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Polarization and Its Discontents

Morocco before and after the Arab Spring

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Abstract

This paper uses data obtained from three Moroccan household surveys that took place between 2000 to 2013, to address issues related to the so-called "Arab puzzle." Welfare inequalities are low and declining in Arab countries and exist against the backdrop of a growing sense of dissatisfaction and frustration. The paper hypothesizes that welfare inequality plays a role, if seen through the lens of absolute measures and notably absolute polarization. The paper argues that the relatively worse perception of poor, vulnerable, and lower middle-class Moroccan households mirrors the ongoing hollowing out of the welfare distribution process and its concentration in the tails. The results of a multi-logit regression indicate that polarization is significantly correlated to perception and, importantly, that this correlation is asymmetric. The poorer are the households, the more polarization is perceived to link negatively to the well-being of households; and the richer are the households, the more polarization will positively correlate with their perceived well-being. The results are robust to the use of classes or quintiles for ranking social groups from the poorest to the richest.

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Polarization and Its Discontents: Morocco before and after the Arab Spring

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1. Introduction

Welfare[1] disparities are generally found to play an important role in explaining the frustration and dissatisfaction that people may have with the societies in which they live; in the most extreme cases, these disparities are directly linked to the outbreak of civil conflicts (Hirschmann and Rothschild, 1973; Muller, 1985; Esteban and Ray, 1999, 2008, 2011). In this regard, the Middle East and North Africa (MENA) region represents an important exception, as in the face of apparently low and stagnant inequality, dissatisfaction is rampant (*inter alia*, Verme et al., 2014, Cuesta Leiva et al., 2016, and Devarajan and Ianchovichina, 2018). What mechanisms might explain this puzzle? Drawing on Moroccan data, we show that absolute measures of welfare disparities—notably absolute polarization—are significantly correlated to perceptions of deprivation, and hence more suitable in explaining the growing discontent characterizing the central and lower deciles of welfare distribution.

At the end of the last decade, the MENA region was the only region in the world with a high incidence of large declines in average subjective well-being, with steeper declines for the top 60 percent of the population, representing mostly the middle class, than the bottom 40 percent, representing the poor and vulnerable (Arab Barometer, 2019). This pattern was especially pronounced in the countries that had experienced the Arab Spring—the Syrian Arab Republic, Libya, Tunisia, the Arab Republic of Egypt, and the Republic of Yemen—but the ranks of the unhappy swelled in nearly all Arab countries (Dang and Ianchovichina, 2016).

However, at first glance, a mismatch is apparent between this generalized dissatisfaction of Arab world citizens and inequality. The latter has been stagnant or declining since the end of the 1990s (Hassine, 2015; Hlasny and Verme, 2018), although some works question the veracity of the data arguing that inequality is underestimated (Alvaredo et al., 2018; van der Weide et al., 2018). Likewise, while often identified as one of the root causes of social instability and conflicts, polarization has been moderate and stable throughout the period (Esteban and Ray, 2011). Interestingly, recent evidence suggests that polarization translates into open conflict in the MENA

[1] Since Sen introduced the idea of capabilities after his critiques of utilitarianism and more generally, welfarism, one needs to be cautious theoretically. However, as Sen (1999) acknowledges, multi-dimensional functioning comparisons on capabilities space may not always be possible, and income may be used as a proxy variable while keeping in mind the underlying space of functionings and capabilities. This is our approach here. For a discussion and application of capabilities and human development indicators to the MENA region with emphasis on Egypt, please see Khan (2011).

region only in the presence of non-humanitarian, non-neutral interventions (Abu-Bader and Ianchovichina, 2018).

While in the MENA region there are many unrefuted studies on the limited linkages between relative welfare distribution measures and perception (Verme et al., 2014; Ianchovichina et al., 2015), the link between perception and absolute measures has been less explored. As opposed to relative measures, perception and absolute measures unambiguously indicate an increase in many MENA countries; this is reflected in the close to 20 percent increase in the absolute Gini and absolute Foster and Wolfson indices.[2] When focusing on absolute polarization and applying the relative distribution method,[3] we observe two contemporaneous effects: (i) a general hollowing out of the center of the distribution (see, *inter alia,* Alderson and Doran 2011, 2013); and (ii) a significant concentration in the lower tail, representing the so-called *downgrading effect*. The question that arises in this context is whether this growing absolute polarization, besides showing a similar trend, is also related to the generalized sense of dissatisfaction observed in many Arab countries.

Our hypothesis is that absolute polarization is indeed highly correlated with the perception of households of their socioeconomic status. The worse perception of poor, vulnerable, lower-middle class households, as compared to middle-and-upper-class households mirrors the ongoing process of the hollowing out of the welfare distribution and its concentration in the tails, in other words it mirrors polarization.

Using consumption and socioeconomic perception data from the three comparable rounds of household surveys, we test whether polarization is perceived by households and seek to establish if it contributes to the general malaise and sense of instability reported by Moroccan households. Moreover, as polarization is a synonym of the hollowing out of the central deciles and growing gap between the poorest and the richest, we expect that the lower and central deciles will, as the years go by, feel relatively more threatened by economic downturns and by the fear of losing ground *vis-à-vis* richer households. Another interesting aspect of our analysis is that it covers a

[2] These variations are calculated on the seven countries in the MENA region for which we have at least two comparable surveys, notably Morocco, Tunisia, Egypt, West Bank and Gaza, Jordan and Iraq.

[3] See in the methodological section a detailed explanation of the method that despite the name (relative) is in fact an absolute measure. In this paper we report results for Morocco only, yet the other six countries follow a very similar pattern; these results are available upon request.

period (2000-2013), that includes the Arab Spring in Morocco (2011 and part of 2012). Morocco also experienced political and economic turbulence and change over this period, leading eventually to a new constitution and the introduction of social reforms. The 2013 results thus present a particularly good opportunity to understand whether these reforms had a visible impact on people's welfare, and if they somehow modified the perception of their well-being.

The remainder of this paper is structured as follows. Section 2 presents the most recent debate on the use of relative versus absolute measures of inequality (and polarization). Section 3 gives a detailed account of the data and methodology employed. Section 4 discusses the results emerging from: (i) the analysis of subjective perceptions of well-being among Moroccan households, and (ii) the application of the relative distribution method (Handcock and Morris, 1998, 1999), and (iii) presents econometric exercises to show the links between the considered variables. A conclusion is presented in section 5.

2. Relative vs. Absolute Inequality Measures

The debate on the choice of relative or absolute measures to analyze inequality has recently gained momentum (Niño-Zarazua et al., 2017). In the early years of the new millennium, the effect of globalization on inequality became a widely debated issue both from an economic and a statistical point of view (Bourguignon and Morrison, 2002). The change of inequality during this period partially reveals how the growth generated by globalization has been divided among the haves and have nots (Anand and Segal, 2008, 2015). Consequently, the question of how global inequality has evolved is a highly politically charged issue.

No definitive answer has yet emerged from the scientific debate on this issue (see also Milanovic, 2002; Ravallion, 2003; Atkinson and Brandolini, 2010; Bosmans et al. 2014; Bandyopadhyay et al., 2017). Nonetheless, these studies agree on two main facts, namely that: (a) inequality within most countries is increasing, particularly in large countries such as China, Brazil, Nigeria and the United States (Milanovic, 2012; van Zanden et al., 2014; Khan et al. 2017; Khan and Schettino, 2019); and (b) growth rates in low-income countries (for example, African countries) have led to decreasing inequality between countries as OECD countries also faced an economic crisis over the same period.

The relative view—widely considered the standard approach— is that when all incomes are raised in the same proportion, the inequality does not vary. With the absolute view of inequality, only equal additions to all incomes do not affect inequality. The absolute measures depend on the absolute differences in levels in living standards, rather than relative differences, as captured by the ratios to the mean. As Ravallion (2003) points out, this fundamental difference can be easily grasped using a simple example: "Consider an economy with just two household incomes: US$1,000 and US$10,000. If both incomes double in size, then relative inequality will remain the same; the richer household is still 10 times richer. But the absolute difference in their incomes has doubled, from US$9,000 to US$18,000. Relative inequality is unchanged but absolute inequality has risen".[4]

The subjective perception of rising inequality often appears to refer to the absolute concept of inequality. Indeed, Ravallion (2003) finds that 40 percent of participants thought about inequality in absolute terms and concludes that there is no "right" or "wrong" concept, but rather that they reflect different value judgments about what constitutes higher levels of 'inequality'. In other words, the question is whether it is more suitable to have a measure in which inequality remains unchanged when all incomes increase in the same proportion (i.e. the well-known property of *scale invariance*), or when an equal amount is added to all incomes (i.e. the *translation invariance*).

