

Chapter 2

A Comparative Analysis of Subsidies and Subsidy Reforms in the Middle East and North Africa Region

Abdelkrim Araar and Paolo Verme

Introduction

As highlighted in Chap. 1, consumer subsidies in the Middle East and North Africa (MENA) Region are widespread. All of the countries in the Region administer energy subsidies, and most countries administer food subsidies on at least a few items. These subsidies are important for households in that they constitute a sizable part of household expenditure and represent an important share of governments' expenditure or forgone revenues. Consumer subsidies are also larger in this part of the world compared to other regions (Clements et al. 2013; Sdrilevich et al. 2014) and they are more heterogeneous in many respects. The initial origins, types, profile, administration, and cost and beneficiaries of subsidies vary significantly across the countries of the MENA Region. This heterogeneity makes comparisons across countries more complex, but also provides an opportunity to derive lessons on subsidies and subsidy reforms.

This chapter aims to illustrate how the SUBSIM model can be used to analyze the impacts of consumer subsidies reforms and hence help guide policy reforms. Specifically, the chapter does this offering a standardized analysis of consumer subsidies in 2014. We use household budget survey data for five selected case studies and standardize the key variables for the analysis, including expenditure per capita on individual products and a basic set of household characteristics. We also update all surveys to 2014 using information on production, prices, and population

A. Araar (✉)
University of Laval, Quebec, QC, Canada
e-mail: aabd@ecn.ulaval.ca

P. Verme
The World Bank, Washington, District of Columbia, USA
e-mail: pverme@worldbank.org

growth and transform all values in purchasing power parity (PPP) using the latest round of the PPP survey (2011). We then use a version of the microsimulation model “SUBSIM,” which is designed to make comparisons across countries, to provide a comparative distributional analysis of subsidies and simulations of subsidies reforms. This version of the software is designed to compare individual products across countries and allows researchers to see how any two countries compare in the distribution of subsidies and in the outcomes of subsidies reforms. In this way, we are able to simulate the same subsidy reforms in different countries and compare the outcomes across countries in terms of household welfare and government revenues.

The countries considered are Libya, Morocco, and Tunisia for North Africa and Djibouti and the Islamic Republic of Iran for the Middle East. The combined populations of these countries is 130 million or about 34% of the population of the MENA Region. The sample includes net oil exporters such as the Islamic Republic of Iran and Libya and net oil importers such as Morocco and Tunisia. It also includes low-income countries (Djibouti), low-middle-income countries (Morocco and Tunisia), and middle-income countries such as the Islamic Republic of Iran.

The products we consider are those that are the most relevant in terms of subsidies and those that are most frequently subsidized in the countries considered. These products are gasoline, diesel, liquefied petroleum gas (LPG), and electricity for energy products, and flour, bread, sugar, and vegetable oil for food products. The comparison of energy products could be done across all countries considered while the comparison of food products was possible only for selected countries. That is because for some countries like Tunisia it was not possible to gather all the necessary information while in other countries such as Djibouti some of the four food products considered were not subsidized.

The focus of the analysis is on direct effects only, as it was not possible to collect and standardize a sufficient number of input-output matrixes for a comparative analysis of indirect effects. The relative importance of indirect effects changes across products and income groups. It is high for products like gasoline and for richer quintiles and small for products like bread and for poorer quintiles. Therefore, results on welfare related to reforms on food products capture the greatest share of the total effect, but results on overall welfare related to energy products miss on an important share of the total impact of subsidies reforms. These indirect effects are reported in the country chapters that use input-output tables, but will not be discussed here.

Results show that the distribution and effects of subsidies are quite diverse across countries and products. Energy subsidies tend to be pro-rich in terms of absolute amounts (larger amounts accrue to richer households) but tend to be more important for the poor in terms of expenditure shares. Instead, food subsidies can be larger for the poor in absolute and relative terms. These findings do not apply everywhere, and the scale of these phenomena are different across countries and products. The welfare effect of a 30% reduction in subsidies can be important, especially if we consider the cumulated effect across products, but the cost of compensating the loss in welfare for the poorest is generally low as compared to the budget benefits of the

reform. This leaves governments with some fiscal space for compensation of other groups such as the middle class.

This chapter is organized as follows. The next section illustrates the data and methods used for the analysis. The chapter then provides a comparative distributional analysis of subsidies and simulates subsidy reforms comparing the outcomes across countries.

Data and Analytical Approach

In the following sections, we describe the microdata used for the analysis and the baseline prices (subsidized products and unit subsidies) as of 2014, our baseline year. The HBS surveys, prices and methodology employed to update the data to 2014 are the same used for the country chapters. The updates were made using published IMF macroindicators for inflation and gross domestic product (GDP) per capita as well as population statistics (see Tables 2.11 and 2.12). The exercise that follows does not draw from the country chapters; rather, it re-estimates the distribution of subsidies and provides new simulations of subsidies reforms using the primary data files for each country and transforming expenditure into U.S. dollars (\$) at purchasing power parity (PPP). This allows comparing subsidies and the outcome of subsidies reforms using a common currency.

Microdata

Table 2.1 shows the population statistics estimated directly from the surveys. These numbers are not identical to all country-specific population estimates, but they are very close. We can see that the sample of countries considered amounts to a total

Table 2.1 Baseline population and expenditure statistics, in US\$ at PPP

Country	Population	Number of households	Per capita expenditures	Household expenditures
Djibouti	939,000	166,966	1,977	11,121
Iran, Islamic Rep.	77,969,000	21,909,116	7,477	26,609
Libya	6,213,000	991,549	1,983	12,424
Morocco	33,179,000	7,070,798	4,170	19,565
Tunisia	11,060,000	2,548,655	3,960	17,186
Total	129,360,000	32,687,084	3,913	17,381

Source World Bank estimations from Household Budget Surveys

Note PPP = purchasing power parity. Data on household expenditure per capita can be very different from data on GDP per capita and the cross-country ranking made according to these two criteria can be quite different. This is mostly explained by the fact that total household expenditure represents different shares of GDP across countries

population of almost 130 million people, approximately 34% of the population in the MENA Region in 2014. The total household expenditure for the countries considered is approximately \$0.63 trillion-PPP per year, which amounts to \$3,913-PPP per capita, per year, and \$17,381-PPP per household, per year. This average hides differences across countries. The Islamic Republic of Iran is by far the country with the highest per capita expenditure (\$7,477-PPP). Morocco, and Tunisia follow with approximately \$4,000-PPP, and Libya and Djibouti come last with approximately \$2,000-PPP. The sample of countries we have is representative of three groups of countries at different levels of economic development. We also have oil-producing countries and net exporters of oil, such as the Islamic Republic of Iran and Libya; non-oil-producing countries with some natural resources, such as Morocco; and non-oil-producing countries, such as Tunisia, which have little in the way of natural resources. Therefore, we have a certain diversity also in terms of natural endowments.

Baseline Prices and Subsidies

As a reference period for the analysis, we use the very early part of 2014 when oil prices and subsidies peaked at their highest levels. A major wave of subsidies reforms occurred in the MENA Region in 2014 but this chapter focuses on the extraordinary situation faced by MENA countries before the reforms. We are interested in the prices and subsidies existing in the MENA countries just before the reforms.

