenditure class. The importance of education fell in 2010 compared to 2006, while the importance of household composition rose.

Table 11 reports on the decomposition of non-educated/educated expenditure differential. From 2006 to 2010, the overall differential increased among the poorest deciles, while it fell among the middle and high expenditure deciles. This trend could be explained by a widening gap in the endowments among the poor and middle-expenditure groups, narrowing gap in the endowments among the rich, increasing returns-to-endowments effect among the poor and falling returns effect among the middle- and high-expenditure groups.

Differentials in household head characteristics and household composition are the main factors contributing to the expenditure gap between the non-educated and the educated households in 2006. In 2010, household composition and employment status of the head are responsible for the expenditure gap between non-educated and educated households, as well as for the widening in this gap among the lowest decile.

Returns to household characteristics and to geographic location contributed to the expenditure gap in 2010, in higher deciles in the case of household composition, and in lower deciles in the case of geographic location.

Table 12 shows the decomposition of the differential in expenditure between nonemployed and employed households. It reports that the differential varied across the expenditure distribution. In the lowest decile the gap was negative, but became positive in the middle and high expenditure deciles.

Ranking of the endowment effect and the returns effect follows an interesting pattern across the two survey years. The endowment effect of employment status is positive across all deciles and across both years, rising with expenditure decile. By 2010 it falls among the lowest decile, remains unchanged in the middle decile, and rises among the highest decile. The returns effect is negative throughout, falls with expenditure decile, and decreases among the lowest expenditure class even as it rises among the middle group, and stagnates among the rich.

Characteristics of household heads, education and household composition are all significant factors in the endowment effect responsible for the non-employed/employed expenditure differential. Household characteristics and composition contribute positively, raising the non-employed/employed expenditure differential among middle and high expenditure households. Education of the household head (and geographic location in 2006) contributes negatively, attenuating the non-employed/employed expenditure differential among middle and high expenditure households.

With respect to the returns effects, it is worth noting some patterns. The differential returns to household characteristics and to household composition contribute positively to the overall gap in most of the evaluated deciles and both years. Education and geographic location have mixed effects on the overall gap – typically negative in the lowest expenditure group and high positive in the middle group.

			Jordan 2006			Jordan 2010	
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	-0.100***	-0.167***	-0.360***	-0.017	-0.140***	-0.343***
		(0.037)	(0.032)	(0.052)	(0.029)	(0.027)	(0.054)
	Endowment	-0.116***	-0.178***	-0.264***	-0.0896***	-0.0835***	-0.193***
		(0.036)	(0.034)	(0.055)	(0.026)	(0.025)	(0.049)
	Returns	0.016	0.011	-0.097	0.0730**	-0.0564*	-0.150**
		(0.049)	(0.040)	(0.068)	(0.036)	(0.031)	(0.062)
	Head char	-0.006	-0.010	-0.013	-0.002	-0.008	-0.0329**
$\mathbf{s}$		(0.006)	(0.008)	(0.015)	(0.006)	(0.005)	(0.016)
ect	Head edu	-0.0325**	-0.0656***	-0.107***	-0.0388***	-0.0503***	-0.0685***
Eff ed)		(0.015)	(0.014)	(0.024)	(0.011)	(0.011)	(0.020)
ain	Head empl	-0.006	0.019	0.010	-0.010	0.002	0.016
'mé xpl		(0.014)	(0.012)	(0.020)	(0.012)	(0.010)	(0.020)
ю Э	Hh comp	-0.0430***	-0.0971***	-0.0859***	-0.015	-0.0349**	-0.105***
Enc		(0.013)	(0.018)	(0.024)	(0.015)	(0.015)	(0.030)
	Geo.location	-0.028	-0.024	-0.0671*	-0.024	0.008	-0.003
		(0.027)	(0.022)	(0.038)	(0.016)	(0.015)	(0.028)
	Head char	-0.050	1.149***	0.895	-0.423	0.108	3.284***
		(0.567)	(0.443)	(0.763)	(0.487)	(0.421)	(0.855)
	Head edu	-0.106	0.033	0.075	-0.057	-0.040	0.023
d)		(0.085)	(0.067)	(0.115)	(0.064)	(0.056)	(0.113)
ine	Head empl	-0.012	0.124***	0.110	0.015	0.040	0.005
s E plai		(0.058)	(0.045)	(0.078)	(0.044)	(0.038)	(0.076)
urn: lex]	Hh comp	0.408	-0.009	0.090	0.245	0.210	-0.222
Ün		(0.264)	(0.208)	(0.358)	(0.171)	(0.148)	(0.300)
R O	Geo.location	-0.012	0.012	-0.017	0.013	0.0273*	0.0703**
		(0.024)	(0.019)	(0.032)	(0.018)	(0.016)	(0.032)
	Constant	-0.213	-1.298***	-1.248	0.280	-0.402	-3.311***
		(0.597)	(0.467)	(0.804)	(0.489)	(0.423)	(0.860)
	Observations		2,897			2,845	

## Table 9. Quantile decomposition for Jordan (2006-2010) by rural/urban

Source: Computed by the authors using Jordanian HEIS 2006 and 2010/11 (OAMDI, 2014d; ERF & DOS, 2013). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 non-directional t-test.

		Jordan 2006			Jordan 2010			
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	
	Overall Gap	0.107**	0.313***	0.258***	0.008	0.189***	0.320***	
		(0.051)	(0.066)	(0.081)	(0.041)	(0.041)	(0.081)	
	Endowment	-0.004	-0.168	-0.192	0.403***	0.028	-0.502*	
		(0.238)	(0.291)	(0.363)	(0.134)	(0.130)	(0.277)	
	Returns	0.110	0.481	0.451	-0.395***	0.161	0.822***	
		(0.243)	(0.294)	(0.369)	(0.137)	(0.132)	(0.284)	
	Head char	-0.081	-0.109	0.229	-0.063	-0.252***	-0.278*	
ts		(0.120)	(0.147)	(0.185)	(0.074)	(0.071)	(0.154)	
lec.	Head edu	-0.112**	-0.296***	-0.399***	-0.109***	-0.110***	-0.264***	
Eff (ed)		(0.050)	(0.063)	(0.079)	(0.031)	(0.031)	(0.065)	
ent lain	Head empl	-0.060	-0.061	-0.114	0.311***	0.093	-0.132	
xp]		(0.223)	(0.270)	(0.339)	(0.110)	(0.106)	(0.227)	
е Е	Hh comp	0.240***	0.296***	0.083	0.266***	0.296***	0.182**	
Enc		(0.068)	(0.083)	(0.102)	(0.045)	(0.045)	(0.087)	
	Geo.location	0.009	0.002	0.008	-0.002	0.001	-0.010	
		(0.007)	(0.012)	(0.010)	(0.006)	(0.007)	(0.020)	
	Head char	-1.372	0.925	-0.803	0.505	-1.179*	0.721	
		(1.156)	(1.374)	(1.745)	(0.722)	(0.683)	(1.455)	
	Head edu	-0.040	0.366***	0.500***	0.032	0.026	0.230	
ts (1		(0.107)	(0.123)	(0.160)	(0.078)	(0.073)	(0.154)	
Tec	Head empl	-0.012	0.043	0.083	-0.450***	-0.150	0.110	
s Ef		(0.232)	(0.279)	(0.352)	(0.119)	(0.114)	(0.245)	
ext	Hh comp	0.145	-0.400	0.372	-0.284	-0.228	0.840**	
Un		(0.257)	(0.278)	(0.378)	(0.178)	(0.163)	(0.344)	
$\mathbf{R}$	Geo.location	-0.132	-0.030	-0.287	-0.005	-0.076	-0.478**	
		(0.147)	(0.172)	(0.221)	(0.100)	(0.095)	(0.202)	
	Constant	1.521	-0.424	0.587	-0.192	1.769**	-0.601	
		(1.249)	(1.484)	(1.885)	(0.757)	(0.716)	(1.527)	
	Observations		2,897			2,845		

Table 10. Quantile decomposition for Jordan (2006-2010) by male/female household head

Notes: Computed by the authors using Jordanian HEIS 2006 and 2010/11 (OAMDI, 2014d; ERF & DOS, 2013). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 non-directional t-test.