Therefore, while relative inequality could to some extent be considered as the most adequate concept in empirical work in development economics (with some *caveats*, see Bandyopadhyay et al., 2017, and footnote below), concern for the absolute dimension of inequality has far-reaching implications for assessing the distributive consequences of economic growth (Ravallion, 2003; Atkinson and Brandolini, 2015). Furthermore, greater attention to absolute inequality would help inform important debates on development, as absolute inequality is what most people arguably see in their daily lives; this, in turn, underpins their concerns on distributive justice when they talk about the "gap between the rich and the poor" and the "widening economic divide" (Amiel and Cowell, 1999).

[4] To state this more rigorously in an axiomatic framework, relative inequality in this instance is measured by using the axiom of scale irrelevance – a controversial axiom from the perspective of well-being in terms of capabilities or even utilitarian welfare comparisons.

3. Data and Methodology

The data used in this paper are obtained from three rounds of Moroccan household budget surveys (*Enquête Nationale sur les Niveaux de Vie des Ménages*) held in 2000, 2006 and 2013. Household expenditures (per capita) are used as the main welfare indicator throughout the analysis. Since reliable income data are difficult to obtain, we use consumption as a measure of well-being (Deaton and Zaidi, 2002). Indeed, informal sectors are an important part of the workforce in these countries, despite difficulties involved in quantifying such income. To compare different years, consumption is deflated using the local CPI and further converted into 2011 international dollars, using the PPP conversion factor obtained from the World Development Indicators website.[5]

The methodology used throughout the paper is the "relative distribution" method, a fully non-parametric statistical framework that enables comparison of the entire consumption distribution at two different points in time (Handcock and Morris, 1998, 1999).[6]

Despite its name, the relative distribution method produces an *absolute* measure of polarization. More formally,[7] let Y_0 be the welfare variable for the reference year (2000) and Y the welfare variable for the comparison year (2013). The relative distribution is defined as the ratio of the density of the comparison year to the density of the reference year evaluated at the relative data r [8]:

$$g(r) = \frac{f\left(F_0^{-1}(r)\right)}{f_0\left(F_0^{-1}(r)\right)} = \frac{f(y_r)}{f_0(y_r)}, \quad 0 \le r \le 1, \quad y_r \ge 0, \tag{1}$$

where $f(\cdot)$ and $f_0(\cdot)$ denote the density functions of Y and Y_0, respectively, and $y_r = F_0^{-1}(r)$ is the quantile function of Y_0. When no changes occur between the two distributions, $g(r)$ has a uniform distribution; a value of $g(r)$ higher (lower) than 1 means that the share of households in

[5] Accessible at: https://data.worldbank.org/.
[6] The relative distribution is a well-established approach to distributional analysis. At present, it has been employed by Alderson et al. (2005), Massari et al. (2009a, b), Alderson and Doran (2011, 2013), Borraz et al. (2013), Clementi and Schettino (2015), Nissanov and Pittau (2016), Petrarca and Ricciuti (2016), Clementi et al. (2017, 2018, 2019a, 2019b), and Nissanov (2017).
[7] Here we limit ourselves to illustrating the basic concepts behind the use of the relative distribution method. Interested readers are referred to Handcock and Morris (1998, 1999) for a more detailed explication.
[8] For a formal definition of "relative data", see *infra*.

the comparison year is higher (lower) than the corresponding share in the reference year at the rth quantile of the latter.

One of the major advantages of this method is that it makes it possible to decompose the relative distribution into changes in location and changes in shape. The decomposition can be written as:

$$\underbrace{\frac{f(y_r)}{f_0(y_r)}}_{\text{Overall}} = \underbrace{\frac{f_{0L}(\tilde{y}_r)}{f_0(y_r)}}_{\text{Location}} \times \underbrace{\frac{f(y_r)}{f_{0L}(\tilde{y}_r)}}_{\text{Shape}}, \tag{2}$$

where $f_{0L}(\tilde{y}_r)$ is a counterfactual density function with the shape of the reference distribution but the same location as the comparison distribution. In the empirical application that follows, we use an additive median shift to match the locations of the reference and comparison distributions, that is:

$$f_{0L}(\tilde{y}_r) = f_0(y_r + \rho), \tag{3}$$

where the value $\rho = m - m_0$ is the difference between the medians of the comparison and reference distributions.[9]

The additive transformation[10] (3) appears well-suited to a counterfactual density decomposition, as the visual impact of equal additions is a sliding of the reference density along the x-axis with no change in shape. Furthermore, it is consistent with the *absolute* way of summarizing inequality, as the Lorenz curves (and the summary inequality measures based on them) of the reference and counterfactual distributions are not held constant, in other words relative inequality changes. However, absolute inequality, which depends on the absolute differences in levels of consumption expenditure rather than relative differences, remains unchanged when all expenditures are increased or decreased by the same amount (see for example, Kolm (1976), and the discussion set forth in section 2).

[9] The choice of the median as the measure for location is because population quantiles are a natural, robust and scale-invariant unit of measurement, whereas alternative indices, such as the mean, are more sensitive to extreme values/outliers, and are thus not an appropriate measure of central tendency for skewed distributions.

[10] In contrast, a multiplicative location shift would modify the shape of the reference distribution. The equi-proportionate welfare changes increase the variance and the rightward shift of the reference distribution is accompanied by a flattening (or shrinking) of its shape.

The relative distribution approach also includes a median relative polarization index, which is a measurement of the degree to which the comparison distribution is more polarized than the location-adjusted reference:

$$MRP = \frac{4}{N}\left(\sum_{i=1}^{N}\left|\tilde{r}_i - \frac{1}{2}\right|\right) - 1. \tag{4}$$

The values of the MRP index range between -1 and 1: positive values represent more polarization and negative values represent less polarization; a value of 0 indicates no differences in distributional shape. The MRP index can be additively decomposed into the lower relative polarization index (LRP) and the upper relative polarization index (URP) as follows:

$$MRP = \frac{1}{2}\left(LRP + URP\right). \tag{5}$$

As the MRP, LRP and URP range from -1 to 1, and equal 0 when there is no change.

We conclude our analysis by explicitly linking polarization to perception data. Specifically, we use a multinomial logit (MNL) model based on 2013 household data, as well as the following question which is used as perception indicator:

"How is your current living standard compared to the last ten years"

Possible answer categories are: 1 = Improved; 2 = Not changed; 3 = Worsened; 4 = Do not know.[11]

In the MNL model we assume that the dependent variable is the logarithm of the ratio between the probability of selecting a response option and the probability of choosing the reference response category. In our case with $J = 4$ categories, we contrast categories 1, 3 and 4 against 2, i.e. we pick the response option "Not changed" as the reference category as it merits particular attention in interpreting the recent trend of subjective welfare perceptions of households—see section 4(b). We thus estimate the following linear regression model for 2013 as:

$$\ln\left[\frac{\Pr\left(Y_i = j\right)}{\Pr\left(Y_i = 2\right)}\right] = \alpha_j + \sum_{h=1}^{5}\beta_{jh}\left(MRP_{ih} \times CLASS_h\right) + \sum_{k=1}^{9}\gamma_{jk}X_{ik}, \quad i = 1,2,\ldots,N, \quad j = 1,3,4, \tag{6}$$

[11] Data on responses to this question come from the same survey that we used for the analysis of polarization, i.e. the Moroccan '*Enquête Nationale sur les Niveaux de Vie des Ménages*'. Due to their very limited number, missing observations were treated as 'Do not know'.

where α_j is a constant, β_{jh} and γ_{jk} denote the regression coefficients to be estimated, and the X's are household-level controls, which include household size, gender, age, marital status, literacy, education, employment status and location (rural/urban and region).