Table 2.2 shows the baseline prices and unit subsidies for energy products. For LPG, prices are the lowest for Libya and the Islamic Republic of Iran in that

Table 2.2 Energy unit prices and subsidies, in US\$ at PPP (2014)

	Price	Subs.	Subs. (%)	Increase (%)	Price	Subs.	Subs. (%)	Increase (%)
	<i>LPG (13 kg)</i>				<i>Electricity (kWh, av.)</i>			
Djibouti	28.3	2.8	9.1	10				
Iran, Islamic Rep.	1.9	9.7	83.3	500	0.18	0.25	58.5	140.7
Libya	2.9	27.4	90.4	947	0.26	0.11	30.6	44
Morocco	10.4	20.7	66.6	199.8	0.21	0.15	42.3	73.2
Tunisia	9.8	20.9	68	212.7	0.11	0.63	85.4	583
	<i>Gasoline (L)</i>				<i>Diesel (L)</i>			
Djibouti	3	-0.1	-2		2.1	0.3	11.1	12.5
Iran, Islamic Rep.	0.5	2.3	83.3	500	0.4	2.3	84.8	557.1
Libya	0.2	1.6	87.7	714.7	0.2	1.6	88.1	740
Morocco	3.1	0	0		2.4	0.2	7.5	8.1
Tunisia	2.5	0.2	9.1	10	2.1	0.4	17.4	21.1

Source World Bank estimations from Household Budget Surveys

Note PPP = purchasing power parity

order and the highest for Djibouti. The highest shares of subsidies as a percentage of the free market price are in Libya and the Islamic Republic of Iran, the two oil-producing countries, with Libya's LPG subsidies reaching 90.4% of the full price. The percentage price increases that would be necessary to eliminate subsidies on LPG are remarkable. In Libya the price would have to be increased by 947% to eliminate subsidies and in the Islamic Republic of Iran by 500%.

It is interesting to see that in Djibouti, the poorest of the countries considered, the price of LPG is 15 times the price in the Islamic Republic of Iran, the richest country considered. This divergence is also striking because LPG is a product that is typically consumed by the poor and it is the most important among the poor. The claim that consumers' subsidies are a form of social protection schemes does not really hold if we observe data for LPG across countries.

Prices for electricity appear less diverse, but that can be explained by the way the prices are listed—in kilowatt hours (average across tariffs blocks). As a percentage of the free market price, electricity subsidies are the highest in Tunisia. The lowest subsidies are for Libya (30.6%) and Morocco (42.3%) but still high. To reach the market price, Libya would have to increase prices by 44%, an increase that would not go unnoticed by the population, and Tunisia would have to increase prices by 583%, a staggering figure.

Prices for gasoline and diesel are closer to the free market price for most countries except the Islamic Republic of Iran and Libya. The Islamic Republic of Iran and Libya in particular would have to raise prices of gasoline fivefold and more than sevenfold, respectively, to reach the free market price. For the Islamic Republic of Iran in 2014 this finding is remarkable given that this country went through a comprehensive reform of the subsidies system in 2010 that supposedly eliminated most subsidies and was costly in terms of cash transfers administered to the population in compensation of the subsidies removal.

For food (Table 2.3), the items considered are few, but we can see that subsidies can also be quite high. For flour, subsidies represent 91.3% of the free market price in Libya and almost 60% in the Islamic Republic of Iran. Libya has also the highest subsidies for bread, sugar, and vegetable oil, and the Islamic Republic of Iran has large subsidies on bread. Therefore, the oil-producing countries seem to be those that maintained the highest food subsidies. However, subsidies are also high in Morocco for flour and sugar, and in this country these products are universally subsidized and not subject to quotas.

A Distributional Analysis of Subsidies

As indicated in the overview to this book, all country case studies use the microsimulation model SUBSIM to provide a distributional analysis of subsidies and simulations of alternative subsidy reforms. The publicly available version of SUBSIM comes in two flavors, SUBSIM direct, which estimates direct effects

Table 2.3 Food unit prices and subsidies, in US\$ at PPP (2014)

		Price	Subs.	Subs. (%)	Increase (%)	Price	Subs.	Subs. (%)	Increase (%)
		<i>Flour</i> (kg)				<i>Bread</i> (kg)			
Djibouti		0.759	0.053	6.5	7.0	n.a.	n.a.	n.a.	n.a.
Iran, Islamic Rep.		0.689	1.027	59.9	149.2	1.199	1.346	52.9	112.2
Libya		0.130	1.360	91.3	1044.4	0.054	1.334	96.1	2491.9
Morocco						n.a.	n.a.	n.a.	n.a.
	<i>Flour1</i>	1.197	0.168	12.3	14.0%				
	<i>Flour2</i>	0.479	0.342	41.7	71.5%				
		<i>Sugar</i> (kg)				<i>Vegetable oil</i> (L)			
Djibouti		0.865	0.061	6.5	7.0	1.422	0.171	10.7	12.0
Iran, Islamic Rep.		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Libya		0.362	1.545	81.0	427.2	0.868	4.054	82.4	467.0
Morocco						n.a.	n.a.	n.a.	n.a.
	<i>Sugar1</i>	1.393	0.682	32.9	49.0				
	<i>Sugar2</i>	1.393	0.682	32.9	49.0				
	<i>Sugar3</i>	1.077	0.682	38.8	63.3				

Source World Bank estimations from Household Budget Survey

Note Subsidized flour and sugar in Morocco have different prices depending on varieties and forms; kg = kilogram; PPP = purchasing power parity

using Household Budget Survey (HBS) data only, and SUBSIM indirect, which uses HBS data and input-output matrixes to estimate direct and indirect effects.

This chapter uses a third version of SUBSIM, which is not yet publicly available and which is designed to provide comparative analyses of subsidies across countries. This version is similar to the SUBSIM direct version in that it automatically provides a set of results in Excel tables and graphs that can be readily used for analysis. The difference is that this version provides results for individual products across countries instead of results for individual countries across products. As part of the distributional analysis, we look first at the importance of subsidies and subsidized products for households. We then determine who are the main beneficiaries of subsidies, as well as the potential dilemmas for reforming subsidies.

When we talk about the importance of subsidized products, we should distinguish between *absolute* and *relative* importance. For absolute importance, we refer to the monetary values of subsidies or subsidized products in USD at PPP values. For relative importance, we refer to subsidies or subsidized products as a share of total household expenditure.

The Absolute Importance and Distribution of Subsidies

Table 2.4 compares the per capita expenditure of the four main energy and food products considered across countries in US\$-PPP values. Looking at energy products and on average, households spend \$19.7 per capita, per year on LPG, \$85.5 on electricity, \$54.2 on gasoline, and \$9.5 on diesel. These amounts vary widely across countries. For example, Moroccans spend (in PPP values) the largest amount on LPG, electricity, and diesel. Libya has the lowest expenditure for electricity and one of the lowest for gasoline and diesel. As expected, because Libya has high subsidies and Morocco has low subsidies, it is clear that expenditures for crude oil products are partly driven by the level of subsidies. But other factors must be considered, including the desirability of these products and the exchange rate used in PPP values.