			Jordan 2006		Jordan 2010			
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	
	Overall Gap	-0.176***	-0.198***	-0.160**	-0.240***	-0.103***	-0.117**	
		(0.032)	(0.032)	(0.068)	(0.045)	(0.030)	(0.055)	
	Endowment	0.030	0.112***	0.323***	0.100**	0.145***	0.071	
		(0.037)	(0.040)	(0.089)	(0.050)	(0.031)	(0.054)	
	Returns	-0.206***	-0.310***	-0.483***	-0.340***	-0.248***	-0.188***	
		(0.047)	(0.047)	(0.105)	(0.060)	(0.037)	(0.068)	
S	Head char	-0.0961**	0.058	0.241**	-0.050	0.029	0.115*	
)		(0.047)	(0.049)	(0.110)	(0.062)	(0.037)	(0.068)	
Ef	Head empl	-0.036	-0.019	0.006	-0.142***	-0.035	-0.137***	
ent lair		(0.029)	(0.031)	(0.069)	(0.045)	(0.027)	(0.049)	
wm Exp	Hh comp	0.169***	0.0877**	0.105	0.297***	0.159***	0.126**	
op (E		(0.037)	(0.040)	(0.086)	(0.050)	(0.029)	(0.050)	
En	Geo.location	-0.008	-0.0147*	-0.030	-0.004	-0.007	-0.0326**	
		(0.008)	(0.009)	(0.019)	(0.011)	(0.007)	(0.013)	
	Head char	-2.112***	-0.200	(0.592)	(0.836)	0.222	(0.087)	
	XX 1 1	(0.573)	(0.540)	(1.174)	(0.787)	(0.500)	(0.942)	
ects ed)	Head empl	-0.073	-0.017	-0.075	0.098	-0.014	(0.031)	
∃ff	TThe second	(0.038)	(0.050)	(0.122)	(0.077)	(0.049)	(0.091)	
ns I xpl	Hn comp	(0.212)	(0.122)	0.529	-0.296 (0.234)	$0.288^{\circ}$ (0.151)	0.898***	
Jne	Geo location	0.046	0.060	(0.400)	0.251**	0.144**	0.108	
C Re	Oco.iocation	(0.077)	(0.072)	(0.156)	(0.099)	(0.064)	(0.121)	
	Constant	1.813***	-0.275	-0.348	0.443	-0.888*	-1.139	
		(0.623)	(0.594)	(1.297)	(0.842)	(0.530)	(0.996)	
	Observations		2,897			2,845		

## Table 11. Quantile decomposition for Jordan (2006-2010) by non-educated/educated

Notes: Computed by the authors using Jordanian HEIS 2006 and 2010/11 (OAMDI, 2014d; ERF & DOS,

2013). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 non-directional t-test.

			Jordan 2006			Jordan 2010	
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	-0.0573*	0.0852***	0.172***	-0.0930***	0.040	0.208***
		(0.035)	(0.027)	(0.049)	(0.027)	(0.027)	(0.048)
	Endowment	0.180***	0.185***	0.208***	0.132***	0.183***	0.240***
		(0.043)	(0.033)	(0.062)	(0.031)	(0.035)	(0.059)
	Returns	-0.238***	-0.100***	-0.036	-0.225***	-0.143***	-0.032
		(0.052)	(0.038)	(0.073)	(0.039)	(0.038)	(0.070)
S	Head char	0.117**	0.139***	0.204***	0.0963**	0.129***	0.217***
fect		(0.055)	(0.040)	(0.078)	(0.039)	(0.040)	(0.072)
Ef	Head edu	-0.0571***	-0.110***	-0.147***	-0.0581***	-0.104***	-0.112***
ent lair		(0.018)	(0.015)	(0.027)	(0.011)	(0.013)	(0.022)
wm [xp]	Hh comp	0.127***	0.167***	0.161***	0.0936***	0.158***	0.134***
ор Щ		(0.042)	(0.032)	(0.060)	(0.027)	(0.030)	(0.050)
En	Geo.location	-0.00727*	-0.0106**	-0.010	0.001	-0.001	0.001
		(0.004)	(0.004)	(0.006)	(0.002)	(0.002)	(0.006)
	Head char	1.559**	-0.096	0.831	0.380	0.203	1.031
		(0.667)	(0.477)	(0.926)	(0.562)	(0.496)	(0.957)
d)	Head edu	-0.088	0.122**	0.129	-0.105	0.156***	0.085
ffe ine		(0.085)	(0.061)	(0.118)	(0.071)	(0.060)	(0.119)
s E pla	Hh comp	0.147	0.126	0.118	0.174	-0.123	0.853***
nrn		(0.233)	(0.167)	(0.323)	(0.167)	(0.144)	(0.281)
Ur	Geo.location	-0.120	0.056	-0.095	0.110*	0.0986*	-0.168
ЧО		(0.086)	(0.062)	(0.120)	(0.066)	(0.059)	(0.112)
	Constant	-1.736**	-0.308	-1.018	-0.786	-0.478	-1.834*
		(0.704)	(0.505)	(0.980)	(0.578)	(0.519)	(0.992)
	Observations		2,897			2,845	

Table 12. Quantile decomposition for Jordan (2006-2010) by non-<br/>employed/employed

Notes: Computed by the authors using Jordanian HEIS 2006 and 2010/11 (OAMDI, 2014d; ERF & DOS, 2013). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 non-directional t-test.

#### Tunisia

Tables 13 through 16 show decomposition of expenditure inequality across demographic groups in Tunisia and Sudan. For the rural/urban gap in Tunisia, table 13 reports that the overall expenditure gap is negative in both years 2005 and 2010 and for all expenditure deciles. The gaps at various deciles cannot be easily ranked. Rural households' expenditure per capita is lower than that of urban households, by a similar relative amount across wealth strata. On the other hand, we see that the rural/urban gap increased from 2005 to 2010, difference that is statistically significant at the lowest decile.

The endowment effect is negative across both years and all deciles. Endowments of rural households are lower than endowments of their urban counterparts. These endowment effects are higher, the higher in the expenditure distribution we get, implying greater *explained* inequality at the top. The endowment effect grows over time among the lowest and middle deciles, but decreases among the highest decile.

The returns effects are also negative throughout, but they appear to fall across expenditure deciles and their ranking across time is unclear. We can only conclude that unexplained inequality across different decile groups – that due to higher returns to endowments earned by urban households – is particularly large in the poorest segment of the population. In the top decile group, the endowment effect dominates over the returns effect, while the ordering is reversed in the lowest decile. In the middle decile, ordering switches between year 2005 and 2010. Figures A15–A16 illustrate the endowment and returns effects across all expenditure deciles of the Tunisian population.

Differential endowments of education and employment status of the household head, household composition and geographic region all contribute to increasing the expenditure gap. Difference in educational achievement and employment status is particularly important to explaining the expenditure gap in the highest decile, for which the coefficients are highest in absolute value. The returns effects of various factors are less significant throughout, with characteristics and employment status of household heads being the most significant. The differential in the returns to household characteristics contributes to the rural/urban gap (negative coefficients), while that of employment status attenuates it (positive coefficients).

Table 14 reports that gender gap in Tunisia was positive in favor of female-headed households in all population deciles in 2005, while in 2010 it was positive only among the highest expenditure decile. For the bottom and middle deciles in 2010, in turned in favor of male-headed households (significant for the bottom decile). Decomposition of this gap shows that the endowment effect was positive in the bottom decile in favor of female households, negative in the top decile, and on either side of zero and insignificant in the middle decile. The returns effect, on the contrary, was negative in the bottom decile, on either side of zero in the middle decile (negative significant in 2010), and positive in the top decile. These patterns indicate that poor female-headed households tend to be more endowed with market-valued characteristics than their poor male-headed counterparts, but face lower returns on these endowments. Among rich households, female-headed households have lower endowments but face greater returns to them.

Regarding specific endowments responsible for the gender gap, household composition and to some degree employment status are responsible for causing the positive gender gap. On the other hand, education and other characteristics of household heads, and geographic location work to reduce the gap across expenditure deciles and across the two years. The effects of education and other household-head characteristics increase in magnitude at higher expenditure deciles, while the effects of other endowments cannot be ranked across deciles.

