

Equality of Human Opportunities in the Middle East and North Africa*

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We present estimates of the Human Opportunity Index (HOI) for 10 countries in the Middle East and North Africa (MENA) using harmonized household expenditure and income surveys. The index measures equality of opportunity in access to basic services (electricity, piped water, sanitation and basic education) by children. MENA governments play a large role in provision of these services, so how equitably they are provided determines the life chances of MENA children and overall equality of opportunity in these countries. We find that HOI levels in MENA countries have improved over time and compare favorably with similar measures computed for other countries, notably those in Latin America. Our findings broadly indicate that authoritarian MENA governments that are widely criticized for failing to foster dynamic economies and deliver jobs and high economic growth, have done reasonably well in providing access to basic services and ensuring that they are delivered relatively equitably. We provide decompositions of HOI for individual outcomes over time to account for the contribution of the change in average access vs. its distribution to change in the HOI. We also provide the Shapley decompositions of the Dissimilarity Index of the outcomes to gain insight into the significance of different circumstances to changes in the HOI.

Keywords: human opportunity index, inequality, inequality of opportunity, Shapley decomposition, education, Middle East

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INTRODUCTION

Economic inequality is considered a prime source of popular dissatisfaction with the status quo that led to the Arab uprisings in 2011. Curiously, the standard measures of inequality, such as the Gini index, place most Arab countries below the more unequal developing countries, such as China and Latin American countries (Bibi and Nabli 2009, Belhaj-Hassine 2015). To reconcile the widely held perceptions of profound social and economic injustice in the region with low estimates of income inequality, what the World Bank (2015) calls the “MENA inequality puzzle,” researchers have looked for evidence of inequality beyond the standard indicators of income and consumption inequality Devarajan and Ianchovichina (2018), though the picture that emerges is still unclear. Some studies assume — with good reason — that income and expenditure data from household surveys underestimate income inequality because they do not capture top incomes. Assouad et al. (2018) amend survey data with data from tax revenues to find much higher income inequality in Lebanon, and Van Der Weide et al. (2018) find the same in Egypt using real estate data to capture top incomes. World Bank (2015) provides evidence of high levels of inequality in financial wealth. But, contrarily, Hlasny and Verme (2018), who use the Pareto

distribution to estimate the top tail of the income distribution, confirm the low Gini index obtained from survey data. Others have searched for social injustice arising from inequality of opportunity to explain the MENA puzzle. Salehi-Isfahani et al. (2014) and Assaad et al. (2019) find high levels of inequality of opportunity in education in several MENA countries. On the other hand, evidence of economic mobility from wage data in Egypt does not indicate particularly high levels of inequality of opportunity Belhaj-Hassine (2012), Assaad et al. (2018).

In this paper we shed new light on the MENA inequality puzzle by looking at the Human Opportunity Index (HOI), which captures the inequality of opportunity in access by young children to basic services, such as electricity, water, sanitation, and schools. HOI measures the extent to which access to basic services that determine a child's future depends on circumstances beyond his or her control. The circumstances are defined by the child's gender and the characteristics of the family and the community into which he or she is born. HOI is closely connected with the concept of equality of opportunity that has been proposed by Roemer (1998) and empirically implemented by Bourguignon et al. (2007) and Ferreira and Gignoux (2011), among others. But, like the generalized Lorenz curve, the HOI is sensitive to both the mean level of access to a particular service as well as the variance of its distribution.

We estimate the HOI for ten Middle Eastern countries for two periods in the decade prior to the Arab spring, circa 2000 and 2010. We want to know if prior to the Arab Spring this type of inequality of opportunity had deteriorated. We follow the methodology proposed by de Barros et al. (2009) to measure the extent and equity of supply of basic services, such as electricity, piped water, and sanitation as well as access to education. We also provide estimates of the contribution of different circumstances — e.g., family background vs. community characteristics — to total inequality in access to a service, using the Shapley decomposition.

HOI is relevant for gauging the extra level of dissatisfaction with high or rising inequality of access to government-provided basic services, which Cammett et al. (2015) note as a source of the Arab Spring grievances. Other region-wide studies of inequality of opportunity that have on education, Salehi-Isfahani et al. (2014) and Assaad et al. (2018), only partially implicate the government because they are largely affected by parental characteristics. As a measure of equity in the supply of publicly provided services, HOI speaks directly to how people perceive the quality of the state's performance. Since independence in the 1950s, most MENA countries have been ruled by populist, left-leaning and authoritarian governments. Charismatic leaders, such as Gamal Abdel Nasser, ruled with the help of an implicit "authoritarian bargain" according to which they would deliver basic services, subsidies, and jobs widely and equitably in exchange for political acquiescence Desai et al. (2009). Measurement of HOI is therefore especially useful for understanding if the Arab protests were the result of failures of governments to keep their end of the bargain. In addition, because the HOI captures the inequality of opportunity faced by a rising generation, it speaks more directly to the dissatisfaction felt by the Arab youth, who played the largest role in the uprisings.

Our findings broadly indicate that authoritarian MENA governments that are widely criticized for failing to foster dynamic economies and deliver jobs and high economic growth, have done reasonably well in providing access to basic services and ensuring that they are delivered relatively equitably. We measure progress according to this measure over time for the six countries in our sample that provide data at two points of time. As de Barros et al. (2009) note, the main purpose of HOI is to measure progress over time in children's access to the basic opportunities that are publicly provided, both in the extent of coverage and equity in their distribution. HOI comparisons over time, if done with the same type of survey and list of circumstances, do not suffer from the difficulties of comparison across countries. Here our results show variation in the experience of MENA countries during the first decade of this century. Egypt and Iran show improvement in education and housing HOIs. This is consistent with other studies of HOI in Egypt, such as Vélez et al. (2012), who find improvements, particularly for housing, during the same period we study and Aran and Ersado (2013), who used DHS and household expenditure surveys for the period before the Arab Spring and consider other outcomes besides housing. Jordan has the highest HOIs in the sample, which reduces the significance of its slight deterioration in HOI. There have been improvements in specific services, such

as housing in Palestine and reaching sixth grade on time in Iraq.

Tunisia is the only country in this group of five to have experienced deterioration in HOI. Note that because coverage rates have generally increased over time, any deterioration in HOI is necessarily the result of a less equal distribution. The case of Tunisia is especially noteworthy because it was the place where the Arab Spring began in 2011. The deterioration in its HOI in the preceding decade is therefore suggestive. While we cannot claim any causal relationship, our results put worsening equity in access to basic services in the list of explanations for Tunisia's uprising. Other studies of Tunisian HOI partially confirm our finding. Jemmali and Amara (2015) measure HOI for six regions in 2005 but do not report the national rate. Jemmali and Amara (2018) repeat the same exercise for 2010 and drop the second for the same regions and conclude that there has been no improvement over the five-year period. Amara and Jemmali (2018) use a multiple-indicators survey for a single year so their study does not reveal any trend. Finally, Saidi and Hamdaoui (2017) report HOI for health outcomes but do not compare HOIs over time.

HOI is not a measure of inequality and hence it is not comparable with the Gini index. Differences in the outcomes used, circumstances that account for the distribution of the outcomes, and the type of survey employed may differ. Nevertheless, keeping in mind these differences, in a later section we compare our results with those for Sub-Saharan Africa (SSA) (Dabalen et al., 2014) and Latin America (de Barros et al., 2009, Molinas Vega et al., 2012). These comparisons suggest that MENA countries have done relatively well, especially in the provision of housing services.

