



available evidence on inequality in the Middle East and how it compares to other world regions is relatively scarce. In this paper, we attempt to combine available data sources (national accounts, household surveys, income tax data, and wealth rankings) in a systematic manner in order to provide novel estimates of the distribution of income between 1990 and 2016. According to our benchmark series, the Middle East appears to be the most unequal region in the world, with a top decile income share as high as 64 percent, compared to 37 percent in Western Europe, 47 percent in the United States (US), and 55 percent in Brazil (see Alvaredo et al. 2018). This is due both to enormous inequality between countries (particularly between oil-rich and population-rich countries), and to very large inequality within countries (which we probably under-estimate, given the limited access to fiscal data).

These estimates are based on two methodological innovations. To our knowledge, our paper is the first attempt to combine Middle East household surveys with income tax data. Namely, we use the findings from Lebanese income tax micro-files exploited by Assouad (2017), and apply generalized Pareto interpolation techniques (Blanchet *et al.*, 2017). This leads us to significantly correct upward standard survey-based, within-country inequality estimates. This upward correction should still be viewed as a lower bound, but more plausible than usual measures based solely upon self-reported data. Next, our paper is also the first attempt to combine within-country inequality measures in order to estimate the distribution of income for the entire Middle East region. Both innovations play an important role in accounting for our high inequality findings (they have impacts comparable in magnitude). We stress that we still face important limitations and uncertainties regarding the measurement of income distribution in the region, and that increased transparency on income and wealth data is highly needed. However our main conclusion—the fact that the Middle East is one of the most unequal regions in the world, if not the most unequal region—appears to be robust.

Of course, we do not pretend that this high inequality level is the only explanation for the regional political instability. Other factors—religious, historical, cultural and political—certainly play an important role as well. But we believe that inequality can be part of the explanation, or at least that it belongs to a set of background factors contributing to generate political upheavals. The 1990 invasion of Kuwait by Iraq—two countries with vastly different per capita income and wealth—is a clear and extreme example. More generally, one can argue that perceptions about inequality and the fairness or unfairness of the distribution of income are determined not only by within-country inequality but also by inequality at the regional level, and sometime even at the global level.

The final outcome of the combination of country distributions is less straightforward than it may seem, and it requires empirical examination. To a large extent, this paper can be viewed as an exercise of aggregation. We show how changing the geographical level of analysis affects the measurement of inequality. In the case of the Middle East, the concept of nation-state may not be the most meaningful lens through which we can analyze the concentration of income. The total population of the region (about 410 million in 2016) is comparable to Western Europe (420 million) or the US (320 million), and is characterized by a relatively high degree of cultural, linguistic and religious homogeneity (at least as compared to these other ones).

Even more strikingly, when we integrate Eastern and Western Europe, thereby looking at a population of over 570 million, we find that the top 10 percent income share rises moderately, from 37 percent in Western Europe to 39 percent for total Europe. On the contrary, when we put together Middle Eastern countries, inequality increases much more. How much is due to the various institutional features of Europe (such as free mobility or regional development funds), and the lack thereof in the Middle East, is an interesting issue, which falls beyond the scope of the present paper. In any case, we feel that such regional comparisons are legitimate and to some extent informative—as much as the usual inequality comparisons between nation-states. Both types of comparisons seem to capture complementary and valuable dimensions of individual perceptions about inequality.

This paper is part of a broader project, the World Inequality Database (WID.world) that attempts to produce annual distributional statistics—and micro data on income and wealth distributions—that are comparable across countries (Alvaredo *et al.*, 2016). For this, we follow common methods that involve the combination of national accounts, surveys, and fiscal registries in a consistent manner to produce *distributional national accounts*. The method has already been applied to the US (Piketty *et al.*, 2016), France (Garbinti *et al.*, 2016; 2017), China (Piketty *et al.*, 2017), and Russia (Novokmet *et al.*, 2017). Although there are similarities across countries, lessons can be drawn from specific cases to help produce new databases for future works, in a context of scarcity of data.

The rest of this paper is organized as follows. In Section 2, we relate our work to the existing literature on income inequality in the Middle East and at the global level. Section 3 describes our main data sources, concepts, and methods. In Section 7, we present our main results on the evolution of income inequality in the Middle East, and also compare our series to other countries. Section 11 provides the conclusions. This paper is supplemented by an extensive online appendix that includes all the raw data and codes, and also presents additional results and robustness checks.

## 2. RELATION TO LITERATURE ON MIDDLE EAST AND GLOBAL INEQUALITY

The study of the evolution of income and consumption inequality using household surveys is a well-established tradition in a number of countries in the Middle East (see e.g. Wahba, 1996 and 2009 and Said, 2007, in the case of Egypt). In addition, following the Arab Spring movement, there has been renewed interest in inequality measurement in these countries. A number of papers have argued that national-level income inequality does not seem to be particularly high by international standards, and therefore that the source of dissatisfaction might lie elsewhere (see in particular Halsny and Verne, 2015, 2018; see also World Bank, 2012, and Bibi and Nabli, 2010). This somewhat surprising fact, coined “the Enigma of Inequality” (UNDP, 2012) or the “Arab Inequality Puzzle” (World Bank, 2015), has produced a rising literature on inequality in the region (see Ncube and Anyanwu, 2012; Hassine, 2015; Halsny and Verne, 2015; van der Weide *et al.*, 2016, or Assaad *et al.*, 2017).

As noted in the introduction, our contribution to this literature is twofold. We combine household surveys with income tax data in order to correct upwards the top

of survey-based income distributions, and we aggregate within-country distributional data in order to estimate the distribution of income at the level of the entire Middle East. This leads us to relatively novel (though not entirely unexpected) conclusions regarding extreme inequality in the region. We stress that these results should be viewed as exploratory and suffer from many limitations. In particular, despite our best efforts, our ability to properly measure income inequality within individual countries is severely limited by the low quality of available data sources. The problem is particularly acute in the Gulf countries, for which very few studies on income distribution exist (see e.g. El-Katiri *et al.*, 2011, on Kuwait), and where the low standard survey-based Gini coefficients seem to contradict important aspects of their political economy, namely the growing share of migrant population, a large majority of which is composed by low-paid workers living in difficult conditions (Human Right Watch, 2013). The flow of migrant workers in Gulf countries has grown substantially over the period, making nationals willing to defend their numerous privileges, e.g. through restraining naturalization.<sup>1</sup> But the most striking manifestation of the restrictions imposed to the migrant population is probably the highly exploitative “sponsorship system” of labor, or “kafala system” (Kapiszewski, 2006; Human Right Watch, 2013), resulting in the creation of an extremely polarized social structure with two different groups in the legal, social and economic dimensions (Chatham House, 2015). As far as we know, little research has been conducted to study the two populations in order to measure income inequality in Gulf societies (see Naidu *et al.*, 2016, on the UAE, using new administrative wage data for foreigners, and Weyl, 2018). In the context of this paper, we attempt to put together all published statistical information regarding the inequality of income between nationals and foreign workers in Gulf countries (see Section 7). Unfortunately, we still face important limitations in our quantitative understanding of these issues.

Finally, our paper is closely related to the literature on the world distribution of income (Bourguignon and Morrisson, 2002; Milanovic, 2002; Lakner and Milanovic, 2013). In particular, Lakner and Milanovic (2013) attempts to correct upwards the top income share estimates constructed on the basis of national household surveys to study how much this impacts the measurement of the world distribution of income. Our approach is similar, except that we focus on regional inequality rather than global inequality. Of course both works are highly complementary: before we can perform a meaningful aggregation at the world level, it is important to ensure that we are able to do it at a broad regional level.

### 3. DATA SOURCES, CONCEPTS AND METHODS

This paper relies on four types of data sources: household surveys, income tax data, wealth rankings and national accounts. We define the Middle East as the region going from Egypt to Iran and from Turkey to the Gulf countries, excluding Israel. We start by putting together a macroeconomic database with annual

<sup>1</sup>“Oil wealth, and the practice of dividing some of this among citizens, mean there are very strong economic incentives to limit citizenship to a small pool of people. Gulf nationals typically do not pay income tax, have free health care and education provided by the state, receive subsidies for electricity and fuel, and often receive other benefits (such as land grants). Traditionally they have also expected the state to provide a job—an idea enshrined in some Gulf constitutions and—housing.” (Chatham House, 2015, p. 17).