Subsidies on food are much less widespread in terms of countries and products. Libya has the largest variety of food subsidies, and a few other countries subsidize flour, bread, sugar, or vegetable oil, which are the four products that we analyze across countries. The largest subsidies go to flour and bread. The distinction between flour and bread is not always clear cut in the data. Some countries subsidize the price of flour for mills and then impose regulated prices on the sale of bread. What we observe in expenditure data are direct purchases of flour or bread on the part of households. Therefore, we need to estimate the flour subsidies received by households via the purchase of bread using conversion factors between these two products. As a consequence, the estimates on bread and flour should be taken with some caution. Sugar is also an important subsidized item in three countries, and vegetable oil remains subsidized in two countries.

The results on the distribution of subsidies across quintiles are very different depending on the product and the country (Fig. 2.1). Consider LPG first. In one country, the Islamic Republic of Iran, subsidies on LPG are progressive, meaning that poorer households get the largest dollar amounts of subsidies. But for all the other countries, subsidies on LPG are clearly regressive, as richer households get

Table 2.4 Per capita expenditure on subsidized products, in US\$ at PPP/year

	Energy				Food			
	LPG	Electricity	Gasoline	Diesel	Flour	Bread	Sugar	Vegetable oil
Djibouti	1.8	95.1	36.9	n.a.	35.8	n.a.	51	29.2
Iran, Islamic Rep	10.6	83	102.8	0.6	12.6	163.7	n.a.	n.a.
Libya	4.4	26.4	26.8	0.5	9	30.1	17.9	46.6
Morocco	42.6	114.9	19.9	26.6	56.7	n.a.	26.8	n.a.
Tunisia	38.9	108.1	84.7	10.3	n.a.	n.a.	n.a.	n.a.
Average across countries	19.7	85.5	54.2	9.5	28.5	96.9	31.9	37.9

Source World Bank estimations from household budget surveys

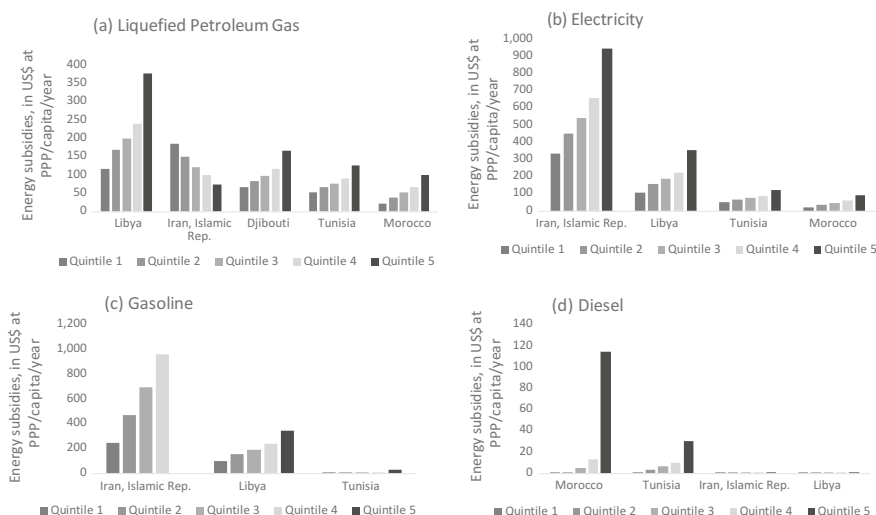


Fig. 2.1 Distribution of energy subsidies, in US\$ at PPP/capita/year. *Source* World Bank estimations from household budget surveys

the largest amounts. Subsidies for LPG vary between a few dollars for the poorest quintile in Morocco to almost \$400 for the rich in Libya. These amounts are significant, particularly for the poorest countries. However, we should not take for granted that subsidies on LPG are always prorich, as shown for the Islamic Republic of Iran.

Electricity subsidies are the most important in dollar amounts and exceptionally important in the Islamic Republic of Iran, where subsidies can reach up to \$1,000-PPP per capita, per year for the richest quintile. Subsidies are less important in other countries but still nonnegligible, varying between a few dollars and more than \$300-PPP per capita, per year. In the case of electricity, subsidies invariably favor the rich in absolute terms, as the largest amounts in dollar equivalents are taken up by the richest quintiles with no exceptions across countries. Clearly, oil-producing countries are those that offer the largest subsidies via electricity, probably because the need to produce electricity with cheaper fuels is less of a priority.

Also in the case of gasoline and diesel, subsidies are invariably prorich, with the largest dollar amounts taken up by the richest. The dollar amounts of these two products are relevant only in a few countries—the Islamic Republic of Iran and Libya for gasoline—that are either oil producers or endowed with natural resources. In these countries and for these products, it is evident that the dollar amounts across the distribution increase quickly as we move toward richer households, showing that the regressivity of these subsidies is steep and consistent across countries. Diesel is important only in Morocco and Tunisia and only for the top quintile.

The variety and amounts of food subsidies are much smaller than energy subsidies (Fig. 2.2). They are below \$40-PPP for flour and oil and below \$20-PPP for

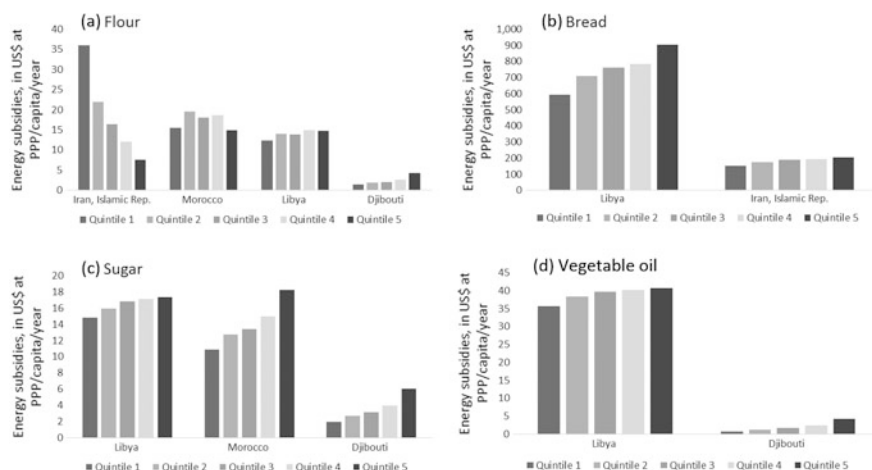


Fig. 2.2 Distribution of food subsidies, in US\$ at PPP/capita/year. *Source* World Bank estimations from household budget surveys

sugar. The only significant subsidies are for bread in Libya and the Islamic Republic of Iran where the amounts can reach \$900-PPP and \$200-PPP, respectively, for the richest quintile, and the pattern is regressive. In general, larger subsidies accrue to richer quintiles with monotonic increases across quintiles. This pattern holds for sugar, bread, and oil for all countries and for flour in Libya and Djibouti, but not for Morocco and the Islamic Republic of Iran, where for flour subsidies are larger for poorer quintiles. Therefore, exceptions to the prorichness of subsidies may exist also for food products.

The Relative Importance and Distribution of Subsidies

Figure 2.3 illustrates the share of expenditure on total expenditure for the four energy products by country and by quintile. Starting with LPG, we see that Morocco and Tunisia have the highest shares of expenditure on LPG. These countries spend more in relative terms but less in absolute terms as shown in Fig. 2.1. We can also see that these shares decrease as we move toward richer quintiles. The richest quintile in the Islamic Republic of Iran spends less than 0.1% of total expenditure on LPG. The shares in other countries are lower than 0.5% for all quintiles. With the only exception of Djibouti, the share of expenditure on LPG decreases with richer quintiles.