The empirical literature on the inequality of opportunity, including the HOI literature, has been criticized for its limited policy implications. Kanbur and Wagstaff (2014) are concerned that statistics that show a small contribution of circumstances to inequality of opportunity, even with the warning that it is a lower bound, can mislead policymakers into thinking that inequality of opportunity is moderate or manageable. They argue that the conventional measures of inequality, such as the poverty rate, are less open to such ambiguity. This is a valid criticism of empirical studies of inequality of opportunity in which an outcome — such as income — has at least two types of influences, circumstances and effort. HOI analysis does not, strictly speaking, decompose into influences of circumstances vs. effort, because access to publicly provided services depends more on their availability than individual effort, which is ineffective if these services do not exist. This is much more true when the individual in question is a child. Of the services we study only reaching sixth grade on time can be said to depend in part on child and parent effort. So, in general, estimates of inequality in access to basic services are not a simple decomposition into circumstances and effort. Another reason why the critique of inequality of opportunity by Kanbur and Wagstaff (2014) does not reduce the value of HOI analysis is that the set of circumstances and basic services used in the analysis, though incomplete, is fixed over time. Furthermore, it is also fixed in our comparison across countries and regions, such as between MENA and Latin America. The fact that our estimates of inequality of opportunity are lower bounds does not reduce their value to policymakers who benefit from knowing how equality of access to a service they provide has changed over time and how it compares with other countries.

The remainder of this paper proceeds as follows. The next section describes the harmonized HIES data we use, followed by methodology, the results, the section comparing the results for MENA with those of other regions, and the conclusion.

DATA

Studies of inequality of human opportunities usually use household surveys that include information on access to basic services, schooling of children under 16 who live with their parents, and other family characteristics. We take advantage of the harmonized income and expenditure surveys for MENA countries provided by the Economic Research Forum (see Table 1).¹ We supplement these data with several surveys from Iran and the most recent (2012)

household socio-economic survey from Iraq, available from the World Bank. Most countries in our study appear more than one year; we have at least two surveys from Egypt, Iran, Iraq, Jordan, Palestine, and Tunisia, but only one survey each from Morocco, Sudan, Syria, and Yemen (see Table 1 for the complete list of the surveys and their dates). We limit our discussion in this paper to the results from surveys from around the beginning and the end of the decade 2000-2010. These surveys are well-suited for the purpose of cross-country analysis because they have been harmonized to unify as much as possible the definitions of variables measuring access to basic services and education. In almost all cases, access to a service is a binary variable.

We construct our working samples for children 0-16 years old with information on their characteristics, those of their parents and other household characteristics. Limiting the child age to 16 ensures that more than 95% of the children are still living with their parents. The samples range in size from about 5,800 to 77,000 (see Table 2).

Our definition of variables closely follows those in the harmonized data as well as those used by de Barros et al. (2009), which is important for comparison with LAC. An important exception is with the definition of sanitation which can vary from country to country. In some surveys, sanitation is minimally defined as a latrine, which could be a hole in the ground with no running water. In the harmonized data the variable designating toilet facilities signifies a higher level of sanitation than a latrine and sometimes indicates a flush toilet. In Iran, sanitation is a binary variable for having a bath in the house, which usually includes a flush toilet and hot water, and thus sets a higher standard than we use in other countries in our sample. Because we use this variable as our sanitation variable, our estimates of housing HOI for Iran are underestimates. Iran's 2006 census, which reports the presence

Table 1. List of countries and surveys used in this study

Country	Circa 2000	Circa 2010	Survey
Egypt	1999	2010	Household Income, Expenditure, and Consumption Survey, (HIECS)
Iran	2000	2010	Household Expenditure and Income Survey, (HEIS)
Iraq	2007	2012	HEIS (2007), Household Socio-Economic Survey (HSES) (2012)
Jordan	2006	2010	Household Expenditure and Income Survey, (HEIS)
Morocco	2001	-	Household Expenditure and Income Survey, (HEIS)
Palestine	1998	2010	Expenditure and Consumption Survey (ECS)
Sudan	-	2009	National Baseline Household Survey (NBHS)
Syria	2004	-	Household Expenditure and Income Survey, (HEIS)
Tunisia	2005	2010	National Survey on Household Budget, Consumption and Standard of Living (EBCNV)
Yemen	-	2006	Household Expenditure and Income Survey, (HEIS)

Table 2. Sample sizes for surveys

Country	Circa 2000	#Observation	Circa 2010	#Observation
Egypt	1999	40247	2010	11352
Iran	2000	51334	2010	39563
Iraq	2007	45574	2012	66441
Jordan	2006	6782	2010	5809
Morocco	2001	30919	-	-
Palestine	1998	8923	2010	9776
Sudan	-	-	2009	20746
Syria	2004	77009	-	-
Tunisia	2005	16252	2010	13044
Yemen	-	-	2006	47763

Source: ERF Data Portal <http://www.erfdataportal.com/index.php/catalog>, Statistical Center of Iran, and the World Bank

¹See the ERF data portal OMADI at <http://www.erfdataportal.com/index.php/catalog>.

Table 3. Summary statistics of circumstances for Egypt, Iran, Iraq, and Jordan

	Egypt		Iran		Iraq		Jordan	
	1999	2010	2000	2010	2007	2012	2006	2010
Child age	8.58 (4.82)	8.06 (4.88)	9.50 (4.59)	8.75 (4.87)	8.11 (4.75)	8.10 (4.71)	8.26 (4.81)	8.19 (4.91)
Father years of schooling	6.07 (6.20)	7.78 (5.99)	5.25 (4.85)	7.33 (4.87)	9.52 (4.10)	6.17 (4.78)	10.40 (4.04)	10.47 (3.86)
Mother years of schooling	4.20 (5.86)	6.61 (6.13)	3.75 (4.43)	6.40 (4.84)	7.58 (3.51)	3.86 (4.04)	9.79 (4.17)	10.43 (3.98)
No. of siblings	2.94 (1.76)	2.37 (1.45)	3.00 (1.93)	1.73 (1.42)	4.21 (2.30)	4.04 (2.26)	3.91 (2.02)	3.67 (1.89)
Log expenditures pc	7.30 (0.53)	8.25 (0.48)	14.91 (0.75)	16.65 (0.76)	7.09 (0.63)	5.03 (0.50)	6.80 (0.55)	7.12 (0.52)
Gender of head (Male=1)	92.45	91.67	96.19	96.19	95.14	95.03	95.92	95.26
Gender of child (Male=1)	51.62	51.30	52.06	51.26	51.57	51.29	51.64	50.67
Place of residence (Urban=1)	42.52	40.04	60.08	68.05	66.32	64.48	80.85	82.87
Single parent	8.00	8.45	4.28	4.29	5.15	5.92	4.25	4.83
No of observations	39086	11319	50634	39348	45574	66441	6782	5809

Note: Standard deviations in parentheses. Dummy variables are percent.

Table 4. Summary statistics of circumstances for Morocco, Palestine, Sudan, Syria, Tunisia, and Yemen

	Morocco	Palestine		Sudan	Syria	Tunisia		Yemen
	2001	1998	2010	2009	2004	2005	2010	2006
Child age	8.87 (4.69)	7.90 (4.69)	8.31 (4.90)	7.55 (4.71)	8.39 (4.75)	8.85 (4.80)	8.59 (4.89)	8.25 (4.71)
Father years of schooling	3.34 (4.50)	8.11 (4.58)	10.39 (3.83)	3.17 (4.88)	7.08 (4.38)	8.68 (6.49)	9.40 (6.73)	4.42 (5.29)
Mother years of schooling	1.63 (3.63)	6.91 (4.36)	10.05 (3.63)	2.35 (4.34)	4.86 (4.42)	5.11 (6.41)	5.81 (6.92)	1.00 (2.78)
No. of siblings	3.53 (2.02)	5.21 (2.58)	4.37 (2.14)	4.25 (2.35)	4.35 (2.47)	2.50 (1.52)	2.27 (1.44)	5.06 (2.50)
Log expenditures pc	9.73 (0.87)	8.36 (0.57)	8.92 (0.63)	7.17 (0.70)	10.44 (0.58)	7.05 (0.72)	7.44 (0.70)	11.11 (0.66)
Gender of head (Male=1)	91.51	98.02	97.53	92.88	95.86	92.31	93.17	94.88
Gender of child (Male=1)	51.06	52.52	51.39	52.63	51.60	49.78	50.38	51.86
Place of residence (Urban=1)	53.11	64.48	72.45	27.97	46.98	61.85	63.39	24.66
Single parent	8.76	2.03	2.55	4.21	4.47	8.33	7.56	5.47
No of observations	24651	8923	8897	20746	73637	16252	13044	37550

Note: Standard deviations in parentheses. Dummy variables are percent.

of both bath and toilet separately, shows that 99.1% of families had access to a toilet and 84.8% to a bath.

