



# A brief multi-dimensional overview of socioeconomic inequality measurements

*Doha Data Forum*

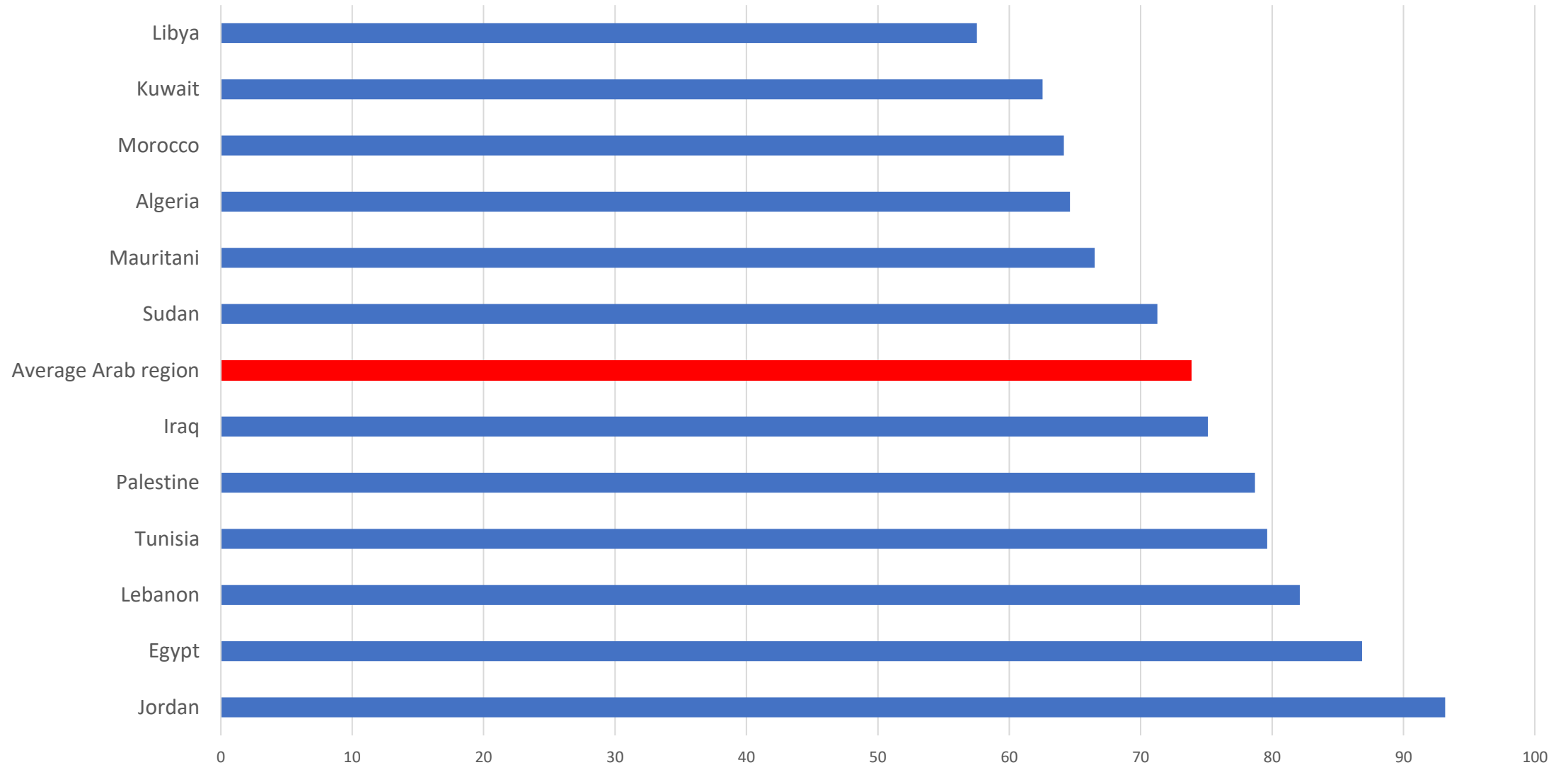
*October 30, 2023*

# Abstract



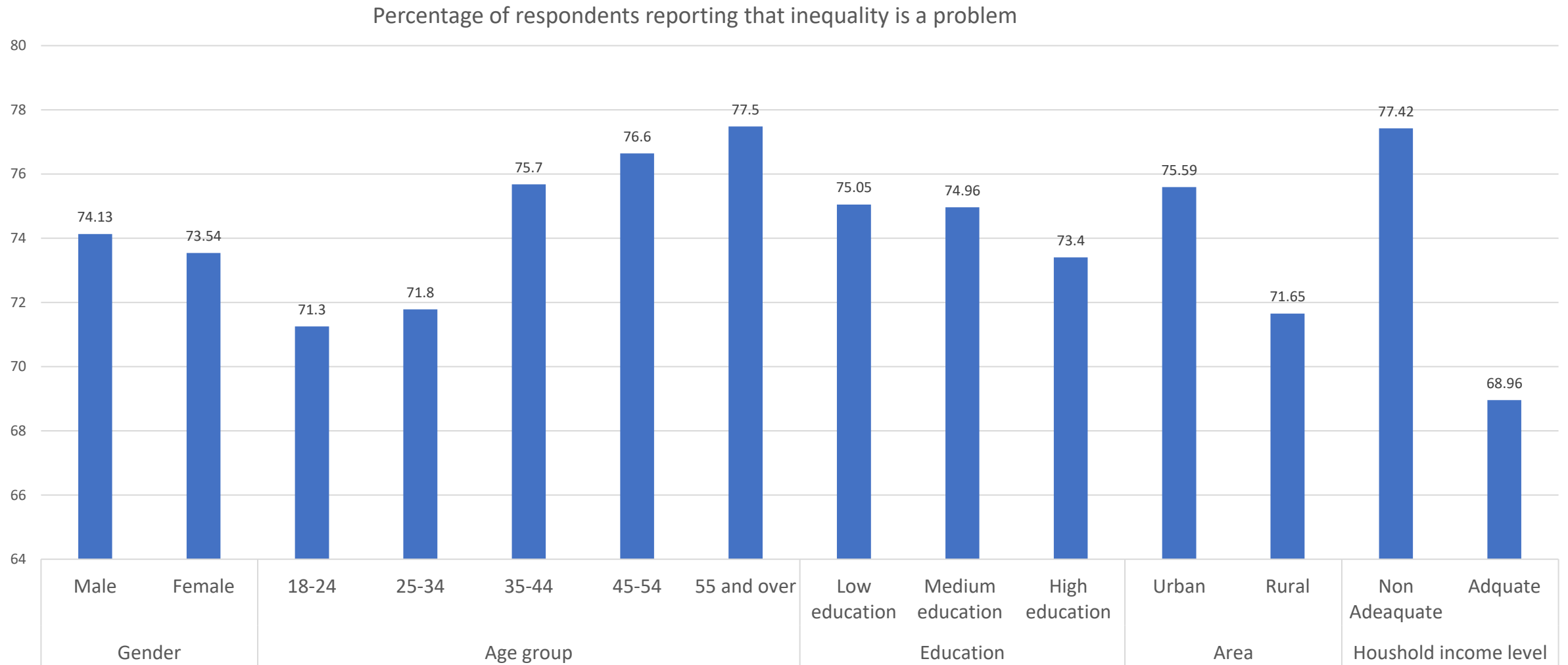
- Data collection and analysis on inequality is not an exact science as it combines both positive and normative aspects.
- The measurement of socioeconomic inequality has largely taken place within single dimensions such as income and education.
- Normative aspects are influenced by judgement on the types of inequality we should be concerned about and what constitutes high, low and 'acceptable' levels of inequality.
- This presentation will attempt to capture the global and regional debate by providing summary discussion of data collection and analysis of various dimensions of socioeconomic inequality.

## Percentage of respondents reporting that Inequality is a problem in the country



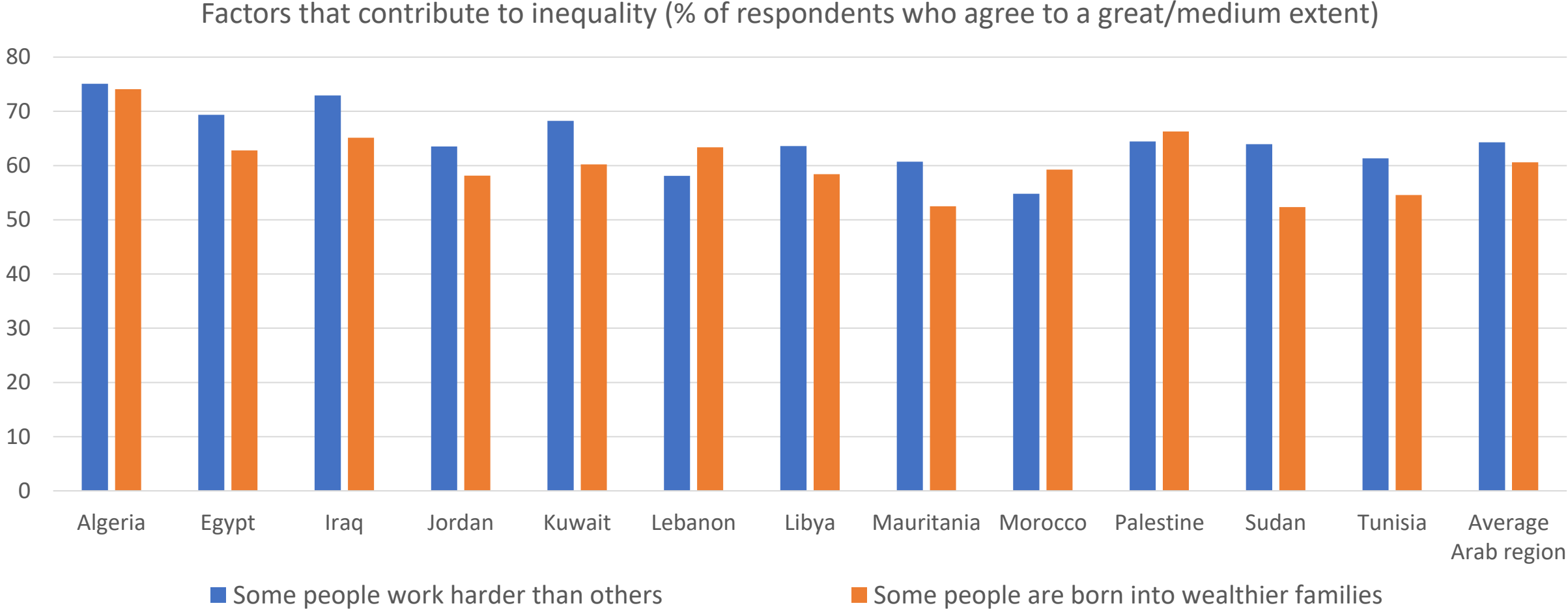
Source: The Arab Barometer Survey, Wave VII.2021-2022. <https://www.arabbarometer.org/survey-data/data-downloads/>