The situation is rather different for electricity. We can see that the share of expenditure in Morocco is the highest for the third quintile whereas it decreases from the poorest to the richest quintiles for all other countries. This result depends on the type of tariff system in place and on the coverage of electricity. The countries

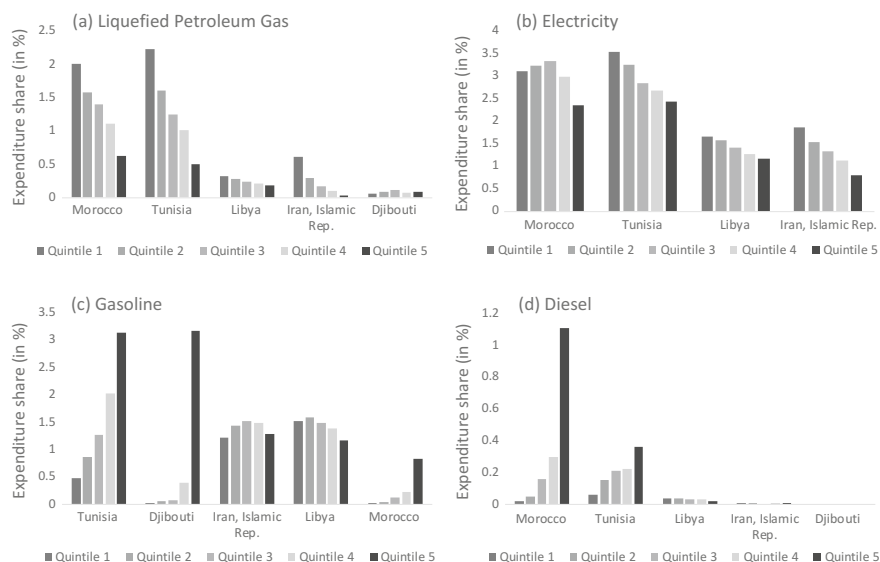


Fig. 2.3 Expenditure shares of subsidized energy products across countries and quintiles. *Source* World Bank estimations from household budget surveys

that show regular decreasing shares across the distribution tend to have almost universal coverage of electricity and mild progressive pricing, whereby higher blocks of consumption correspond to higher prices applied only to the marginal quantities. In Morocco the hump-shaped distribution could be due to the particular combination of increasing block tariffs (IBT) and volume differentiated tariffs (VDT) tariffs¹ and the size of the interblocks price increases. For electricity, therefore, it would be wrong to assume that the share of household expenditure is invariably more important for the poor, particularly because the poor benefit from very low tariffs.

For gasoline and diesel the distributional picture is fairly consistent, but opposite to LPG. Gasoline and diesel are disproportionately consumed by richer households. In Morocco car ownership is concentrated among richer households, and the consumption of these products among poorer households is confined to small quantities used for motorcycles or nontransport purposes. We see the shares of household expenditure on gasoline and diesel growing with richer quintiles as shown in Fig. 2.1 for almost all countries. The exceptions for gasoline are Libya

¹IBT = increasing block tariffs, which means that consumers pay the marginal price on marginal quantities, for example, \$0.10 on the first 100 kWh of electricity consumed, \$0.15 cents on the consumption between 101 and 200 kWh, and so forth. VDT = volume differentiated tariffs, which means that consumers pay the marginal price on all quantities consumed, for example, \$0.10 if they consume less or equal to 100 kWh of electricity consumed, \$0.15 on all quantities consumed if they fall in the consumption block 101–200, and so forth

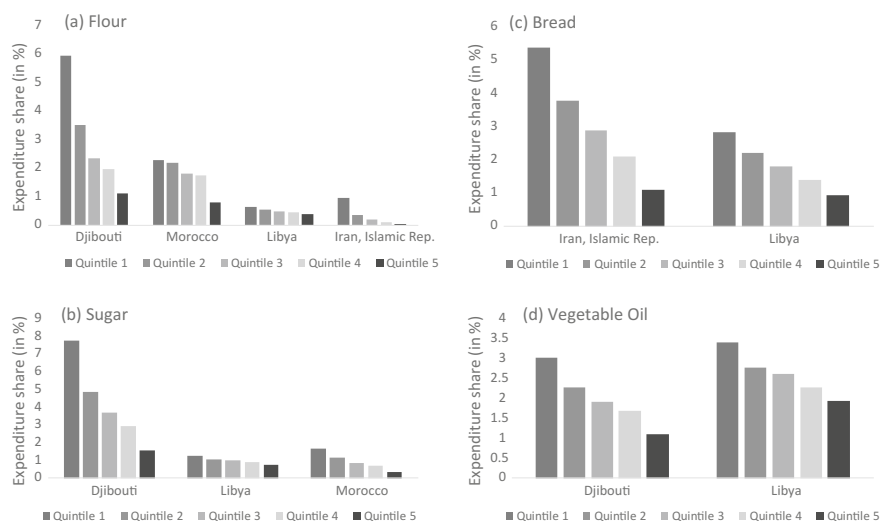


Fig. 2.4 Expenditure shares of subsidized food products across countries and quintiles. *Source* World Bank estimations from household budget surveys

and the Islamic Republic of Iran, two oil-producing countries where subsidies are high, public transport is limited, and the use of private transport is almost universal. Indeed, we can see that the distribution in these two countries are hump-shaped, with the largest expenditure relative to total expenditure borne by the middle class.

The consumption of diesel is much smaller in all countries, and in Djibouti the Islamic Republic of Iran, and Libya is negligible. These are the countries where diesel cars are scarcely available or not permitted. In countries that do consume some amounts of diesel, the share of expenditure invariably grows with richer quintiles.

For food products (Fig. 2.4), the situation is much simpler. For all products and in all countries, the household budget shares of expenditure on subsidized products is higher for poorer households and progressively lower for richer households, as we should expect. The decrease between quintiles is also very steep in general, particularly for flour and sugar in Djibouti and bread in the Islamic Republic of Iran. These products are evidently very important for the poor in these countries, representing up to 8% of total expenditure for the poorest quintile.

A Policy Dilemma

It should be clear by now that there is a certain trade-off between the share of expenditure on subsidized products in total household expenditure and the dollar amounts of subsidies received. To illustrate this trade-off, Fig. 2.5 plots these two dimensions across population percentiles for LPG in different countries. For most

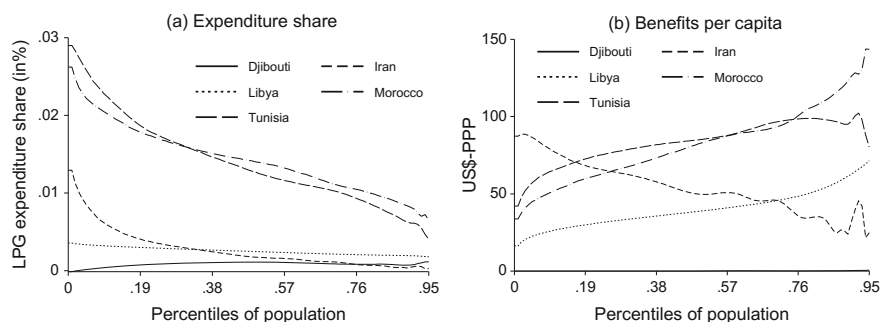


Fig. 2.5 Expenditure shares of LPG versus subsidies per capita. *Source* World Bank estimations from household budget surveys

countries, the curves are negatively sloped for the expenditure shares, meaning that poorer households spend a larger share of total expenditure on subsidized products than richer households (Fig. 2.5, panel a). Also in most countries, richer households receive larger amounts of subsidies in per-capita terms (Fig. 2.5, panel b). This rule is not, however, always true. For example, the data for LPG in the Islamic Republic of Iran show a negative slope in both graphs, demonstrating not only that this product is more important for poorer households but also that these households receive a larger amount per capita in subsidies than richer households. This is less evident for food products, such as flour (Fig. 2.6). We can see that although the share of expenditure is higher for poorer households as for energy products, the subsidies per capita are more pro-poor, particularly in the Islamic Republic of Iran. In Djibouti, however, subsidies on flour are prorich.