Tables 3 and 4 present the summary statistics for the circumstances for surveys used in this paper. The surveys are similar in terms of child age but differ in parent years of schooling, which ranges from 1.0 years for mothers in Yemen in 2006 to 10.47 for fathers in Jordan in 2010. Number of siblings varies with fertility levels, which is lowest in Tunisia and Iran and highest in Palestine and Yemen. In all countries, the majority of households are headed by men and less than 10% of the children live with a single parent, which is often headed by a woman. There is more variation in the place of residence of the children. In most countries, urban residence predominates; Egypt, Syria, Sudan, and Yemen are the exceptions.

METHODOLOGY

The HOI is based on a social welfare function first suggested by Sen (1976), which defines social welfare as the multiple of the mean access to an advantage and a measure of equity in its distribution. The HOI is thus composed of two elements: (i) the coverage rate of a basic service; and (ii) how equitably that service is distributed relative to the distribution of circumstances. The index increases with the coverage rate and declines with the degree of inequality of access to a service (for details see the technical note de Barros et al., 2008). de Barros et al. (2009) propose a single index for inequality of human opportunities as the average of the HOI indices for all the services.

To make this concept operational, two choices have to be made: what are the basic opportunities and what is the population of interest. From the equality of opportunity perspective, inequities that matter are those that result from the circumstances beyond individual control, which suggests the population of interest should be limited to children for whom access to opportunities is beyond their control. One could include adults, but then the HOI would be closer to a static notion of inequality, like the Gini index.

The choice of what to include in the set of “basic opportunities” is less clear. In their pioneering study of HOI, done for Latin America, de Barros et al. (2009) define basic opportunities as “all those essential to ensuring that today’s children will have the potential, as adult, to better achieve the outcomes of their choosing.” They limit the choice of basic opportunities to basic services, such as electricity, clean water, sanitation, and schooling. We consider access to basic services as access to opportunities for housing quality. Education opportunities are measured by school attendance of children ages 10-14 and completion of sixth grade on time for children ages 12-16. The choice of opportunities to include is also determined by the availability of comparable data across time and countries. In this paper, we follow de Barros et al. (2009) and consider opportunities that are associated with access to publicly provided basic services.

To get a bit more specific, let us define more precisely the two components of the HOI: the average level of access to a specific service, $\bar{p}$, and equity in access to that service. The latter is measured by a version of the “dissimilarity index (D)”, which is widely used in sociology. The D-index measures the disparity of access rate for a service (such as clean water) by different groups of people (or types) defined by their circumstances, such as rural girls with illiterate parents. So, for example, if the access rate for a given service for a particular type is $x\%$ and the average access rate for the whole population is $y\%$, then the dissimilarity between x and y influences the D-index. The D-index is constructed to range between 0 and 1, with $D = 0$ for perfect equality of opportunity and 1 for perfect inequality.

The HOI is then defined as:

$$HOI = \bar{p}(1 - D), \quad (1)$$

where $\bar{p}$ is the average rate of coverage of the service and $(1 - D)$ measures equality in access. D can be estimated through a variety of parametric, semi-parametric, or nonparametric methods. de Barros et al. (2008) suggest to estimate it using a logistic regression in which the dependent variable, I , is binary, indicating access when $I = 1$ and zero otherwise. This methodology is implemented using the module `hoi` in Stata.

$$\ln\left(\frac{P(I = 1|X)}{1 - P(I = 1|X)}\right) = X\beta, \quad (2)$$

Table 5. Specification of variables in the separable logistic regression function

List of circumstances	Specification
Child gender	dummy
Parents' education	quadratic
Per capita household expenditures	logarithmic
Number of siblings	linear
Presence of parents	dummy
Urban or rural	dummy
Gender of household head	dummy

where X is a vector of circumstance variables (see Table 5):

Using the estimated coefficients from the logistic regression 2, this procedure computes each individual's predicted probability of access to an opportunity, $\hat{p}_i$ as:

$$\hat{p}_i = \frac{\exp(X_i\hat{\beta})}{1 + \exp(X_i\hat{\beta})} \quad (3)$$

The estimates D are then computed using the distance between $\hat{p}_i$ and the average access rate, $\bar{p}$.

$$\hat{D} = \frac{1}{2\bar{p}} \sum_{i=1}^n w_i |\hat{p}_i - \bar{p}|, \quad (4)$$

where w_i are sampling weights, $\bar{p} = \sum_{i=1}^n w_i \hat{p}_i$, and n is the number of individuals. D is equal to zero if $\hat{p}_i = \bar{p}$ for all i , and equal to one if only one person has access.

Related HOI indices can be aggregated to form a single index, such as for education or housing. The simplest way to do this is to average the HOI for the components. This is the method used in the original HOI study of Latin America (de Barros et al., 2009) and in most other studies with which we compare our results. Islam and Mitra (2017) have proposed a multidimensional HOI (called MHOI), which defines a new outcome based on the number of services to which a child has access. For example, MHOI for housing opportunities can be defined as the number of the three housing services to which a child has access. We provide estimates of multidimensional HOI for housing but not for education, because the latter does not lend itself to redefinition as the two components of the education index are not mutually exclusive. If, for example, a 13-year-old child has reached sixth grade on time, very likely he or she is attending school. We do not emphasize MHOI in our computations because it is not available for other countries for comparison, making it difficult to judge if MENA estimates are high or low.

RESULTS

In this section we discuss our results for housing and education in that order.

Housing

Table 6 reports the results for electricity, water, and sanitation, as well as the overall housing index. The latter is computed in two ways, as the average of the indices for the three services and as a multidimensional measure as

Table 6. Human opportunity index for housing services (percent)

Country	Piped water			Sanitation			Electricity			MHOI Housing			HOI Housing		
	Circa 2000	Circa 2010	Change	Circa 2000	Circa 2010	Change	Circa 2000	Circa 2010	Change	Circa 2000	Circa 2010	Change	Circa 2000	Circa 2010	Change
Egypt	78.44 (0.24)	84.66 (0.41)	0.62	98.28 (0.08)	98.93 (0.11)	0.07	98.05 (0.09)	99.45 (0.09)	0.14	76.66 (0.25)	83.57 (0.41)		91.59	91.80	
Iran	86.5 (0.16)	95.27 (0.12)	0.97	56.89 (0.21)	87.67 (0.17)	3.42	96.32 (0.09)	99.19 (0.08)	0.32	55.63 (0.21)	85.71 (0.18)		79.90	91.47	
Iraq	76.33 (0.36)	81.51 (0.21)	1.04	98.78 (0.10)	98.06 (0.07)	-0.14	99.81 (0.05)	98.94 (0.05)	-0.17	75.8 (0.36)	80.11 (0.22)		91.64	89.79	
Jordan	95.58 (0.34)	92 (0.54)	-0.72	100	99.98 (0.01)	0.00	99.79 (0.04)	99.28 (0.21)	-0.10	95.55 (0.34)	91.94 (0.54)		98.46	95.99	
Morocco	25.53 (0.21)			62.91 (0.33)			46.63 (0.31)			22.34 (0.17)			45.02		
Palestine	78.51 (0.49)	91.06 (0.33)	1.05	100	99.64 (0.07)	-0.03	98.67 (0.15)	99.86 (0.05)	0.10	77.85 (0.50)	90.94 (0.33)		92.39	95.35	
Sudan		48.06 (0.74)			80.86 (0.62)			60.68 (0.67)			39 (0.70)			64.46	
Syria	71.84 (0.19)						99.14 (0.04)			71.75 (0.19)			85.49		
Tunisia	67.8 (0.80)	66.75 (0.84)	-0.21	99.13 (0.23)	87.59 (0.70)	-2.31	94.87 (0.51)	98.35 (0.28)	0.70	66.9 (0.80)	63.87 (0.80)		87.27	77.17	
Yemen		28.04 (0.36)			45.33 (0.40)			33.88 (0.35)			15.01 (0.25)			36.69	
Average	73.57	77.73		66.71	75.04		91.60	89.21		55.08	66.31		69.53	72.39	
Average*	81.02	87.38		83.98	94.11		97.58	99.23		69.34	83.11		87.54	90.74	