# To what extent do you believe that the gap between the rich and the poor is a problem in your country?



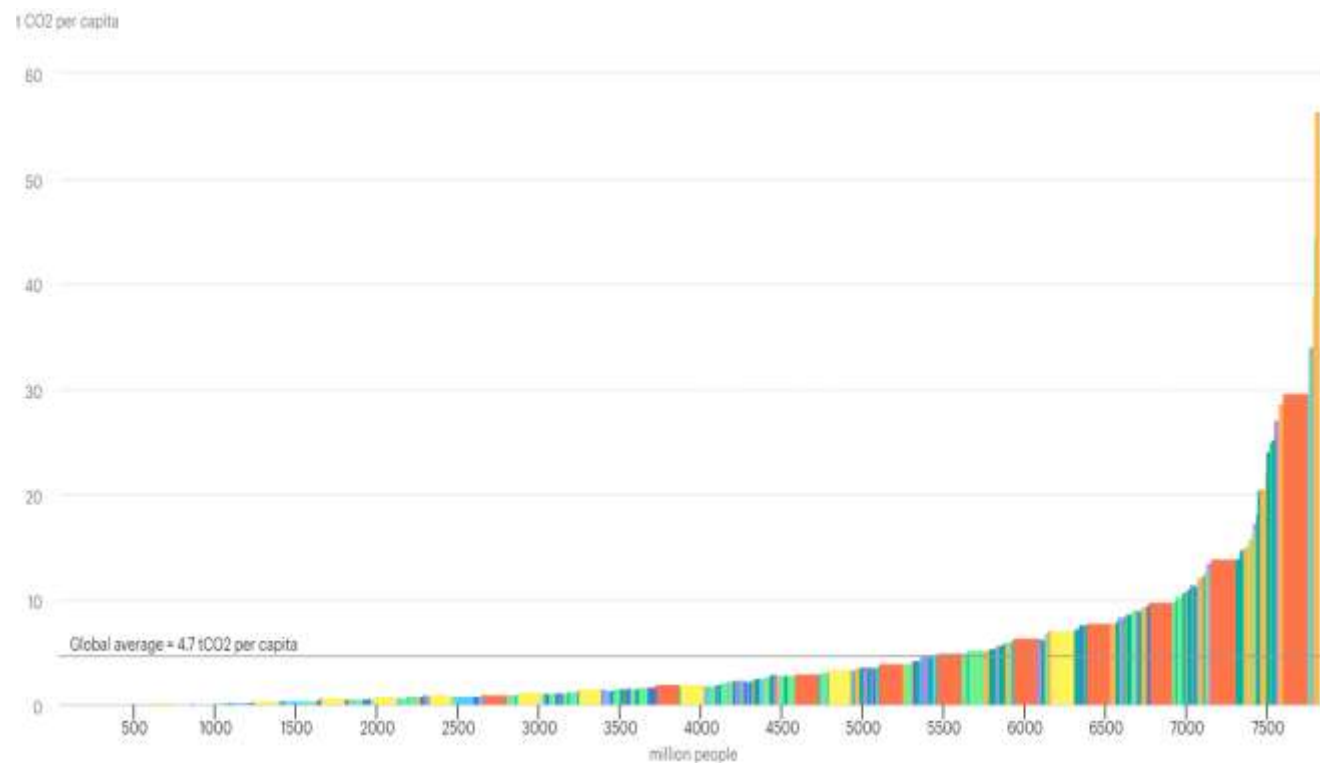
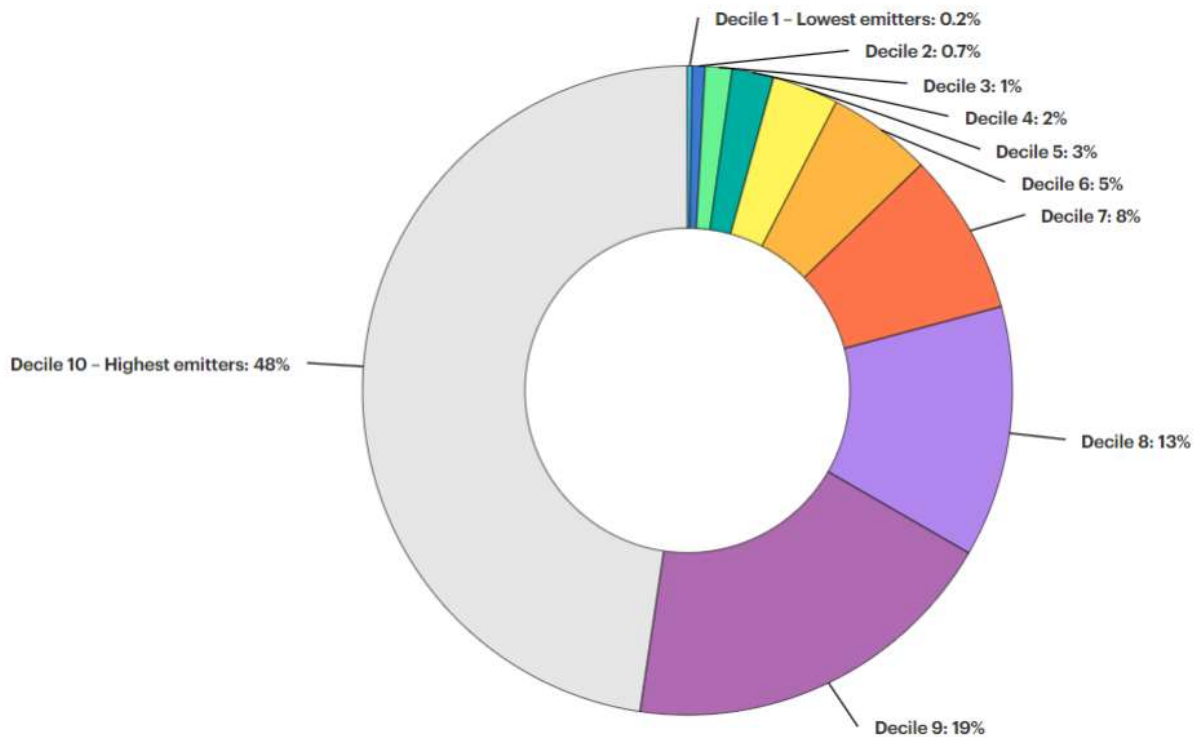
Source: The Arab Barometer survey, Wave VII.2021-2022, whole sample covering 12 countries

# To what extent do you believe each of the following factors contributes to economic inequality in your country?



Source: The Arab Barometer survey, Wave VII. 2021-2022. <https://www.arabbarometer.org/survey-data/data-downloads/>

# CO2 emissions are highly unequal

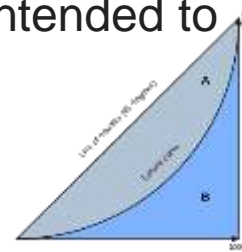


# Definition of Inequality

- Inequality of Opportunities (initial conditions – ex ante)
- Inequality of Efforts and Talents
- Inequality of Outcomes (ex post)
- Social and Intergenerational Mobility (dynamic aspect – Great Gatsby curve: the more inequality the less social mobility)
- Inequality is like cholesterol: there is good (efforts) and bad one (IoO)... the higher IoO the lower inclusive growth
- Vertical – horizontal inequalities

# Types of inequality measurement

- **Mean, median, S.D.**
- **Percentile/decile ratios:** 90/10, 90/40, 90/50, etc
- **Growth incidence curve**
- **Theil index (decomposable)**
- **Atkinson index:** percentage of income that a society would have to forego in order to have more equal income
- The **Foster–Greer–Thorbecke indices** are a family of poverty metrics. The individual indices within the family are derived by substituting different values of  $\alpha$  into the following equation: 
$$FGT_{\alpha} = \frac{1}{N} \sum_{i=1}^H \left( \frac{z - y_i}{z} \right)^{\alpha}$$
 where  $z$  is the poverty threshold,  $N$  is the number of people in the economy,  $H$  is the number of poor (with incomes at or below  $z$ ),  $y_i$  is the income of each  $i$ . The higher the value of  $\alpha$ , the greater the weight place on the poorest.
- With  $\alpha = 0$ ,  $FGT_0 = \frac{H}{N}$  [the formula reduces to the headcount ratio - the share of the population that lives below the poverty line].
- With  $\alpha = 1$ ,  $FGT_1 = \frac{1}{N} \sum_{i=1}^H \left( \frac{z - y_i}{z} \right)$  the formula reduces to the poverty gap.
- The most commonly used index from the FGT family is  $FGT_2 = \frac{1}{N} \sum_{i=1}^H \left( \frac{z - y_i}{z} \right)^2$  which puts higher weight on the poverty of the poorest individuals, making it a combined measure of poverty and income inequality.
- The **Gini coefficient/index** is a measure of statistical distribution intended to represent income, consumption or wealth inequality: 
$$\text{Gini} = \frac{A}{A+B}$$
- **Mincer eq.; Blinder-Oaxaca, RIF decompositions**





## Proposed Data & Methodology

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- **Household surveys**, the data sources traditionally used to observe inequality dynamics, do not properly capture these evolutions.
- Combine and reconcile **different data sources**: national accounts, survey data, fiscal data, and wealth rankings
- PROS → Enables tracking more precisely the evolution of income or wealth levels.
- The systematic use of the data sources allows comparisons between countries and over long time periods
- CONS → surveys do not inform adequately on income and wealth levels of the richest individuals
- Lack of data meant that estimates are made for some countries based on data available for other countries;
- It combines different data sources, which are not fully consistent with one another.

## Existing Methodologies

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- Share by decile (%); Bottom 50% share; top 1% share; middle 40%;
- Pre-tax income refers to the sum of all pretax income flows accruing to the individual owners of the production factors (labor and capital) before tax and transfer system, but after social insurance system.

## MENA

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- World Inequality Database has historical data for countries.