In the spirit of the relative distribution, the explanatory variable:

$$MRP_i = 4\left|\tilde{r}_i - \frac{1}{2}\right| - 1, \quad i = 1, 2, ..., N, \tag{7}$$

reflects the relative ranks (in other words, the relative data) of the 2013 consumption values in the median-adjusted consumption distribution of 2000, which are obtained as follows:

$$\tilde{r}_i = \begin{cases} 0, & \text{if } y_i < \tilde{y}_j \\ \dfrac{\tilde{W}_j}{\tilde{W}}, & \text{if } \tilde{y}_j \le y_i < \tilde{y}_{j+1}, \quad j = 1, 2, \ldots, N-1 \\ 1, & \text{if } y_i \ge \tilde{y}_N \end{cases} \tag{8}$$

where $\tilde{y}_1, \tilde{y}_2, \ldots, \tilde{y}_N$, with $\tilde{y}_j = y_j^0 + \left(m - m^0\right)$, are the ordered values of the median-adjusted reference distribution Y^{0L}, $\tilde{W}_j = \sum_{j=1}^{N}\left(\tilde{w}_j \times \mathbf{1}_{\tilde{y}_j \le y_i < \tilde{y}_{j+1}}\right)$ is the running sum of the weights of Y^{0L}, and $\tilde{W} = \sum_{j=1}^{N} \tilde{w}_j$ is the total sum of weights.[12] More precisely, the polarization variable (7) measures how far the relative data $\tilde{r}_i$ deviate from $1/2$, i.e. from the median value of a random variable whose distribution is the relative distribution between the comparison and the location-adjusted reference distributions and of which the relative data represent the realizations. The choice of the linear transformation (four times the deviations minus 1) results in a variable taking values between -1 and 1 and that, on average, amounts to the value of the median relative polarization index given by (4). Negative values would mean that households in the lower (upper) quantiles of the comparison population tend to concentrate at the median of Y^{0L}, a very strong sense in which they are better-off (worse-off) than households in the corresponding reference population. On the other hand, positive values would correspond to a situation where households in the lower (upper) quantiles of the comparison population tend to concentrate near the bottom

[12] The function $\mathbf{1}_{\tilde{y}_j \le y_i < \tilde{y}_{j+1}}$ denotes the indicator function, which is 1 if $\tilde{y}_j \le y_i < \tilde{y}_{j+1}$ and 0 otherwise.

(top) of Y^{0L}, meaning they are worse-off (better-off) than households in the corresponding reference population.

Finally, the variable $CLASS$ is an indicator variable identifying which economic class the households belong to. We defined four thresholds, using different lines calculated by the World Bank to define different social statuses: 3.2 $ PPP; 5.5, $ PPP; 10 $ PPP; and 20 $ PPP per capita per day. Using them, we create five distinct groups based on their consumption per capita per year: these are the "poor" (annual consumption per capita ≤ 1,170 $ PPP), "vulnerable" (1,170 < annual consumption per capita ≤ 2,000 $ PPP), "lower-middle class" (2,000 < annual consumption per capita ≤ 3,650 $ PPP), "middle class" (3,650 < annual consumption per capita ≤ 7,300 $ PPP) and "upper-middle class" (annual consumption per capita > 7,300 $PPP). In model (6), this variable is interacted with MRP to investigate how the correlation of the latter with households' welfare perceptions varies across classes with different economic status.

4. Results

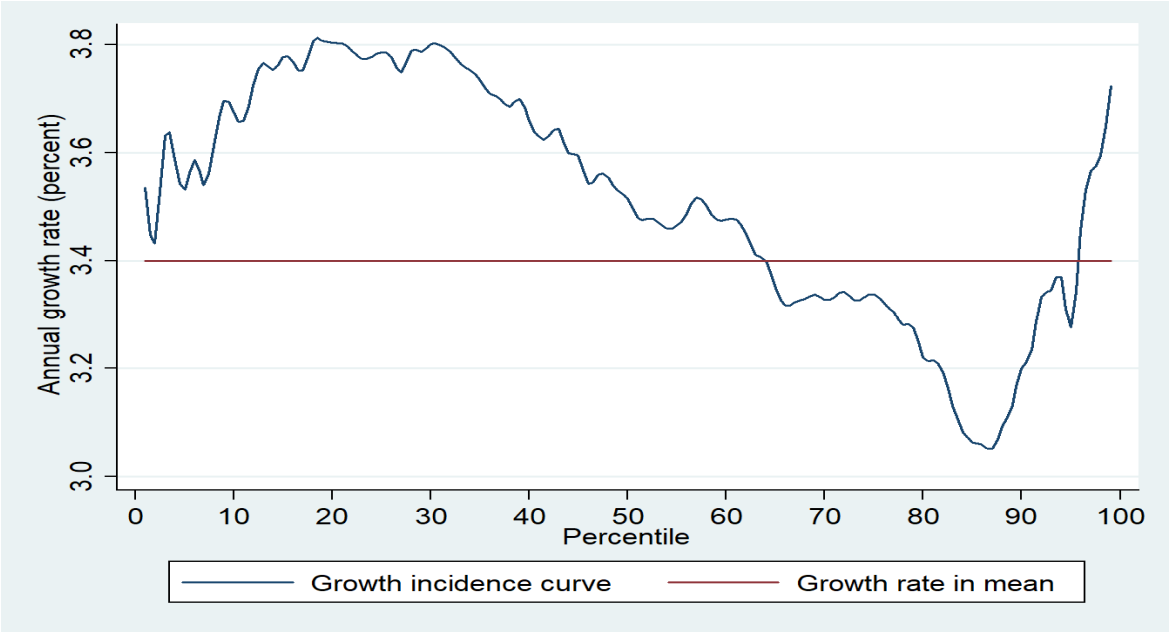
As pointed out in the previous sections, one of the main goals of this paper consists in showing how absolute measures evolve in line with households' welfare perception. Therefore, after describing the theoretical differences between the two sets of indices and the data, we proceed by reporting the results from perception indicators obtained from the three rounds of Moroccan household surveys. Before analyzing the perception outcomes that, as we will see, are strongly correlated with the class composition of Moroccan society, we outline a brief overview on Morocco's economic performance and welfare distribution.

4.a Poverty, (relative) inequality and class composition in Morocco: 2000-2013

While real GDP per capita increased by about 1.5 percent per annum and showed substantial volatility throughout the 1990s, the following decade (the 2000s) began with a much more stable pattern of growth and substantially higher annual rates. GDP per capita increased at an annual rate of 3.1 percent between 2001 and 2017, almost doubling from 15,702 Moroccan dirhams in 2001 to nearly 26,217 dirhams in 2017 (Figure 1 and Pinto Moreira, 2019).

Growth, however, has not been accompanied by rapid economic modernization and significant labor market outcomes. Indeed, the Moroccan economy created an average of 115,000 jobs annually between 2000 and 2013, which was insufficient to absorb the annual increase of the working-age population (HCP and WB, 2017a). Also, informality is widespread as only 17 percent of the labor force has a regular contract. Women and young people are particularly disadvantaged. Compared to other MENA region countries, female participation in the labor force is low and declined from 28.1 percent in 2000 to 22.4 percent in 2017; over the same period the youth unemployment rate increased from 19.6 percent to 26.5 percent, especially among the highly educated.

Figure 1: Morocco's growth incidence curves for per capita consumption, 2000-2013



Source: Authors' calculations based on Morocco's household surveys

Poverty was reduced from 24 percent in 2001 to 7.7 percent in 2013.[13] GDP growth, therefore, has translated into high growth of household consumption, particularly for the bottom 40 percent of the distribution (HCP and WB, 2017b). Compared to an average growth rate of consumption of about 3.4 percent between 2001 and 2013, the consumption of the bottom 40 percent grew at about 3.6/3.7 percent (Figure 1). Indeed, in relative terms the poorest tended to benefit more than those between the 60 and the 95 percentiles of the consumption distribution. Over the same period,

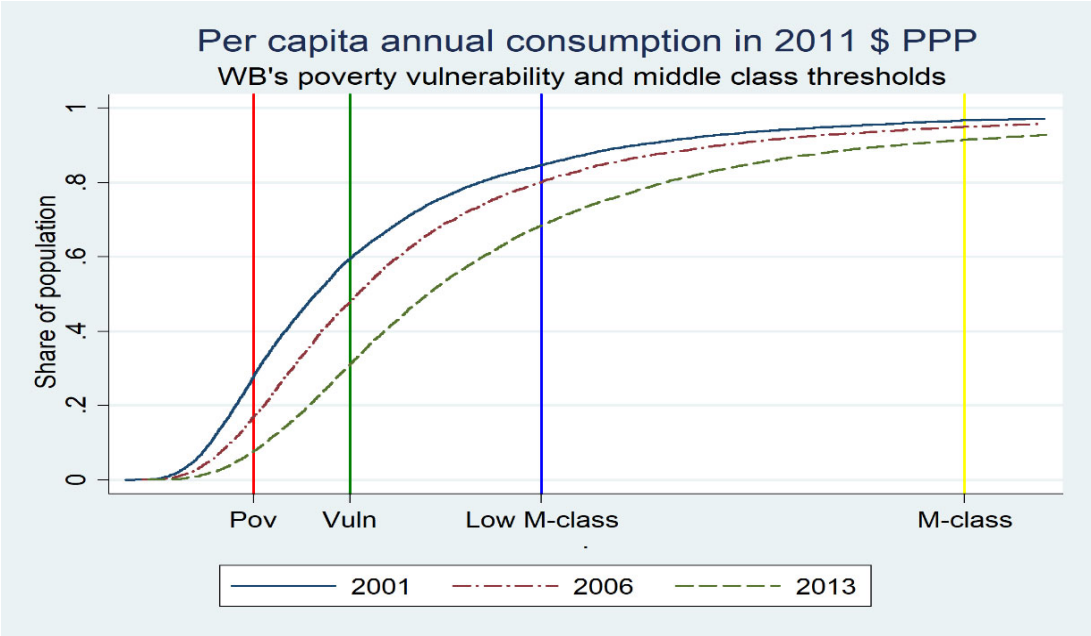
[13] Measured with the national poverty line, the decline is from 15 percent to 4.8 percent (HCP and WB, 2017b).

inequality, as measured by the Gini index, declined slightly to below 40 percent (39.5 percent)—a particularly high value when compared to the rest of MENA region.