Note: Standard errors in parentheses. Change is percent annual. For actual survey years see Table 1. Average* refers to averages for countries with surveys for both periods.
Source: Authors' calculations

Table 7. Dissimilarity index in housing (percent)

Country	Piped water		Sanitation		Electricity		Housing	
	Circa 2000	Circa 2010	Circa 2000	Circa 2010	Circa 2000	Circa 2010	Circa 2000	Circa 2010
Egypt	7.18 (0.47)	4.6 (0.74)	0.34 (0.11)	0.2 (0.16)	0.77 (0.20)	0.16 (0.17)	7.64 (0.48)	4.78 (0.76)
Iran	5.1 (0.33)	1.87 (0.26)	17.47 (0.51)	4.83 (0.40)	1.46 (0.20)	0.27 (0.19)	18.1 (0.52)	5.62 (0.42)
Iraq	10.01 (1.01)	7.3 (0.47)	0.29 (0.19)	0.73 (0.14)	0.07 (0.15)	0.3 (0.08)	10.07 (1.01)	7.81 (0.48)
Jordan	0.87 (0.58)	1.45 (0.97)	0	0.01 (0.69)	0.1 (0.86)	0.32 (0.69)	0.86 (0.59)	1.45 (0.98)
Morocco	40.77 (0.99)		15.79 (0.8)		24.55 (0.99)		44.59 (0.78)	
Palestine	6.91 (0.84)	2.15 (0.61)	0	0.15 (0.24)	0.43 (0.31)	0.05 (0.09)	7.12 (0.87)	2.16 (0.60)
Sudan		16.48 (2.08)		7.08 (1.25)		14.97 (1.54)		22.77 (2.35)
Syria	7.96 (0.40)				0.28 (0.07)		7.98 (0.41)	
Tunisia	14.86 (2.13)	16.18 (2.39)	0.35 (0.50)	5.25 (1.57)	2.03 (0.99)	0.69 (0.62)	15.25 (2.16)	17.92 (2.44)
Yemen		24.53 (1.93)		18.71 (1.15)		28.18 (1.39)		40.49 (2.49)

Note: Standard errors in parentheses. Change is percent annual. For actual survey years see Table 1.
Source: Authors' calculations

Table 8. Coverage rate of housing opportunities (percent)

Country	Piped water		Sanitation		Electricity		Housing	
	Circa 2000	Circa 2010	Circa 2000	Circa 2010	Circa 2000	Circa 2010	Circa 2000	Circa 2010
Egypt	84.51 (0.17)	88.75 (0.30)	98.61 (0.06)	99.13 (0.09)	98.81 (0.05)	99.61 (0.06)	83 (0.18)	87.76 (0.31)
Iran	91.11 (0.11)	97.08 (0.08)	68.93 (0.18)	92.11 (0.12)	97.75 (0.06)	99.46 (0.05)	67.92 (0.18)	90.82 (0.13)
Iraq	84.82 (0.23)	87.94 (0.14)	99.06 (0.06)	98.79 (0.05)	99.89 (0.03)	99.24 (0.04)	84.29 (0.23)	86.9 (0.15)
Jordan	96.43 (0.26)	93.35 (0.41)	100	99.99 (0.01)	99.89 (0.02)	99.59 (0.11)	96.38 (0.26)	93.29 (0.41)
Morocco	43.1 (0.24)		74.71 (0.23)		61.8 (0.25)		22.34 (0.17)	
Palestine	84.34 (0.36)	93.06 (0.25)	100	99.79 (0.04)	99.1 (0.10)	99.91 (0.03)	83.81 (0.36)	92.95 (0.25)
Sudan		57.55 (0.66)		87.02 (0.42)		71.37 (0.54)		50.49 (0.65)
Syria	78.05 (0.15)				99.42 (0.03)		77.97 (0.15)	
Tunisia	79.63 (0.53)	79.63 (0.54)	99.48 (0.14)	92.45 (0.43)	96.84 (0.31)	99.04 (0.16)	78.93 (0.54)	77.81 (0.53)
Yemen		37.16 (0.31)		55.77 (0.33)		47.17 (0.30)		25.23 (0.23)

Note: Standard errors in parentheses. Change is percent annual. For actual survey years see Table 1.
Source: Authors' calculations

explained in Islam and Mitra (2017). Tables 7 and 8 report the estimates for coverage and dissimilarity separately. For all tabulated results, to avoid clutter, we present the estimates for two periods roughly corresponding to the years 2000 and 2010.

The HOI varies widely across the region, from a low of 36.69% in Yemen in 2006 to a high of 95.99% in Jordan in 2010 (Table 6). Egypt, Iran, Iraq, Jordan, and Palestine have housing HOI values above 90%. Unsurprisingly, Sudan and Yemen, the two poorest countries in our sample, have very low HOIs. Morocco, also a relatively poor country by the region's standards, had a low value too in 2001 (45.02%), but we do not know its estimate for 2010.

The HOI for housing has improved over time for Egypt, Iran, and Palestine but declined for Iraq, Tunisia, and Jordan. Jordan experienced a small drop in its housing HOI during 2006-2010, mostly as a result of a water crisis that reduced access to clean water in 2010, especially in refugee areas. The surprising case here is Tunisia, with a housing HOI of 77.17% in 2010, which had dropped from 87.27% since 2005 despite a growing economy. The decline in sanitation HOI was the largest among housing outcomes, down from 99.13% in 2005 to 87.59% in 2010 (Table 6). Since these declines are more the result of rising inequality (as indicated by an increase in the D-index), these findings confirm the explanations of the 2011 Tunisian uprising that stressed regional inequalities Joyce (2013), Nucifora and Rijkers (2014). The estimates of the multidimensional HOI (MHOI) for housing using the method suggested by Islam and Mitra (2017) offer the same trends as HOI computed as the simple average of the underlying services.

Education

The two education outcomes used to construct the education HOI are school attendance for children 10-14 years old and reaching sixth grade on time for those 12-16 years old. We regard attendance as mainly the result of public sector investment, and reaching sixth grade on time as the result of a combination of public investment (in school quality) and parental effort.

Across the region the HOI for attendance is high but not impressive for sixth grade on time (Table 9). The lowest HOI in attendance circa 2010 is Iraq (77.97%) and the highest is Palestine (97.87%). For sixth grade on time, the range in the second period is from Yemen (35.65%) to Jordan (86.78%). The low average performance of the region

Table 9. Human opportunity index for education (percent)

Country	School attendance			Sixth grade on time			HOI Education		
	Circa 2000	Circa 2010	Change	Circa 2000	Circa 2010	Change	Circa 2000	Circa 2010	Change
Egypt	99.60 (0.10)	91.82 (0.59)	-0.78	31.83 (0.48)	38.77 (0.95)	0.69	65.72	65.30	-0.04
Iran	89.59 (0.26)	94.07 (0.29)	0.50	53.64 (0.40)	68.76 (0.53)	1.68	71.62	81.42	1.09
Iraq	77.63 (1.07)	77.97 (0.46)	0.07	66.70 (1.23)	75.53 (0.60)	1.77	72.17	76.75	0.92
Jordan		96.94 (0.59)	-	59.24 (2.02)	86.78 (1.47)	4.59	-	91.86	
Morocco	66.14 (0.55)		-	50.14 (0.57)		-	58.14		
Palestine	-	97.87 (0.32)	-	44.13 (1.09)	84.75 (0.78)	3.69	-	91.31	
Sudan		97.60 (0.59)	-		38.86 (1.54)	-		68.23	
Syria	85.42 (0.28)	-	-	38.02 (0.35)		-	61.72		
Tunisia	90.47 (1.00)	85.96 (1.39)	-0.90	35.04 (1.49)	46.24 (2.01)	2.24	62.76	66.10	0.67
Yemen		88.28 (0.54)	-	-	35.65 (0.62)	-		61.97	
Average	84.64	91.24		46.28	53.65		64.19	72.44	
Average*	91.64	90.08		46.47	58.17		68.85	73.39	

Note: Standard errors in parentheses. Change is percent annual. For actual survey years see Table 1. Average* refers to averages for countries with surveys for both periods.