Among the returns effects, returns to household characteristics and to education appear to contribute to the pro-female expenditure differential (most coefficients are positive), implying that female-headed households receive higher returns to them. Returns to employment, household composition and geographic location are for the most part higher among male-headed households (most coefficients are negative) and thus work against the observed overall gap. One half of these effects are statistically significant.

Table 15 shows that the differential in per capita expenditure between households with non-educated versus educated heads in Tunisia is in favor of the latter group. In 2005 this overall gap was increasing with the population quantile, while in 2010 the ranking was unclear. Both the endowment effects and the returns effects contributed to this pro-educated gap. The endowment effects were largest in magnitude among the lowest population decile, while the returns effects were largest among the highest decile. The endowment effects increased substantially from 2005 to 2010, while the returns effects rose for the lowest decile but shrank for the highest decile. As a result of these trends, the overall gap rose over time among the lowest and middle deciles, but decreased among the highest decile.

Differentials in employment status, household composition and geographic location are the main factors contributing to the pro-educated expenditure gap. The endowment effect of characteristics of household heads was just above zero (insignificant) for all expenditure deciles in 2005, and small negative (significant for the middle decile) in 2010. In the middle and especially the highest expenditure decile, return to employment of the household head contributed to the pro-educated gap, while the return to geographic location attenuated it.

Table 16 reveals that the difference in expenditure between the non-employed and the employed households in Tunisia was in favor of the non-employed group, and increased along the expenditure distribution. Between the 2005 and 2010 waves, the overall gap fell in magnitude in the bottom and middle of the population distribution, and increased in the highest decile.

The positive sign of the overall gap is due to the endowment differential between the employed and the non-employed. The endowment effect is positive throughout, and largest among the bottom decile of households and smallest among the top decile. It dominates over the returns effect in magnitude, which is negative and significant among the lowest and middle deciles, and positive among the highest decile.

Among differentials in various household circumstances, the differential in characteristics of household heads, household composition and geographic location contribute to the expenditure gap favoring the non-employed significantly, while the differential in education would favor the employed group, also significantly. The positive differentials in characteristics of household heads, household composition and geographic location are greatest in the poorest decile and smallest in the richest decile, while the negative differential in education is largest in the richest decile.

Differential returns to these endowments between the employed and non-employed households have important effects on the overall non-employed/employed expenditure gap. Return to characteristics of the household head help to increase the gap in favor of the non-employed significantly. Returns to education and to household composition have a mostly negative effect, favoring the employed, particularly among the lowest population decile.

#### Sudan

Only one survey wave, for year 2009, is available for Sudan. This limitation prevents us from inferring how expenditure inequality in the country evolved over time, and also means that fewer estimates are available to check the robustness of our inequality decomposition and its patterns across individual demographic groups and population quantiles. Nevertheless, estimates for Sudan in tables 13–16 are large in magnitude and highly significant, suggesting that our results are robust to sampling errors and other data issues.

The right panel of table 13 indicates that the overall rural/urban expenditure gap in Sudan favors urban households, and is particularly large among the lowest expenditure decile of the population. This negative significant gap is due to both endowment and returns effects. The returns effects dominate among the lowest decile, while the endowment effects dominate among the middle and highest deciles. Figure A17 illustrates the decomposition into the endowment and returns effects across all expenditure deciles.

Regarding endowments that may be valued by markets, rural/urban differentials in education and employment of the household head, household composition and geographic location have positive bearing on the overall expenditure gap. The endowment effects of education and geographic location rise in magnitude with the expenditure quantile, while those of employment and household composition fall. Finally, the returns effects are much less significant than the endowment effects, but reveal that returns to education and geographic location contribute to the negative overall expenditure gap, and are the largest in the lowest expenditure decile.

Expenditure gap between male and female headed households, shown in table 14, favors male households among the lowest decile, but favors female households among the wealthiest segment of the population (significant). The endowment effects are small negative across all deciles (insignificant throughout), favoring male households, while the returns effects are negative among the lowest decile and but positive for the middle and the highest deciles (significant for the latter two).

With respect to individual endowments of characteristics and their differentials between the male and female households, we conclude that education and geographic location increase the gap in favor of male-headed households, while employment status and household composition increase it in favor of female-headed households. The returns effects of these characteristics typically favor male-headed households who may face more developed markets for human capital. Returns to characteristics of household heads and to employment status increase the expenditure gap favoring male-headed households, while returns to other endowments have sporadic or small effects on the overall gap.

Table 15 presents the results of decomposition of the non-educated/educated gap in household expenditures. The overall gap is negative, favoring households with educated heads. This is attributable to both endowment and returns effects. The returns effects

dominate, particularly so among the highest expenditure decile households. Differentials in employment status and of geographic location appear to widen the overall expenditure gap toward the educated (with the exception of the highest decile where the endowment effect of employment is positive significant). The differential in characteristics of household heads appears to be narrowing it. All of these endowment effects are largest among the lowest decile group.

Regarding returns to endowments, educated household heads are estimated to earn higher returns to their characteristics, increasing the expenditure gap in favor of the educated significantly, but lower returns to employment and to household composition, lowering the overall gap somewhat.

Finally, table 16 shows the results of decomposition of the expenditure gap in Sudan between households with non-employed versus employed heads. This gap is significant negative for the lowest and the middle deciles, exhibiting favor toward employed households. It is weakly positive for the highest expenditure decile. Decomposing this overall gap, we find that the endowment effects are small and insignificant positive, while the returns effects are significant negative for the lowest and the middle deciles, driving the overall inequality.

Differentials in endowment of education (significant) and geographic location (insignificant) contribute to the gap in favor of the employed. Differentials in endowment of household-head characteristics mitigate it to favor the non-employed. Gaps in returns to these endowments between the non-employed and the employed groups do not individually explain the overall expenditure gap. The returns effects of individual household endowments are small and insignificant, or switch signs across population deciles. Only household-head characteristics have consistent returns effects across all deciles, all negative but insignificant, suggesting that households with employed heads may have higher returns to their heads' characteristics.

			Tunisia 2005			Tunisia 2010			Sudan 2009	
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	-0.574***	-0.562***	-0.667***	-0.660***	-0.576***	-0.676***	-0.576***	-0.493***	-0.456***
	-	(0.018)	(0.015)	(0.025)	(0.020)	(0.015)	(0.023)	(0.025)	(0.019)	(0.030)
	Endowment	-0.190***	-0.263***	-0.402***	-0.270***	-0.318***	-0.340***	-0.189***	-0.251***	-0.279***
		(0.020)	(0.018)	(0.030)	(0.027)	(0.019)	(0.028)	(0.032)	(0.021)	(0.032)
	Returns	-0.384***	-0.298***	-0.265***	-0.390***	-0.258***	-0.336***	-0.387***	-0.241***	-0.177***
		(0.025)	(0.021)	(0.036)	(0.032)	(0.022)	(0.034)	(0.039)	(0.026)	(0.041)
	Head char	0.005	0.00594**	0.003	-0.0110***	-0.003	0.001	0.002	0.002	0.00791*
S		(0.003)	(0.003)	(0.005)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
fect	Head edu	-0.0285***	-0.0607***	-0.162***	-0.0309**	-0.0714***	-0.154***	-0.0668***	-0.109***	-0.177***
Eff		(0.009)	(0.008)	(0.015)	(0.016)	(0.011)	(0.017)	(0.017)	(0.011)	(0.018)
ain	Head empl	-0.003	-0.009	-0.0462***	-0.007	-0.0223***	-0.0189**	-0.0275***	-0.0112**	0.002
vm xpl		(0.008)	(0.007)	(0.011)	(0.008)	(0.006)	(0.008)	(0.008)	(0.005)	(0.007)
о Э	Hh comp	-0.0776***	-0.0897***	-0.110***	-0.0860***	-0.0736***	-0.0743***	-0.0317***	-0.0156**	-0.007
Ene		(0.007)	(0.007)	(0.010)	(0.008)	(0.006)	(0.008)	(0.008)	(0.007)	(0.010)
—	Geo.location	-0.0858***	-0.110***	-0.0872***	-0.135***	-0.147***	-0.0936***	-0.0649**	-0.118***	-0.105***
		(0.017)	(0.014)	(0.024)	(0.022)	(0.015)	(0.022)	(0.027)	(0.018)	(0.027)
	Head char	-0.457*	-0.530**	-0.165	0.250	-0.605**	-0.670*	-0.359	0.379*	-0.345
		(0.277)	(0.217)	(0.387)	(0.330)	(0.237)	(0.374)	(0.288)	(0.214)	(0.356)
	Head edu	-0.024	0.005	-0.058	0.119	-0.180	-0.128	-0.108**	-0.0624*	-0.036
ts (1		(0.051)	(0.040)	(0.071)	(0.185)	(0.131)	(0.206)	(0.045)	(0.033)	(0.055)
fec	Head empl	0.0890**	0.031	0.018	0.145***	0.038	-0.030	0.000	-0.033	0.018
i Ei		(0.037)	(0.029)	(0.051)	(0.039)	(0.028)	(0.044)	(0.076)	(0.056)	(0.092)
ext	Hh comp	0.121	0.098	0.175	-0.032	0.239***	0.138	-0.085	0.140	0.196
Un		(0.095)	(0.075)	(0.132)	(0.102)	(0.073)	(0.114)	(0.177)	(0.130)	(0.216)
$\mathbf{R}$	Geo.location	0.006	-0.033	0.092	-0.022	-0.105***	0.067	-0.112**	-0.0673*	-0.088
		(0.041)	(0.034)	(0.060)	(0.052)	(0.035)	(0.055)	(0.054)	(0.039)	(0.064)
	Constant	-0.119	0.131	-0.327	-0.850**	0.355	0.286	0.277	-0.597**	0.078
		(0.305)	(0.239)	(0.425)	(0.402)	(0.287)	(0.452)	(0.325)	(0.241)	(0.402)
	Observations		12,305			11,278			7,774	