TABLE 1  
POPULATION AND INCOME IN THE MIDDLE EAST (2016)

	Population (million)	Adult Population (aged 20 and more, in million)	Adult population (% of ME total)	National Income (Billion PPP Euro 2016)	% ME Total Income (PPP)	National Income (Billion MER Euro 2016)	% ME Total Income (MER)
Turkey	80	53	21%	1,073	19%	548	22%
Iran	80	56	22%	896	16%	330	13%
Egypt	93	54	22%	800	14%	234	9%
Iraq-Syria-Other (non-Gulf)	102	52	21%	570	10%	243	10%
Iraq	38	18	7%	354	6%	112	4%
Syria	19	10	4%	47	1%	28	1%
Jordan	8	4	2%	57	1%	30	1%
Lebanon	6	4	2%	57	1%	40	2%
Palestine	5	2	1%	16	0%	12	0%
Yemen	27	13	5%	39	1%	21	1%
Gulf Countries	54	37	15%	2,394	42%	1,179	47%
Saudi Arabia	32	20	8%	1313	23%	575	23%
Oman	5	3	1%	118	2%	47	2%
Bahrain	1	1	0%	46	1%	26	1%
UAE	9	8	3%	430	7%	283	11%
Kuwait	4	3	1%	258	5%	122	5%
Qatar	2	2	1%	229	4%	126	5%
Total Middle East	409	252	100%	5,733	100%	2,534	100%

TABLE 2  
HOUSEHOLD SURVEYS USED IN THIS PAPER (1990-2016)

	Survey years	Average ratio (total survey income)/(national income)
Turkey	1994, 2002-2016	43%
Iran	2010, 2013	49%
Egypt	1999, 2004, 2008, 2010, 2012, 2015	40%
Iraq-Syria-Other non-Gulf	1992-2013	53%
<i>Iraq</i>	2007	60%
<i>Syria</i>	2004	56%
<i>Jordan</i>	1992, 2002, 2006, 2008, 2010, 2013	70%
<i>Lebanon</i>	2007	37%
<i>Palestine</i>	1996-1998, 2004-2008, 2010-2011	65%
<i>Yemen</i>	2006	33%
Gulf Countries	1995-2013	30%
<i>Saudi Arabia</i>	2008	30%
<i>Oman</i>	2010	29%
<i>Bahrain</i>	1995, 2005, 2015	37%
<i>UAE</i>	1998, 2009	39%
<i>Kuwait</i>	2007, 2013	21%
<i>Qatar</i>	2007, 2012	23%

series of population and national income between 1990 and 2016. Basic descriptive statistics for 2016 from this database are reported in Table 1. The region is characterized by very large between-country inequality (we further discuss this issue in Section 7). All details about the data sources are described in the online appendix.

In order to estimate the distribution of income in the Middle East, our general method follows three steps. We begin with household survey income series (step 1), which we correct using (i) generalized Pareto interpolation techniques (see Blanchet *et al.*, 2017 for the description of the method), and (ii) personal income tax micro-data from Lebanon (see Assouad, 2017 for a description of the fiscal data and their limitations) (step 2). We then use national accounts and rich lists in order to impute tax-exempt capital income (step 3). Our concepts and methods follow those described in the Distributional National Accounts guidelines used for the World Inequality Database (Alvaredo *et al.*, 2016). In particular, the method in three steps is very similar to that used for China in Piketty *et al.*, (2017), and for Russia in Novokmet *et al.* (2017), with some differences highlighted in the following sections.

### 3.1. Step 1: constructing a household income database for the Middle East

Income and inequality data are scarce in the Middle East, notably in the poorest and the richest countries. Even when national statistics offices do undertake household surveys on income or expenditures, access to the data is very limited. Until recently, it was almost impossible to obtain micro-data.<sup>2</sup> Finally, when they exist, the databases are often of poor quality (see Bibi and Nabli, 2010 for a review of existing data, and an assessment of their access and quality).

<sup>2</sup>See in particular the Open Access Micro Data Initiative undertaken by the Economic Research Forum.

The first part of our work consists in gathering available sources to create a Middle East income database and generate raw survey-based inequality series at the national and regional levels. Table 2 summarizes the years for which household survey data are available: there are, for each country, between 1 and 16 years with data. Regarding the format, there are four cases: (1) eight countries with survey micro-data; (2) six countries with tabulated information on the distribution of income, extracted from household surveys reports and/or official publications; (3) three countries with data on expenditure and consumption (tables or micro-data); (4) 1 country, Saudi Arabia, with no detailed published data. In the online appendix we provide a thorough description of all data sources by country, the information available, and the methods to produce income distribution series over the 1990-2016 period (Online Appendix A). We briefly summarize now three main issues regarding the data construction process.

A first issue refers to the definition of income. The data quality makes it impossible to harmonize the series in a completely satisfactory manner. Only the micro-data for Turkey contain relatively detailed information on income categories (wages, pension and other replacement income, business and capital income). Other micro-databases only provide total disposable income, with some additional information on imputed rental income and/or the amount of taxes on consumption and durable goods, property taxes etc. paid for some years and countries. Tabulated data usually contain limited information on the definition of income. Whenever possible, the survey income concept that we use attempts to approach pre-tax, post-replacement income (Alvaredo *et al.*, 2016). More precisely, pension income (and other replacement income such as unemployment insurance) is included, while pension contributions (and other social contributions financing replacement income flows) are deducted. Therefore, in the trade-off between harmonizing our database (between years and/or countries) and approaching the pre-tax income concept, we choose the latter. This is a substantial limitation that needs to be improved in the future.

The second issue concerns the unit of observation. We take the adult individual as the basic unit and we assume that income is equally split between adult household members.<sup>3</sup> We normalize our series to the adult population (aged 20 and above). Using the generalized Pareto interpolation techniques developed in Blanchet, Fournier and Piketty (2017), and the *gpinter* web interface ([www.wid.world/gpinter](http://www.wid.world/gpinter)), we estimate the full distribution of raw survey income separately for all countries and for the region as a whole.<sup>4</sup> We express the distributions in terms of generalized percentiles (or g-percentiles).<sup>5</sup>

The third issue is related to the years without data. As one can see from Table 2, household surveys are available only for a limited number of years. To infer the distribution of years with no data, we use the household surveys of the

<sup>3</sup>See Online Appendix A for more details on the country specific hypothesis made to derive the per adult income distributions.

<sup>4</sup>We use the merging option to derive the national distribution of Iran (by merging the rural and the urban income distributions) and of the Gulf countries (by merging the income distributions of foreigners with the one of non-foreigners).

<sup>5</sup>There are 127 g-percentiles: 99 for the bottom 99 percentiles, 9 for the bottom 9 tenth-of-percentiles of the top percentile, 9 for the bottom 9 one-hundredth-of-percentiles of the top tenth-of-percentile, and 10 for the 10 one-thousandth-of-percentile of the top one-hundredth-of-percentile.

closest available year.<sup>6</sup> For a number of countries we only have one household survey, which means that by construction we are forced to use the same inequality level over the entire 1990–2016 period. As we repeatedly stress, this major limitation implies that we cannot draw robust conclusions about the evolution of income inequality: our main objective is then to estimate the overall level of income inequality in the Middle East, *the evolution and level*.

Additionally, in order to ensure maximal comparability across countries and years, we choose to anchor all country-year-level income distributions to the relevant per adult national income. That is, for every country-year, we proportionally upgrade all income levels for all percentiles so that per adult average income always coincides with per adult average national income observed in our macroeconomic database (therefore keeping the income distribution and shares constant). By doing so, we certainly do not pretend that available national income series are perfectly comparable. We simply assume that these are the most comparable income series we have: national accounts at least attempt to apply the same definitions in all countries, which is not the case with survey income. This issue is further discussed in the DINA Guidelines (Alvaredo *et al.*, 2016).

We also report on Table 2 the ratios between total survey income and national income. For most Middle East countries, the ratios lie between 40 percent–50 percent, which is fairly small, but not unheard of by international standards. However, the ratios are substantially smaller in Gulf countries—as low as 20 percent–30 percent. That is, compared to other countries, a very large fraction of national income of Gulf countries is missing from self-reported household survey income. To the extent that nationals benefit from the excluded income components (which typically refer to the undistributed profits of oil corporations, and the capital income from sovereign wealth funds) more than foreigners, this implies that we are likely to severely underestimate income inequality in Gulf countries. To correct for this, we proceed as follows: we impute a fraction of the missing income (the gap between national income and total survey income) to nationals only, so that the ratio between survey income (augmented by the imputation) and national income reaches 30, 50, 70, or 100 percent. We take as benchmark survey distributions for Gulf countries the series where this ratio equals 50 percent, except in Qatar where we take the series where the ratio is 30 percent.<sup>7</sup>

### 3.2. Step 2: Fiscal data correction

Self-reported survey data is well-known to underestimate incomes at the top (within the top decile, and particularly within the top percentile). Generally speaking, the strategy followed in WID.world in order to correct for this is to use income tax micro-files, together with national accounts and wealth data in order

<sup>6</sup>We also constructed estimates based on the assumption of linear inequality trends between survey years. This made very little difference in both the level and trend of inequality in the Middle East as a whole, so in our benchmark series we simply use the closest available year for country-level data.