Source: Authors' calculations

Table 10. Dissimilarity index in education (percent)

Country	School attendance			Sixth grade on time		
	Circa 2000	Circa 2010	Change	Circa 2000	Circa 2010	Change
Egypt	0.14 (0.20)	2.89 (1.09)	0.28	6.81 (2.13)	10.7 (3.57)	0.39
Iran	3.73 (0.49)	2.3 (0.61)	-0.16	12.44 (1.02)	6.93 (1.11)	-0.61
Iraq	7.06 (1.86)	6.8 (0.88)	-0.05	9.01 (2.14)	5.64 (1.15)	-0.67
Jordan		1.01 (0.19)		3.48 (4.5)	2.85 (2.59)	4.59
Morocco	11.24 (1.24)			16.8 (1.71)	-	
Palestine	-	0.56 (0.61)		8.59 (3.61)	2.93 (1.33)	
Sudan		0.95 (1.57)			15.83 (5.76)	
Syria	4.43 (0.50)			8.99 (1.35)	-	
Tunisia	3.23 (1.85)	4.74 (2.81)	0.30	19.09 (6.13)	10.84 (6.59)	-1.65
Yemen		3.18 (0.88)		-	18.56 (2.26)	

Note: Change is percent annual.

Source: Authors' calculations

Table 11. Coverage rate of educational opportunities (percent)

Country	School attendance			Sixth grade on time		
	Circa 2000	Circa 2010	Change	Circa 2000	Circa 2010	Change
Egypt	99.75 (0.06)	94.55 (0.39)	-0.52	34.15 (0.45)	43.41 (0.90)	0.93
Iran	93.06 (0.18)	96.27 (0.19)	0.36	61.26 (0.39)	73.88 (0.52)	1.40
Iraq	83.53 (0.82)	83.66 (0.37)	0.03	73.31 (1.10)	76.87 (0.54)	0.71
Jordan		97.93 (0.38)		61.37 (1.83)	89.32 (1.12)	4.66
Morocco	74.52 (0.44)			60.26 (0.50)		
Palestine		98.43 (0.23)		48.28 (1.02)	87.31 (0.63)	3.55
Sudan		98.54 (0.35)			46.17 (1.52)	
Syria	89.37 (0.20)			41.78 (0.33)		
Tunisia	93.49 (0.70)	90.24 (1.04)	-0.65	43.31 (1.50)	51.86 (1.99)	1.71
Yemen		91.18 (0.40)			43.77 (0.59)	

Note: Change is percent annual.

Source: Authors' calculations

in terms of reaching sixth grade on time is consistent with the general view of the region as having done much better in enrollment than in performance. This is exemplified by the case of Sudan, which had the second lowest score in reaching sixth grade on time but one of the highest HOIs for attendance. The low quality of MENA education is also reflected in the low performance of MENA 8 graders in international TIMSS results, which test learning in math and science Salehi-Isfahani et al. (2014). As for the change in HOI in education, only four countries have data in two points of time. Of these only Iran, which had an average HOI in education, improved most, increasing its HOI by 9.8 percentage points. Egypt shows a small deterioration in the education HOI, which is the consequence of a decline in the HOI in attendance, from close to 100% to 91.82%, while the HOI for sixth grade on time increased (from 31.83% to 38.77%). In contrast, Iraq shows almost no improvement in HOI for attendance but a reasonable increase in reaching sixth grade on time, registering a 10 percentage points improvement between 2007 and 2012. Tunisia is the surprising case because of its deterioration in attendance, though it showed improvement in reaching

sixth grade on time, so its overall education HOI increased by 3.34 percentage points in five years. A possible clue to this finding is in Table 10, which shows that Tunisia's D-index for attendance increased between 2005 to 2010 (the dates of the two surveys we use). We return to this issue in the next section.

Time Decompositions

Change in HOI over time can occur as a result of a change in average access (coverage or scale effect), $\Delta_{\bar{p}}$, or change in the distribution of access, Δ_D , or both. Time decomposition measures the contribution of these factors to change in HOI over time. The change in HOI between periods 0 and 1 can be written as (see (de Barros et al. 2008)):

$$\Delta = HOI_1 - HOI_0 = \bar{p}_1(1 - D_1) - \bar{p}_0(1 - D_0).$$

Rearranging terms, we get:

$$\Delta = HOI_1 - HOI_0 = \underbrace{(\bar{p}_1(1 - D_0) - \bar{p}_0(1 - D_0))}_{\Delta_{\bar{p}}} + \underbrace{(\bar{p}_1(1 - D_1) - \bar{p}_1(1 - D_0))}_{\Delta_D} \quad (5)$$

Thus the contribution of change in coverage to change in HOI, $\Delta_{\bar{p}}$, is the change in coverage keeping D at its initial value, and likewise for the contribution of change in the D-index. This procedure is implemented as part of the Stata module hoi.

We perform this decomposition for six countries in our sample for which surveys are available for two points in time: Egypt, Iran, Iraq, Jordan, Palestine, and Tunisia. The results are presented in Figures 1 and 2 for housing and education decompositions, and the corresponding data are reported in Tables 15 and 16.

In most cases, the scale effect dominates the distributional effect, meaning that the main source of change in HOI for housing and education has been the extension of services rather than increased equity in their distribution.

To give weight to the impact of these effects on the changes in HOI, we begin with the time decomposition of the change in the HOI for housing. The decomposition is done for each service separately. For piped water, for which, except in Jordan and Tunisia, the HOI has improved, the decomposition shows that, on average, two-thirds of the improvement in the HOI is due to the scale effect and the remaining one-third is attributable to the distributional effect. In Jordan, the reduction in the housing HOI is mainly due to the reduction in the HOI in access to clean water. As noted above, this is mainly due to the water crisis caused by the inflow of refugees. This is confirmed by the fact that more than 80% of the decline in the water HOI is due to reduced scale or coverage. In Tunisia, where HOI also declined, the entire reduction is explained by a deterioration in equality of distribution.

For sanitation, the HOI increased in most countries. In Iran, which led the pack by increasing its HOI from 56.89% to 87.67% between 2000 and 2010, 62% of this expansion came from increased coverage (Table 15).² In Tunisia, where the decline in sanitation HOI was largest (11.54 percentage points), the scale effect contributed 60.71% of the decrease.

In the case of access to electricity, all countries with more than one year of survey data had nearly complete access in the early period, so the decomposition results in Table 15 do not say much because there is not much change to decompose.

For education, we examine the time decomposition of the HOI for attendance and reaching sixth grade on time. As noted earlier, except in Tunisia and Egypt, all countries improved their HOI in attendance, with the increase in coverage playing the dominant role (Table 16). In Tunisia, where the HOI in attendance deteriorated by 4.5 percentage points, about 30.2% was due to increased inequality in its distribution. The HOI for reaching sixth grade

²As noted earlier, sanitation in Iran is measured by access to an indoor bathing facility, which is more than a toilet.