Table 13. Quantile decomposition for Tunisia (2005-2010) and Sudan (2009) by rural/urban

Notes: Computed by the authors using Tunisian EBCNV 2005 and 2010 (OAMDI 2014c; OAMDI 2014d), and Sudanese NBHS 2009 (OAMDI 2014b). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 non-directional t-test.

			Tunisia 2005			Tunisia 2010			Sudan 2009	
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	0.013	0.0477**	0.0867**	-0.151***	-0.013	0.0896**	-0.042	0.041	0.181***
		(0.036)	(0.021)	(0.035)	(0.034)	(0.022)	(0.035)	(0.053)	(0.039)	(0.067)
	Endowment	0.159*	-0.001	-0.155*	0.041	0.080	-0.225**	-0.005	-0.104	-0.137
		(0.085)	(0.048)	(0.081)	(0.083)	(0.053)	(0.087)	(0.090)	(0.065)	(0.116)
	Returns	-0.146	0.049	0.242***	-0.191**	-0.0928*	0.314***	-0.038	0.145**	0.318**
		(0.090)	(0.050)	(0.086)	(0.086)	(0.054)	(0.091)	(0.100)	(0.070)	(0.128)
	Head char	-0.019	-0.0945***	-0.191***	0.001	-0.0833**	-0.203***	0.030	-0.033	-0.155**
S		(0.065)	(0.036)	(0.062)	(0.060)	(0.038)	(0.063)	(0.058)	(0.040)	(0.075)
Gect	Head edu	-0.0525**	-0.0762***	-0.223***	0.000	-0.0483***	-0.208***	-0.035	-0.114***	-0.268***
Eff (ed)		(0.022)	(0.013)	(0.023)	(0.021)	(0.013)	(0.024)	(0.040)	(0.029)	(0.055)
ent ain	Head empl	0.054	0.040	0.141***	-0.057	0.0911***	0.000	-0.040	0.025	0.147***
vm xpl		(0.046)	(0.026)	(0.043)	(0.053)	(0.033)	(0.056)	(0.033)	(0.023)	(0.043)
о Е Э	Hh comp	0.189***	0.140***	0.133***	0.157***	0.155***	0.196***	0.111***	0.106***	0.102**
Enc		(0.024)	(0.013)	(0.021)	(0.023)	(0.014)	(0.023)	(0.032)	(0.023)	(0.040)
	Geo.location	-0.011	-0.010	-0.0152**	-0.0614***	-0.0350***	-0.009	-0.0712**	-0.0876***	0.037
		(0.012)	(0.007)	(0.008)	(0.012)	(0.009)	(0.010)	(0.034)	(0.025)	(0.041)
	Head char	0.831	0.166	0.467	1.733***	0.189	0.406	-0.961*	-0.146	-0.384
		(0.521)	(0.300)	(0.523)	(0.511)	(0.324)	(0.543)	(0.582)	(0.405)	(0.736)
	Head edu	0.147	-0.017	0.048	0.023	-0.027	0.673***	-0.091	0.039	0.317***
cts ()		(0.095)	(0.055)	(0.095)	(0.222)	(0.141)	(0.237)	(0.076)	(0.053)	(0.096)
ffec	Head empl	-0.050	-0.0721*	-0.146**	0.071	-0.046	0.106	-0.043	-0.227***	-0.579***
s E pla		(0.071)	(0.041)	(0.071)	(0.069)	(0.044)	(0.073)	(0.114)	(0.078)	(0.141)
urn: lexj	Hh comp	-0.267*	-0.076	0.497***	-0.179	-0.170**	0.272*	-0.343	-0.224	0.108
(Ur		(0.142)	(0.084)	(0.148)	(0.130)	(0.083)	(0.140)	(0.292)	(0.202)	(0.366)
що	Geo.location	0.075	-0.129**	-0.080	0.104	-0.140***	-0.225**	0.175*	0.072	-0.019
		(0.095)	(0.054)	(0.095)	(0.085)	(0.054)	(0.090)	(0.105)	(0.073)	(0.133)
	Constant	-0.881	0.176	-0.544	-1.942***	0.101	-0.918	1.226*	0.631	0.876
		(0.550)	(0.318)	(0.554)	(0.570)	(0.362)	(0.608)	(0.646)	(0.449)	(0.816)
	Observations		12,305			11,278			7,774	

Table 14. Quantile decomposition for Tunisia (2005-2010) and Sudan (2009) by male/female household head

Notes: Computed by the authors using Tunisian EBCNV 2005 & 2010. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 non-directional t-test. Table 15. Quantile decomposition for Tunisia (2005-2010) and Sudan (2009) by non-educated/educated

			Tunisia 2005			Tunisia 2010			Sudan 2009	
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	-0.513***	-0.592***	-0.750***	-0.619***	-0.622***	-0.617***	-0.402***	-0.406***	-0.452***
		(0.029)	(0.021)	(0.029)	(0.025)	(0.020)	(0.029)	(0.028)	(0.020)	(0.029)
	Endowment	-0.189***	-0.166***	-0.124***	-0.225***	-0.200***	-0.198***	-0.160***	-0.124***	-0.0443***
		(0.016)	(0.011)	(0.015)	(0.016)	(0.012)	(0.017)	(0.017)	(0.013)	(0.017)
	Returns	-0.324***	-0.425***	-0.626***	-0.394***	-0.422***	-0.419***	-0.241***	-0.283***	-0.408***
		(0.029)	(0.020)	(0.031)	(0.026)	(0.020)	(0.030)	(0.030)	(0.021)	(0.031)
S	Head char	0.004	0.009	0.002	-0.011	-0.0233***	-0.011	0.0196**	-0.003	0.0181**
(		(0.009)	(0.006)	(0.010)	(0.008)	(0.005)	(0.009)	(0.008)	(0.005)	(0.008)
Eff led)	Head empl	-0.0524***	-0.0570***	-0.0304**	-0.0195*	-0.0172**	-0.0286**	-0.0243***	-0.004	0.0199***
ent lain		(0.011)	(0.008)	(0.012)	(0.011)	(0.008)	(0.013)	(0.008)	(0.005)	(0.007)
vm [xp]	Hh comp	-0.0190**	-0.007	-0.0166*	-0.0308***	-0.0236***	-0.0274***	-0.007	0.008	0.011
(E dov		(0.009)	(0.007)	(0.009)	(0.009)	(0.007)	(0.011)	(0.006)	(0.006)	(0.007)
En	Geo.location	-0.122***	-0.111***	-0.0786***	-0.164***	-0.136***	-0.131***	-0.148***	-0.125***	-0.0935***
		(0.009)	(0.006)	(0.008)	(0.009)	(0.007)	(0.009)	(0.014)	(0.010)	(0.013)
	Head char	-0.009	-0.143	0.175	-0.024	-0.049	0.260	-1.523***	-0.503**	-0.635*
		(0.493)	(0.347)	(0.528)	(0.464)	(0.359)	(0.547)	(0.336)	(0.236)	(0.358)
cts d)	Head empl	0.006	-0.058	-0.210**	0.067	-0.131***	-0.218***	0.025	0.028	0.090
ffe		(0.080)	(0.056)	(0.085)	(0.062)	(0.048)	(0.073)	(0.091)	(0.064)	(0.097)
s E pla	Hh comp	0.214	0.458***	0.554***	-0.023	0.219**	0.061	0.158	0.260*	0.729***
urn Jex		(0.152)	(0.107)	(0.163)	(0.120)	(0.092)	(0.141)	(0.193)	(0.135)	(0.204)
(U1	Geo.location	-0.114	0.239***	0.298***	-0.131*	0.161***	0.268***	0.026	-0.053	-0.084
Η		(0.083)	(0.058)	(0.088)	(0.077)	(0.060)	(0.091)	(0.051)	(0.036)	(0.054)
	Constant	-0.421	-0.922***	-1.442***	-0.283	-0.623*	-0.790	1.071***	-0.016	-0.508
		(0.499)	(0.351)	(0.534)	(0.475)	(0.367)	(0.560)	(0.369)	(0.259)	(0.392)
	Observations		11,431			11,188			7,774	