## Recommendations

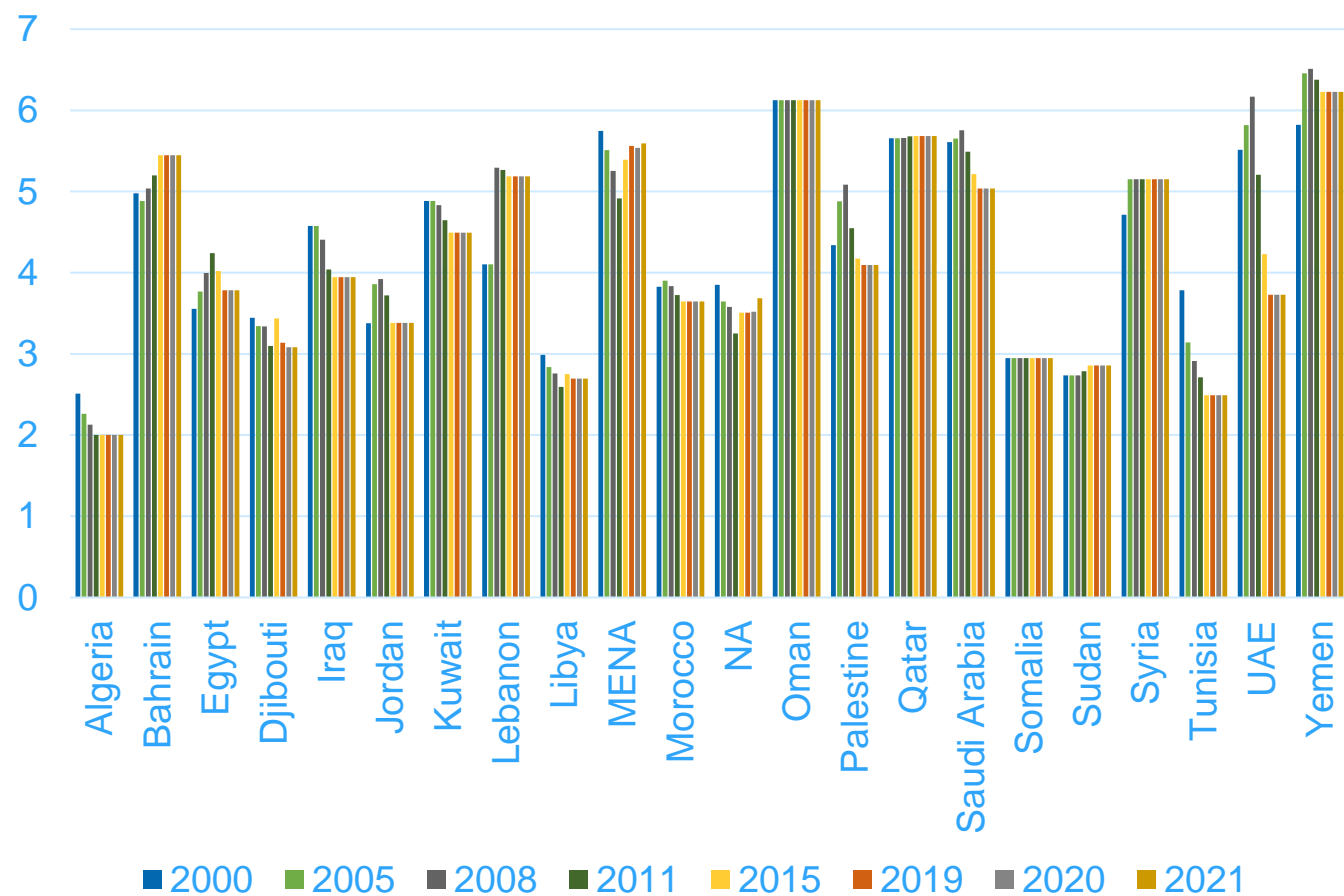
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- Improve data availability

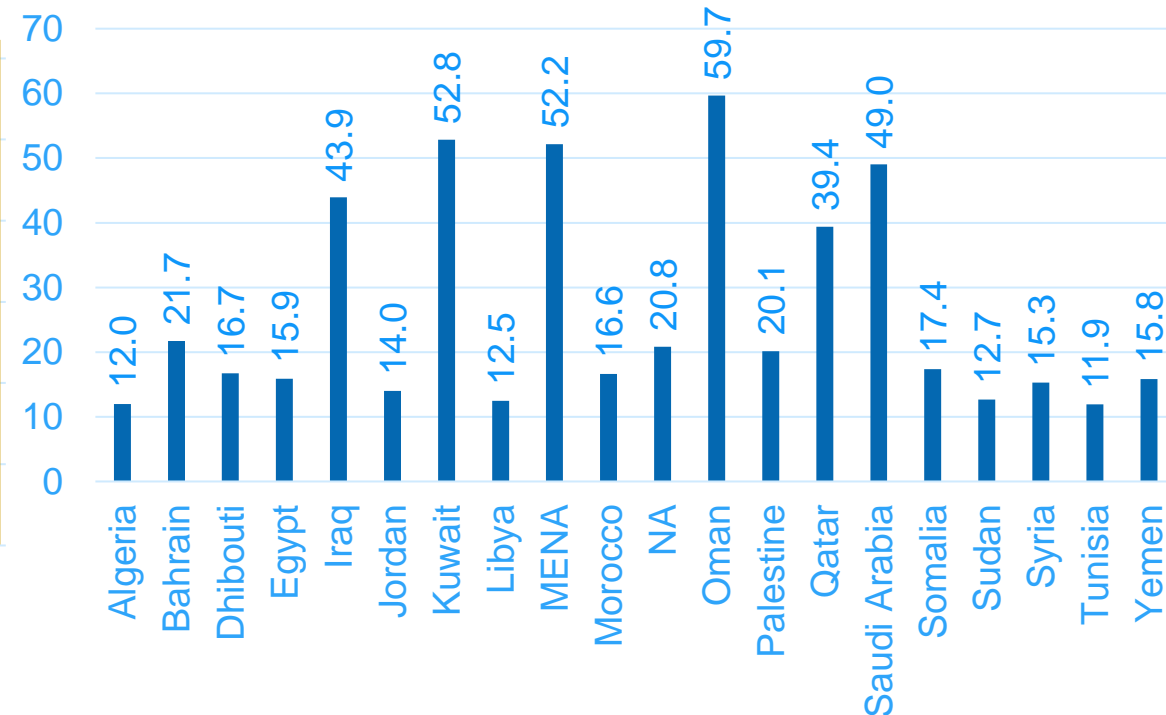
# Income and wealth inequality



Ratio of top 10 percent to bottom 50 percent



Wealth inequality - ratio of top 10% to bottom 50% (2021)



- The gap between the top 10% and the bottom 50% is larger in terms of wealth inequality
- Estimates done on limited data

Source: World Inequality Lab

## Data & Methodology

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- Land inequality is described using the distribution of the land among different population groups such as **top 10%**, **middle 40%**, and **bottom 50%**.<sup>[1]</sup>
- Utilizes **household survey data** instead of **agricultural census data** to account for the **land value** and also the **landless population**.<sup>[1]</sup>
- **PROS** → Surveys provide information on both the area and the market value of land at the household level which allows for a more comprehensive understanding of land inequality, considering both the **physical distribution** and the **economic value of land**.
- **CONS** → The valuation practice in surveys is generally based on **subjective assessment**. Also, they might **miss private corporate farms** and **underreport the population at the top of the distribution**.

## Existing Methodologies

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- The **land GINI coefficient** is the traditional measurement and justified since it's based on widely available census data, enabling a long-term view of land inequality across nations.

## MENA

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- In the MENA region, countries would need to gather comprehensive household surveys that capture both land ownership and land value to apply this new methodology.

## Recommendations

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- Different methods to be used in land valuation could improve this approach significantly. Accounting for the soil quality, risk of desertification, etc.

# Income inequality – income after fiscal redistribution



## Proposed Data & Methodology

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- Budget **data from administrative registries** (e.g. revenues collected by tax category, property tax, spending on cash transfers, etc. Benefits or taxes matched back into the main (household) survey for analysis.
- PROS → Holistic impact analysis of fiscal policy. Designed to measure who bears the burden of taxes and who receives the benefits of government spending.
- Can determine whether fiscal redistribution improves or worsens poverty as well as inequality
- CONS → Looks only at what is paid and what is received without assessing the behavioral responses that taxes and public spending may trigger in individuals or households.

## Existing Methodologies

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- Concepts for Market (Pre-fiscal), Disposable , Consumable and Final Income
- Fiscal redistribution impact on Inequality, Poverty incidence, Income concentration share, Marginal Contributions, etc.

## MENA

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- CEQ Institute has conducted fiscal incidence studies for Egypt, Jordan, Morocco, Tunisia. Studies are underway in Iraq, and Palestine.

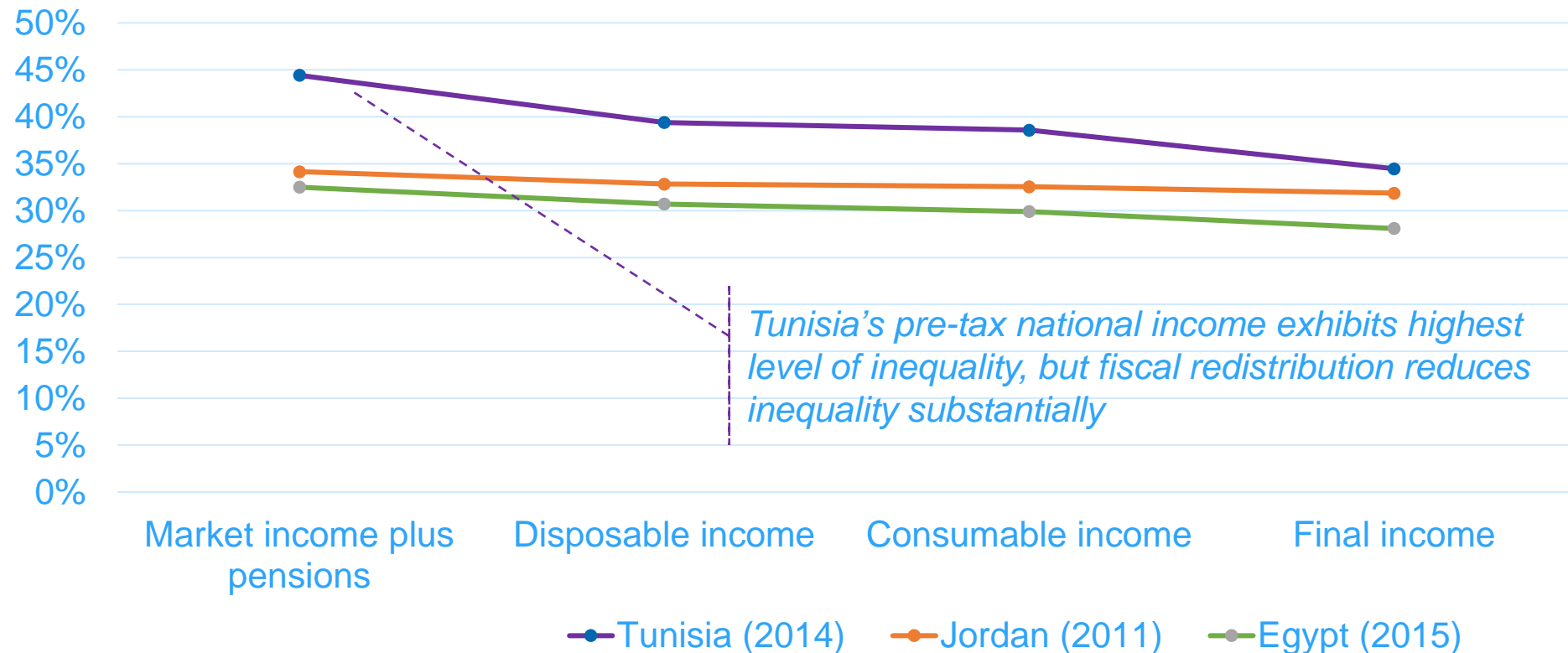
## Recommendations

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- Increase coverage across region; update existing analysis; make analysis publicly available (e.g. Morocco, Egypt)