<sup>7</sup>In Qatar, given that foreigners represent a large share of the total population (90 percent), and that the ratio between survey and national income is particularly low (22 percent), top income shares are very sensitive to the operation that reattributes part of the missing income to the nationals only (see Figure 9a—Qatar). We therefore only attribute a share of missing income so that the ratio survey/national income equals 30 percent and not 50 percent as in other countries.



to cover tax-exempt income. When income tax data do not exist or is limited in scope (e.g. when only tax tabulations, as opposed to micro files, are available), the DINA Guidelines recommend supplementing existing data with generalized Pareto interpolation techniques. In the case of Middle East countries, income tax data are unfortunately extremely limited. Lebanon is the only country for which we were able to access income tax micro-files. These data are relatively detailed, consisting on yearly quasi-exhaustive micro-files over the 2005–2014 period. However, for other countries, despite our best efforts, we do not have any income tax data (not even income tax tabulations). This is unfortunate, because household surveys in the Middle East appear to underestimate top incomes at least as much as in the rest of the world, and possibly more. In particular, survey-based inverted Pareto coefficient  $b(p)$  are implausibly low for top incomes, generally around 1.5–1.7 (and sometime even less than 1.5) at the level of the top 10 percent (i.e.  $p=0.9$ ).<sup>8</sup> In contrast, in countries with reliable income tax data,  $b(p)$  coefficients are typically between 2 and 3 (or even more in highly unequal countries), and tend to follow a U-shaped generalized Pareto curve, with a rising part within the top decile (Blanchet *et al.*, 2017). The Lebanese income tax micro-files confirm this general finding: top income levels reported in tax data are much higher than in household surveys (top 1 percent incomes are 2-3 times higher, with large variations across income levels and over years), and the tax-corrected inverted Pareto coefficients within the top decile are 3 or higher (Assouad, 2017).<sup>9</sup> The reasons why household surveys almost systematically lead to excessively low  $b$  coefficients typically come from the fact that surveys suffer from various under-reporting, truncations and top coding problems (with top coding, or self-censored top incomes,  $b$  naturally becomes very close to 1 at the very top).<sup>10</sup> Naturally, surveys have other merits, and include detailed socio-demographic information that one could never obtain using tax data. However, for the study of the top decile—and therefore for the study of the total inequality level of a country, given the importance of the income share going to the top decile—it is necessary to supplement surveys with other sources and methods.

In order to construct our benchmark series, we choose to adopt correction factors that are based on the income tax data from Lebanon. More precisely, the income tax micro-files enable us to compute correction coefficients for thresholds and average incomes by  $g$ -percentiles.<sup>11</sup> We apply no correction below  $p=0.8$ , i.e. we assume correction factors exactly equal to 1 for the bottom 80 percent, which is approximately the case in the Lebanese data (see Assouad, 2017 on the choice of the correction profiles.). These coefficients do not depend on the income levels in Lebanon, but only on the percentiles. We apply the average correction coefficients per percentile over the 2005–2014 period in Lebanon to all other countries. We

<sup>8</sup>See Online Appendix, Table A3.

<sup>9</sup>See also section 4 and Table 3 below for corrected  $b(p)$  coefficients.

<sup>10</sup>Hasly and Verme (2013, Figure 10, p. 28) use household income surveys for Egypt between 1999 and 2010 and argue that top-decile inverted Pareto coefficients around 1.5-1.7 are not unusual by international standards. However this conclusion comes entirely from the fact that they compare with coefficients coming from household surveys (which are artificially low).

<sup>11</sup>By definition, the coefficients are the ratio of thresholds (resp. averages) between the raw survey and the corrected distributions.

have also computed a large number of variant series based upon alternative assumptions (see online appendix).<sup>12</sup> The impact on the overall inequality level in the Middle East and the comparison with other world regions is relatively limited (as a first approximation). In order to derive more precise estimates, we would need to have access to income tax data (at least in the form of income tax tabulations, and ideally in the form of micro files) for all Middle East countries.

### 3.3. Step 3: Missing capital income and wealth correction

Finally, we correct our fiscal income series to take into account non-reported and tax-exempt capital income. Important components of capital income are missing from fiscal income data, even in the absence of tax evasion (see the discussion in Alvaredo *et al.*, 2016 and Piketty *et al.*, 2017). They typically include corporate retained earnings, and imputed housing rental income. We assume that these “non-fiscal” income  $y_{nf}$  is equal to 10 percent of national income in each country, a reasonable figure given our findings in other countries. For Lebanon, however, we estimate it to be 20 percent of national income by using available information from national accounts and government reports on tax revenues, published by the Ministry of Finance (Assouad, 2017). Then, to estimate the distribution of personal income  $y_p = y_f + y_{nf}$ , i.e. the sum of fiscal and non-fiscal income, we need to make an assumption about the distribution of  $y_{nf}$  and the correlation between  $y_f$  and  $y_{nf}$ . We assume that  $y_{nf}$  follows the same distribution as wealth, which we estimate by applying generalized Pareto interpolation techniques to wealth rankings (see below). As for the correlation structure between  $y_f$  and  $y_{nf}$ , on the basis of estimates obtained in countries with adequate micro-files, we use the family of Gumbel copulas, with Gumbel parameter  $\theta = 3$  (see Piketty *et al.*, 2017, and Novokmet *et al.*, 2017). We should stress that this wealth-based correction has a relatively limited impact on our final income inequality estimates (and in particular a much smaller impact than the fiscal data correction), so that the uncertainty that we are facing here is unimportant for our main findings (see Section 4).

In order to estimate wealth inequality, we proceed as follows. Most observers tend to assume—and probably rightly so—that the level of wealth inequality in the region is high by international and historical standards. However, there is substantial uncertainty about the exact level of wealth concentration, due to the almost complete lack of proper statistical evidence. Here we follow a simple method similar to that applied in Novokmet *et al.* (2017), and use rich lists to produce estimates of top wealth shares for Middle Eastern countries in 2016, which we then use to allocate tax-exempt capital income. We use billionaire’s lists published by Forbes

<sup>12</sup>In particular, to derive the raw survey distribution of Lebanon, one needs to assume an inverted Pareto coefficient at the top due to the format of available tabulations. This affects the correction coefficients and the levels of inequality in all countries. For other variants on the definition of income and profile of correction, see Assouad, 2017. We have also computed variant series based on the assumption that inverted Pareto coefficients  $b(p)$  take average WID.world values (typically within the interval [2,3]) for Middle East countries other than Lebanon. This leads to results for total Middle East inequality that are close in magnitude to those presented here (see Online Appendix, Tables A3–A4 for inverted Pareto coefficients for the various countries and years, before and after our benchmark fiscal corrections).

and the magazine *Arabian Business*. Generally speaking, we find that the ratio of billionaires' wealth to national income is indeed extremely high by international standards. For Saudi Arabia, Qatar, Bahrain and Lebanon, it is greater than 20 percent on average, while total billionaire wealth represents between 5 percent and 15 percent of national income in the U.S., Germany and France over 2005–2015. Wealth concentration is particularly high in Lebanon, where the average income and the average wealth are substantially below Western levels (Assouad, 2017). We stress however that billionaires' lists are particularly fragile and volatile in the Middle East. There are relatively few billionaires and their number varies substantially from year to year (many years have no data). For instance, *Forbes* reports one or two billionaires in Bahrain and Qatar and only in three years between 1990–2016. However, for some years, billionaires' wealth can represent a very high ratio to national income. Given that the figures are extremely volatile, using this data source to identify a trend in wealth concentration is impossible. Several reasons can explain why wealth rankings might be particularly incomplete in the region. First, large amounts of wealth may be missing due to a pervasive use of tax havens and offshore bank accounts. The data leaked from HSBC Switzerland and Mossack Fonseca (the so-called “Swiss leaks” and “Panama Papers”) show that Middle East countries are among the top clients of those offshore financial institutions.<sup>13</sup> Evidence indeed indicates that hidden wealth is high by international standards (Zucman, 2015). Andersen *et al.* (2016) also show that “petroleum-rich autocracies” in the Arab world tend to hide larger amounts of wealth and that they would do it more easily than other countries with oil resources. In addition, rich lists do not include wealth owned by ruling families and heads of states. This may lead to a substantial downward bias in the region, where the line between public and private property is often blurred. We attempt to include figures on state leaders' wealth when we could find some, but reliable information is very scarce.<sup>14</sup>

For all these reasons, we did not attempt to derive annual wealth distribution series. Rather, we compute one average estimate for wealth inequality for each country, applying the same general method as in Novokmet *et al.* (2017). For each country, we compute average billionaire wealth relative to national income over all available years over 1990–2016. We then compute average standardized distributions of wealth for the US, France and China from WID.world series.<sup>15</sup> We note that variations across countries and over time in these standardized wealth distributions mostly happen above  $p_0=0.99$ , i.e. below  $p_0=0.99$  the ratios of the different percentile thresholds to average wealth are relatively stable over time and across countries, at least as a first approximation with most of the variation taking place within the top 1 percent. Therefore we choose to use the same normalized distribution for Middle East countries below  $p_0=0.99$  as the average US-France-China

<sup>13</sup>In terms of amount of wealth placed in their offshore accounts. See <https://projects.icij.org/swiss-leaks/countries/rankings#money>.