This slight decline was the result of two counter-balancing trends: convergence of development across regions and increased intra-region inequality in some regions. Indeed, inequality increased mostly in the coastal regions (with the notable exception of the Casablanca region), while it decreased in the inner and eastern parts of the country. Likewise, relative polarization measures such as the Foster and Wolfson (1992, 2010) slightly declined from 35.15 in 2000 to 32.87 in 2013.

As can be seen in the stochastic dominance curves in Figure 2, growth has been moderately pro-poor, and have had an effect on Morocco's class composition. By comparing the three curves (2001, 2006, 2013), we can observe a clear rightward shift of consumption distribution, which in terms of socioeconomic status, determined: (i) an upgrading of households belonging to the second and third deciles graduating from poor to vulnerable over a decade; (ii) an upgrading of households belonging to the 4th to 6th deciles moving to "lower-middle class" status; (iii) an upgrading of the 8th decile entering the middle classes. In 2013, the poor occupy the bottom decile, the vulnerable the 2nd and 3rd deciles, the lower-middle class the 4th to the 7th deciles, the middle class the 8th to the 9th deciles, the upper class the 10th decile.

Figure 2: Stochastic dominance curves: 2000, 2006 and 2013



Source: Authors' calculations based on Morocco's household surveys.

4.b Perception indicators

The focus of our analysis in this section is on the results emerging from the welfare perception in the decade preceding each wave. The 2001, 2006 and 2013 household surveys had a dedicated question on general welfare perception, which is fully comparable through the three waves; however, beginning with the 2006 survey, a new section explicitly asks respondents to address the issue of subjective poverty. The respondent is always the household head on behalf of the whole family.

Figure 3 refers to two non-overlapping points in time (2000 and 2013) and offers insights of trends over more than 20 years (i.e. from 1991 to 2013). The 2006 result lies somewhere between the 2000 and 2013 results (provided upon request). Throughout this section we use the above-mentioned class definition to group household perception. One possible caveat to this approach is that the size of the surveyed groups has tended to change over time as people have become upwardly mobile and entered more affluent groups. However, a comparison of the results of the quintiles in Figure 3(b) shows that this potential bias is not a genuine concern, as the same trends and variations identified in the analysis by classes can be easily detected when analyzing the results by quintiles.

Figure 3: Perception of current living standard compared to the last 10 years

(a) By classes ***(b) By quintiles***

Source: Authors' calculations based on Morocco's household surveys.

Figure 3(a) plots the results of the question "How is your current living standard compared to the last ten years?" by classes. A couple of clear trends emerge. Firstly, the households surveyed in the year 2000, particularly those considered to be among the poorest, perceived a very sharp decline in their living standards compared to the previous ten years (the 1990s), despite the fact that consumption levels had increased, and that poverty had declined (HCP, 2001; HCP and WB, 2017b). Indeed, in the same year, the share of households declaring that their welfare had declined was much higher than the share of those declaring it had improved. The shares of positive and negative perception vary a lot by classes: the poorer the class, the higher the share of those declaring that their welfare declined. In contrast, the share of households stating that their welfare improved increases monotonically with consumption: higher deciles show a higher propensity to have a positive perception. A generalized sense of a highly polarized society in which only the top deciles were perceived to have benefitted from the slow and volatile growth of the 1990s had already begun to form in early 2000 (Pinto Moreira, 2019).

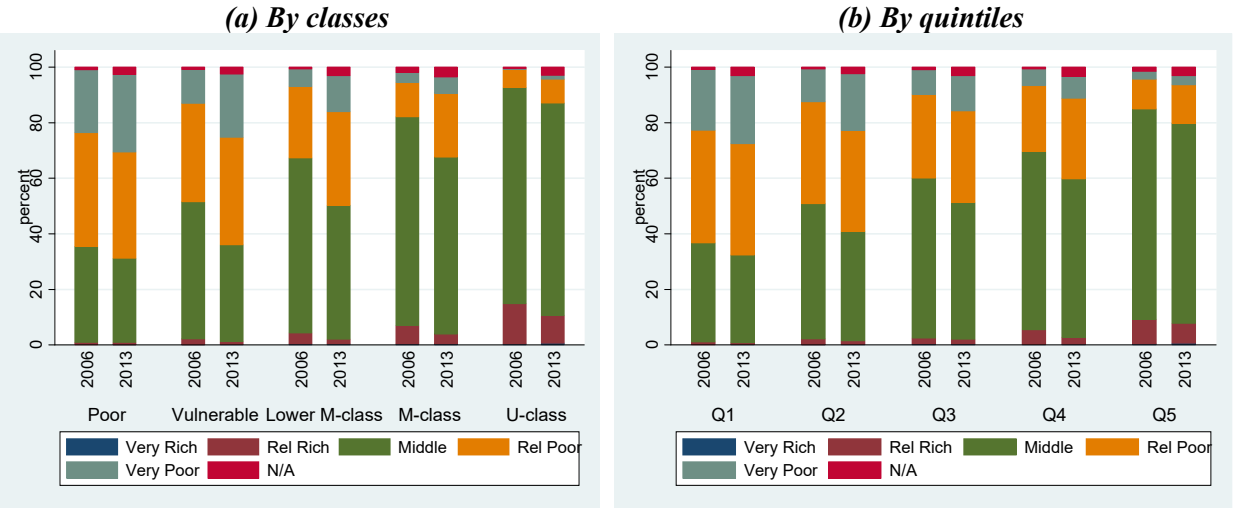
Second, while we observe some important differences between 2001 and 2013, the above-mentioned monotonic structure is preserved. The share of "Improved" increased for all classes/quintiles and the share of "Worsened" decreased for all classes/quantiles. Overall, people perceived an improvement in living conditions in line with growth patterns; in relative terms,

however, the richest perceived considerably greater improvements than the poorest. Indeed, those belonging to the bottom four classes only saw a marginal increase in the share of "Improved", while the largest differences are observed only in the upper classes (+17 percent more). On the positive side, there is a sharp decline in the share of those whose situation worsened, so much so that the share of those in the lower classes declaring they faced improved conditions is about the same as the share of those declaring a decline; in addition, the further up we progress in welfare distribution, the more the share of "Declined" declines against the share of "Improved".

Finally, it is very important to look at the trend of those declaring "Not changed". This trend is also monotonic and declining as in the share of households declaring a worsening, but its interpretation deserves particular attention: after a not particularly rewarding decade, the fact that the lower classes were declaring no change has a completely different meaning than for those of the upper classes declaring the same thing. This may be a positive outcome for households belonging to the top classes but represents a negative outcome for those belonging to the bottom classes: in the latter case, nothing has changed, even after a long and sustained period of growth and rapid poverty reduction.

It is also interesting to compare the "objective" social status (class) with the perceived class. Unfortunately, this specific section of the questionnaire was only included in the 2006 survey, so we could only compare it to the results of the 2013 survey. We focused our attention on the question: "In what social level do you rank your household in comparison with what prevails in your social environment (*douar* or neighborhood)?"

Figure 4: Perception of households' social level in comparison with own social environment



Source: Authors' calculations based on Morocco's household surveys.