For most countries, this trade-off creates a dilemma. On the one hand, that subsidies are prorich would clearly speak in favor of eliminating subsidies with little consequences on welfare. On the other hand, these subsidized products can be relatively more important for the poor, even if subsidies are in place. The elimination of these subsidies would be felt more by the poor than by the rich with a

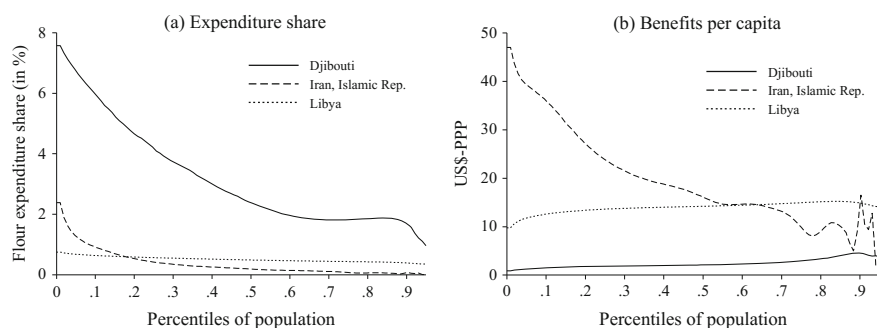


Fig. 2.6 Expenditure shares of flour versus subsidies per capita. *Source* World Bank estimations from household budget surveys

likely effect on poverty. As we saw, the trade-off does not necessarily apply to all countries; instead, it varies across products, and the size of the trade-off may be different across products and countries.

We should also note the structural relation between the values on the y-axes of the two panels in Fig. 2.5. Let p = unit free market price, s = unit subsidies, q = quantities, and y = total income. The y-axis of the panel a is then $(pq-sq)/y$ and the y-axis of panel b is sq . Income and quantities being equal, the higher the unit subsidy, the lower the expenditure share. Subsidies and quantities being equal, the higher is income, the lower is the share of expenditure. Because the unit market price and subsidy are set by the government and equal for all, the shape of the lines largely depend on the distribution of incomes in each country. Therefore, **knowledge of the household income or expenditure distribution is an essential prerequisite to prepare subsidies reforms.**

Simulations of Subsidies Reforms

In order to simulate comparable reforms across countries, we consider a flat reduction of unit subsidies by 30% across all products and all countries. We measure the impact of these reforms on household welfare, inequality, and the government budget in this order. We also consider the cost for the government of compensating the population to reach the prereform level of welfare. The implied changes in prices of the proposed simulations are large for most countries and products, which makes the standard linear approach to subsidies simulations inappropriate. We therefore model the demand function using Cobb-Douglas preferences.²

Welfare

Figures 2.7 and 2.8 show the impact on household welfare (measured in terms of household expenditure per capita). For each product in the figures we have two panels. The top panel illustrates the welfare impact in annual per capita US\$-PPP terms. The bottom panel illustrates the welfare impact in terms of share of total household expenditure. Therefore, the top part of the figures is the absolute welfare effect, and the bottom part is the relative welfare effect.

For LPG, the greatest impact of this reform would be in Morocco, with a per capita impact per year of about \$20-PPP on average. The smallest impact is in Djibouti, the poorest of the countries considered. It is also instructive to see that the distributions of these impacts can be regressive or progressive depending on the country. In the Islamic Republic of Iran, the impact is regressive all along the

²See www.subsim.org for more details on the SUBSIM model and its use.

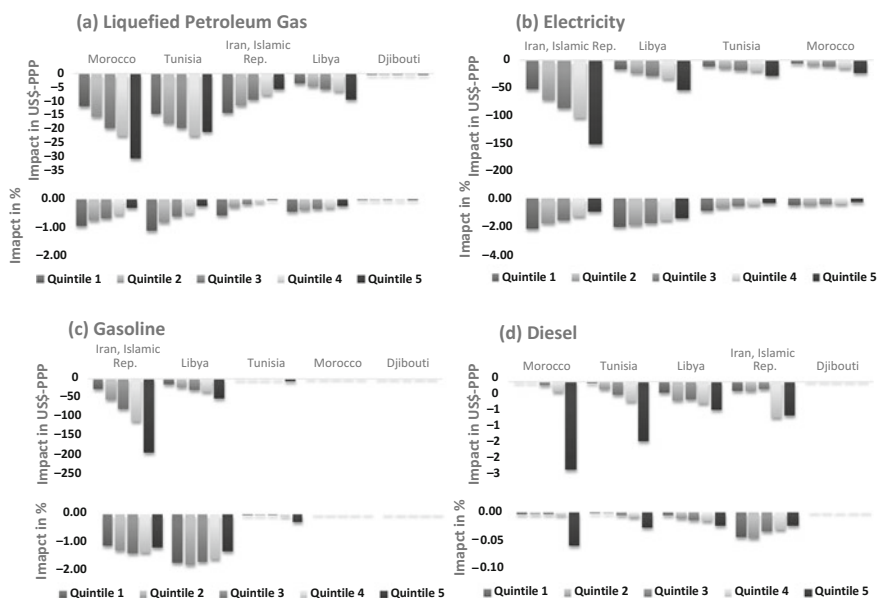


Fig. 2.7 Welfare impact of a 30% reduction in energy subsidies, in US\$-PPP/capita/year. *Source* World Bank estimations from household budget surveys

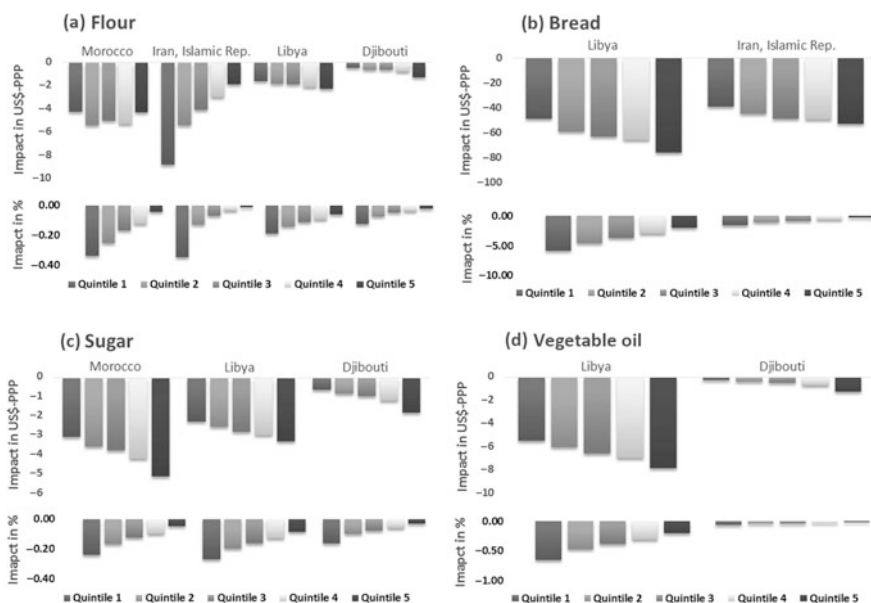


Fig. 2.8 Welfare impact of a 30% reduction in food subsidies, US\$-PPP/capita/year. *Source* World Bank estimations from household budget surveys

distribution, with the highest per capita impact for the poorest quintile and the lowest impact for the richest quintile whereas they are progressive in all other countries. As these are dollar values, it is evident that the relative impact on household welfare is much greater for the poor than for the rich, as can be seen in the bottom part of the LPG figure, where it is clear that the welfare impact in terms of share of total expenditure is regressive in all countries.