<sup>14</sup>We gathered some figures from various sources (newspapers articles, *Forbes'* “Royals” and “Dictators” lists). We could not cover all ruling families and, when we find information, it is only available for some years. For an example, figures on the Assad family's wealth are only available for two years. We did not find figures on billionaires in Jordan.

<sup>15</sup>That is, we divide all thresholds and bracket averages for all 127 generalized percentiles by average wealth, and we compute the arithmetic average for the three countries.

normalized distribution. To estimate the average wealth, we compute an annual average wealth-income ratio over all countries available in WID.world, and we apply this average to each country average income. The difficult question is to know how to link the distribution from  $p_0=0.99$  to billionaire level, and also to make an assumption about the average number  $n$  of adults per billionaire family (sometime Forbes includes very large family groups in the same billionaire family; sometime it is just one individual or one married couple). We first re-estimate the 127 generalized percentile within the top 1 percent of the normalized distribution in order to reach billionaires' level. In our benchmark series we assume  $n=5$  and a linear correction factor  $f(p)$  from  $p_0=0.99$  up to billionaire level, as this assumption seems to work relatively well for the US, France and China.<sup>16</sup> This method gives a first approximation of the concentration of wealth in the region. In the appendix we present a number of alternative series based upon explicit assumptions and generalized Pareto interpolation techniques. We should stress again that even though the uncertainty about the exact magnitude of wealth concentration is high, it has relatively limited impact on our final income inequality estimates (see Section 4).

#### 4. MAIN RESULTS: EXTREME CONCENTRATION OF INCOME IN THE MIDDLE EAST

We now present our main results on the level and evolution of income inequality in the Middle East. We start by describing the general evolution of average incomes and between-country inequality in the region over the 1990–2016 period. We then present what we consider our most robust and interesting finding, i.e. the extreme level of income concentration in the Middle East as a whole (as compared to other world regions), taking into account both between-country and within-country inequality. Finally, we discuss our findings regarding the evolution of income inequality in the Middle East over the 1990–2016 period (which, as we stressed in the previous section, should be viewed as more fragile and exploratory than our findings regarding the level). Complete series and detailed country-level estimates are available in the online appendix.

##### 4.1. *Evolution of average incomes and population in the Middle East*

The 1990–2016 period has seen rapid population growth in the Middle East: the total population rose by about 70 percent, from less than 240 million in 1990 to almost 410 million in 2016. The rise in average income has been much more modest. Using purchasing power parity estimates (expressed in 2016 euros), per adult national income rose from about 20 000€ in 1990 to 23 000€ in 2016, i.e. by about 15 percent. Using market exchange rates (again in 2016 euros), per adult national income rose from less than 9 000€ in 1990 to about 10 000€ in 2016 (see Figure 1a).

<sup>16</sup>We also estimate variant series based upon alternative assumptions:  $n=2,4,6,8$  instead of  $n=5$ , as well as a piecewise linear  $f(p)$  with a fraction  $f=0,0.2,0.4,0.6,0.8,1$  of the total correction between  $p_0=0.99$  and  $p_1=0.999$  (and a fraction  $1-f$  between  $p_1=0.999$  and billionaire level). For countries without billionaires' data, namely Iran, Jordan, Palestine, Yemen, we simply upgraded the average standardized distributions of wealth for the US, France and China to the country specific average wealth.

Given the importance of migrations and economic relations between the two regions, it is natural to compute the ratio between per adult national income in the Middle East and the West European average (itself defined for the present purpose as the average of per adult national income in Germany, France and the United Kingdom). Using purchasing power parity estimates (PPP), we find that average income in the Middle East stood at about 70–75 percent of the European average in 1990. It then fell during the 1990s and early 2000s, down to about 60 percent around 2003–2004, and finally rose back to about 65–70 percent between 2004 and 2016. Using market exchange rates (MER), the ratio has also been stagnating over the 1990–2016 period, but at substantially lower levels, i.e. around 25–30 percent of the West European average rather than 60–70 percent (see Figure 1b).

In our view, both the PPP and the MER viewpoints express valuable and complementary aspects of international inequality patterns. The PPP viewpoint should of course be preferred if we are interested in the living standards of the inhabitants living, working and spending their incomes in the various countries (which is the case of most people). However the MER viewpoint is more relevant and meaningful if we are interested in external economic relations: e.g. the ability of tourists and visitors from Europe or Gulf countries to consume when they travel to other countries; or the ability of migrants or prospective migrants from Egypt or Syria to send part of their euro wages back home. Here market exchange rates matter,

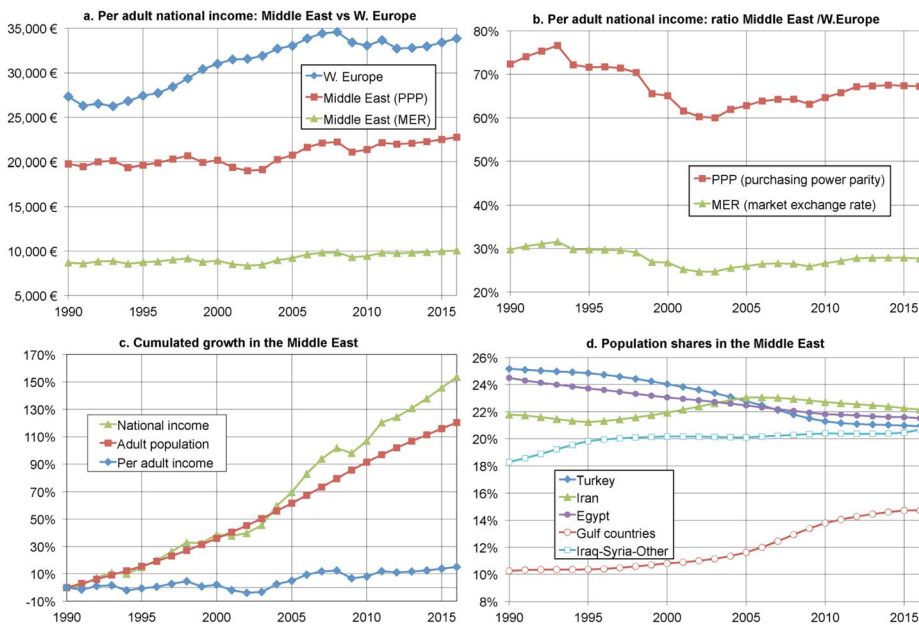


Figure 1. Income, population and growth in the Middle East 1990-2016.

Notes: Per adult national income in € 2016 PPP (purchasing power parity) vs MER (market exchange rate). Western Europe is Germany-France-Britain. Cumulated growth since 1990. National income in € 2016 PPP. Authors' computations using national accounts and GDP deflator. Shares in total Middle East adult population (20+). Gulf countries include Saudi Arabia, UAE, Oman, Kuwait, Qatar, Barhein. Other Arab Middle East countries (Jordan, Lebanon, Palestine, Yemen) are included with Iraq-Syria.

and may also play an important role on the perceptions of inequality. Whatever the viewpoint, it is important to have in mind that per adult average income benefited from very little growth over the 1990–2016: in effect, the vast majority of aggregate national income growth was absorbed by the rise of population (see Figure 1c).

Next, and most importantly, it is critical to stress that there exists enormous and persistent between-country inequality behind the Middle East average. In order to summarize the changing population and income structure of the Middle East, it is helpful to decompose the region into five blocs: (i) Turkey; (ii) Iran; (iii) Egypt; (iv) Iraq and Syria and other non-Gulf countries: Jordan, Lebanon, Palestine, Yemen); and (v) Gulf countries (including Saudi Arabia, Oman, Bahrain, UAE, Qatar and Kuwait) (see Table 1). Each of the first four blocs represents about 20–25 percent of total population of the Middle East, with relatively little variations over the 1990–2016 period (except for a slight rise in the share of the Iraq-Syria-other bloc). The main change in the structure of Middle East population over the past quarter of a century is the rise of the population share of Gulf countries, from about 10 percent in 1990 to 15 percent in 1996 (Figure 1d). This is almost entirely due to the rise of migrant workers in oil-rich countries.