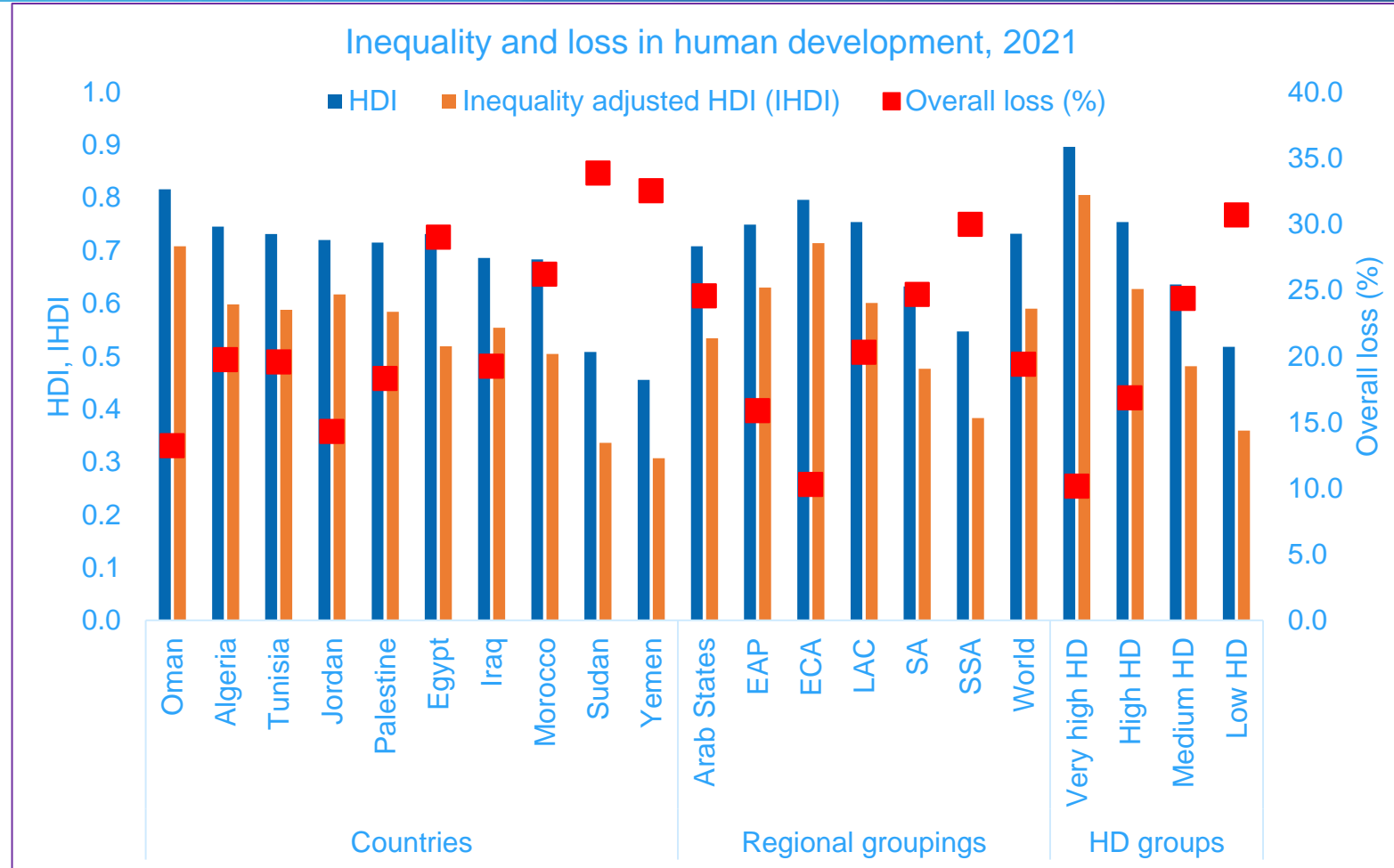
# MENA examples of Fiscal Incidence Analysis

Impact of Fiscal Policy on Inequality: Change in Gini Coefficient –  
*Market income to Final Income (i.e. after taxes and social transfers)*  
*in Jordan, Tunisia and Egypt*



# Inequality-Adjusted HDI (I-HDI)

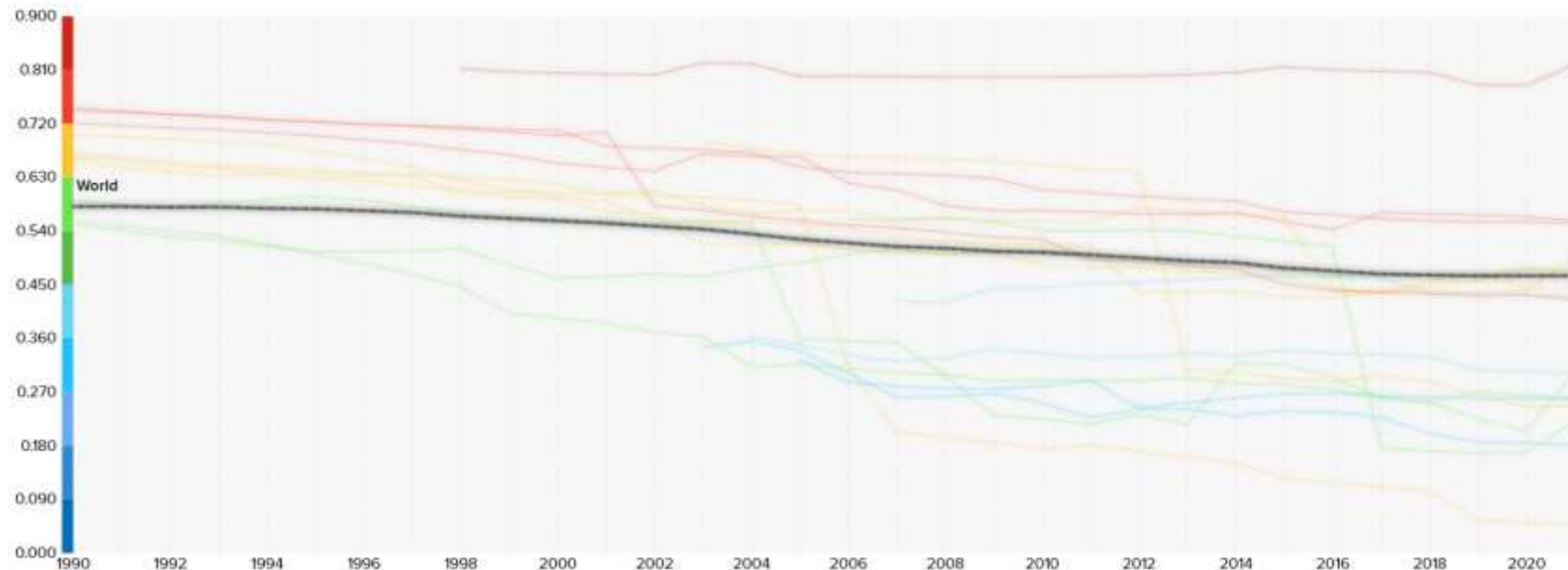
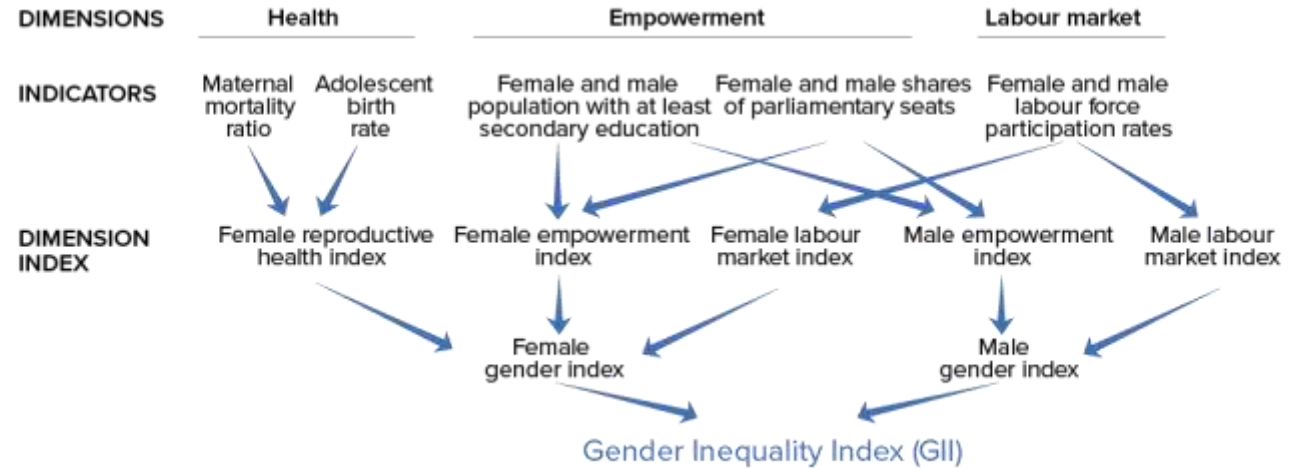
- I-HDI is HDI value adjusted for inequalities in the three basic dimensions of human development.
- Inequalities in the region have affected the quality of human development. Overall loss in human development due to inequality in the region is the second highest, following Sub-Saharan Africa.
- It is computed as a geometric mean of inequality-adjusted dimensional indices
- The IHDI value equals the HDI value when there is no inequality across people but falls below the HDI value as inequality rises
- [https://hdr.undp.org/sites/default/files/2021-22\\_HDR/hdr2021-22\\_technical\\_notes.pdf](https://hdr.undp.org/sites/default/files/2021-22_HDR/hdr2021-22_technical_notes.pdf)