For electricity, the welfare impact is quite large in all countries, with the Islamic Republic of Iran having by far the highest impact followed by Libya. In the Islamic Republic of Iran, the impact on the richest quintile is very high, about \$150-PPP per person, per year. But because the richest quintiles are affected the most in absolute terms, this impact is progressive in all countries. This result is due to the tariff systems in place, which typically include low tariffs for the first or the first two tariffs' blocks and high tariffs for the last block. As the relation between electricity consumption and household welfare is quite linear in most countries, households in the richer quintiles are also the largest consumers of electricity. This finding is apparent in the difference between the bars for the fourth and fifth quintiles. As for LPG, the welfare impact is progressive in absolute terms, but regressive in relative terms (relatively to total expenditure). As shown in the lower part of the electricity figure, in all countries, the relative welfare impact is regressive.

Welfare impacts are also high for gasoline, especially for the oil-producing countries of Libya and the Islamic Republic of Iran. The average cost for households in the richest quintile in the Islamic Republic of Iran is about \$200-PPP, a large amount even for a country that is the richest among those considered. For all countries, the welfare impacts are progressive because the poor do not own means of transport and therefore do not consume gasoline. The impacts on household welfare of diesel's reforms are very small as compared to the impact of other products. They are around \$1-PPP per person, per year. Also for diesel, the impact is progressive in all countries considered. Contrary to LPG and electricity, the relative welfare impact is not necessarily regressive but mostly progressive or hump-shaped.

Figure 2.8 shows the welfare impact for food items. The relative welfare impact is unambiguously regressive for all products and countries. The absolute welfare impact can be progressive or regressive for flour, but is always progressive for

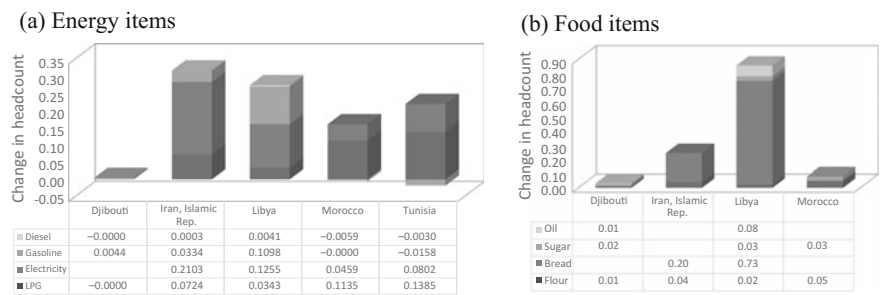


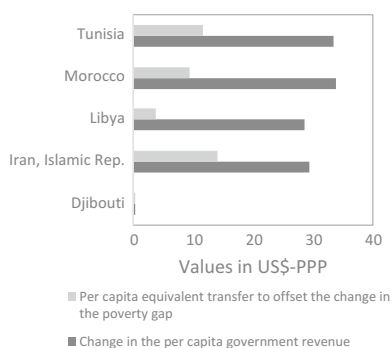
Fig. 2.9 Inequality impacts of a 30% reduction in subsidies. *Source* World Bank estimations from household budget surveys

bread, sugar, and oil. The largest impacts are observed for bread in Libya with close to \$80-PPP per person, per year for the richest quintile.

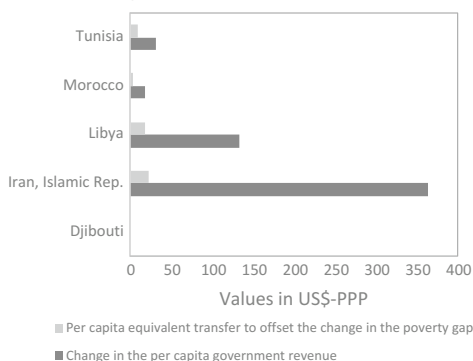
Inequality

A reduction in subsidies implies a loss in welfare, but changes in inequality (measured in terms of changes of household expenditure per capita) can go in any direction depending on the distribution of expenditure and on the parts of the population that are most affected by the reforms. As is apparent in Fig. 2.9, the reduction in subsidies for energy products does not make much difference for inequality in any of the countries considered, with a maximum impact observed in the Islamic Republic of Iran for only one-third of one percentage point. These changes can also be positive or negative depending on the country, although it is clear that the changes are too small to be significant. The greatest increase in

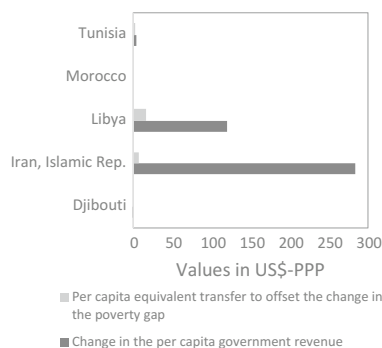
(a) Liquefied petroleum gas



(b) Electricity



(c) Gasoline



(d) Diesel

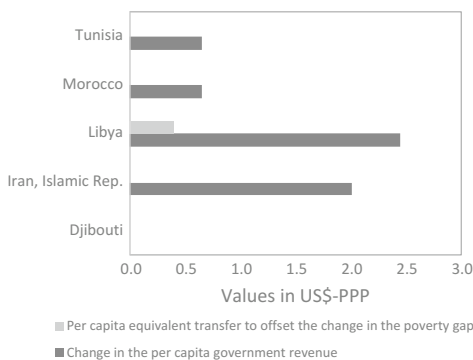


Fig. 2.10 Governments' revenue impact of a 30% reduction in subsidies on energy products, in US\$-PPP/capita/year. *Source* World Bank estimations from household budget surveys

inequality is obtained in Libya if oil, sugar, bread, and flour subsidies are cut by 30%, but even in this extreme case, inequality would increase by less than one percentage point.

Government Budget

What are the gains in budget revenues? How much is required in cash transfers to offset the increase in the poverty gap determined by the reform? Figure 2.10 shows the increase in per-capita government revenue of a 30% reduction in subsidies. The graph also shows the necessary universal transfer required to offset the change in poverty gap resulting from the reforms. This amount can be considered as the minimum universal transfer to keep the poverty gap unchanged.