If we now turn to average income patterns in these five sub-regions, we find that per adult national income is substantially below average everywhere except in Gulf countries. One can distinguish between two groups: Turkey and Iran, where average incomes have generally been around 50–60 percent of the West European average in PPP terms (with a significant rise of Turkish incomes over the 2001–2015 period, in contrast to Iranian stagnation); and Egypt and Iraq-Syria-other, where average incomes have always stood at significantly lower levels (around 30–40 percent of West European average in PPP terms). Using market exchange rates, we find that Egypt-Iraq-Syria-other have stagnated around 10–15 percent of the West European average. It is also worth noting that Turkey rises slightly above Middle East average when we consider MER series, while Iran falls towards the levels of Egypt and Iraq-Syria, reflecting the weakness of the Iranian currency and the relative strength of the Turkish lira. As compared to the rest of the Middle East, Gulf countries clearly belong to a different category. In PPP terms, their average per adult national income was about three times that of Western Europe in 1990, and almost two times in 2016; in MER terms, their income was 40 percent higher than the West European level in 1990, and is currently about 10 percent lower.

In brief: the enormous gap in average incomes between Gulf countries and the more populated Middle East countries has been trending downwards in the past 25 years. However, two remarks are in order. First, the income gap is still enormous: Gulf countries represent only 15 percent of the Middle East population in 2016, but they receive between 42 percent (in PPP terms) and 47 percent (in MER terms) of total Middle East income (Table 1). Back in 1990, their population share was 10 percent, and their income share was between 44 percent (PPP) and 48 percent (MER). Next, the fall in the income gap between Gulf countries and the rest of the Middle East reflects a number of complex and contradictory forces. It is partly due to the evolution of oil prices and output levels, as well as to the relative fast output growth in non-Gulf countries like Turkey. But it is also due to the very large rise of migrant workers, and the consequently migration-led reduction of per adult national income in Gulf countries: the massive inflow of foreign

workers (especially in the construction and domestic services sectors) resulted in a stronger increase in the population denominator than in the income numerator. By putting together census and survey data for the various countries, we find that the overall rise of the population share of Gulf countries (from 10 percent to 15 percent of total Middle East population) is almost entirely due to the rise in foreign workers, which increased from less than 50 percent in 1990 to almost 60 percent of the total population in 2016. From this viewpoint, it is also helpful to distinguish between two groups of Gulf countries: one group made of Saudi Arabia, Oman and Bahrain, where nationals still make a (small) majority (the foreign population share has been relatively stable around 40–45 percent of total adult population between 1990 and 2016); and another group made of United Arab Emirates (UAE), Kuwait and Qatar, where the nationals make a small minority of the resident population (the foreign share rose from 80 percent to 90 percent). This second group made about one quarter of total population of Gulf countries in 1990, up to about one third by 2016.

It is worth stressing that our ability to measure income inequality in oil-rich countries is relatively limited. By exploiting available household surveys, we find that the ratio between average per adult survey income between nationals and foreigners is particularly large in UAE-Kuwait-Qatar (which is not surprising, given the very small share of nationals), and most importantly that this ratio has increased over time, from 250 percent in 1990 to around 350 percent in 2016. In Gulf countries where the national-foreigner population structure is closer to 50–50 (i.e. Oman-Bahrain), the average income ratio between nationals and foreigners appears to be less extreme (but still substantial: around 160 percent). These estimates are solely based upon self-reported survey data (with no correction for the under-estimation of top incomes), and should therefore be considered as a lower bound. Finally, we are not able to include Saudi Arabia (by far the most populated among Gulf countries) in these computations due to a lack of access to adequate survey data.<sup>17</sup>

#### 4.2. *Extreme Level of Income Concentration in the Middle East*

We now present our main results regarding the level of income concentration in the Middle East. According to our benchmark estimates, the share of total income going to the top 10 percent income earners is about 64 percent in the Middle East, compared to 37 percent in Western Europe and 47 percent in the US (Figure 2a).

Several remarks are in order. First, these three regions have comparable population sizes (with a total population of about 410 million in the Middle East, 420 million in Western Europe, and 320 million in the US), and a relatively large degree of cultural, historical and linguistic proximity, so we feel that the comparison is legitimate and meaningful.

Next, the fact that we find much higher inequality levels in the Middle East appears to be extremely robust. We obtain the same finding not only in the benchmark series, but also in all variant series, often with a larger margin. Also, in Figure 2 we focus on the latest years available (2012–2016), but the inequality gap

<sup>17</sup>See Online Appendix for the treatment of Saudi Arabia.

with other regions was if anything even bigger in previous decades (see Section 4.3). Most importantly, we stress again that our inequality estimates for the Middle East are based upon highly conservative estimates of within-country inequality.

Income inequality also appears to be significantly higher in the Middle East than in Brazil—a country with a population of around 210 million that is often described as one of the most unequal in the world, and where the top decile income share is about 55 percent (Morgan, 2017). The Middle East also displays slightly higher inequality estimates than South Africa, with about 63% for the top decile income share for the latest available years (Alvaredo and Atkinson, 2010, and series updated in WID.world).

It is worth stressing that the origins of inequality are very different in these different groups of countries. In the case of the Middle East, they are largely due to the geography of oil ownership and the transformation of oil revenues into permanent financial endowments. In contrast, extreme inequality in South Africa is intimately related to the legacy of the Apartheid system: until the early 1990s, only the white minority (about 10 percent of the population, which until today roughly corresponds to the top 10 percent income group) had full mobility and ownership rights. In Brazil, the legacy of racial inequality also plays an important role (it was the last major country to abolish slavery in 1887, at a time when slaves made up about 30 percent of the population), together with huge regional inequality. It is striking to see that the Middle East, in spite of its much larger racial and ethno-cultural homogeneity, has reached such inequality levels.

It is also worth stressing that inequality levels in the Middle East appear to be significantly larger than those observed in giant countries with much larger populations such as China and India (Figures 2a and 2b). Here we use inequality

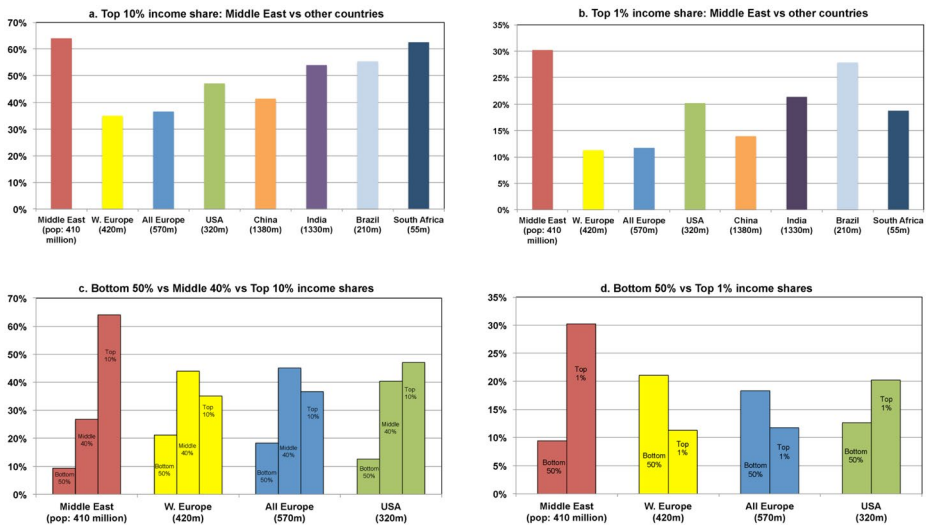


Figure 2. Income distribution in the Middle East and other countries and regions.

Source: WID.world

Notes: Distribution of national income (before taxes and transfers, except pensions and unempl. insurance) among adults. Corrected estimates combining survey, fiscal, wealth and national accounts data. Equal-split series (income of married couples divided by two). Latest years available (2012–2016).



estimates that were recently constructed for China and India by Piketty, Yang and Zucman (2017) and Chancel and Piketty (2017). These estimates are obviously far from perfect, but they probably tend to minimize the gap with the Middle East (in particular, we have access to more extensive income tax data for China and India than the for the Middle East).

In brief: according to our estimates, the Middle East appears to be the most unequal region in the world. This is true for the top decile income share, as well as for other inequality indicators; the top percentile income share is about 30 percent in the Middle East, vs. 12 percent in Western Europe, 20 percent in the US, 28 percent in Brazil, 18 percent in South Africa, 14 percent in China and 21 percent in India (Figure 2b). This is also true for synthetic indicators such as the Gini coefficient (see online series at WID.world).

We find it particularly informative to compare the overall levels of the income shares going to the bottom 50 percent, the middle 40 percent and the top 10 percent and 1 percent in the Middle East and other countries (Figures 2c and 2d). For instance, according to our benchmark estimates, the bottom 50 percent of the population receives about 9 percent of total income in the Middle East (vs. 18 percent in Europe), as compared to 64 percent for the top 10 percent (vs. 37 percent in Western Europe). This clearly illustrates that differences in distributions can make an enormous difference when comparing income and welfare levels across countries.