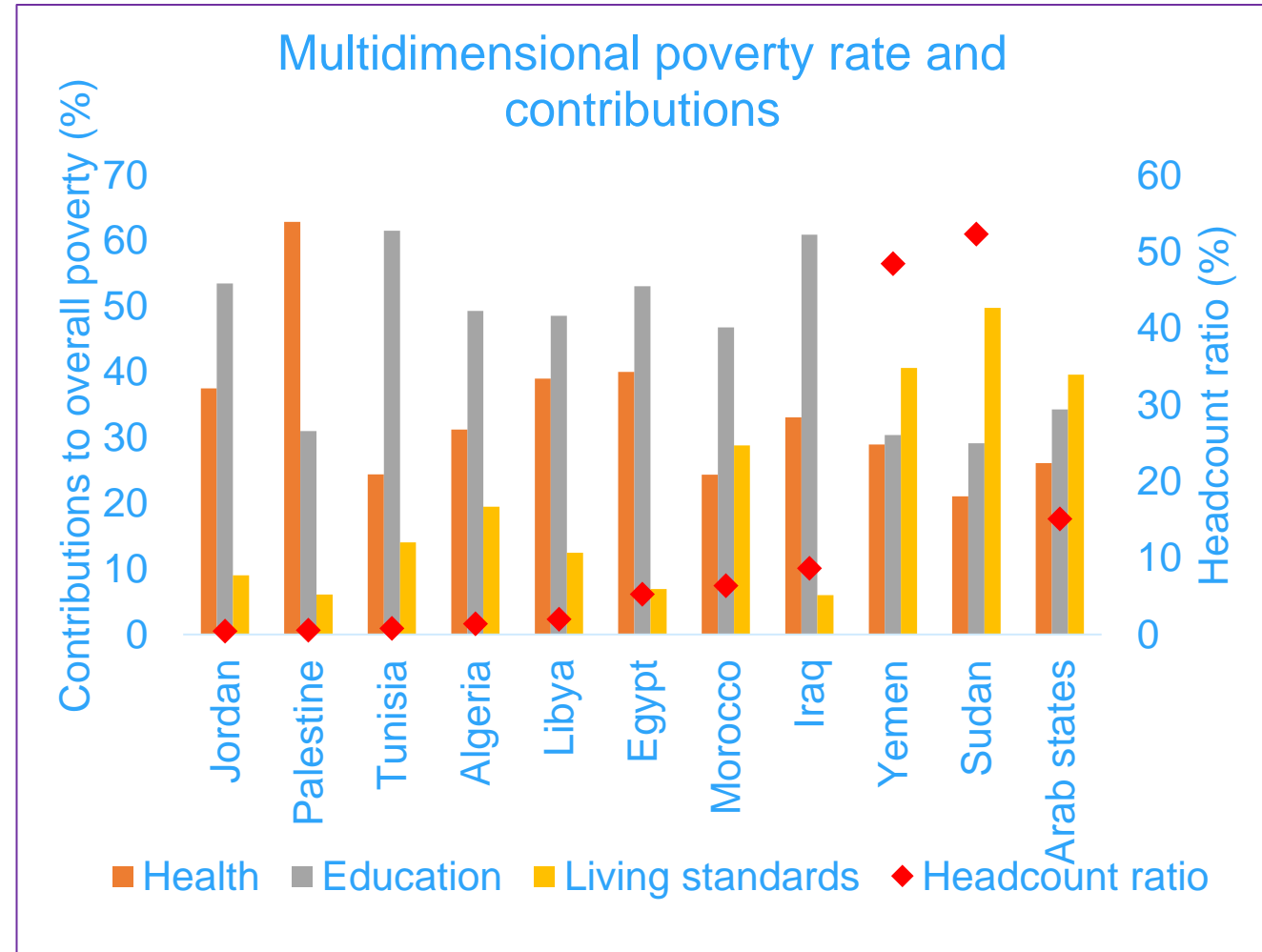
# Gender Inequality Index

- GII reflects gender-based disadvantage in three dimensions— reproductive health, empowerment and the labour market. It shows the loss in potential human development due to inequality between female and male achievements in these dimensions. It ranges from 0, where women and men fare equally, to 1. The first aggregation is by a geometric mean across dimensions, calculated separately for women and men, and are the aggregated using a harmonic mean across genders.



# Multidimensional poverty and inequality among the poor

- About 15.1 percent of the developing Arab countries for which data is available were multidimensionally poor in 2021
- Major contributions to multidimensional poverty come from deprivations in living standards (39.7%), education (34.3%) and health (26.1%) ([UNDP&OPHI, 2023](#)).
- Deprivations in education is the major contributing factor in MICs but deprivation in living standard is the major contributor in LDCs.
- Data sources: Mainly (DHS, MICS), but other surveys have also been used.

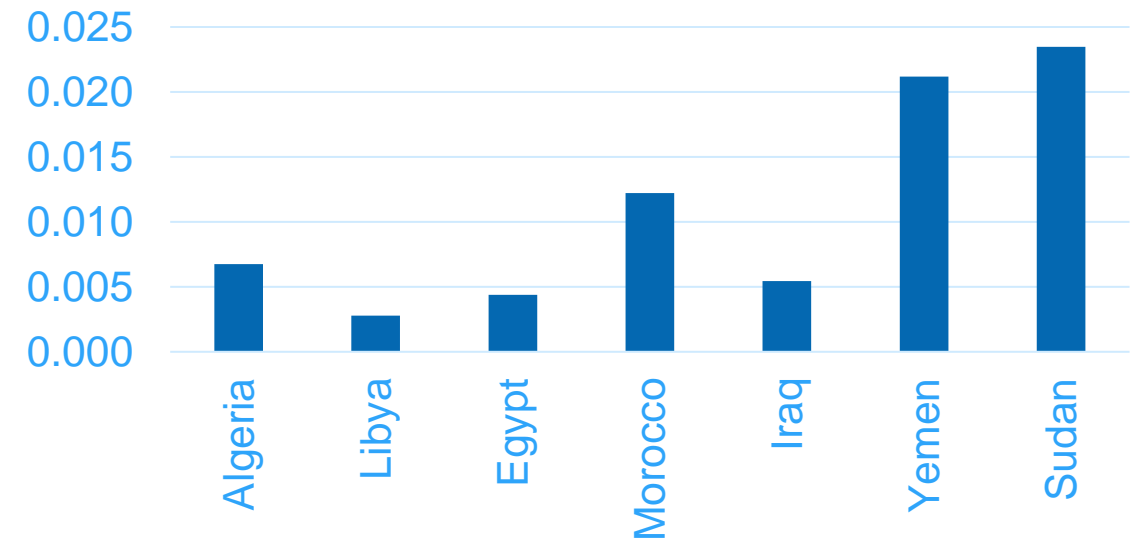




# Multidimensional poverty and inequality among the poor

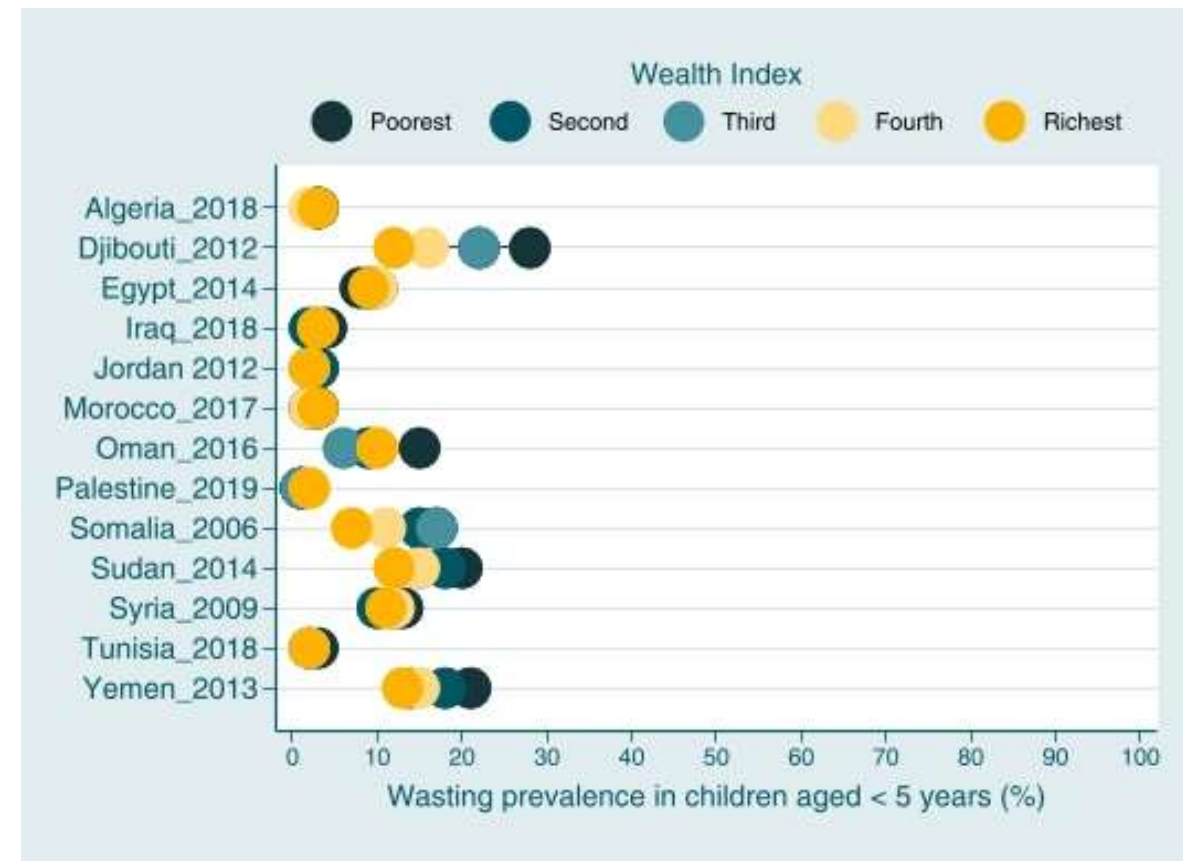
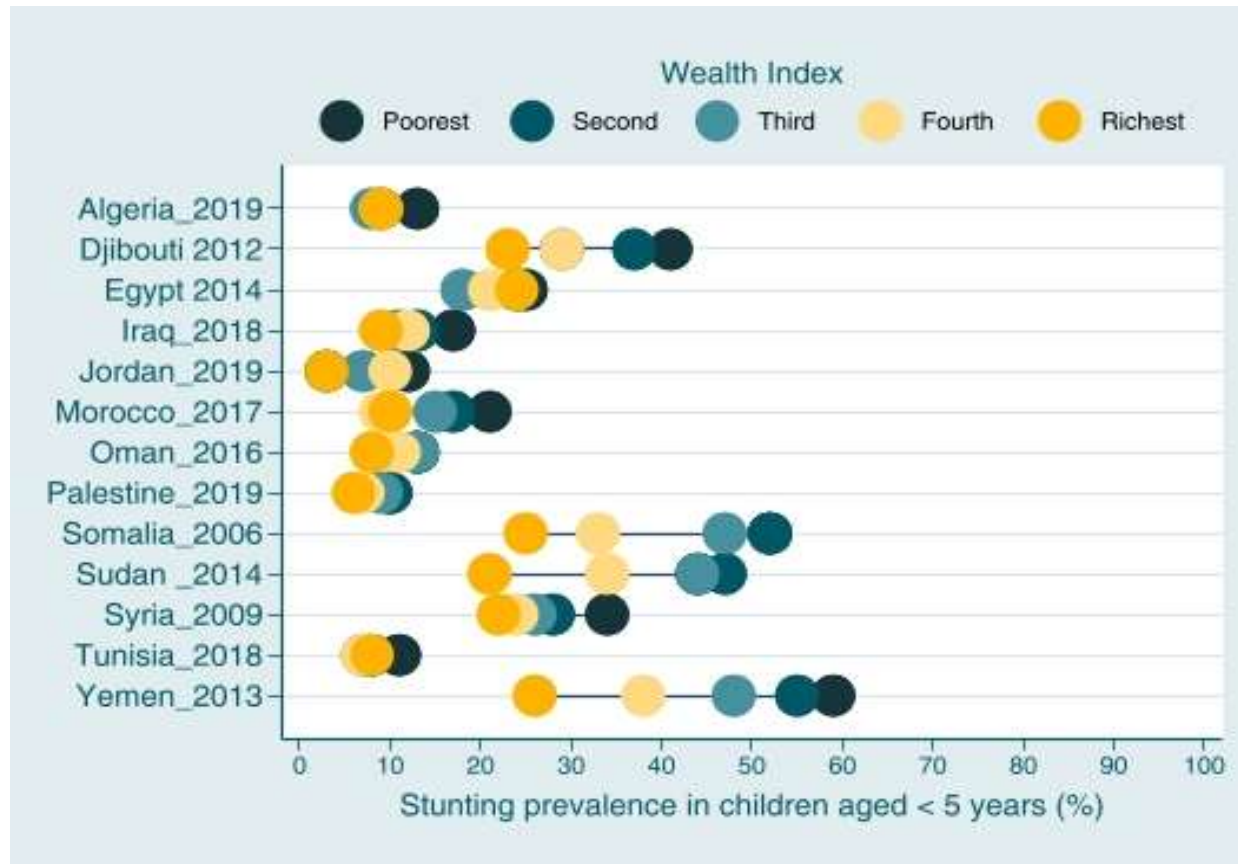
- Variance of individual deprivation scores of poor people. It is calculated by subtracting the deprivation score of each multidimensionally poor person from the intensity, squaring the differences and dividing the sum of the weighted squares by the number of multidimensionally poor people.
- They illuminates pockets of high intensity poverty that otherwise might be missed
- **PROS** → The systematic use of the data sources allows comparisons between developing countries and over long time periods.
- **CONS** → lack of data meant that estimates are made for some countries based on data available for other countries.