Notes: Computed by the authors using Tunisian EBCNV 2005 and 2010 (OAMDI 2014c; OAMDI 2014d). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 non-directional t-test.

			Tunisia 2005			Tunisia 2010			Sudan 2009	
		10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
	Overall Gap	0.0927***	0.103***	0.116***	0.031	0.0922***	0.137***	-0.140***	-0.0703**	0.100
		(0.022)	(0.017)	(0.027)	(0.027)	(0.016)	(0.024)	(0.046)	(0.029)	(0.064)
	Endowment	0.364***	0.183***	0.003	0.425***	0.168***	0.0988***	0.000	0.034	0.040
		(0.029)	(0.021)	(0.034)	(0.039)	(0.021)	(0.030)	(0.045)	(0.029)	(0.065)
	Returns	-0.272***	-0.0801***	0.113***	-0.394***	-0.0760***	0.038	-0.141**	-0.104***	0.060
		(0.034)	(0.024)	(0.040)	(0.043)	(0.023)	(0.035)	(0.060)	(0.035)	(0.086)
S	Head char	0.190***	0.0500**	0.0990***	0.0871**	0.0445**	0.049	0.033	0.0589**	0.209***
ect		(0.031)	(0.022)	(0.037)	(0.043)	(0.023)	(0.034)	(0.050)	(0.029)	(0.073)
Eff (ed)	Head edu	-0.0360***	-0.0711***	-0.214***	-0.004	-0.0401***	-0.107***	-0.003	-0.0375***	-0.185***
ent ain		(0.009)	(0.007)	(0.015)	(0.009)	(0.005)	(0.010)	(0.017)	(0.011)	(0.030)
ym( xpl	Hh comp	0.162***	0.165***	0.0902***	0.279***	0.126***	0.123***	-0.006	0.025	0.026
(E Jo		(0.025)	(0.018)	(0.029)	(0.034)	(0.018)	(0.026)	(0.036)	(0.023)	(0.051)
Enc	Geo.location	0.0482***	0.0392***	0.0286***	0.0618***	0.0379***	0.0327***	-0.024	-0.012	-0.011
		(0.007)	(0.005)	(0.006)	(0.012)	(0.006)	(0.005)	(0.016)	(0.010)	(0.016)
	Head char	0.563	0.411	1.083**	1.050**	0.696**	0.724*	-0.128	-0.483*	-0.556
		(0.356)	(0.254)	(0.438)	(0.474)	(0.275)	(0.436)	(0.458)	(0.266)	(0.632)
t) (t	Head edu	-0.025	-0.035	0.076	-0.505**	0.091	-0.074	-0.079	-0.052	0.369***
ffec		(0.061)	(0.043)	(0.075)	(0.206)	(0.122)	(0.194)	(0.062)	(0.036)	(0.087)
s Ei olai	Hh comp	-0.100	-0.034	0.429***	-0.394***	-0.118	0.355***	-0.174	-0.117	0.592
urns ext		(0.111)	(0.079)	(0.137)	(0.121)	(0.072)	(0.115)	(0.310)	(0.180)	(0.432)
Un	Geo.location	0.054	-0.0684*	0.004	0.108	-0.028	0.071	0.122	-0.005	-0.068
A O		(0.057)	(0.041)	(0.069)	(0.069)	(0.039)	(0.061)	(0.084)	(0.049)	(0.119)
	Constant	-0.764**	-0.354	-1.480***	-0.653	-0.717**	-1.037**	0.117	0.552*	-0.278
		(0.386)	(0.275)	(0.475)	(0.549)	(0.317)	(0.502)	(0.553)	(0.321)	(0.767)
	Observations		12,305			11,278			7,774	

Table 16. Quantile decomposition for Tunisia (2005-2010) and Sudan (2009) by non-employed/employed

Notes: Computed by the authors using Tunisian EBCNV 2005 and 2010 (OAMDI 2014c; OAMDI 2014d). Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 non-directional t-test.

## 5. Discussion

This study aimed to measure economic inequalities between various socio-economic groups and across population wealth strata in the Arab region. Inequality among different geographic areas and social groups was measured in order to estimate the effect of circumstances that people live in on overall inequality. Differences in households' endowments, such as human capital, socio-demographic characteristics and households' geographic location, were evaluated as main determinants of the expenditure differentials across social groups. The study used a rich sample of eleven Household Income and Expenditure surveys from five Arab countries: Egypt, Jordan, Palestine, Sudan and Tunisia. This allowed us to evaluate trends in inequality and its composition over time – in the case of Egypt even before and after the Arab Spring uprisings. We followed Belhaj Hassine (2014) in applying unconditional quantile regressions to decompose expenditure gaps by their source at different points in the population distribution.

We found that Egypt, Sudan and Tunisia exhibit relatively high expenditure gaps across rural/urban and educated/non-educated groups, while the gaps in Jordan and Palestine, and those across employed/non-employed and male/female headed households are moderate. Between 2008 and 2012 the rural/urban and education gaps decreased in Egypt while the household-gender and employment gaps increased, especially for the highest population decile. In Jordan, between 2006 and 2010, the rural/urban gap decreased across population quantiles, while the employment gap increased. The education gap increased for the poor but decreased for the rich, while the gender gap fell for the poor but increased for households at the median and the top of the distribution. In Palestine, between 2007 and 2011, the rural/urban gap decreased for the rich while it increased for the poor. The gender and employment gaps decreased for both the poor and the rich. However, the education gap increased. In Tunisia, between 2005 and 2010, the rural/urban gap increased both for the rich and the poor. The education gap increased for the poor and median-expenditure households but increased slightly for the rich.

These results paint a complex picture of the pattern of inequality in the Arab region. While overall inequality regressed in most Arab countries, this favorable trend did not hold for intergroup inequality evaluated across different pairs of demographic groups, or across all wealth strata of population. Inter-group inequalities in different countries have different sources, and the degrees to which they can be attributed to 'explained' differences in endowments of human capital across demographic groups, and to 'unexplained' differences in returns to these endowments differ.

A number of robustness checks were performed to evaluate sensitivity of results to variable specifications. One, division of household expenditure by the number of household members was used in deference to previous literature in the aim to facilitate comparison of Gini coefficients across studies. An alternative approach is to use a modified OECD adult-equivalence scale with household size computed as  $[1 + 0.7 (N_{adults}-1) + \alpha N_{children} + \alpha N_{elderly}]$  where  $\alpha$  is taken to be 0.3 to account for a lesser role played by children under the age of 14 and the elderly aged 65+ years (Glewwe and Twum-Baah, 1991, as cited in Haughton and Khandker

2009:29). This alternative, evaluated for Jordan 2010, yields results reported in figure A18 in the Appendix. These results are qualitatively analogous to those in figure A11. While the level of expenditure per capita has changed, measures of inequality remain similar.