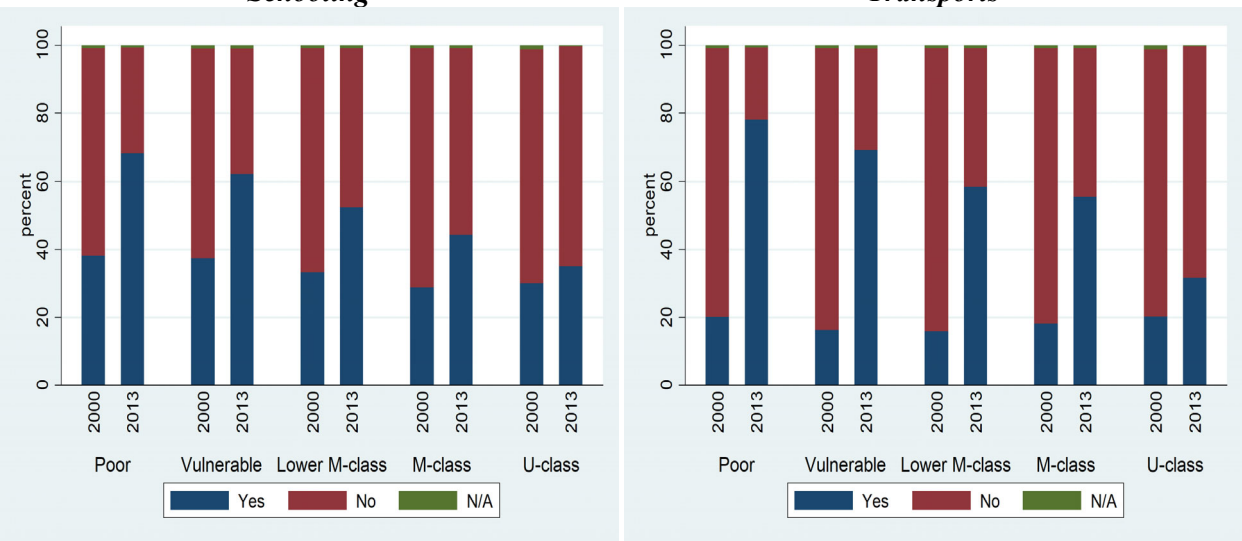
In both rounds of the survey, the majority of households did not consider themselves as richer than the average households belonging to the social contexts in which they lived. It is worth noting that the share of households that considered themselves as poorer than other households was particularly high in the first quintile, and then declined quasi-monotonically through to the top one. Nonetheless, there are important nuances to this general trend. For example, while the (largely pessimistic) subjective perception recorded in 2013 among the poorest classes had slowly declined, as compared to 2006, something had clearly changed among the newly graduated vulnerable and the lower-middle class households. In both cases the (correct) perception of ranking in the middle declined considerably, proportionally raising their awareness of being relatively poorer than other households. Also, the middle classes considered that their perceived status had decreased; however, 70 percent of respondents from this social class did not feel poorer than other households. Finally, the "class-consciousness" of upper-class households declined slightly in 2013 but still stood above 80 percent.

The sense of frustration and perception of non-improvement shared by many Moroccans is further corroborated by an analysis of specific issues of concern to Moroccans in the course of their daily lives. For the sake of brevity, we decided to report only four results: two relating to the type of expenses that posed a problem for households over the past 10 years, for example, schooling and transports; and two relating to future issues of concern, for example, lower purchasing power and criminality (Figure 5).

Figure 5: Negative perception on specific issues

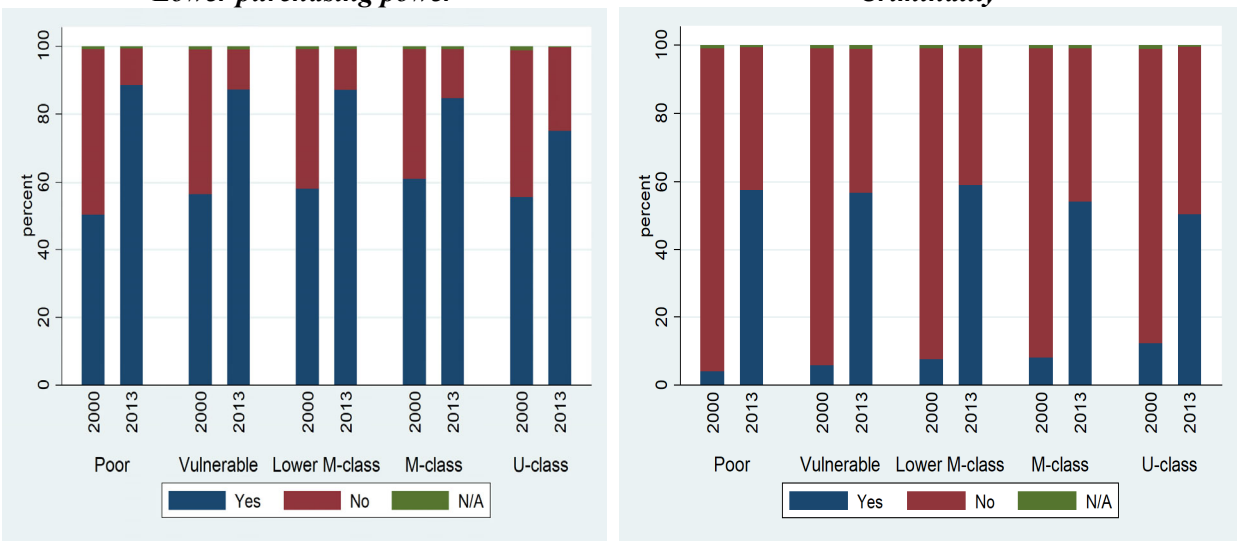
(a) Among your expenses in the last 10 years, did … pose you a problem?

Schooling ***Transports***



(b) Is … a concern for your future?

Lower purchasing power ***Criminality***



Source: Authors' calculations based on Morocco's household surveys

The top two panels in Figure 5 report two sources of expenses that have become particularly burdensome for Moroccan households, notably schooling and transport. All classes, with the exception of the upper classes, declare that these two expenses had become a serious source of concern between 2001 and 2013. In 2013, 70 and 60 percent of the poor and vulnerable, respectively, declared that they struggled with schooling expenses; however, in 2001 only 40 percent of them declared having experienced difficulties with these expenses. Interestingly, the

rapid urbanization process that Morocco experienced in the 2000s amplified the importance of transport costs. Job opportunities have increasingly become more concentrated in big towns, obliging people to commute and spend much more on transport than in the past; they have also faced difficulties as public transport has not kept pace with increasing demand. In 2000, about 20 percent of respondents in almost all classes declared that public transport was an issue; however, in 2013 transport was an issue of serious concern for the majority of the bottom four classes.

The future also looks gloomier for many Moroccan households (Figure 5, lower panels). When asked to judge whether a number of common problems, ranging from youth unemployment to a lack of security concerned them, the answer was in most cases "Yes". We decided to report just the result from the questions on the reduction in purchasing power and criminality, but for most of the other questions the response and the pattern is very similar: there was a much higher share of "Yes", particularly among the central and lower strata of the population.

Overall, the results on perception suggest that perceived economic instability and social insecurity rose between 2001 and 2013. The perspective of younger generations, as captured in questions about their future, schooling or unemployment, which was particularly concerning for parents. The impression is that large segments of Moroccan society did not feel secure about their status and were very skeptical about transmitting the same level of well-being to future generations. Combining all the pieces of this puzzle, we find clear signs that Moroccan fear "déclassement",or losing the status that they obtained at a high cost. These fears continue to exist despite the important economic and political reforms launched by Morocco in 2011—reforms which probably came too late to reverse the general sense of malaise that has accumulated for such a long time.

4.c Absolute measures of polarization

As opposed to the relative measures which, as previously mentioned, marginally declined, absolute measures increased substantially between 2001 and 2013. The absolute Gini, i.e. the Gini index multiplied by the mean of the distribution, grew by 50 percent, whereas the absolute version of the Foster and Wolfson's polarization measure increased by 45 percent.[14] While already indicating a

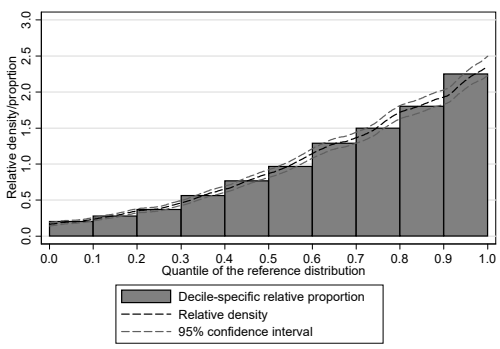
[14] Formally, the Foster-Wolfson index is defined as:

clear trend, these proposed synthetic measures fail to indicate where the changes take place. To further analyze absolute polarization, we therefore used the "relative distribution" method. This combines the strengths of summary absolute polarization indices with the possibility of graphically visualizing the differences in the shape and in the medians of the compared distributions.

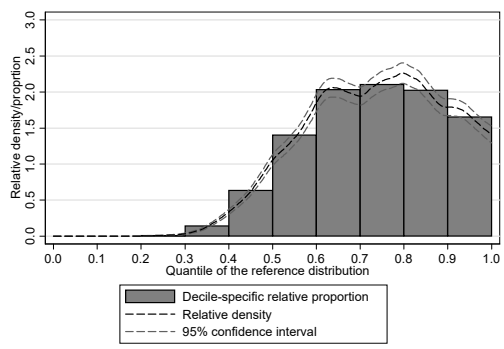
Figure 6 presents the results of the relative distribution analysis for Morocco between 2000 and 2013. Panel (a) depicts the overall relative distribution, while the location effect, i.e. the effect only due to the median shift, is shown in the panel (b) of Figure 6. Finally, panel (c) displays the shape effect, which represents the relative distribution net of the median influence.