#### 4.3. *Analyzing the evolution of income inequality in the Middle East and other robustness checks*

We now turn to our results regarding the evolution of income inequality in the Middle East over the 1990–2016 period. We stress again that the data sources at our disposal are insufficient to properly analyze trends in inequality. In our benchmark estimates, we find a declining inequality trend at the regional level between 1990 and 2010, followed by a rising trend between 2010 and 2016. However these are trends of relatively small magnitude, and it is unclear whether these are robust findings (more on this below). As a first order approximation, our main finding—and probably the only robust one—is that income concentration is very high and approximately constant in the Middle East region taken as a whole. The fact that inequality remains extreme for all years over the period provides further evidence for the robustness of this result.

According to our benchmark estimates, the top 10 percent income share fluctuates around 60 percent–70 percent of total income between 1990 and 2016, while the bottom 50 percent income share fluctuates around 5 percent–10 percent of total income (Figure 3a). We have constructed a large number of variant estimates, and these orders of magnitude appear to be robust. When we move from the market exchange rate estimates (which we use as benchmark series) to purchasing-power-parity estimates, inequality levels decline a little bit, as one might expect (Figure 3b).<sup>18</sup> When we change the geographical definition of the Middle East by

<sup>18</sup>We tend to prefer MER estimates because they are in a way more comparable to those estimated for other world regions (i.e. we do not use price differentials when estimating income inequality within the US, Brazil, China or India). But as noted above, both perspectives offer valuable and complementary insights.

excluding Turkey (a country whose average income is intermediate between the poorest countries—Egypt, Iraq, Syria, Yemen, etc.—and the oil-rich Gulf countries, and which therefore is likely to moderate inequality at the regional level), we find higher inequality levels.

Finally, inequality remains extremely high, independently of the fraction of missing income (the gap between national income and total survey income) that we attribute to nationals in Gulf countries. Figure 4 displays top income shares for each country in 2016, depending on different scenarios: we impute missing income to nationals so that the average income in the survey (augmented by the imputation) represents 30, 50, 70 or 100 percent of the average national income.

As one can see from Figure 5a, where we compare the evolution of the top 10 percent income share in the Middle East and other world regions between 1990 and 2016, the striking fact is that income inequality has always been much higher in the

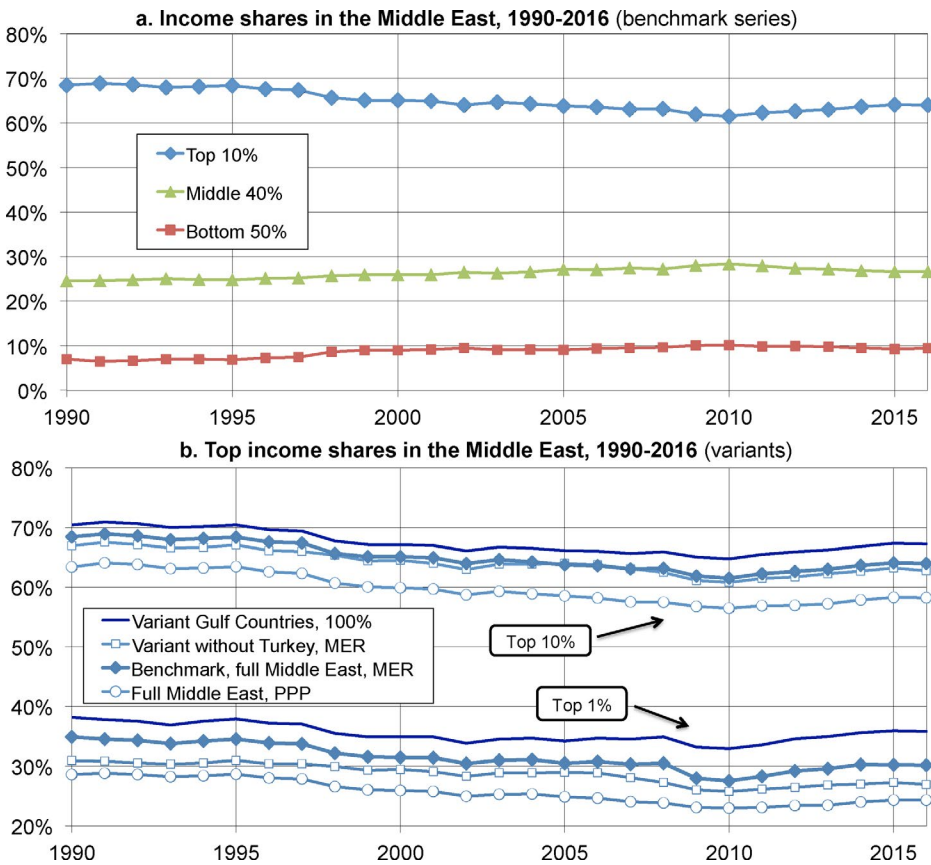


Figure 3. Income shares in the Middle East 1990-2016.

*Notes:* Distribution of national income (before taxes and transfers, except pensions and unemployment insurance) among adults. Corrected estimates combining survey, fiscal, wealth and national accounts data. Equal-split adults series (income of households divided equally among adult members). Given that the ratio between survey and national accounts is particularly low (around 20-30%) in Gulf countries, we create variants where we attribute all missing income to nationals (variant Gulf countries 100%). Benchmark estimates correspond to full Middle East, market exchange rate (MER).

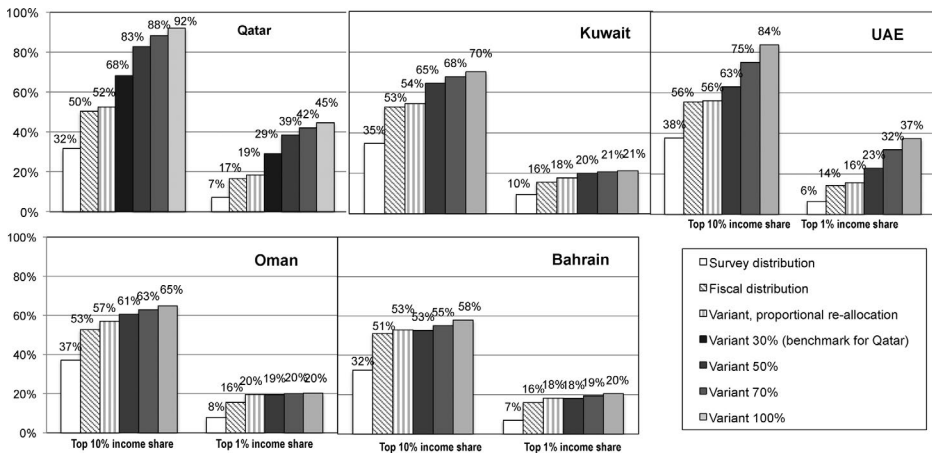


Figure 4. Inequality statistics in Gulf countries, 2016 (variants).

*Notes:* Distribution of income (before taxes and transfers, except pensions and unemployment insurance) among equal-split adults (income of households divided equally among adult members). Survey income series solely use self-reported survey data (but anchors distributions to per adult national income). Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Final estimates (with variants) combine survey, fiscal, wealth and national accounts data. Variants estimates are the result of imputing a fraction of missing income (the gap between national income and total survey income) so that the average income in the survey (augmented by the imputation) represents 30, 50, 70 or 100% of the average national income, and combine survey, fiscal, wealth and national accounts data. We also consider a conservative variant where the missing income is proportionally attributed to both foreigners and nationals."

Middle East.<sup>19</sup> The inequality gap was particularly large in 1990 (in a way, the Middle East has been a pioneer region in terms of extreme inequality). The gap decreased during the 1990s–2000s, as other world regions gradually became more unequal, but it remains substantial, and the Middle East continues to lead the world inequality ranking (with the possible exception of South Africa).<sup>20</sup>

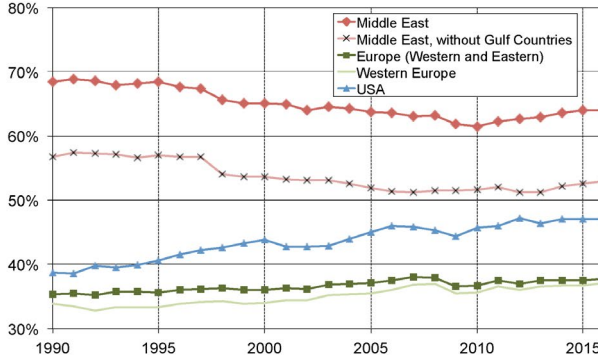
It is worth noting that when we exclude Gulf countries from our computations, inequality remains extreme, with a top decile receiving more than 50 percent of total regional income over the entire period. If inequality mechanically increases when we merge countries with very different average incomes, the extent to which it affects top income shares is not straightforward. When we aggregate series from Eastern and Western European countries for instance, inequality increases (relative to Western Europe) but to a much lesser extent than in the Middle East.