Another robustness check concerns classification of household heads as educated vs. noneducated. In the baseline specification, only household heads who have not completed any level of schooling are classified as non-educated. In some countries it may be more appropriate to use a higher cutoff. As an alternative specification we have considered distinguishing household heads with up to primary/lower secondary school achievement from those with secondary/postsecondary and post graduate education. Figure A19 reports the results for the Jordanian year-2010 survey, where 1,863 household observations are thus classified as non-educated and 982 as educated. The results for this exercise differ somewhat from those in figure A11. The endowment effect is now estimated to be just below zero at the low and high expenditure deciles of the population and zero around the median. This compares to a positive endowment effect for all population deciles, also lowest at the bottom and top expenditure deciles, in the original specification. Under the alternative specification, the returns effect is now estimated to be increasing in strength with the population quantile (compared to decreasing, originally), with the strongest returns effect accruing to the educated among the top expenditure decile.

Hence, it appears that detailed decomposition results for each population decile may not follow through under alternative delineations of comparison groups. Nevertheless, the sign of overall inequality, its decomposition into endowment and returns effects, and their ranking at various population quantiles are estimated consistently under alternative specifications, showing support for general results. A common thread is thus revealed to run across the eleven surveys and alternative model specifications. Education and its return, geographic location, and household composition play a crucial role in the drive to reduce expenditure differentials across social groups. Implications of these findings are that public policy should focus on investing in human capital, facilitating equal access to developmental opportunities across regions and improving family composition using better family planning.

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## Data sources

The following datasets were accessed in the Harmonized Household Income and Expenditure Surveys (HHIES) database at Egypt-based Economic Research Forum's (ERF) portal, http://www.erf.org.eg/cms.php?id=erfdataportal:

- Open Access Micro Data Initiative (OAMDI, 2014a). Version 2.0 of Licensed Data Files; HIECS 2008/2009 - Central Agency for Public Mobilization and Statistics (CAPMAS).
- OAMDI (2014b). Version 2.0 of Licensed Data Files; HIECS 2010/2011 Central Agency for Public Mobilization and Statistics (CAPMAS).
- OAMDI (2014c). HIECS 2012/2013 Central Agency for Public Mobilization and Statistics (CAPMAS).
- Economic Research Forum and the Department of Statistics of Hashemite Kingdom of Jordan (ERF & DOS, 2013), Household Expenditure and Income Survey 2010/2011 (HEIS 2010/2011), Version 1.0 of the Licensed data files, March 2013, DOS, Hashemite Kingdom of Jordan.
- OAMDI (2014d). Version 2.0 of Licensed Data Files; HEIS 2006 DOS, Hashemite Kingdom of Jordan.
- OAMDI (2014e). Version 2.0 of Licensed Data Files; PECS 2007 Palestinian Central Bureau of Statistics (PCBS).
- OAMDI (2014f). Version 2.0 of Licensed Data Files; PECS 2010 Palestinian Central Bureau of Statistics (PCBS).
- OAMDI (2014g). Version 2.0 of Licensed Data Files; PECS 2011 Palestinian Central Bureau of Statistics (PCBS).
- OAMDI (2014h). Version 2.0 of Licensed Data Files; NBHS 2009 Central Bureau of Statistics, Sudan.
- OAMDI (2014i). Version 2.0 of Licensed Data Files; EBCNV 2005 National Institute of Statistics, Tunisia.
- OAMDI (2014j). Version 2.0 of Licensed Data Files; EBCNV 2010 National Institute of Statistics, Tunisia.

## Appendix

#### Table A1. Data sources and summary statistics

			Mean total expenditures per	Median total expend. per
Survey wave	Survey <sup>b</sup>	Households	capita (st.dev.) <sup>a</sup>	capita
Egypt 2008	HEICS 2008/09 (OAMDI 2014a) <sup>c</sup>	23,428	1,425.38 (1,221.58)	1,151.06
Egypt 2010	HEICS 2010/11 (OAMDI 2014b)	7,719	1,603.37 (1352.69)	1,287.40
Egypt 2012	HEICS 2012/13 (OAMDI 2014c)	7,525	1,719.77 (1251.38)	1,414.53
Jordan 2006	HEIS 2006 (OAMDI 2014d)	2,897	2,500.05 (2,274.26)	1,927.28
Jordan 2010	HEIS 2010/11 (ERF & DOS, 2013)	2,845	3,108.79 (4,139.79)	2,348.79
Palestine 2007	PECS 2007 (OAMDI 2014e)	1,231	3,759.11 (3756.81)	2,759.62
Palestine 2010	PECS 2010 (OAMDI 2014f)	3,537	5,138.56 (5012.92)	3,771.70
Palestine 2011	PECS 2011 (OAMDI 2014g)	4,317	5,280.86 (4878.28)	3,964.53
Sudan 2009	NBHS 2009 (OAMDI 2014h)	7,913	1,164.74 (1,260.34)	881.01
Tunisia 2005	EBCNV 2005 (OAMDI 2014i)	12,318	2,600.67 (2,818.96)	1,894.29
Tunisia 2010	EBCNV 2010 (OAMDI 2014j)	11,281	3,332.21 (2,930.51)	2,542.90

<sup>a</sup> Converted using purchasing power parity exchange rate to international dollars (UNSD, 2015). Summary statistics account for household sampling weights and household size.

<sup>b</sup> EBCNV = National Survey on Household Budget, Consumption and Standard of Living; HEICS = Household Expenditure, Income and Consumption Survey; HEIS = Household Expenditure and Income Survey; NBHS = National Baseline Household Survey; PECS = Palestinian Expenditure and Consumption Survey.

<sup>c</sup> The original surveys of HEICS include 48, 658 households (HEICS 2008/2009), 26,500 households (HEICS 2010/2011) and 24,863 households (HEICS 2012/2013).

		Egypt		Jor	dan		Palestine		Sudan	Tu	nisia
	2008	2010	2012	2006	2010	2007	2010	2011	2009	2005	2010
Total expenditure	7,222.01	7,612.50	8,032.07	15,186.10	17,479.10	25,298.37	29,985.84	30,299.69	7,904.36	12,517.68	15,291.19
Total disposable income	8,730.50	8,604.13	9,279.60	12,862.11	15,599.18	n.a.	21,214.35	21,887.29	4,756.66	n.a.	n.a.
Food expenditure	3,350.87	3,094.32	3,083.06	4,690.57	5,958.89	7,787.21	9,188.15	9,260.09	4,523.80	4,416.98	4,620.79
Total expenditure/capita	1,425.38	1,603.37	1,719.91	2,500.05	3,108.79	3,759.11	4,695.58	4,825.61	1,164.74	2,600.67	3,332.21
Food expenditure/capita	643.82	642.85	647.28	761.55	1,046.21	1,123.47	1,388.60	1,421.59	667.48	906.47	1,004.64
Food share in total exp.	49%	44%	41%	33%	36%	35%	34%	34%	60%	41%	34%

Table A2: Total expenditure, total disposable income and food expenditure (International dollar PPP)

Notes: Summary statistics account for household sampling weights. "n.a." indicates that data are not available in the survey.

Table A3: Average households expenditure per capita and share of aggregate expenditure, by quintile (International dollars PPP; [%])

		Egypt		Jor	dan		Palestine		Sudan	Tun	isia
Quintile	2008	2010	2012	2006	2010	2007	2010	2011	2009	2005	2010
1	705.64	788.78	880.86	1,028.89	1,272.47	1,280.02	1,892.32	1,969.32	375.48	785.46	1,066.10
	[9.10%]	[9.10%]	[9.57%]	[7.55%]	[7.71%]	[6.14%]	[6.73%]	[6.83%]	[6.02%]	[5.88%]	[6.31%]
2	1,025.25	1,141.60	1,244.50	1,645.06	1,967.24	2,229.06	3,112.63	3,226.32	670.26	1,377.05	1,852.17
	[12.95%]	[12.88%]	[13.33%]	[11.71%]	[11.55%]	[10.30%]	[10.73%]	[10.88%]	[10.61%]	[10.29%]	[10.93%]
3	1,304.29	1,453.93	1,562.18	2,237.01	2,646.54	3,211.91	4,304.84	4,469.21	965.00	1,968.09	2,609.34
	[16.20%]	[16.12%]	[16.46%]	[15.55%]	[15.17%]	[14.71%]	[14.75%]	[15.03%]	[15.20%]	[14.65%]	[15.38%]
4	1,721.21	1,918.78	2,037.49	3,192.80	3,789.05	4,754.32	6,281.86	6,557.38	1,391.38	2,860.82	3,747.60
	[20.82%]	[20.83%]	[20.97%]	[21.22%]	[21.00%]	[21.30%]	[21.09%]	[21.45%]	[21.90%]	[21.18%]	[22.04%]
5	3,485.14	3,860.17	3,938.16	6,601.92	7,976.75	10,434.27	13,533.24	13,771.91	2,916.03	6,478.80	7,679.37
	[40.94%]	[41.07%]	[39.67%]	[43.97%]	[44.58%]	[47.55%]	[46.70%]	[45.81%]	[46.27%]	[48.00%]	[45.35%]
Total	1,425.38	1,603.37	1,719.91	2,500.05	3,108.79	3,759.11	5,138.56	5,280.86	1,164.74	2,600.67	3,332.21

Notes: Author's calculations from national household surveys. PPP conversion rates from UNSD (2015). Summary statistics account for household sampling weights and household size.