Government revenues are always much larger than the universal cost of compensation to bring the poverty gap back to its prereform level. It is also possible to target compensation and reduce further the cost to the budget, but governments that implemented large reforms in recent years, such as the Islamic Republic of Iran, have not followed that route. On the other hand, governments may want to compensate some of the non-poor, particularly the middle-class, to reduce the risk of political backlash in the aftermath of the reforms. This may rise substantially the cost of compensation but Fig. 2.10 shows that the space for maneuver to compensate beyond the poverty gap is quite large. Therefore, unless compensation benefits are extremely large and universal, reforming subsidies with compensation is most likely to reduce the overall cost of subsidies substantially.

For food items, in general, we observe that the impact is relatively low for the countries with limited subsidy programs, as is the case for Djibouti and Morocco. The picture is different for Libya, where the food subsidy program is very large. In this country and with a universal transfer designed to offset the poverty gap, the increase in per capita government revenue can be large but still below the overall gains in revenues determined by the reforms.

Conclusion

This chapter has provided a comparative analysis of the distribution of subsidies across the MENA Region and a comparative analysis of the welfare and budget effects of subsidies reforms considering a 30% reduction in subsidies. We used a special version of SUBSIM designed to make comparative analyses of subsidies reforms across countries in US\$-PPP values. The purpose of the chapter was not to provide exact estimates of the impacts of reforms but to compare outcomes across countries and show how SUBSIM can be used for this purpose.

The population sample considered is large, almost 130 million people or 34% of the total population in the MENA Region in 2014. All data were actualized to 2014,

and all expenditures transformed into US\$-PPP values using the latest 2011 PPP conversion factor. The total household expenditure considered is approximately \$0.63 trillion-PPP or 3,913 US\$-PPP per capita, per year on average. The sample of countries covered includes low-income countries, low-middle-income countries and middle-income countries. The sample also includes net oil exporters as well as net oil importers.

We found that the size of subsidies does not necessarily relate to the needs of a population. In Djibouti, for example, the poorest of the countries considered in this chapter, the price of LPG is 15 times the price in the Islamic Republic of Iran, the richest country considered. Products such as LPG and electricity tend to have higher subsidies than gasoline. Food subsidies tend to be higher among net oil exporters, as the oil wealth is partly distributed to the population via food subsidies.

Subsidized products are quite important for the populations of the MENA Region. LPG can account for more than 2% of total expenditure as for the poorest quintile in Tunisia, and electricity can reach 3.5% of expenditure as for the poorest quintile in Tunisia. And products such as sugar can reach up to 8% for the poorest people in Djibouti. The importance of LPG decreases with welfare, but it increases for gasoline.

The consumption pattern of subsidized products partly explains who benefits from subsidies, and it is clear that the main beneficiaries can be very different depending on the product and country considered. For example, in the Islamic Republic of Iran, subsidies are progressive for LPG but regressive in all other countries, and electricity and gasoline subsidies are invariably regressive in that the majority of benefits in absolute terms accrue to richer households.

Comparing results on the importance of subsidized products and on the distribution of subsidies leads to an important policy dilemma. Subsidies may be very important for poor households, even though richer households receive the greatest share, which makes subsidy reforms complex from the perspective of public policies. A useful instrument to take decisions on subsidies is to compare the expenditure share curves by percentile of the expenditure distribution with the total subsidies per capita curves. Products and countries where both curves are positively sloped are the most promising for reforms because both the share of these products on household expenditure and the amount of subsidies are larger for the richer households.

Simulations of a 30% reduction in subsidies for all products showed that the welfare implications are important particularly for electricity and LPG where these reforms can reduce household welfare for the poorest quintiles by up to 2% for individual products and can reach 4–5% if we aggregate the impact for all products. Nevertheless, the impact on the poverty gap is small and the impact on inequality is negligible. Instead, the benefits to government budgets are quite large, even if countries decide to compensate households with a universal transfer that would offset the increase in the poverty gap. This result would suggest that countries have some fiscal space for compensating citizens beyond the poor.

Acknowledgements The authors are grateful to Shanta Devarajan and Mustapha Nabli for useful comments on previous versions of the chapter. All remaining errors are responsibility of the authors.

Annex 2.1

See Tables 2.5, 2.6, 2.7, 2.8, 2.9 and 2.10.

Table 2.5 Expenditure shares in energy products (percent)

	Djibouti	Iran, Islamic Rep.	Libya	Morocco	Tunisia
<i>LPG</i>					
Quintile 1	0.06	0.62	0.32	2.02	2.23
Quintile 2	0.09	0.3	0.28	1.58	1.61
Quintile 3	0.12	0.18	0.24	1.41	1.25
Quintile 4	0.08	0.1	0.21	1.12	1.02
Quintile 5	0.09	0.04	0.18	0.63	0.5
Population	0.09	0.14	0.22	1.02	0.98
<i>Electricity</i>					
Quintile 1	n.a.	1.86	1.66	3.11	3.55
Quintile 2	n.a.	1.53	1.58	3.25	3.27
Quintile 3	n.a.	1.33	1.42	3.34	2.85
Quintile 4	n.a.	1.13	1.28	2.99	2.68
Quintile 5	n.a.	0.8	1.17	2.35	2.44
Population	n.a.	1.11	1.33	2.76	2.73
<i>Gasoline</i>					
Quintile 1	0.03	1.22	1.52	0.01	0.47
Quintile 2	0.05	1.43	1.58	0.04	0.86
Quintile 3	0.08	1.52	1.49	0.12	1.27
Quintile 4	0.4	1.49	1.38	0.23	2.02
Quintile 5	3.16	1.28	1.16	0.83	3.13
Population	1.87	1.37	1.35	0.48	2.14
<i>Diesel</i>					
Quintile 1	0	0.01	0.04	0.02	0.06
Quintile 2	0	0.01	0.04	0.05	0.15
Quintile 3	0	0	0.03	0.16	0.21
Quintile 4	0	0.01	0.03	0.3	0.22
Quintile 5	0	0.01	0.02	1.11	0.36
Population	0	0.01	0.03	0.64	0.26

Source World Bank estimations from household budget surveys

Table 2.6 Expenditure shares in food (percent)

	Djibouti	Iran, Islamic Rep.	Libya	Morocco
<i>Flour</i>				
Quintile 1	5.95	0.95	0.63	2.29
Quintile 2	3.53	0.35	0.55	2.19
Quintile 3	2.35	0.19	0.48	1.81
Quintile 4	1.96	0.10	0.45	1.74
Quintile 5	1.12	0.03	0.37	0.79
Population	1.81	0.17	0.45	1.36
<i>Bread</i>				
Quintile 1	n.a.	5.4	2.85	n.a.
Quintile 2	n.a.	3.8	2.22	n.a.
Quintile 3	n.a.	2.9	1.80	n.a.
Quintile 4	n.a.	2.1	1.40	n.a.
Quintile 5	n.a.	1.1	0.94	n.a.
Population	n.a.	2.2	1.52	n.a.
<i>Sugar</i>				
Quintile 1	7.77	n.a.	1.23	1.68
Quintile 2	4.86	n.a.	1.05	1.16
Quintile 3	3.68	n.a.	0.99	0.86
Quintile 4	2.90	n.a.	0.88	0.67
Quintile 5	1.56	n.a.	0.76	0.34
Population	2.58	n.a.	0.90	0.64
<i>Oil</i>				
Quintile 1	3.02	n.a.	3.39	n.a.
Quintile 2	2.28	n.a.	2.76	n.a.
Quintile 3	1.91	n.a.	2.60	n.a.
Quintile 4	1.68	n.a.	2.28	n.a.
Quintile 5	1.10	n.a.	1.93	n.a.
Population	1.48	n.a.	2.35	n.a.