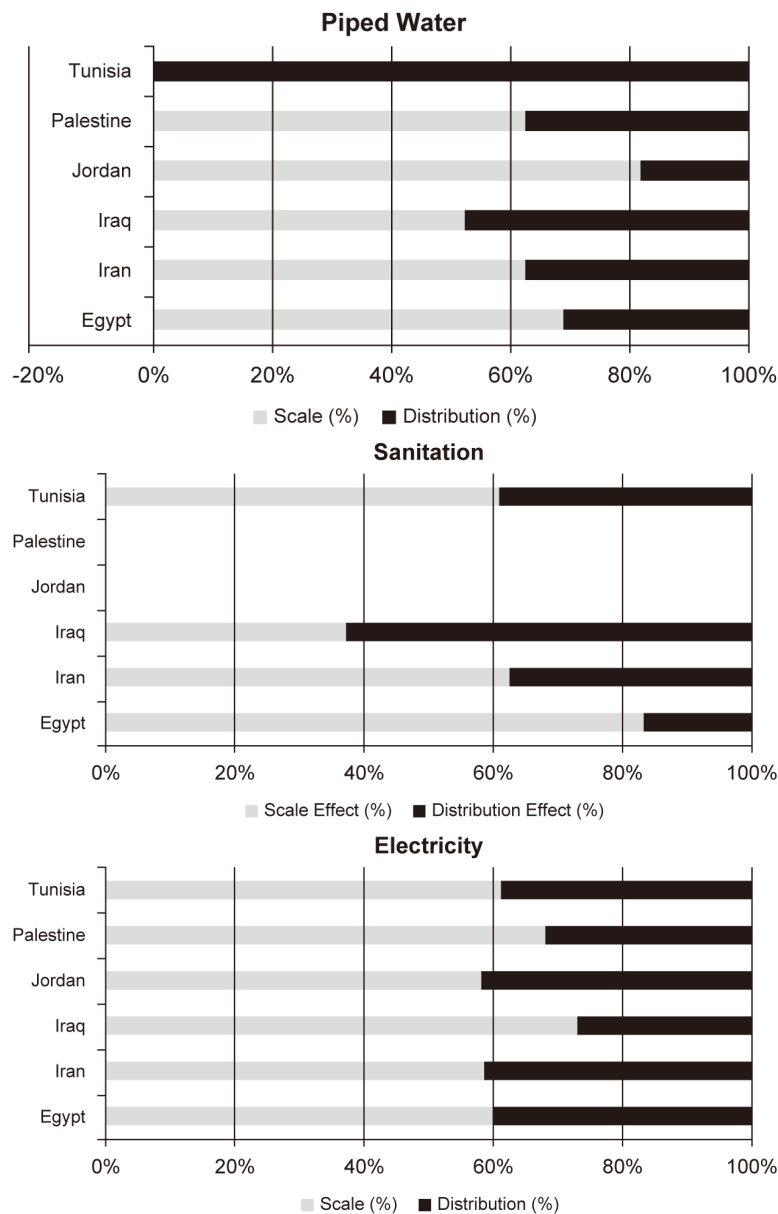


Fig. 1. Time decomposition for housing
Source: Data in Table 15.

on time improved in all countries. As with housing, improvement is mainly achieved by an increase in coverage, a result that is visually clear in Figure 2.

Shapley Decomposition of the Dissimilarity Index

Design of policies to reduce inequality of opportunity requires information about which circumstances add to the inequality most. In the case of HOI, the contribution of different circumstances is obtained by a suitable decomposition of the D-index. The HOI literature has used the Shapley decomposition for this purpose, which we follow here. The idea behind this decomposition is the seminal work of Shapley (1953), which provided a method to quantify the payoff of each player in a cooperative game based on his or her marginal contributions. Shorrocks (2013) used this idea to propose a general method to assess the contribution of a set of factors to a statistic such as an inequality index. His solution measured the marginal impact of each of the circumstances as they are eliminated in

succession from the computation of the HOI, and then averaged these marginal effects over all the possible orders in which they can be eliminated. We apply this technique to the Dissimilarity Index, D .

To do this, we drop each circumstance from the D -index, recalculating the index and repeating the exercise by dropping other factors in turn. To be more specific, let $D = I(y, e, r)$ denote the value of the D -index with inputs y (income), e (parent education), and r (residence). If we first drop income as a factor and re-estimate the index, we obtain $D = I(e, r)$. This yields one part of the marginal contribution of parent education to the D -index which equals $I(y, e, r) - I(p, s)$. If we drop e after p , the D -index will equal $I(e, s)$, in which case the marginal contribution of electricity is $I(e, p, s) - I(p, s)$. There will be many such marginal contributions which will be averaged over all possible permutations in which electricity can be combined with other circumstances to arrive at the Shapley value of electricity.³

The estimates of the Shapley decompositions for the D -index for various outcomes of interest are presented in Tables 12-14.⁴ Before discussing the results presented in these tables, we should note that the gender of the household head and single parenthood are highly correlated resulting in zero values for their Shapley values. Even after we dropped the single-parent variable, the contribution of the gender of the household head to all outcomes was still zero. This is likely because in all countries less than 10% of the households are headed by women and in those households the outcomes are the same as male-headed households. Keep in mind that for most outcomes we

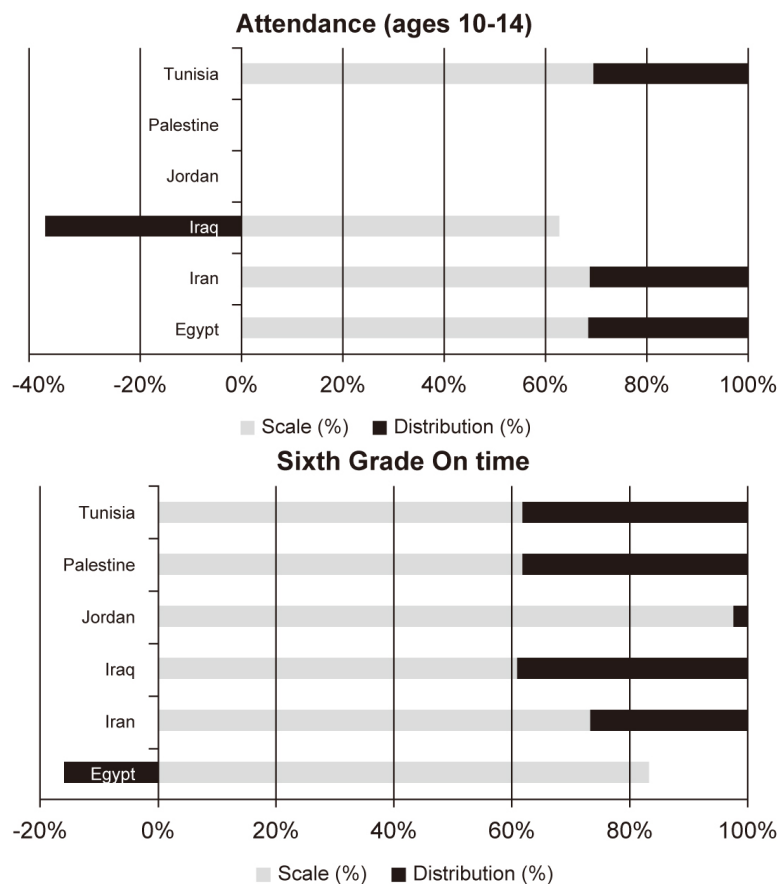


Fig. 2. Time decomposition for education

Source: Data in Table 16.

³We use the Stata command `hoishapley` for these calculations.

⁴For some countries and outcomes the decomposition is not possible, e.g., sanitation in Palestine in 1998, which is 100% coverage, and school attendance in Jordan, for which data is not available.

Egypt										
1999				2010						
	Piped water	Sanitation	Electricity	Attendance	6th grade on time	Piped water	Sanitation	Electricity	Attendance	6th grade on time
Gender of head	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Place of residence	36.26	14.78	20.34	10.17	6.40	29.11	1.93	7.38	3.91	5.51
Father education	17.86	17.80	19.57	31.27	41.05	14.00	7.01	23.08	33.92	28.12
Mother education	19.41	10.20	15.10	19.32	20.49	26.53	7.27	11.33	30.67	31.81
Gender of child	0.04	0.59	0.69	32.79	3.55	0.85	8.89	0.67	3.11	0.18
No. of siblings	6.00	10.06	5.50	1.35	19.25	6.28	14.55	16.42	13.48	9.33
Log expenditures pc	20.44	46.58	38.80	5.10	9.26	23.23	60.35	41.12	14.91	25.05
Iran										
2000				2010						
	Piped water	Sanitation	Electricity	Attendance	6th grade on time	Piped water	Sanitation	Electricity	Attendance	6th grade on time
Gender of head	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Place of residence	46.02	39.83	40.89	30.34	26.86	39.75	41.91	36.33	14.93	19.56
Father education	11.50	13.49	16.45	16.64	20.07	14.30	14.65	12.31	25.57	24.20
Mother education	15.33	13.47	18.63	19.56	15.19	17.86	15.11	22.12	30.77	18.41
Gender of child	0.02	0.03	0.10	8.84	1.80	0.27	0.11	0.65	5.83	1.17
No. of siblings	8.30	6.21	7.10	9.22	13.46	9.16	5.75	6.80	9.70	13.72
Log expenditures pc	18.83	26.97	16.83	15.40	22.62	18.66	22.47	21.79	13.20	22.94
Iraq										
2007				2012						
	Piped water	Sanitation	Electricity	Attendance	6th grade on time	Piped water	Sanitation	Electricity	Attendance	6th grade on time
Gender of head	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Place of residence	72.61	56.50	14.10	10.47	10.32	63.86	43.16	39.04	13.39	17.63
Father education	3.52	6.33	24.73	19.63	32.46	5.24	13.67	17.22	14.07	20.13
Mother education	8.20	22.89	25.25	19.77	23.48	10.71	13.39	16.17	13.45	17.69
Gender of child	0.26	0.85	2.18	22.49	9.40	0.17	0.60	1.50	29.92	2.46
No. of siblings	7.95	3.55	26.84	14.51	11.69	6.36	6.24	13.73	8.32	13.40
Log expenditures pc	7.46	9.88	6.90	13.13	12.65	13.66	22.94	12.34	20.85	28.69