Inequality among the poor

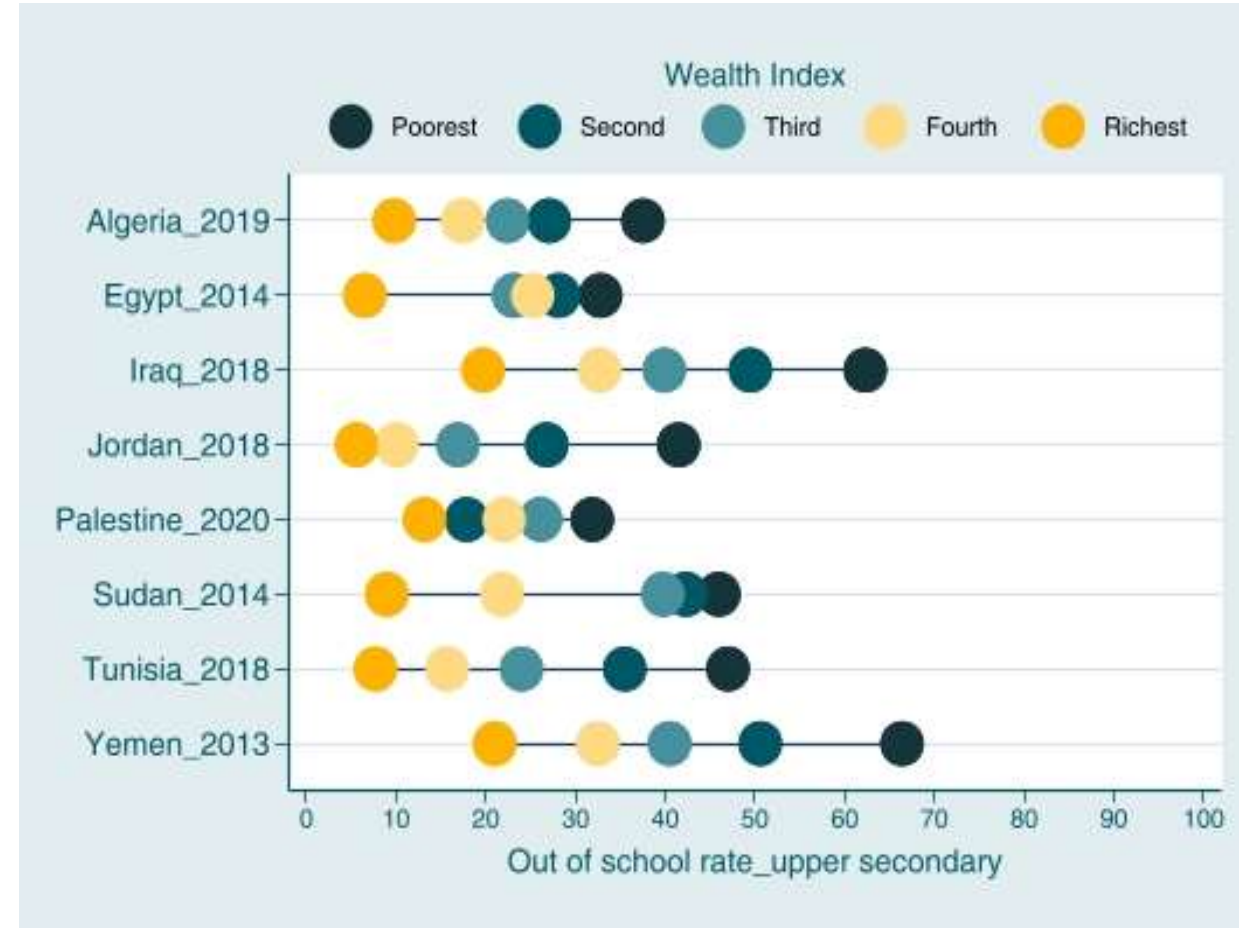
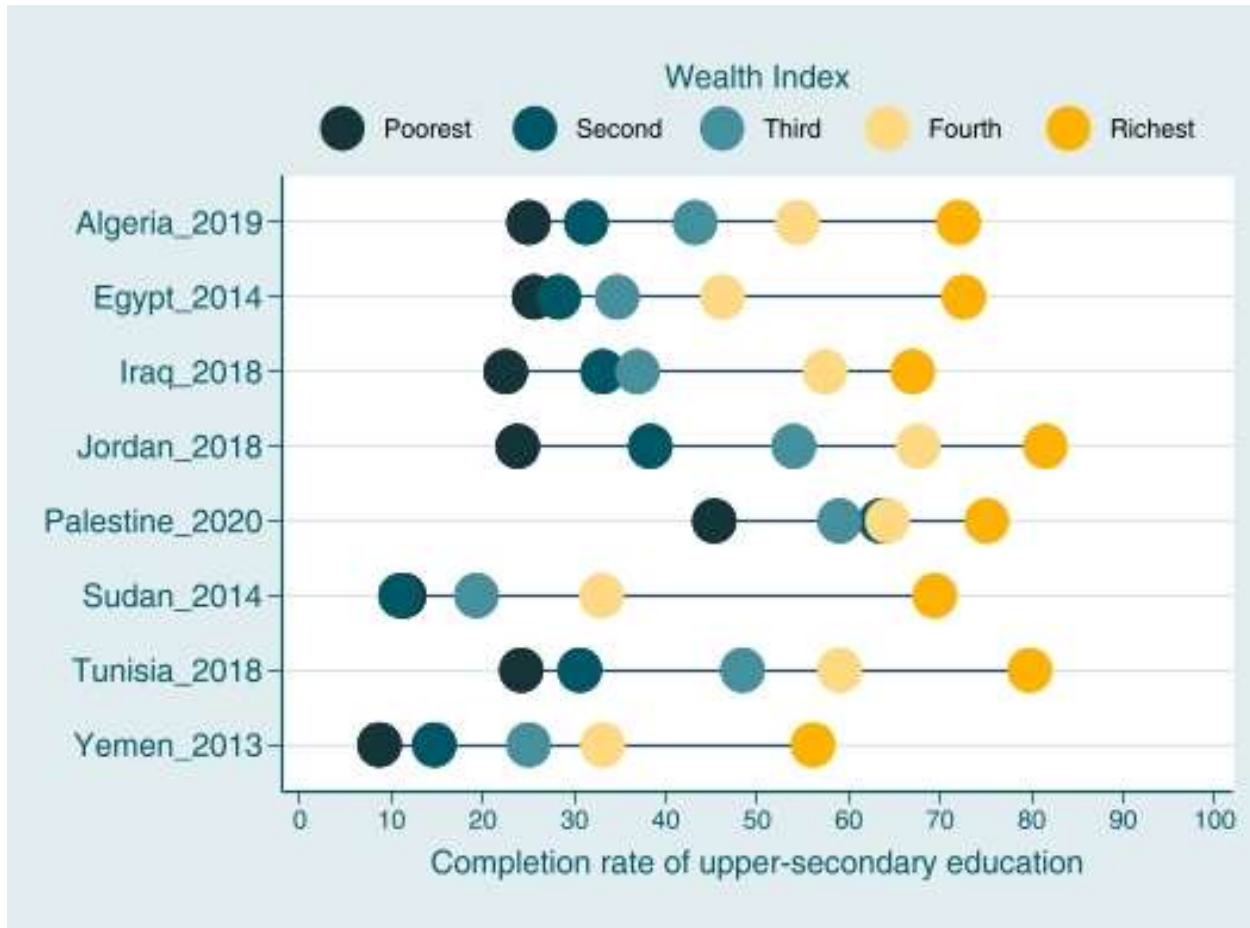


- Result produced by country. Result can also be decomposed by groups (age, sex, sub-national level...)
- Household surveys (DHS, MICS, LSMS, Socioeconomic surveys)—depending on the indicators used for measuring multidimensional poverty