## Table A4: Share of aggregate expenditure, by decile (%)

Palestine

Sudan Tunisia

Decile	2008	2010	2012	2006	2010	2007	2010	2011	2009	2005	2010
1	3.88	3.93	4.10	3.09	3.24	2.39	2.75	2.76	2.27	2.30	2.44
2	5.22	5.17	5.47	4.45	4.47	3.76	3.98	4.07	3.75	3.58	3.87
3	6.08	6.05	6.30	5.34	5.36	4.62	4.86	4.95	4.80	4.64	4.97
4	6.87	6.83	7.03	6.37	6.19	5.68	5.86	5.93	5.82	5.65	5.97
5	7.65	7.61	7.80	7.21	7.10	6.79	6.79	6.97	6.97	6.66	7.08
6	8.54	8.51	8.66	8.34	8.07	7.92	7.97	8.06	8.23	7.99	8.30
7	9.64	9.66	9.75	9.65	9.54	9.54	9.40	9.60	9.88	9.50	9.87
8	11.18	11.18	11.22	11.57	11.46	11.76	11.69	11.85	12.02	11.68	12.17
9	13.80	13.94	13.81	15.43	15.17	15.70	15.81	15.66	15.51	15.65	15.98
10	27.14	27.12	25.86	28.54	29.41	31.85	30.89	30.15	30.76	32.36	29.36

Notes: Author's calculations from national household surveys. PPP conversion rates from UNSD (2015). Summary statistics account for household sampling weights and household size.

#### Table A5: Distribution of households by quintiles and characteristics of household heads

Household			Egypt		Jor	dan		Palestine		Sudan	Tur	nisia
character.	Quintiles	2008	2010	2012	2006	2010	2007	2010	2011	2009	2005	2010
Urban	1	24.97	25.32	26.25	66.03	66.43	55.06	69.15	49.65	10.04	32.06	33.63
	2	32.07	35.04	33.42	77.03	71.70	46.34	66.05	47.39	23.25	53.43	57.31
	3	39.47	43.65	40.86	76.38	71.35	45.12	62.23	51.85	31.73	64.98	66.31
	4	55.8	54.63	51.43	84.28	78.56	56.91	64.18	52.26	40.49	74.72	76.15
	5	77.57	73.74	69.50	90.85	88.05	71.14	74.17	60.83	49.87	84.69	88.43
	Total	45.97	46.47	44.29	78.91	75.22	54.91	67.15	52.40	31.08	61.96	64.36
Employed	1	82.71	82.25	82.39	56.38	57.82	85.02	84.18	80.9	82.47	71.24	67.83
	2	82.31	82.19	82.06	66.67	64.67	86.18	84.15	80.07	87.37	68.28	65.97
	3	79.89	77.40	77.14	67.41	65.38	81.30	80.45	82.41	88.12	65.94	65.03
	4	74.63	73.66	72.49	59.59	54.66	81.30	78.03	73.23	86.54	63.32	62.15
	5	61.96	60.77	58.94	48.36	42.88	73.98	72.3	71.38	84.83	61.22	55.23
	Total	76.30	75.26	74.60	59.68	57.08	81.56	79.82	77.60	85.87	66.00	63.24
Educated	1	32.05	38.60	41.00	68.10	71.35	78.14	81.65	80.32	19.01	6.76	5.04
	2	42.81	48.83	51.43	76.17	77.86	84.15	82.82	84.59	29.06	10.97	10.02
	3	49.54	54.73	55.35	79.66	80.84	81.71	84.18	84.84	33.50	15.90	14.62
	4	56.38	60.52	59.40	81.69	80.14	82.11	81.23	82.50	43.26	23.45	22.90

	5	67.90	69.13	66.18	83.94	79.79	80.49	83.89	81.00	52.97	44.56	41.78
	Total	49.74	54.36	54.67	77.91	78.00	81.32	82.75	82.65	35.56	20.53	18.88
Female hhd.	1	12.36	12.50	12.49	9.83	9.49	4.05	5.85	6.60	9.98	13.72	15.20
	2	12.97	12.44	13.29	8.64	9.84	6.91	6.79	8.34	9.73	16.13	13.08
	3	14.17	14.77	15.75	6.72	12.65	10.98	7.58	10.30	9.17	17.29	14.45
	4	18.42	17.48	19.07	13.64	13.71	6.91	11.32	14.25	9.54	18.50	14.49
	5	25.70	26.33	28.70	20.03	24.96	15.04	17.04	19.00	13.65	20.75	18.31
	Total	16.72	16.70	17.86	11.77	14.13	8.77	9.72	11.70	10.41	17.28	15.11

Source: Author's calculations from national household surveys. PPP conversion rates from UNSD (2015). Notes: Summary statistics account for household sampling weights and household size.

## Table A6: Distribution of households by expenditure deciles and characteristics of household heads

Household			Egypt		Jore	lan		Palestine		Sudan	Tun	isia
character.	Deciles	2008	2010	2012	2006	2010	2007	2010	2011	2009	2005	2010
Urban	1	22.58	23.19	21.51	61.38	62.46	56.45	74.73	50.93	7.20	25.04	26.04
	2	27.36	27.46	30.98	70.69	70.42	53.66	63.56	48.38	12.90	39.11	41.22
	3	30.43	31.61	30.68	74.48	69.12	47.97	66.22	44.44	21.49	49.43	55.41
	4	33.72	38.47	36.17	79.58	74.30	44.72	65.87	50.35	25.00	57.41	59.22
	5	36.08	42.10	37.72	74.48	73.68	43.9	60.90	52.08	27.81	60.42	63.92
	6	42.85	45.21	44.02	78.28	69.01	46.34	63.56	51.62	35.65	69.50	68.71
	7	53.09	49.87	49.67	83.39	75.79	57.72	64.80	51.97	37.50	70.60	75.71
	8	58.51	59.38	53.19	85.17	81.34	56.10	63.56	52.55	43.49	78.81	76.60
	9	69.10	64.46	61.75	88.28	84.21	65.04	71.01	52.55	47.41	80.99	87.15
	10	86.04	83.01	77.26	93.43	91.90	77.24	77.33	69.14	52.34	88.38	89.72
	Total	45.97	46.47	44.29	78.91	75.22	54.91	67.15	52.40	31.08	61.96	64.36
Employed	1	81.60	81.99	82.07	54.14	49.47	84.68	84.04	79.17	81.82	72.16	66.52
	2	83.82	82.51	82.71	58.62	66.20	85.37	84.31	82.64	83.12	70.33	69.15
	3	82.46	82.90	82.07	67.59	71.23	84.55	87.23	80.09	88.21	68.64	68.21
	4	82.16	81.48	82.05	65.74	58.10	87.80	81.07	80.05	86.54	67.91	63.74
	5	81.00	77.07	77.69	66.21	69.47	84.55	77.13	84.03	87.80	67.73	64.98
	6	78.79	77.72	76.60	68.62	61.27	78.05	83.78	80.79	88.43	64.16	65.07