Table 13. Shapley decompositions for Jordan, Palestine, and Tunisia

Jordan										
2006					2010					
	Piped water	Sanitation	Electricity	Attendance	6th grade on time	Piped water	Sanitation	Electricity	Attendance	6th grade on time
Gender of head	0.00		0.00		0.00	0.00	0.00		0.00	0.00
Place of residence	55.79		4.35		2.39	51.35	27.98		0.69	10.61
Father education	7.60		31.62		10.27	4.91	7.76		24.42	16.14
Mother education	16.73		30.72		2.91	27.61	8.64		28.26	7.77
Gender of child	0.82		2.55		33.60	1.60	5.99		1.32	13.71
No. of siblings	15.37		3.55		8.34	6.48	34.80		12.18	9.31
Log expenditures pc	3.69		27.21		42.49	8.05	14.83		33.13	42.46
Palestine										
1998					2010					
	Piped water	Sanitation	Electricity	Attendance	6th grade on time	Piped water	Sanitation	Electricity	Attendance	6th grade on time
Gender of head	0.00		0.00		0.00	0.00	0.00		0.00	0.00
Place of residence	68.16		20.40		10.39	62.94	1.56		5.93	3.29
Father education	4.65		14.14		36.11	12.73	25.63		12.95	11.87
Mother education	16.87		21.41		27.33	17.44	42.11		46.30	26.33
Gender of child	0.26		4.41		3.31	0.75	0.89		24.45	17.81
No. of siblings	3.20		1.47		8.87	4.50	16.66		4.23	14.73
Log expenditures pc	6.86		38.17		14.00	1.64	13.15		6.14	25.97
Tunisia										
2005					2010					
	Piped water	Sanitation	Electricity	Attendance	6th grade on time	Piped water	Sanitation	Electricity	Attendance	6th grade on time
Gender of head	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Place of residence	36.56	19.19	22.11	36.23	12.99	34.30	26.50	30.59	37.83	17.12
Father education	20.60	10.97	16.48	16.18	25.51	20.10	22.67	15.09	19.08	22.51
Mother education	18.73	54.14	24.89	16.56	23.32	20.67	22.50	21.01	15.96	25.82
Gender of child	1.09	2.91	0.68	1.08	4.04	0.55	0.60	1.42	0.15	0.94
No. of siblings	6.55	6.00	6.33	12.06	9.12	7.91	10.60	12.79	9.28	9.57
Log expenditures pc	16.46	6.78	29.51	17.89	25.02	16.47	17.13	19.10	17.70	24.04

Source: Authors' calculations

Table 14. Shapley decompositions for Sudan, Syria, Morocco, and Yemen

	Syria 2004						Sudan 2009					
	Piped water	Sanitation	Electricity	Attendance	6th grade on time	Piped water	Sanitation	Electricity	Attendance	6th grade on time		
Gender of head	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Place of residence	63.85		55.68	2.12	6.36	37.63	40.22	33.49	24.51	26.18		
Father education	9.38		15.79	28.21	38.42	15.82	19.16	17.60	38.93	13.37		
Mother education	11.99		20.30	33.73	25.85	20.57	20.47	18.40	15.92	26.96		
Gender of child	0.20		0.68	11.50	0.16	0.00	0.18	0.40	6.99	5.31		
No. of siblings	6.25		2.27	11.20	15.70	2.96	3.36	2.45	2.09	4.72		
Log expenditures pc	8.33		5.28	13.24	13.51	23.02	16.62	27.65	11.57	23.46		
	Morocco 2001						Yemen 2006					
	Piped water	Sanitation	Electricity	Attendance	6th grade on time	Piped water	Sanitation	Electricity	Attendance	6th grade on time		
Gender of head	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Place of residence	54.41	51.71	49.27	45.61	44.68	58.35	42.06	51.58	13.37	19.61		
Father education	10.30	11.97	12.45	14.14	16.62	10.61	17.44	13.01	19.68	19.95		
Mother education	8.30	7.72	8.14	7.68	9.21	4.96	5.56	6.56	6.53	5.25		
Gender of child	0.02	0.10	0.20	8.14	2.47	0.50	0.28	0.01	48.94	35.86		
No. of siblings	4.02	3.82	3.67	4.85	7.02	2.23	1.89	1.73	1.11	1.08		
Log expenditures pc	22.95	24.68	26.27	19.58	20.00	23.35	32.77	27.11	10.37	18.25		

Source: Authors' calculations

consider, the role of the public sector in the supply of basic services is paramount.

As Tables 12-14 show, in most countries the most important circumstance that explains inequality in child access to housing services is place of residence — rural vs. urban. For example, in Egypt, Iran, Tunisia, and Sudan, more than half of the inequality in access to piped water is explained by location. A high share of location in the piped water D-index, such as 72.61% in Iraq in 2007, implies inequitable government policies in provision of piped water.

Household resources, measured by log expenditure per capita, also matter. In Egypt, its contribution to the D-index ranges from 20.44% for piped water in 1999 to 60.35% in 2010 for sanitation. For all outcomes, consistent with privatization during this period, the contribution of income to the D-index increased over time. The number of siblings matters in several countries, especially in Jordan, but its importance may be because of its correlation with fertility and hence household income and education rather than greater competition for resources between children. The gender of the child does not seem to matter for equity in access to these services, indicating that boys and girls have equal access. This is not the same as overall gender equity, in which MENA lags, but rather it is an indicator of the fact that the supply of basic services to households is independent of the gender balance of their children.

In contrast to housing services, in most countries access to education opportunities is most affected by parent education and income. In Egypt, Jordan, and Palestine, reaching sixth grade on time is heavily influenced by parental education, accounting for more than 60% of the inequality indicated by the D-index. In Syria, too, attendance is nearly entirely accounted for by household characteristics, and for reaching sixth grade on time it is close to 98%, whereas geography matters little.

Gender is important for attendance in the two poorest countries in our sample, Iraq and Yemen, suggesting that when resources are scarce it is girl education that suffers, a result also reported in studies of inequality of opportunity in achievement and attainment (Assaad et al., 2018, Salehi-Isfahani et al., 2014). In Yemen, about 50% of the inequality is explained by gender and 22.50% in Iraq. Our estimates show that between 2005 and 2010, Tunisia managed to substantially reduce the contribution of gender to inequality in reaching sixth grade on time.

These results confirm the complementary roles of governments and parents in inequality of opportunity for children. This is evident in the divergent decomposition results for basic services compared to education. Governments make the critical decisions to supply and distribute basic services, whereas parents make the important decisions for schooling. As a result, we find that location matters more for inequality of access to services whereas parental education matters more for education. Income plays the same role in both basic services and education.