# Inequality in health

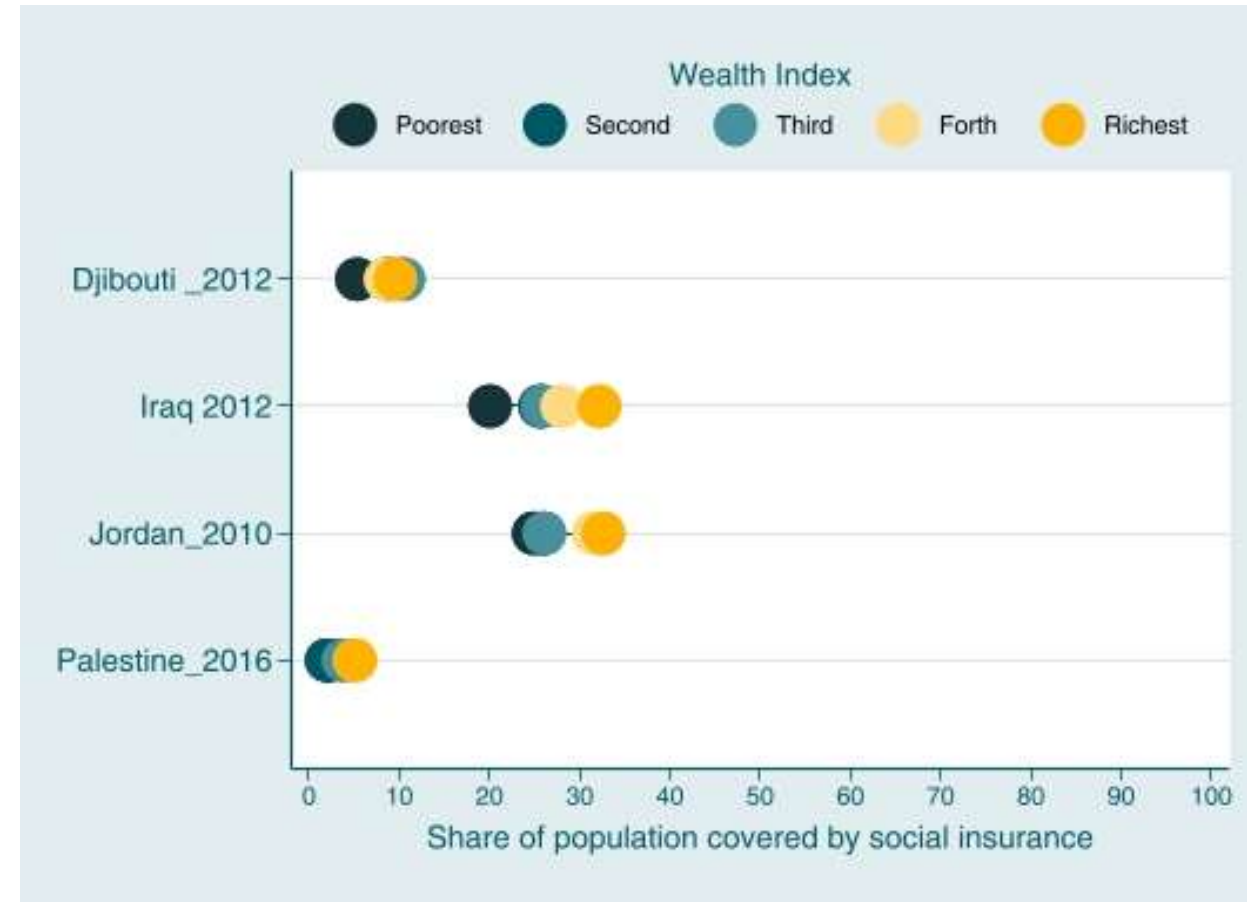
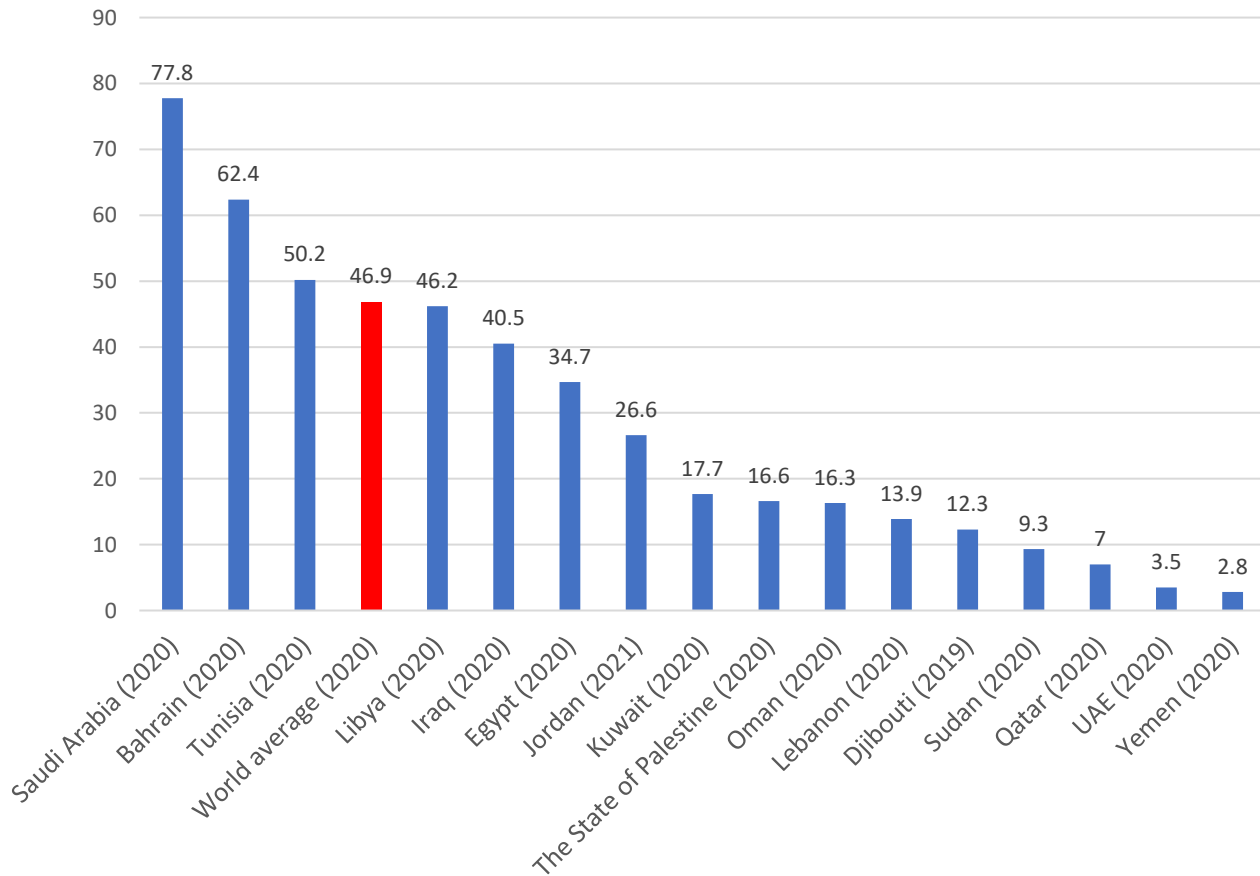


# Inequality in education



# Social protection coverage

Population covered by at least one social protection benefit (%)



Source: ILO - Social Security Inquiry Database. [https://www.ilo.org/shinyapps/bulkexplorer55/?lang=en&id=SDG\\_0131\\_SEX\\_SOC\\_RT\\_A](https://www.ilo.org/shinyapps/bulkexplorer55/?lang=en&id=SDG_0131_SEX_SOC_RT_A). Accessed on: 29 October 2023.



## Proposed Data & Methodology

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- **Cadastral Data:** Cadastral data and land registries contain data on land assets and distribution. Useful for analysis of the concentration of ownership of land.
- **Methodology:** analyzing the complete cadastral records at one point in time and for one geographic area. Involves categorization of proprietary type.
- Calculate the concentration measures using georeferenced information on land ownership from the official cadastral land register using the entire cadastral entire for the district.
- **PROS** → Complementary approach to household surveys and agricultural censuses for estimating land inequality.
- **CONS** → For much of the MENA region, such data will be outdated and not comprehensive, both in terms of valuation of the underlying assets (land and real estate) and registry of ownership.

## Findings

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- Derive relative and absolute concentration measures for the ownership in agricultural land
- Results suggest high relative concentration on the district level with a Gini coefficient. Within the district, varying degrees of land concentration, albeit spatial clusters of high and low concentration.

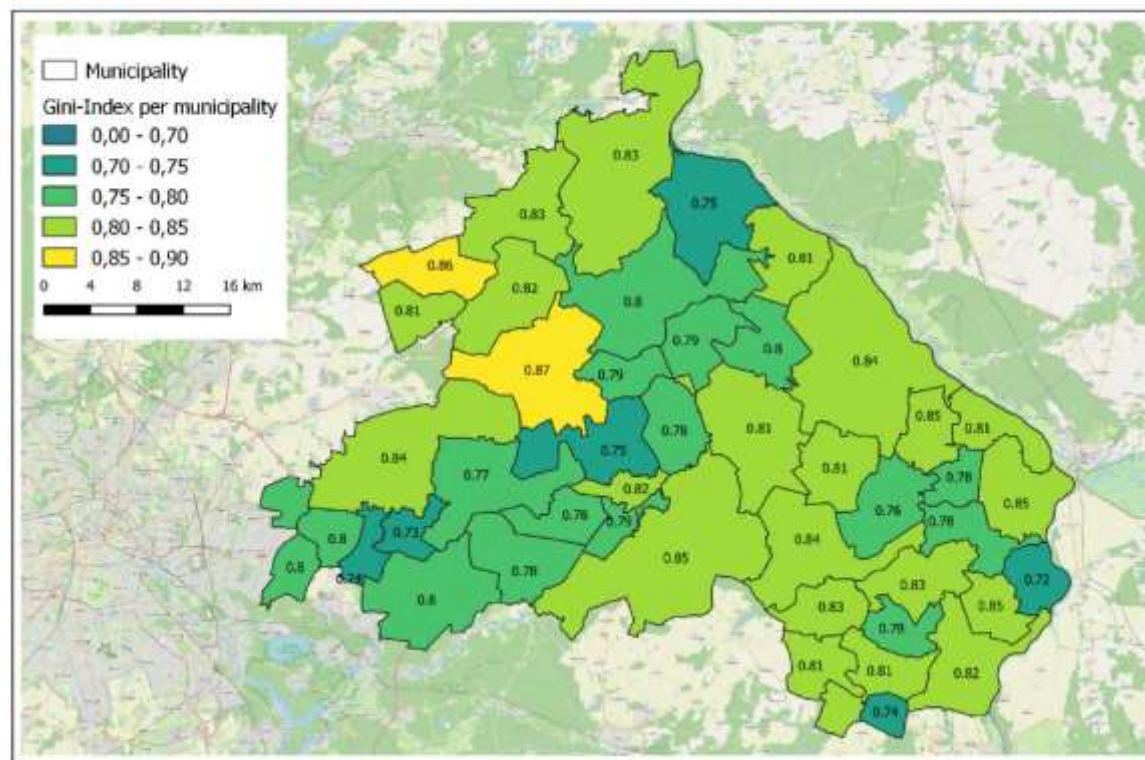
## Recommendations

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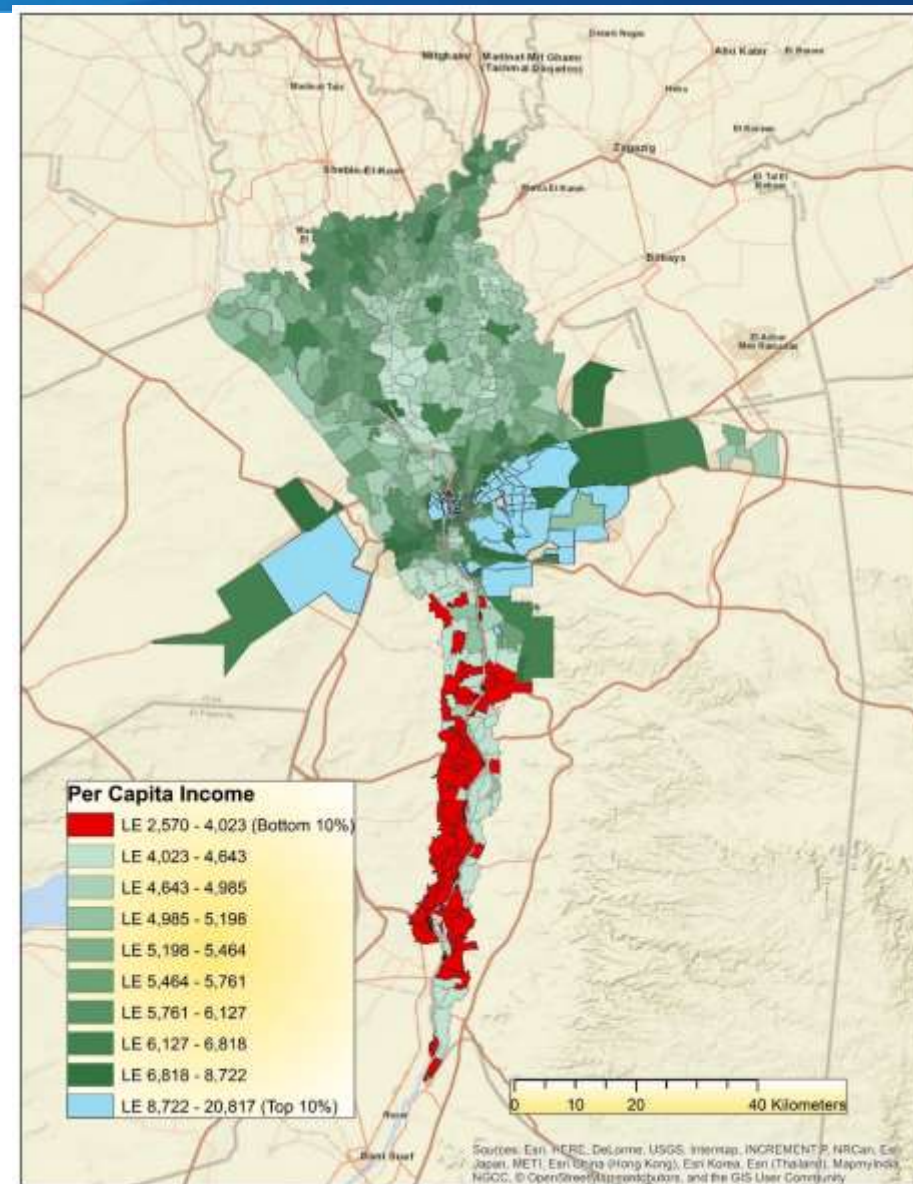
- Improve cadastral data quality and coverage, improve valuation methodologies and ensure valuations are updated; implement effective, efficient land dispute resolutions – clarify title ownership; formally register female asset ownership (e.g., in relation to inheritance processes)

# Territorial distribution of Inequality: Land & Poverty

Figure 7. Spatial pattern of municipality-level Gini coefficients for Märkisch-Oderland.