	7	75.07	74.74	75.17	58.48	59.30	83.74	76.80	75.41	87.37	64.33	62.77
	8	74.18	72.57	69.81	60.69	50.00	78.86	79.26	71.06	85.71	62.31	61.52
	9	66.67	66.02	62.68	53.10	44.56	76.42	73.94	73.38	84.33	62.28	57.45
	10	57.26	55.51	55.19	43.60	41.20	71.54	70.67	69.37	85.34	60.16	53.01
	Total	76.30	75.26	74.60	59.68	57.08	81.56	79.82	77.60	85.87	66.00	63.24
Educated	1	28.08	33.55	35.46	61.38	64.21	78.23	79.79	77.08	16.67	6.5	3.75
	2	36.02	43.65	46.54	74.83	78.52	78.05	83.51	83.56	21.37	7.02	6.32
	3	40.50	45.85	49.00	73.79	78.25	82.93	81.38	84.49	28.07	9.69	8.68
	4	45.11	51.81	53.86	78.55	77.46	85.37	84.27	84.69	30.05	12.24	11.37
	5	47.78	54.27	53.92	78.28	83.51	86.18	84.04	86.11	32.74	13.53	14.18
	6	51.30	55.18	56.78	81.03	78.17	77.24	84.31	83.56	34.26	18.25	15.05
	7	55.27	60.62	59.10	81.31	80.35	83.74	78.13	80.97	40.78	20.76	19.35
	8	57.49	60.41	59.71	82.07	79.93	80.49	84.31	84.03	45.75	26.15	26.43
	9	62.74	62.78	61.89	81.72	77.54	78.86	86.17	78.94	48.17	35.41	36.18
	10	73.06	75.49	70.48	86.16	82.04	82.11	81.60	83.06	57.77	53.5	47.41
	Total	49.74	54.36	54.67	77.91	78.00	81.32	82.75	82.65	35.56	20.53	18.88
Female-headed	1	12.68	11.92	13.15	10.00	11.93	3.23	5.85	6.48	10.61	13.54	15.77
	2	12.04	13.08	11.84	9.66	7.04	4.88	5.85	6.71	9.36	13.90	14.63
	3	12.72	11.40	13.81	8.28	8.42	5.69	6.91	8.33	9.99	15.67	12.68
	4	13.23	13.47	12.77	9.00	11.27	8.13	6.67	8.35	9.47	16.60	13.48
	5	12.98	14.38	17.13	6.90	9.12	8.13	8.78	10.88	8.34	18.16	15.43
	6	15.36	15.16	14.36	6.55	16.20	13.82	6.38	9.72	9.99	16.42	13.48
	7	19.04	15.80	17.93	12.11	11.23	5.69	11.20	13.69	9.47	18.81	14.18
	8	17.80	19.15	20.21	15.17	16.20	8.13	11.44	14.81	9.61	18.18	14.80
	9	22.49	23.09	26.16	17.93	23.51	12.20	18.35	18.29	13.15	21.19	16.49
	10	28.91	29.57	31.25	22.15	26.41	17.89	15.73	19.72	14.16	20.31	20.12
	Total	16.72	16.70	17.86	11.77	14.13	8.77	9.72	11.70	10.41	17.28	15.11

Source: Author's calculations from national household surveys. PPP conversion rates from UNSD (2015). Notes: Summary statistics account for household sampling weights and household size.

## Table A7: Gini index for the eleven surveys

	Egypt			Jordan		Palestine			Sudan	Tunisia	
Subsample	2008	2010	2012	2006	2010	2007	2010	2011	2009	2005	2010
Total expend./capita											
Overall	31.32	31.42	29.59	35.81	36.21	40.83	39.18	38.43	39.88	41.40	38.50
Rural	23.05	23.64	23.67	30.99	29.24	33.05	34.78	30.21	39.09	36.92	34.33
Urban	34.47	34.41	32.33	36.23	37.07	44.08	40.51	40.42	36.35	39.50	36.03
Non-employed	35.45	35.64	34.01	37.86	37.26	39.94	41.53	39.65	42.76	41.14	38.94
Employed	29.97	29.92	27.99	34.33	35.22	44.45	38.65	38.10	38.70	41.43	38.10
Non-educated	25.00	25.19	25.03	35.18	36.23	38.51	42.01	39.99	38.72	37.00	35.80
Educated	33.54	33.36	30.95	35.65	36.08	41.18	38.66	38.03	38.07	41.89	35.69
Female hhd.	34.90	34.50	32.72	37.62	39.16	43.58	43.28	39.60	43.04	42.47	40.59
Male hhd.	30.70	30.87	29.01	35.39	35.62	40.45	38.83	38.27	39.56	41.22	38.23
Food expend./capita											
Overall	25.75	26.09	24.85	33.15	33.44	33.40	31.66	31.52	38.94	33.29	32.33
Rural	21.85	21.98	21.58	31.29	32.28	30.49	29.33	27.54	41.54	32.67	31.89
Urban	28.09	28.93	27.42	33.42	33.62	34.65	32.32	32.55	32.83	31.83	30.55
Non-employed	29.89	29.86	29.05	35.83	36.51	36.97	35.26	34.15	43.83	35.35	34.24
Employed	24.52	24.84	23.45	31.36	30.67	32.58	30.78	30.67	37.99	32.14	31.13
Non-educated	24.12	24.25	23.85	36.06	38.52	33.44	36.97	35.92	39.47	31.70	31.51
Educated	26.29	26.71	25.15	32.41	32.23	33.36	30.72	30.73	36.20	32.58	29.20
Female hhd.	29.33	28.38	27.37	36.31	39.21	32.40	36.53	35.23	43.06	34.97	36.97
Male hhd.	25.10	25.63	24.31	32.71	32.48	33.37	31.23	31.03	38.49	32.97	31.71

Source: Author's calculations from national household surveys. PPP conversion rates from UNSD (2015). Notes: Summary statistics account for household sampling weights and household size.



Figure A1: GDP per capita in 2000 and 2013 and its growth rate (Constant 2011 international \$)

Source: World Development Indicator data, 2015.





Source: World Development Indicator data, 2015.



Figure A3: Poverty headcount ratio in Jordan 2010







Source: World Development Indicator data, 2015.



Figure A6. Poverty headcount ratio in Sudan, 2009

Source: World Development Indicator data, 2015



Figure A6. Poverty headcount ratio in Tunisia, 2000–2005 and 2010

Source: World Development Indicator data, 2015



Figure A7. Decomposition into endowment and returns effects, Egypt 2008



c. Educated/non-educated inequality

d. Male/female household-head inequality

Figure A8. Decomposition into endowment and returns effects, Egypt 2010



a. Urban/rural inequality

b. Employed/non-employed inequality





d. Male/female household-head inequality





a. Urban/rural inequality



b. Employed/non-employed inequality



c. Educated/non-educated inequality

d. Male/female household-head inequality



Figure A10. Decomposition into endowment and returns effects, Palestine 2007



c. Educated/non-educated inequality

d. Male/female household-head inequality

Figure A11. Decomposition into endowment and returns effects, Palestine 2010



a. Urban/rural inequality

b. Employed/non-employed inequality







a. Urban/rural inequality

b. Employed/non-employed inequality



Figure A13. Decomposition into endowment and returns effects, Jordan 2006





b. Employed/non-employed inequality



c. Educated/non-educated inequality







a. Urban/rural inequality

b. Employed/non-employed inequality





d. Male/female household-head inequality

Returns effects and endowment effects for Tunisia 2005

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a. Urban/rural inequality

b. Employed/non-employed inequality









b. Employed/non-employed inequality



c. Educated/non-educated inequality

d. Male/female household-head inequality











Figure A18. Decomposition using an alternative adult-equivalent household-size scale, Jordan 2010







Returns effects and endowment effects for Jordan 2010



c. Educated/non-educated inequality d. Male/female household-head inequality Note: Expenditure per capita is computed using a modified OECD adult-equivalence scale with household size taken as [1 + 0.7 (Nadults-1) + 0.3 Nchildren + 0.3 Nelderly] to account for a lesser role played by children under the age of 14 and the elderly aged 65+ years (Glewwe and Twum-Baah, 1991, as cited in Haughton and Khandker 2009:29).

# Figure A19. Educated/non-educated gap decomposition using an alternative cutoff, Jordan 2010



Note: Household heads with up to primary/lower secondary school achievement are distinguished from those with secondary/post-secondary and post graduate education.