COMPARISON WITH OTHER REGIONS

Our estimates are not strictly comparable to those available in the literature for MENA or other countries because of differences in the outcomes under consideration, circumstances used to account for the distribution of those outcomes, or the type of survey used in the analysis. However, like other economic indices, measurements of HOI acquire their full meaning when placed in the context of other countries. In this regard, comparison with Sub-Saharan African countries, which are generally less developed than MENA, is less informative than comparison with Latin American countries, which are at similar or higher levels of economic development.

Unsurprisingly, the estimates of HOI for MENA are higher than the estimates reported for 20 Sub-Saharan African

⁵There is also less correspondence between MENA and SSA countries. For example, in SSA, Dabalen et al. (2014: 102) include in their definition of clean water rainwater, which yield a relative high HOI for SSA, but when they restrict it to piped water the HOI for access to clean water for most SSA countries drops below that of Yemen, which has the lowest HOI in MENA (based on Fig 6.6 in Dabalen et al. (2014)).

(SSA) countries in Dabalen et al. (2014).⁵ With the exception of attendance, nearly all these countries have HOIs below 50% for education outcomes, such as starting primary school on time or finishing primary school. This is compared to our estimates of HOI for finishing primary school on time, which are above 50% for most MENA countries in our sample (exceptions are Egypt, Sudan, Yemen, and Tunisia). Another point of contrast with Africa is in the change over time. Whereas our results show an improvement for most MENA countries, in SSA they fell (Dabalen et al., 2014: 102).

Comparisons with Latin America and the Caribbean (LAC) are more interesting and informative. Figure 3 depicts our estimates of the HOI for MENA for two periods roughly ten years apart (around the turn of the century and a decade later) and the estimates provided by Molinas Vega et al. (2012) for LAC. The most favorable comparison is in the housing HOI. In MENA this index was 94.0% in the later period (circa 2010), having increased from 90.9% a decade earlier, compared to 69% in LAC, up from 58.5% from the prior decade. These differences are significant at the 5% level. The lowest housing HOI in MENA, 35.7% for Yemen, is about the same as that of Nicaragua (33.5%). The MENA advantage is both in coverage and equity (as measured by the D-index). The average values of the D-index in LAC for access to clean water, sanitation, and electricity are 14.1%, 18.3%, and 7.3%, respectively, whereas in MENA they are 7.3%, 2.5%, and 2.3%.

Comparison of education HOI favors the LAC region. The average HOI in education for MENA in 2010 is around 74% (Table 9) while it is reported in Molinas et al. (2010) at 78% in 2010. If we look at HOI in school attendance, the two regions performed quite the same (91.24% in MENA versus 91.9% in LAC), however LAC outperformed MENA in completing sixth grade on time (53.65% in MENA vs 63.7% for LAC). The level of inequality of opportunity measured by the D-index is a bit better in MENA compared to LAC for completing sixth grade on time (9.3% in MENA vs 10.2% in LAC). The situation is reversed for school attendance where the D-index average is 2.8% in MENA and 1.9% in LAC.

Son (2013) reports HOI for seven Asian countries, though they do not include the more advanced countries such as South Korea or Thailand. Among those included in the study, Indonesia, Philippines, and Vietnam do as well or better than MENA countries in education but not in access to basic infrastructure (what we call housing quality), with the exception of electricity. In sanitation, Sri Lanka ranks the highest (92.1%), higher than most MENA countries. Singh (2011) provides estimates for India, where HOI is low and did not improve despite India's strong growth performance after the 1990s reforms. Finally, Newman (2012) studies Pakistan, whose overall HOI is higher than India's and its education HOI is similar to the richer MENA countries.

CONCLUSION

Populism in the Middle East has been an integral part of the authoritarian bargain (Desai et al. 2009). Post independence, most MENA countries have been ruled by autocratic leaders who promised to deliver education and basic services to their citizens. The Arab uprisings of 2011 raised the question of whether these leaders have by and large kept their end of the bargain. To evaluate the performance of the bargain, we provide estimates of the Human Opportunity Index for 10 MENA countries for two periods of time, around 2000 and 2010.

The HOI measures the extent to which the basic opportunities such as access to basic services and to education that are largely provided by the state are adequately and equally provided. The basic services that make up our housing quality HOI are electricity, clean water, and sanitation. The education HOI consists of school attendance and completing sixth grade on time. HOI measures the average rate of access to these services as well as the equity with which they are supplied. As such, the HOI is not only a useful measure of a country's progress in human development, in the case of MENA countries it provides evidence of the degree to which the region's authoritarian leaders have fulfilled their end of the bargain.

This paper also addresses the so-called MENA inequality puzzle, which asks how to reconcile the widespread

feelings of social injustice that were on display during the Arab uprisings with the low estimates of inequality of outcomes observed from cross-section survey data. Recent evidence on inequality of opportunity to some extent resolves the puzzle by pointing out that the main game for upward social mobility in MENA — especially in education — has been unfair (El-Kogali and Krafft, 2015; Salehi-Isfahani et al., 2014). In contrast, the evidence on inequality in access to basic opportunities that we present in this paper does not indicate particularly high inequality of opportunity. We find that the index of human opportunities for housing and education has improved over time. We also find that the HOIs for nearly all basic opportunities that we consider are higher than in Latin America, a region with roughly the same level of income and economic development.

One way to view these findings is that they do not help resolve the puzzle. Broadly speaking, the authoritarian bargain has not been for nothing. For example, Syria, ruled for decades by a populist authoritarian regime, has a higher HOI in housing than a typical country in Latin America, and considerable greater equity in delivery of basic services than Morocco, a MENA country with a similar level of income but less harsh authoritarian rule.

While the evidence for the rising and relatively high levels of HOI in MENA countries suggests that the authoritarian bargain has delivered in some respects, it does not rule out the possibility that the bargain has passed its expiry date. The bargain was never time consistent anyway, in the sense that rising and broadly shared living

Table 15. Time decomposition for housing

Country	Piped water		Sanitation		Electricity	
	Scale (%)	Distribution (%)	Scale (%)	Distribution (%)	Scale (%)	Distribution (%)
Egypt	71.43	28.57	83.32	16.68	59.84	40.16
Iran	64.76	35.24	62.31	37.69	58.63	41.37
Iraq	54.16	45.84	36.91	63.09	72.93	27.07
Jordan	84.85	15.15			58.23	41.77
Palestine	64.73	35.27			67.94	32.06
Tunisia	-0.16	100.16	60.71	39.29	61.13	38.87

Source: Authors' calculations

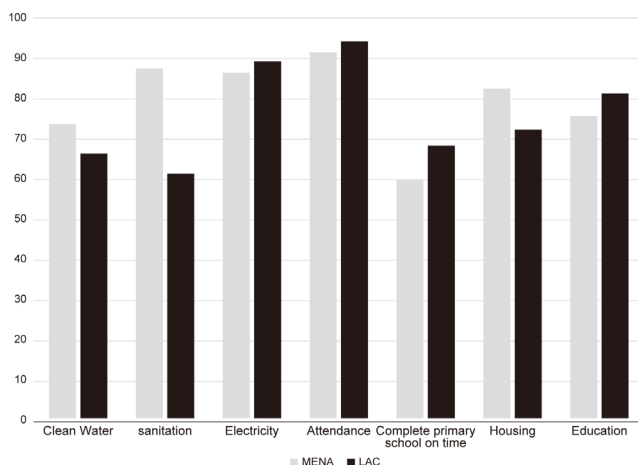


Fig. 3. Comparing HOIs for MENA and LAC

Note: All HOIs are for circa 2010.

Source: MENA: Authors' calculations, Latin America Molinas Vega et al. (2012)

Table 16. Time decomposition for education

Country	School attendance		Sixth grade on time	
	Scale (%)	Distribution (%)	Scale (%)	Distribution (%)
Egypt	68.58	31.42	124.35	-24.35
Iran	69.02	30.98	73.66	26.34
Iraq	240.17	-140.17	60.96	39.04
Jordan			97.97	2.03
Palestine			87.72	12.28
Tunisia	69.76	30.24	61.80	38.20

Source: Authors' calculations

standards give rise to a middle class that may rethink the benefits of the bargain. It seems natural to expect that the very success of the bargain may make it untenable. The question then is whether 2011 was the time when the citizens of certain Arab countries decided they wanted their democratic rights back.

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