Most Gini coefficients on municipality level are above 0.8, suggesting a high ownership concentration in Märkisch-Oderland (Figure 7). However, the largest landowners in each of the 45 municipalities in Märkisch-Oderland rarely own more than 50% of the land within a municipality. This is illustrated in Figure 8, which shows the number of the largest landowners (y-axis), along with the relative proportion of the land each of them owns within the respective municipality (x-axis). Figure 8 corroborates that the largest landowners rarely hold more than 50% of the agricultural areas within one municipality. The high Gini coefficients on municipality level resulted mainly from the large number of individual landowners that own comparably small shares of land.







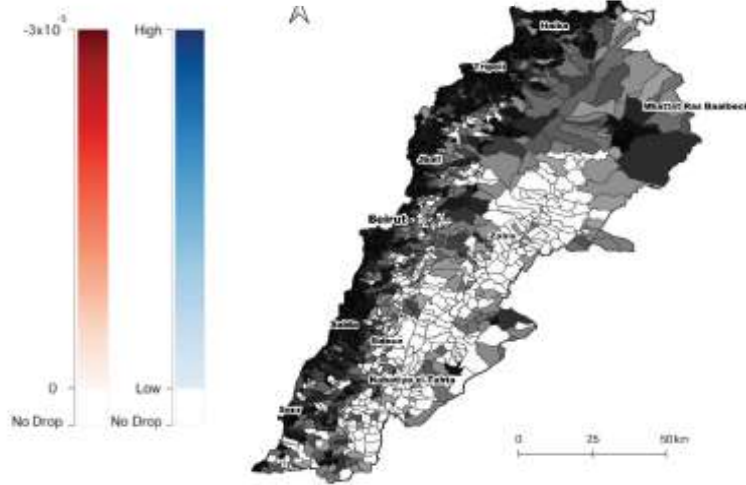
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# Use of satellite imagery

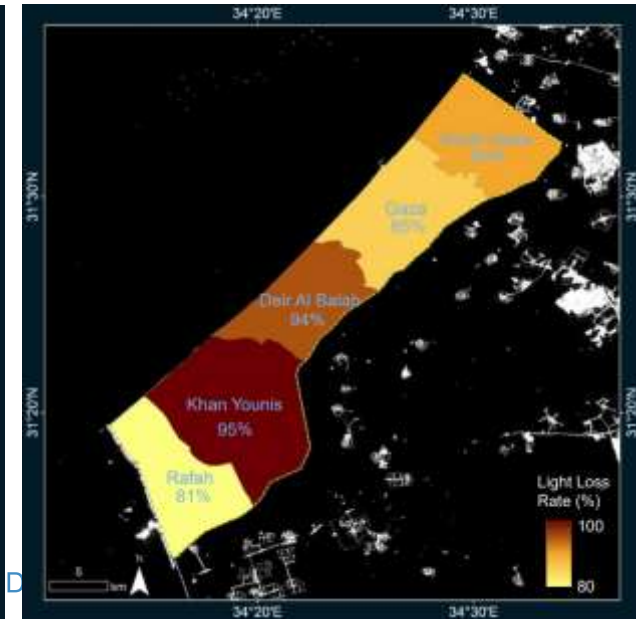
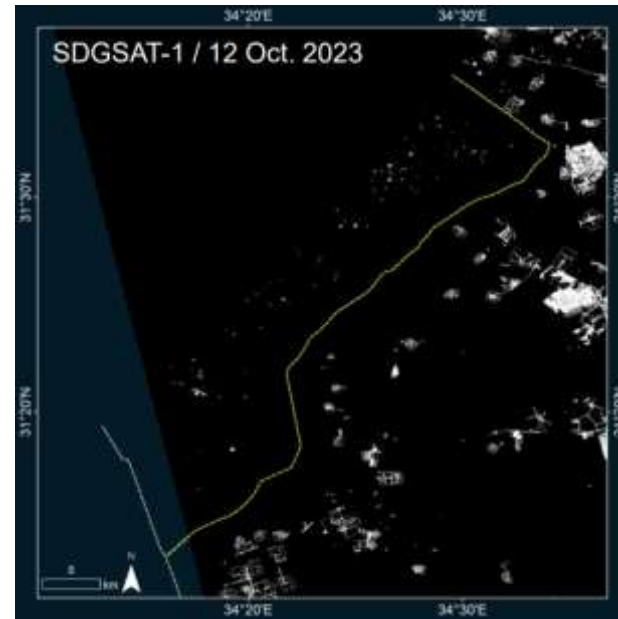
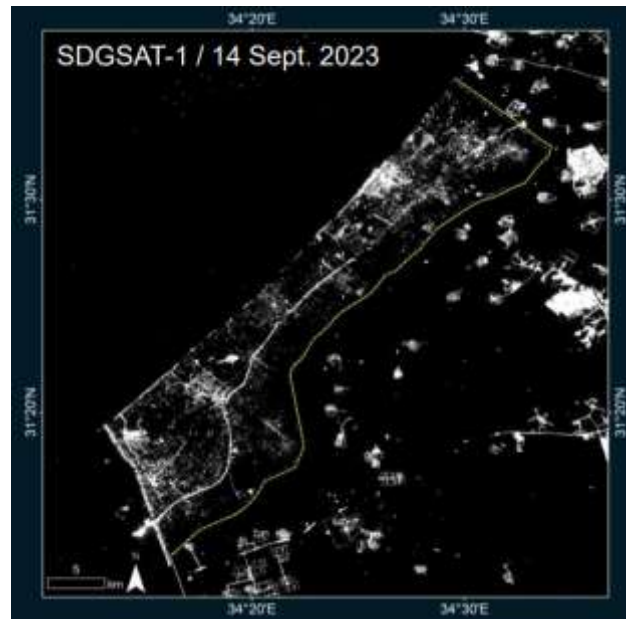
Nitrogen dioxide variation in Qatar



Variation in night lights in Lebanon



Drop in gross domestic product recorded in selected tourist areas in Egypt



# Inequality in the Quality of Employment

- **Informality** is a key challenge in many Arab countries affecting at least 70% of workers in the countries for which we have data.
- New methodologies have been developed to measure quality of employment or job quality across several dimensions including wage income, occupational status (wage work vs. self-employment), work hours, etc.
- Recently, a method similar to the UNDP's Multidimensional poverty index based the **Alkire –Foster methodology was adapted to measure quality of employment (QoE)** and applied to Egypt (Sehnbruch, Pineda and Atallah 2021). The index encompasses three dimensions: income, occupational status (wage work vs. self-employment) and access to social security benefits.
- They found that two most relevant dimensions of the QoE index in Egypt were income and occupational status. Together they contributed 78.2% in 2006, 81% in 2012 and 75.9% in 2018 to the QoE index. Separately, income was the largest contributor to the QoE index in 2006 and 2018 while occupational status was the largest contributor in 2012 when 83.2 % of workers were deprived along that dimension (i.e. wage earners without a contract or self-employed).
- This kind of job quality metric can then be linked to other socioeconomic welfare indicators such as family wealth, parental education and occupation or region of residence to study the interaction of multiple vulnerabilities and the intergenerational transmission of vulnerability for instance. It can be particularly valuable in the presence of panel data.



# Inequality between firms



## Proposed Data & Methodology

- While inequality between firms is less of a concern than inequality between people, it can signal economic problems, such as a slowdown in the diffusion of ideas between leading and laggard firms and can foster higher wage inequality.
- There can be negative effects of high and growing inequality between firms if it is associated with greater market power, slower productivity (and therefore wage) growth and increased income inequality.
- The changes in the inequality between firms cause (or signal) a fall in aggregate productivity growth, which is important as productivity growth is the critical determinant of long-run income growth.
- **Method** – “Productivity dispersion” measure: In order to examine firm inequality, studies use micro firm-level data to calculate a measure of the “dispersion of productivity across firms.
- For example, Andrews, Criscuolo & Gal (2015) and De Loecker et al. (2022) use “**the average productivity for the ‘frontier’ (defined as the employment weighted average productivity of firms in the top 5% of the productivity distribution in each year) compared with ‘followers’ (the rest of the economy).**”

## Existing Methodologies (globally)

Previous studies show that in OECD countries, dispersion in productivity appears to have risen since 1996. Leading firms’ productivity grew by 67 log points between 1996 and 2016 whereas follower productivity grew by 14 log points. Since the Global Financial Crisis, both groups of firms have seen their productivity stall.

**PROS** → Dispersion in productivity across businesses can provide information about the nature of competition and frictions within sectors and the sources of rising wage inequality across businesses.

**CONS** → However, firm- or industry-level studies in the region are typically limited by the lack of comprehensive firm-level data. As a result, most of these types of studies are conducted for developed countries.

## Recommendations

- As many countries in the region embark on adopting policies that aim to enhance aggregate productivity, it would be essential to build data capacities in terms of harmonized micro datasets that would enable tracking the evolution of productivity across firms and sectors.

# Data sources and inequalities they measure

| Data sources   | Inequalities they measure  |
|--|--|
| Living Standard measurement surveys, income, consumption and expenditure surveys   | Inequality measures that are based on income: Gini, inter-quartile ratio also inequalities of opportunities  |
| DHS, MICS, Census  | Inequality of opportunities, inequalities among the poor, Multidimensional inequality (health, education, standard of living)                                      |
| National income and accounts, tax and other administrative registries in combination with household surveys such as LSMS | Income inequality (both inequality of pretax national income and post-tax and post-social transfers income considering fiscal redistribution); wealth inequalities |
| ICT usage surveys, Social media data   | Gender inequality (digital gender gap, gender inequality index)  |
| WHO inequality monitor data, DHS, MICS   | Inequality of opportunities  |

# Data sources and inequalities they measure



| Data sources   | Inequalities they measure   |
|--|---|
| Labor Force Survey, Labor Market Panel Surveys                   | Labor market outcome inequalities (Wage income inequality, Quality of employment)           |
| Agricultural census, household surveys (LSMS), cadastral records | Land inequality   |
| Special Inequality Surveys, Opinion Surveys                      | Specific forms of inequality that a country is interested to measure, Subjective inequality |