Figures 6: Relative consumption distribution for Morocco between 2000 and 2013

(a) Overall



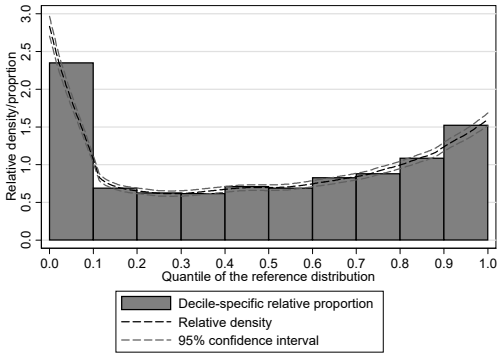
(b) Location



(c) Shape

$$P^{FW} = 2\left(G^{B} - G^{W}\right)\frac{\mu}{m},$$

where μ, m, G^{B} and G^{W} are, respectively, the mean, the median, the between-group Gini coefficient and the within-group Gini coefficient, and where it is assumed that there are only two income groups: an income level below the median; and an income level above the median. The index ranges within the interval [0,1], being equal to 0 in case of a perfectly equal distribution (all the incomes are equal) and equal to 1 for a perfect bimodal distribution, where half of the population has no income, and each member of the other half has an income level that is equal to twice the mean income level. An 'absolute' counterpart of the above index can be constructed by multiplying it by the median.



Source: Authors' calculations based on Morocco's household surveys.

The overall results show that, guided by an increase in consumption, the households shift from the lower deciles of the distribution to the middle and the upper parts. Indeed, the values of the deciles in the upper tail of the distribution are higher than 1, which means that there are more households in that decile of the distribution in the last year of analysis than there were in the first year.

Panel (b) presents the effect due only to the median shift, i.e. the pattern that the relative density would have displayed if there had been no change in distributional shape, but only a location shift of the density. The effect of the median shift was quite large. This alone would have moved a substantial proportion of Moroccan households in 2000 out of the two lowest deciles of the reference distribution and placed them in the other upper deciles of the distribution.

Looking at panel (c), which shows the shape effect, it is clear that there is a concentration in the tails of the distribution. Values above 1 indicate that, in relative terms, there are more households in that decile of the distribution at the end of the examined period than there were at the beginning. Therefore, relative to the initial period, households in the lowest deciles increased by about 14 percent (+1.4 over 1) in the lowest decile, and by 5 percent (+0.5 over 1). Therefore, the trend is more marked in the lower part of the distribution, while a similar but smaller change is observed for the upper tail, with an increase in the last two deciles. Thus, once changes in real median expenditure are netted out, a U-shaped relative density is observed; this supports prior findings on the more unequal and more polarized distribution of consumption expenditure in the course of the past two decades.

The relative polarization measures capture the above changes well. The MRP index equals 0.24, and is statistically significant at the 5 percent level.[15] Looking at the contributions to the distributional change made by the segments of the distribution above and below the median, we find that the MRP is not evenly distributed in the two tails: the LRP = 0.32 is twice as positive as the URP = 0.16, which is consistent with the visual impression from the shape shift towards the upper tail. Thus, both the lower and upper halves of the 2013 consumption distribution Are more widely spread out than the lower and upper halves of the 2000 consumption distribution. About 16 percent (half the LRP) of households in the lower half shift from the center of the distribution to the lower deciles, whereas about 8 percent (half the URP) of households in the upper half shift from more central values towards the upper tail of the distribution.

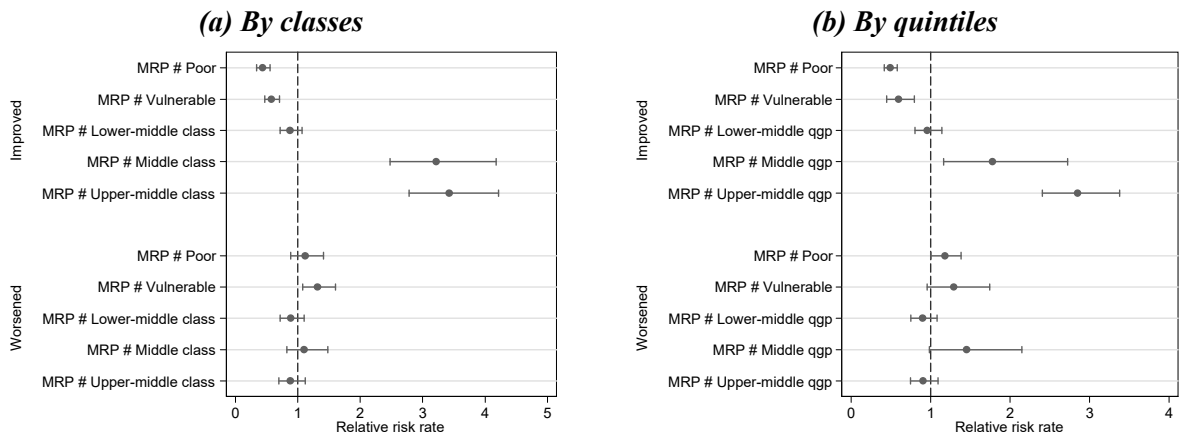
a. Econometric Outcomes

In this section, we use standard econometrics to test the association between consumption polarization and household self-reported welfare.

For the sake of brevity, the estimation results presented here only refer to the interaction between MRP and the factor variable $CLASS$—the full econometric results can be found in the appendix. Figure 7(a) is a plot of the corresponding estimated coefficients (with 95 percent confidence intervals) interpreted in terms of relative risk rates, which can be obtained through the exponentiation of the estimated MNL coefficients.[16] Since the MNL model estimates $J-1$ equation, where the Jth equation is relative to the reference category, the relative risk rate of a coefficient indicates how the probability of selecting a response option compared to the probability of choosing the reference response category changes with the variable in question. In particular, a relative risk rate greater than 1 indicates that the probability of selecting, say, the response option "Improved", as compared to that of responding "Not changed", increases as the variable MRP (and hence polarization) increases. On the contrary, a relative risk rate less than 1 indicates that the probability of selecting the response option "Improved" compared to that of responding "Not changed" decreases with polarization.

[15] The null hypothesis of "No change" with respect to the reference distribution is tested for each index.
[16] The figure does not show the relative risk rate estimates for 'Do not know', due to the irrelevance of this answering option for assessing the evolution of households' welfare perceptions.

Figure 7: Relative risk rates obtained from multinomial logit regressions: improved (above) and worsened (below)



Source: Authors' calculations based on Morocco's household surveys.

As opposed to results for "Worsened", for which most of the coefficients are not statistically significant, the results for "Improved" relative to "Not changed" are particularly insightful with respect to the relation between consumption polarization and household self-reported welfare. Keeping all the other variables constant, if polarization were to increase, the relative probability of declaring that a household's welfare improved, rather than not changed, is $(1-0.431)\times 100 = 56.9\%$ lower for the poor, $(1-0.574)\times 100 = 42.6\%$ lower for the vulnerable, and $(1-0.872)\times 100 = 12.8\%$ lower for households in the lower-middle class—albeit the 95 percent confidence interval of the corresponding relative risk rate overlaps with 1 (0.713—1.068); hence, this decrease in relative probability is not significant. For middle-class and upper-middle-class households, the same relative probabilities are, respectively, $(3.217-1)\times 100 = 221.7\%$ and $(3.425-1)\times 100 = 242.5\%$ higher.