In order to better understand the origins of our high inequality estimates, we compare in Figure 5b the results obtained for our benchmark national income series (combining survey data, national accounts, income tax and wealth data), the results obtained with the fiscal income series (ignoring the wealth correction, which plays a relatively minor role), and the results obtained with the survey data alone. Here we distinguish between the survey income series obtained with different country-level

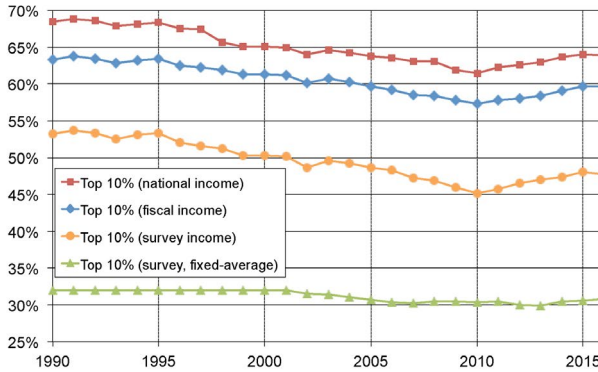
<sup>19</sup>The same conclusion holds true when we look at other inequality indicators such as the bottom 50% income share or the Gini coefficient.

<sup>20</sup>Unfortunately available series for the top 10% and top 1% share in South Africa do not cover all years, so it is difficult to make a complete comparison with the Middle East at this stage.

**a. Top 10% income share in Middle East and other countries and regions**



**b. Decomposing the level of Middle East top 10% income share**



**c. Decomposing the evolution of Middle East top 10% income share**

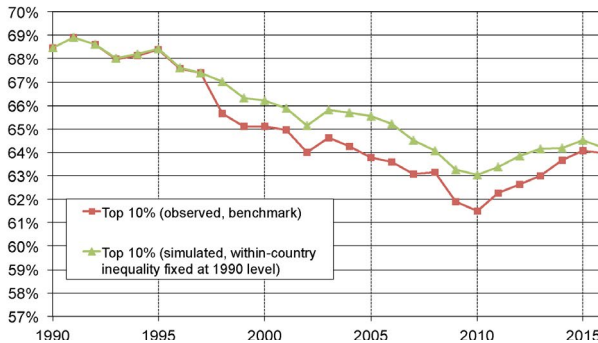


Figure 5. Top 10% income share in the Middle East: comparisons and decompositions.

*Notes:* Distribution of income (before taxes and transfers, except pensions and unemployment insurance) among equal-split adults (income of households divided equally among adult members). Pretax national income estimates combine survey, fiscal, wealth and national accounts data. Fiscal income estimates combine survey and income tax data (but do not use wealth data to allocate tax-exempt capital income). Survey income series solely use self-reported survey data (but anchors national distributions to per adult national income). Survey income with fixed-average-income series assumes same average income for all countries (thereby neutralizing between-country inequality). In panel c, the simulated series assume within-country inequality fixed at 1990 level (so that evolution is entirely driven by trends in between-country inequality).

TABLE 3  
COUNTRY-LEVEL INCOME INEQUALITY SERIES: INCOME SHARES AND OTHER INDICATORS

Country	Year	Bottom 50%	Middle 40%	Top 10%	Top 1%	Gini	P10/ average	P50/ average	P90/ average	P99/ average	Pareto b(10%)	Pareto b(50%)	Pareto b(90%)	Pareto b(99%)
Bahrain	1995	13%	33%	53%	19%	61%	16%	46%	188%	849%	6.7	3.8	2.7	2.2
	2005	13%	35%	51%	17%	60%	16%	52%	183%	791%	6.9	3.3	2.6	2.2
	2015	12%	36%	53%	18%	62%	14%	48%	190%	803%	7.8	3.7	2.6	2.2
Egypt	1999	17%	32%	51%	19%	56%	25%	50%	165%	814%	4.3	3.3	2.9	2.4
	2002	18%	33%	49%	18%	55%	26%	53%	163%	783%	4.2	3.1	2.7	2.3
	2014	18%	33%	49%	19%	54%	27%	54%	163%	762%	4.0	3.0	2.8	2.5
	2008	18%	34%	49%	19%	54%	27%	53%	167%	761%	4.1	3.1	2.7	2.4
	2009	19%	35%	46%	17%	52%	28%	56%	170%	719%	3.9	2.9	2.6	2.3
	2015	18%	33%	49%	19%	54%	27%	54%	163%	762%	4.0	3.0	2.8	2.5
Iran	2010	14%	35%	51%	18%	59%	17%	51%	183%	779%	6.4	3.4	2.6	2.3
	2013	17%	35%	48%	16%	55%	22%	54%	180%	748%	4.9	3.1	2.5	2.2
Iraq	2007	15%	32%	53%	22%	59%	20%	50%	165%	823%	5.4	3.4	3.0	2.7
Jordan	1992	15%	33%	51%	20%	58%	21%	50%	170%	780%	5.3	3.4	2.8	2.6
	2002	18%	36%	46%	15%	53%	25%	56%	182%	674%	4.3	2.9	2.4	2.2
	2006	17%	36%	47%	15%	54%	23%	55%	186%	700%	4.8	3.0	2.4	2.2
	2008	18%	35%	47%	16%	54%	25%	56%	178%	707%	4.3	3.0	2.5	2.2
	2010	17%	32%	52%	22%	57%	22%	52%	158%	816%	4.9	3.2	3.1	2.7
	2013	17%	35%	48%	16%	54%	23%	55%	181%	710%	4.8	3.0	2.5	2.3
Kuwait	2007	5%	26%	69%	21%	78%	7%	16%	250%	1030%	15.3	11.8	2.6	2.1
	2013	7%	29%	64%	20%	74%	10%	20%	261%	917%	11.6	9.5	2.3	2.2
Lebanon	2005	13%	35%	52%	22%	62%	15%	48%	180%	760%	7.2	3.6	2.7	2.8
	2006	13%	35%	52%	21%	61%	16%	49%	180%	751%	7.1	3.5	2.7	2.8
	2007	11%	33%	57%	24%	66%	12%	42%	184%	847%	9.5	4.2	2.9	2.8
	2008	11%	32%	57%	24%	66%	11%	42%	184%	856%	9.7	4.3	2.9	2.8
	2009	11%	33%	57%	23%	66%	12%	42%	185%	855%	9.5	4.2	2.9	2.7
	2010	11%	32%	57%	23%	66%	12%	42%	185%	863%	9.6	4.3	2.9	2.7
	2011	11%	32%	57%	23%	66%	11%	41%	185%	867%	9.7	4.3	2.9	2.7
	2012	10%	32%	58%	24%	67%	11%	41%	186%	874%	9.8	4.4	2.9	2.7

TABLE 3  
Continued

Country	Year	Bottom 50%	Middle 40%	Top 10%	Top 1%	Gini	P10/ average	P50/ average	P90/ average	P99/ average	Pareto b(10%)	Pareto b(50%)	Pareto b(90%)	Pareto b(99%)
	2013	11%	32%	57%	23%	67%	11%	41%	186%	873%	9.7	4.4	2.9	2.7
	2014	11%	32%	57%	23%	66%	12%	42%	185%	861%	9.6	4.3	2.9	2.7
Oman	2010	8%	35%	57%	18%	68%	6%	40%	212%	878%	18.2	4.5	2.5	2.0
Palestine	1996	15%	37%	48%	14%	57%	17%	54%	201%	701%	6.3	3.2	2.3	2.0
	1997	15%	37%	48%	14%	57%	17%	53%	201%	706%	6.4	3.2	2.3	2.0
	1998	15%	37%	49%	14%	58%	17%	53%	200%	714%	6.6	3.2	2.3	2.0
	2004	15%	36%	49%	15%	58%	16%	53%	191%	751%	6.8	3.2	2.4	2.0
	2005	14%	37%	50%	16%	59%	15%	50%	203%	743%	7.4	3.4	2.3	2.1
	2006	14%	36%	50%	15%	59%	16%	51%	193%	761%	7.0	3.4	2.5	2.0
	2007	13%	35%	52%	17%	62%	14%	47%	198%	790%	8.1	3.7	2.5	2.1
	2008	14%	36%	50%	14%	59%	16%	50%	199%	739%	7.0	3.5	2.4	2.0
	2010	13%	35%	52%	17%	61%	14%	48%	196%	782%	7.6	3.7	2.5	2.2
	2011	13%	36%	51%	16%	60%	15%	49%	198%	745%	7.3	3.5	2.4	2.1
	Qatar	2007	8%	26%	66%	23%	73%	9%	31%	178%	1112%	12.6	6.0	3.5
2012		10%	23%	67%	27%	71%	12%	33%	133%	1281%	9.0	5.6	4.7	2.1
SaudiArabia	2008	8%	30%	62%	20%	72%	9%	28%	223%	964%	12.1	6.5	2.6	2.0
Syria	2004	14%	37%	49%	15%	58%	16%	51%	201%	624%	6.7	3.3	2.3	2.4
Turkey	1994	8%	31%	61%	28%	71%	7%	36%	165%	970%	15.4	5.1	3.5	2.9
	2002	14%	31%	55%	22%	62%	17%	45%	169%	909%	6.3	3.8	3.1	2.5
	2003	14%	31%	55%	22%	61%	18%	46%	167%	910%	6.1	3.8	3.1	2.4
	2004	14%	32%	53%	21%	60%	18%	48%	173%	815%	6.1	3.6	2.9	2.6
	2005	15%	34%	51%	19%	58%	19%	51%	177%	797%	5.9	3.3	2.7	2.4
	2006	16%	34%	50%	18%	57%	21%	52%	176%	793%	5.3	3.2	2.7	2.3
	2007	16%	35%	49%	17%	56%	21%	53%	176%	751%	5.2	3.1	2.6	2.3
	2008	16%	34%	50%	18%	57%	20%	53%	173%	748%	5.4	3.2	2.7	2.4
	2009	15%	33%	52%	19%	58%	20%	51%	171%	858%	5.6	3.3	2.8	2.3
	2010	16%	33%	51%	20%	58%	21%	51%	171%	793%	5.3	3.3	2.8	2.5
	2011	16%	33%	51%	19%	58%	20%	50%	173%	811%	5.4	3.4	2.8	2.4
	2012	16%	33%	51%	20%	58%	21%	50%	172%	772%	5.2	3.3	2.8	2.6
	2013	16%	33%	51%	19%	57%	22%	51%	169%	761%	4.9	3.3	2.8	2.5
	2014	15%	33%	52%	21%	59%	21%	50%	166%	793%	5.3	3.4	2.9	2.6