Similar results hold *vis-à-vis* a robustness check where model (6) was re-estimated by replacing the factor variable $CLASS$ with a new indicator variable QGP identifying quintiles of expenditure, i.e.:

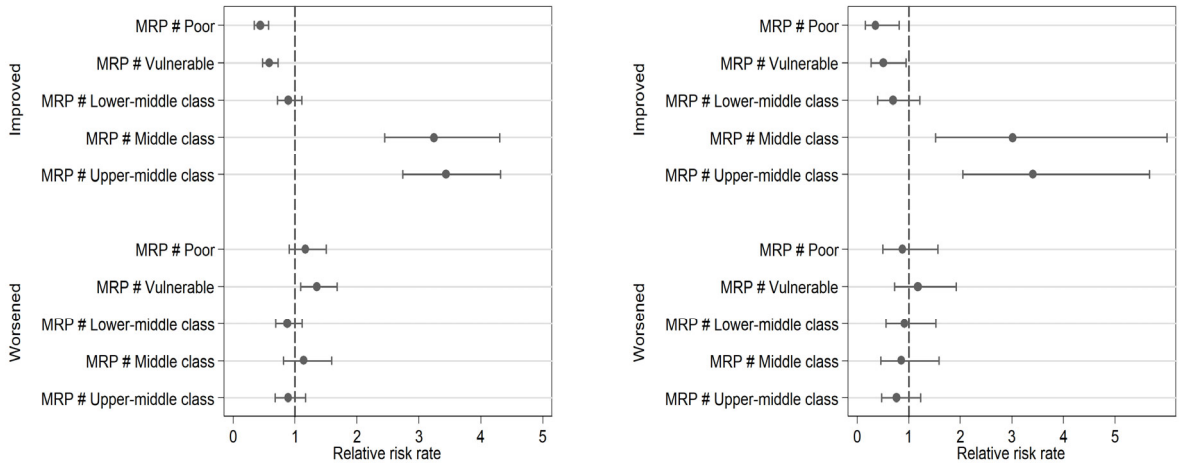
$$(9)\ \ln\left[\frac{\Pr(Y_i = j)}{\Pr(Y_i = 2)}\right] = \alpha_j + \sum_{h=1}^{5}\beta_{jh}\left(MRP_{ih}\times QGP_h\right) + \sum_{k=1}^{9}\gamma_{jk}X_{ik}, \quad i = 1,2,\ldots,N, \quad j = 1,3,4.$$

The results, visually displayed in Figure 7(b), still correspond to the previously described pattern: for "Improved" relative to "Not changed", if polarization were to increase, the relative probability for households to declare that their welfare improved, rather than not changed, is $(1-0.492)\times 100 = 50.8\%$ lower for the first quintile, $(1-0.597)\times 100 = 40.3\%$ lower for the second, and $(1-0.960)\times 100 = 4.0\%$ lower for the third quintile—although this estimate is not significant. In contrast, for the last two quintiles of expenditure the estimated relative probabilities are, respectively, $(1.781-1)\times 100 = 78.1\%$ and $(2.851-1)\times 100 = 285.1\%$ higher.

We conducted the same exercise by separately estimating our model by the respondent's sex, age groups and location (urban/rural) to check for robustness and to control for the respondents' heterogeneity. In Figure 8 we reported the results of the model by the household head's gender, while the other results are available upon request. Overall, in all these models using the class dimension as independent variable (but the results by class are very similar), the above-mentioned pattern of negative association between polarization and perception among the lower classes and vice versa is upheld, even controlling for household respondents' heterogeneity: no significant differences were discerned if household heads are male or female, young or adult, or living in urban or rural settings.

Figure 8: Relative risk rates obtained from multinomial logit regressions: improved (above) and worsened (below)

(a) Male household head respondent ***(b)Female household head respondent***



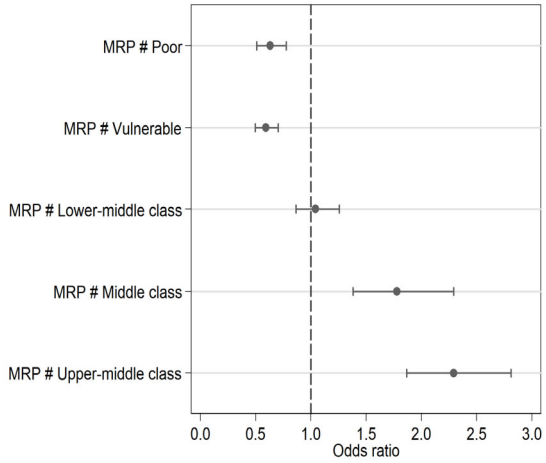
Source: Authors' calculations based on Morocco's household surveys.

The final robustness check is reported in Figure 9 and additional results are available upon request. As mentioned in section 4b, the response "Not change" can assume a very different meaning if pronounced by people in lower classes or in higher classes. In order to verify whether this is the case or in other words if the base category in previous regressions is a heterogenous category, we run two different logit models where the dependent variable is in the first case a dummy that assumes value 1 when the household head answered either worsened or not changed while in the second case another dummy that assumes value 1 when the household head responded that it had improved or not changed. The gist behind this test is twofold. First to show that even if we put together the response not change to either worsened or improved, we can replicate the same "class dynamic" evidenced by the multi-logit and secondly that the "Not change category" for the poorest looks much closer to the "Worsened" case while for the rich is closer to the "Improved" answer.

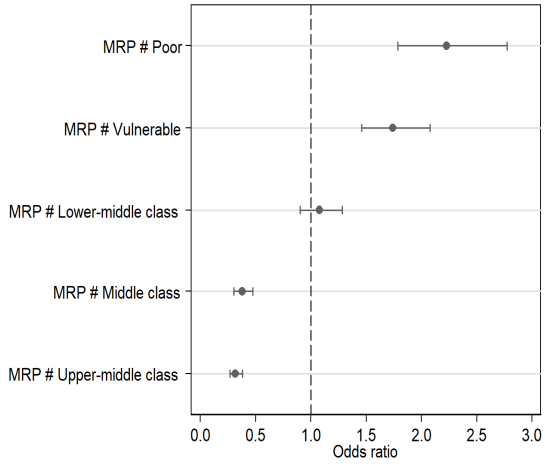
Figure 9a confirms the robustness of the multi-logit results. A high percentage of the wealthiest respondents declared that conditions had improved, and in their case, polarization remained positively associated with improved conditions; however, as before, even adding the "Not changed" response to "Improved" does not change much for the poorest. The negative association between polarization and perceived welfare improvements among the lower classes remained significant. Figure 9b substantially improves the significance of the results and outlines a much clearer class-based pattern. Among the poorest, the positive association between polarization and perception of worsened condition becomes very significant, while for the rich the opposite holds.

Figure 9: Relative risk rates obtained from logit regressions

(a) Dependent variable: 0 = "Worsened + Do not know"; 1 = "Improved + Not changed"



(b) Dependent variable: 0 = "Improved + Do not know"; 1 = "Worsened + Not changed"



Source: Authors' calculations based on Morocco's household surveys.

Overall, the econometric findings on polarization and households' perceptions of welfare consistently converge towards the narrative outlined in section 4(b). In 2013, compared to the previous 10 years, households belonging to the bottom four classes only see a marginal increase in the share of "Improved", while the big difference is observed only in the upper-middle class. On the other hand, there is a sharp increase in the share of those declaring "Not changed", especially for the lower classes where in presence of long and sustained growth this could well represent a negative outcome. As shown, this pattern is significantly correlated with the increasing polarization that has affected the distribution of welfare in Morocco between 2000 and 2013.

5. Conclusions

The foregoing analysis raises the question of whether the Arab puzzle exists. Inequality and polarization do not seem to play a role in explaining the dissatisfaction and sense of frustration that led many Arabs to call for radical reforms, and in some cases seek to overthrow their regimes. Our paper suggests that in the case of Morocco, polarization does play a role: the main finding of this paper is that we should use absolute measures rather than relative measures.

Three rounds of Moroccan household surveys offer the opportunity to gauge the evolution of polarization and the perception of well-being in a large sample of Moroccan households. Also, the

period considered is of interest since it covers the pre- and post-Moroccan Arab Spring, and the subsequent political and economic changes set in motion by the protests.

A preliminary analysis of the two sets of variables already indicates that they do not go at par. Although Moroccan households experienced an improvement in their living standard between 2001 and 2013 and escaped from poverty and vulnerability to graduate into the middle classes – more than 70 percent of Moroccan households indicate that their well-being did not improve compared to the last 10 years. There is, however, a lot of variation depending on social status. While most of the poor, vulnerable and lower-middle-class households experienced few improvements compared to the last 10 years, middle-class households (but mostly those in the upper class) appear to have benefitted the most. When compared to the responses of the 2001 survey, the result is clearer. The upper classes appear to have experienced a significant increase in the share of those seeing their well-being improved; however, the share of those other classes experiencing an improvement did not vary much, with the only positive change being an increase in those declaring that conditions had not changed for them, as well as a reduction in the share of those seeing a decline.

To further confirm the general perception that improvements in welfare had not been uniformly distributed—a trend captured in household perception – we looked at the perceived status (poorer or richer than neighbors) and compared the results from the 2006 and 2013 surveys, as this section of the questionnaire was not available in the 2001 survey data. Despite these improvements, in both rounds most households did not consider themselves richer than the households living in their neighborhood; however, as in the previous case, the perception of relative poverty is higher among the poorest and declines quasi-monotonically through to the top one. What is striking is finding how much this perception worsened among the lower and middle classes along with their absolute shares: in 2013 almost 50 percent of those in the lower middle class, and 30 percent of those in the middle class declared themselves either poorer or very poor compared to their peers, whereas in 2006 these percentages stood at 30 and 15 percent, respectively.

In the second part of the paper we linked these preliminary findings on perception to polarization. Our hypothesis is that the ongoing process of absolute polarization which was detected through the use of the relative distribution method conditions the perception of household's well-being. Exploiting the chance to construct a dynamic indicator of polarization, i.e. by using the relative

distribution to compare the situation in 2013 to the reference situation in 2001 at the household level, and linking it to household perception, it is possible to test whether absolute polarization is linked to household perception. To our knowledge this is the first attempt to explain, at such granular level, the correlation of absolute polarization with well-being perception.

Results from the multi-logit regression where we also control for standard household-level characteristics, for example, such as education, employment, location, etc., indicate that polarization is significantly linked to perception, and most importantly that this relation is asymmetric. By interacting the polarization indicator with dummy variables defining classes of welfare (poor, vulnerable, etc.), we find that the poorer the household, the more polarization is perceived to be linked to the well-being of the household, while the richer it is the more polarization will positively link to its perceived well-being. Results are robust with respect to the use of classes or quintiles for ranking social groups from the poorest to the richest and other specifications.

In conclusion, while absolute polarization is growing in many countries (Nissanov and Pittau, 2016; Petrarca and Ricciuti, 2016; Clementi et al., 2017), few analytical works explicitly link this pattern to a respondent's unhappiness about his or her socioeconomic condition. Morocco offers a unique opportunity in this regard for two related reasons. First, the Moroccan household surveys collect reliable and comparable data on perception, and second because these data made it possible to document that, despite making important economic progress, Moroccan citizens appeared dissatisfied with their socioeconomic situation and were very concerned about their future. At first glance, there was no apparent link between this negative perception and welfare distribution; poverty rates fell and inequality, as measured by the Gini index, did not vary. In contrast, exercising the theoretical option to link people's perception and an underlying household level measure of absolute polarization, enabled us to show that perception is indeed significantly linked to welfare distribution.

The potential applications of this new method can be implemented beyond Morocco. According to some preliminary analysis that has been undertaken, other countries in the MENA region show evidence of growing polarization, and as in Morocco their citizens seem to be quite unhappy about their socioeconomic status. A broad regional analysis in the spirit of the present paper might indeed

shed additional light on the root causes of the socio-political instability of the MENA region over the past two decades.

6. Appendix

	Class model (1)	Quintile model (2)
Dependent variable	Evolution of the standard of living during the last 10 years	Evolution of the standard of living during the last 10 years
	Improved	
Household size	0.104***	0.0962***
	[0.0145]	[0.0142]
Male	0	0
	[.]	[.]
Female	-0.158	-0.156
	[0.136]	[0.136]
Age	-0.00249	-0.00175
	[0.00221]	[0.00220]
Single	0	0
	[.]	[.]
Married	-0.00906	-0.0240
	[0.152]	[0.151]
Divorced	-0.109	-0.129
	[0.226]	[0.226]
Widower	0.00567	-0.00724
	[0.190]	[0.190]
Literate	0	0
	[.]	[.]
Illiterate	-0.104	-0.117
	[0.147]	[0.147]
None	-0.305	-0.353
	[0.181]	[0.181]
Pre-school	-0.226	-0.273
	[0.146]	[0.145]
Primary	-0.395***	-0.444***
	[0.117]	[0.116]
Secondary	-0.233*	-0.262*
	[0.116]	[0.115]
Tertiary	0	0

	[.]	[.]
Other	-0.195 [0.148]	-0.139 [0.144]
Employed	0 [.]	0 [.]
Unemployed	-0.436* [0.179]	-0.440* [0.178]
Inactive	-0.0830 [0.0720]	-0.0824 [0.0718]
Urban	0 [.]	0 [.]
Rural	0.149** [0.0563]	0.125* [0.0559]
Tanger-Tetouan-Al Hoceima	-0.0440 [0.0889]	-0.0421 [0.0889]
Oriental	-0.307** [0.112]	-0.320** [0.111]
Fès-Meknès	0.119 [0.0881]	0.104 [0.0880]
Rabat-Salé-Kénitra	0.421*** [0.0855]	0.406*** [0.0848]
Béni Mellal-Khénifra	0.257** [0.0956]	0.234* [0.0950]
Casablanca-Settat	0 [.]	0 [.]
Marrakech-Safi	-0.352*** [0.0870]	-0.360*** [0.0871]
Drâa-Tafilalet	1.463*** [0.140]	1.436*** [0.139]
Souss-Massa	0.423*** [0.0999]	0.411*** [0.0997]
Guelmim-Oued Noun	0.482* [0.190]	0.474* [0.190]
Laâoune-Sakia El Hamra	0.609** [0.186]	0.591** [0.186]
Dakhla-Oued Ed-Dahab	0.303 [0.213]	0.314 [0.212]

Poor # Granular MRP	-0.843*** [0.127]	
Vulnerable # Granular MRP	-0.554*** [0.103]	
Lower-middle class # Granular MRP	-0.136 [0.103]	
Middle class # Granular MRP	1.168*** [0.133]	
Upper-middle class # Granular MRP	1.231*** [0.106]	
Q1 # Granular MRP		-0.709*** [0.0858]
Q2 # Granular MRP		-0.516*** [0.146]
Q3 # Granular MRP		-0.0411 [0.0890]
Q4 # Granular MRP		0.577** [0.217]
Q5 # Granular MRP		1.048*** [0.0863]
Constant	-0.477* [0.214]	-0.320 [0.209]
Worsened		
Household size	-0.00704 [0.0152]	-0.00808 [0.0149]
Male	0 [.]	0 [.]
Female	0.0210 [0.122]	0.0201 [0.121]
Age	-0.000504 [0.00231]	-0.000513 [0.00231]
Single	0 [.]	0 [.]
Married	-0.229 [0.160]	-0.232 [0.159]
Divorced	0.479*	0.473*

	[0.210]	[0.210]
Widower	0.206 [0.184]	0.201 [0.184]
Literate	0 [.]	0 [.]
Illiterate	-0.138 [0.162]	-0.147 [0.161]
None	0.113 [0.209]	0.126 [0.208]
Pre-school	0.0317 [0.169]	0.0405 [0.169]
Primary	0.170 [0.141]	0.174 [0.141]
Secondary	0.221 [0.141]	0.225 [0.141]
Tertiary	0 [.]	0 [.]
Other	21.60*** [0.990]	22.17*** [0.993]
Employed	0 [.]	0 [.]
Unemployed	0.727*** [0.150]	0.733*** [0.150]
Inactive	0.295*** [0.0724]	0.296*** [0.0725]
Urban	0 [.]	0 [.]
Rural	-0.210*** [0.0598]	-0.213*** [0.0595]
Tanger-Tetouan-Al Hoceima	0.132 [0.0932]	0.133 [0.0932]
Oriental	0.388*** [0.102]	0.389*** [0.102]
Fès-Meknès	0.211* [0.0872]	0.212* [0.0872]
Rabat-Salé-Kénitra	0.353*** [0.0882]	0.355*** [0.0881]

Béni Mellal-Khénifra	-0.198 [0.104]	-0.202 [0.104]
Casablanca-Settat	0 [.]	0 [.]
Marrakech-Safi	-0.737*** [0.0996]	-0.737*** [0.0997]
Drâa-Tafilalet	0.413* [0.164]	0.405* [0.164]
Souss-Massa	0.0851 [0.105]	0.0880 [0.105]
Guelmim-Oued Noun	-0.173 [0.224]	-0.168 [0.223]
Laâoune-Sakia El Hamra	0.00676 [0.209]	0.0169 [0.210]
Dakhla-Oued Ed-Dahab	0.717*** [0.205]	0.718*** [0.205]
Poor # Granular MRP	0.111 [0.119]	
Vulnerable # Granular MRP	0.273** [0.100]	
Lower-middle class # Granular MRP	-0.121 [0.110]	
Middle class # Granular MRP	0.0969 [0.150]	
Upper-middle class # Granular MRP	-0.128 [0.121]	
Q1 # Granular MRP		0.166* [0.0813]
Q2 # Granular MRP		0.255 [0.153]
Q3 # Granular MRP		-0.104 [0.0923]
Q4 # Granular MRP		0.373 [0.199]
Q5 # Granular MRP		-0.101 [0.0969]

Constant	-0.409 [0.229]	-0.373 [0.224]
Observations	15970	15970

Standard errors in brackets * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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