TABLE 3  
*Continued*

Country	Year	Bottom 50%	Middle 40%	Top 10%	Top 1%	Gini	P10/ average	P50/ average	P90/ average	P99/ average	Pareto b(10%)	Pareto b(50%)	Pareto b(90%)	Pareto b(99%)
	2015	15%	33%	53%	22%	59%	20%	50%	165%	802%	5.4	3.4	3.0	2.7
	2016	15%	31%	54%	23%	60%	20%	48%	159%	814%	5.4	3.5	3.2	2.9
UAE	1998	9%	30%	61%	20%	69%	11%	32%	210%	953%	9.7	5.7	2.7	2.1
	2009	11%	33%	56%	16%	65%	18%	36%	219%	798%	6.1	5.0	2.4	2.0
Yemen	2006	14%	37%	50%	16%	59%	15%	51%	201%	658%	7.2	3.4	2.3	2.4

Distribution of national income (before taxes and transfers, except pensions and unemployment insurance) among adults. Corrected estimates combining survey, fiscal, wealth and national accounts data. Equal-split series (income of married couples divided by two). For similar series on the distribution of raw survey income (before any correction) and fiscal income (before wealth correction), see appendix.

average incomes (anchored on observed country-level per adult national incomes), and the survey income series simulated by assuming fixed country-level average incomes (thereby neutralizing the impact of between-country inequality). Both the within-country inequality effect (fiscal data correction), and the between-country inequality effect play an important role in accounting for the very high inequality estimates.

Finally, we have also simulated what the evolution of income inequality in the Middle East over 1990–2016 would have been if within-country inequality had remained fixed at the observed 1990 level. Figure 5c shows that the evolution of the top 10 percent share at the level of the Middle East would have been virtually the same, declining between 1990 and 2010, and rising since 2010. This shows that our estimates are mostly driven by the evolution of between-country inequality.

This is partly due to the fact that we do not have survey data for all years (Table 2), so that for some countries our inequality estimates display very little time variations (and in some cases no time variation at all). This is also due to the fact that even in countries with several surveys over the period, we observe limited variations in income inequality, and these variations tend to compensate each other. For instance, surveys indicate that income inequality declined somewhat in Turkey between 2003 and 2007, but then rose between 2007 and 2016; inequality increased in Lebanon between 2005 and 2008 and then stabilized; inequality declined in Egypt between 1999 and 2010, but then rose between 2010 and 2015; inequality increased in the UAE between 1998 and 2009 according to the top 10 percent income share (but declined according to the top 1 percent income share); inequality increased according to both indicators in Qatar between 2007 and 2012; and so on (Table 3).

Most of these variations are relatively modest in magnitude, so it is not surprising that most of the evolution of Middle East inequality is driven by the evolution of between-country inequality and the fact that the gap in average income between oil-rich countries and other countries has been trending downwards (but is still very large in level). Had we access to adequate income tax data throughout the 1990–2016 period, we might reach different conclusions and find a strong within-country rising inequality trend (such as the one found in a large number of very different countries across the world, e.g. in the US, Europe, India, China, South Africa, Russia, with varying magnitudes). It is also possible that Middle East countries—like Brazil—belong to a different category, i.e. countries where inequality has always been very large historically (so that it did not rise in recent decades). Given the data sources at our disposal, we are not able to conclude with a satisfactory degree of precision.

## 5. CONCLUDING COMMENTS

In this paper we have combined household surveys, national accounts, income tax data, and wealth data in order to estimate the level and evolution of income concentration in the Middle East for the period 1990–2016. According to our benchmark series, the Middle East appears to be the most unequal region in the world, with a top decile income share as high as 64 percent, compared to 37 percent in Western Europe, 47 percent in the US, and 55 percent in Brazil. This is due both to enormous inequality between countries (particularly between oil-rich and population-rich countries) and to large inequality within countries (which we probably under-estimate, given the limited access to proper fiscal



data). To our knowledge, this is the first attempt to measure income inequality at the level of the Middle East taken as a whole.

The data at our disposal is highly imperfect and we still face considerable limitations in our ability to measure inequality in the Middle East. In particular, there is much uncertainty about inequality trends in the period under study. However the general conclusion that the overall inequality level is one of the highest in the world—if not the highest in the world, with the possible exception of South Africa—appears to be very robust.

In conclusion, we would like to stress the importance of increasing transparency on income and wealth in the Middle East. In particular, it is critical that Middle East countries provide access to household surveys micro-files, and even more importantly that they provide access to income tax data (at least in the form of income tax tabulations). It is very difficult to have an informed public debate about inequality trends—and also about a large number of substantial policy issues such as taxation and public spending—without proper access to such data. While the lack of transparency on income and wealth is an important issue in many—if not most—areas of the world, it appears to be particularly extreme in the Middle East, and arguably raises in itself a problem of democratic accountability, independently from the actual level of inequality.

Finally, our results regarding the enormous level of income inequality in the Middle East region naturally point toward the need to develop mechanisms of regional redistribution and investment. In a way, this is already happening, in the sense that oil-rich countries regularly make loans to poorer countries (e.g. Saudi Arabia to Egypt) and that these loans sometimes include implicit or explicit subsidies. However such mechanisms are usually of limited magnitude, and tend to be highly unpredictable. Given the enormous concentration of gross domestic product and national income in the region, mechanisms of regional investment funds similar to those developed in the European Union (with permanent transfers between the richest and the poorest countries of the order of several percentage points of GDP) could make a big difference. These issues would deserve more attention in future research.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's web site:

**Appendix A. Data construction**

**Appendix B. Income and wealth distribution series**

Table A1. Household surveys used in this paper (1990-2016)

Table A2. Gulf-Countries Income Inequality Series: nationals vs foreigners in the survey data

Table B3. Country-Level Income Inequality Series: Income Shares and Other Indicators for the Survey Distribution

Table B4. Country-Level Income Inequality Series: Income Shares and Other Indicators for the Fiscal Distribution

Figure B1. Decomposing the level of Middle East top 10% income share

Figure B2. Decomposing the level of Middle East top 1% income share

Figure B3. Decomposing the level of Middle East Middle 40 % income share

Figure B4. Decomposing the level of Middle East Bottom 50% income share

Figure B5. Top 10% income share in the Middle East, 1990-2016: impact of the tax correction (1)

Figure B6. Top 1% income share in the Middle East, 1990-2016: impact of the tax correction (1)

Figure B7. Top 10% income share in Lebanon: impact of the tax correction (1)

Figure B8. Top 1% income share in Lebanon: impact of the tax correction (1)

Figure B9. Top 10% income share in the Middle East, 1990-2016: impact of the tax correction (2)

Figure B10. Top 1% income share in the Middle East, 1990-2016: impact of tax correction (2)

Figure B11. Pareto coefficients curves in the Middle East, 1990: impact of tax correction (2)

Figure B12. Pareto coefficients curves in the Middle East, 2016: impact of tax correction (2)

Figure B13. Inverted Pareto curves in the Middle East in selected years, final benchmark distribution

Figure B14. Top 10% income share in the Middle East, 1990-2016: impact of the wealth correction

Figure B15. Top 1% income share in the Middle East, 1990-2016: impact of the wealth correction

Figure B16. Top 10% income share in the Middle East, 1990-2016, geographical variants

Figure B17. Top 1% income share in the Middle East, 1990-2016