Source World Bank estimations from Household Budget Surveys

Table 2.7 Per capita subsidies in energy products, in US\$-PPP

	Djibouti	Iran, Islamic Rep.	Libya	Morocco	Tunisia
<i>LPG</i>					
Quintile 1	66.5	185.1	116	23.3	52.1
Quintile 2	83.2	149.6	169.1	39.1	66.5
Quintile 3	96.9	122	200.5	52.9	76.8
Quintile 4	115.6	99.7	240.7	67.6	91.1
Quintile 5	165.6	73.2	377.5	100.3	125.5
Population	105.6	125.9	220.8	56.6	82.4
<i>Electricity</i>					
Quintile 1	n.a.	334.15	108.3	20.78	50
Quintile 2	n.a.	449.1	157.91	34.95	63.91
Quintile 3	n.a.	542.06	187.3	47.25	73.78
Quintile 4	n.a.	656.06	224.79	60.35	87.49
Quintile 5	n.a.	946.57	352.57	89.58	120.56
Population	n.a.	585.56	206.17	50.58	79.14
<i>Gasoline</i>					
Quintile 1	0	244.63	97.34	0	0.66
Quintile 2	-0.01	469.19	155.11	0	2.07
Quintile 3	-0.02	693.17	192.81	0	4.23
Quintile 4	-0.16	963.85	238.34	0	9.45
Quintile 5	-3.65	1685.58	343.1	0	27.76
Population	-0.77	811.22	205.33	0	8.83
<i>Diesel</i>					
Quintile 1	n.a.	0.28	0.31	0.25	0.8
Quintile 2	n.a.	0.32	0.5	1.03	3.48
Quintile 3	n.a.	0.24	0.47	4.67	6.6
Quintile 4	n.a.	1.19	0.58	12.97	9.94
Quintile 5	n.a.	1.11	0.76	114.33	30.43
Population	n.a.	0.63	0.52	26.64	10.25

Source World Bank estimations from household budget surveys

Table 2.8 Per capita subsidies on food, in US\$-PPP

	Djibouti	Iran, Islamic Rep.	Libya	Morocco
<i>Flour</i>				
Quintile 1	1.5	36.0	12.3	15.5
Quintile 2	2.0	21.9	14.1	19.5
Quintile 3	2.0	16.5	13.9	18.0
Quintile 4	2.7	12.1	14.9	18.6
Quintile 5	4.3	7.6	14.8	14.9
Population	2.5	18.8	14.0	17.3
<i>Bread</i>				
Quintile 1	n.a.	152.7	594.9	n.a.
Quintile 2	n.a.	175.6	709.3	n.a.
Quintile 3	n.a.	190.9	760.4	n.a.
Quintile 4	n.a.	193.1	786.3	n.a.
Quintile 5	n.a.	205.7	903.1	n.a.
Population	n.a.	183.6	750.8	n.a.
<i>Sugar</i>				
Quintile 1	1.99	n.a.	14.9	10.9
Quintile 2	2.69	n.a.	15.9	12.7
Quintile 3	3.16	n.a.	16.8	13.4
Quintile 4	3.96	n.a.	17.1	15.0
Quintile 5	6.04	n.a.	17.3	18.2
Population	3.57	n.a.	16.4	14.0
<i>Oil</i>				
Quintile 1	0.77	n.a.	35.7	n.a.
Quintile 2	1.26	n.a.	38.4	n.a.
Quintile 3	1.64	n.a.	39.7	n.a.
Quintile 4	2.30	n.a.	40.3	n.a.
Quintile 5	4.26	n.a.	40.7	n.a.
Population	2.05	n.a.	39.0	n.a.

Source World Bank estimations from Household Budget Surveys

Table 2.9 Impact on welfare of 30% reductions in subsidies on energy products, in US\$-PPP/capita

	Djibouti	Iran, Islamic Rep.	Libya	Morocco	Tunisia
<i>LPG</i>					
Quintile 1	0	-14.1	-3.6	-11.8	-14.5
Quintile 2	0	-11.5	-4.7	-15.5	-18
Quintile 3	0	-9.4	-5.5	-19.5	-19.6
Quintile 4	0	-7.7	-6.5	-22.2	-22.3
Quintile 5	-0.1	-5.6	-9.3	-30.5	-20.9
Population	-0.1	-9.7	-5.9	-19.9	-19.1
<i>Electricity</i>					
Quintile 1	n.a.	-52.6	-16.3	-5.3	-10.9
Quintile 2	n.a.	-71.2	-23.9	-8.7	-14.6
Quintile 3	n.a.	-86	-28.4	-11.8	-17.1
Quintile 4	n.a.	-104.1	-34.2	-15.1	-20.3
Quintile 5	n.a.	-151.1	-53.7	-22.9	-27.6
Population	n.a.	-93	-31.3	-12.8	-18.1
<i>Gasoline</i>					
Quintile 1	0	-27.7	-14.3	0	-0.2
Quintile 2	0	-53.3	-22.8	0	-0.6
Quintile 3	0	-78.9	-28.4	0	-1.2
Quintile 4	0	-109.8	-35.2	0	-2.7
Quintile 5	1.1	-192.8	-50.7	0	-7.9
Population	0.2	-92.5	-30.3	0	-2.5
<i>Diesel</i>					
Quintile 1	n.a.	-0.27	-0.35	-0.01	-0.05
Quintile 2	n.a.	-0.29	-0.57	-0.02	-0.21
Quintile 3	n.a.	-0.22	-0.54	-0.11	-0.4
Quintile 4	n.a.	-1.12	-0.67	-0.31	-0.61
Quintile 5	n.a.	-1.06	-0.87	-2.74	-1.86
Population	n.a.	-0.59	-0.6	-0.64	-0.63

Source World Bank estimations from household budget surveys

Table 2.10 Impact on welfare of 30% reductions in subsidies on food products, in US\$-PPP/capita

	Djibouti	Iran, Islamic Rep.	Libya	Morocco
<i>Flour</i>				
Quintile 1	-0.5	-8.8	-1.6	-4.2
Quintile 2	-0.6	-5.4	-1.8	-5.4
Quintile 3	-0.6	-4.0	-1.9	-5.0
Quintile 4	-0.8	-3.0	-2.1	-5.2
Quintile 5	-1.3	-1.9	-2.3	-4.3
Population	-0.7	-4.6	-1.9	-4.8
<i>Bread</i>				
Quintile 1	n.a.	-39.0	-49.0	n.a.
Quintile 2	n.a.	-45.1	-59.0	n.a.
Quintile 3	n.a.	-49.1	-63.6	n.a.
Quintile 4	n.a.	-49.7	-66.1	n.a.
Quintile 5	n.a.	-53.1	-76.4	n.a.
Population	n.a.	-47.2	-62.8	n.a.
<i>Sugar</i>				
Quintile 1	-0.6	n.a.	-2.3	-3.0
Quintile 2	-0.8	n.a.	-2.5	-3.5
Quintile 3	-0.9	n.a.	-2.8	-3.7
Quintile 4	-1.2	n.a.	-2.9	-4.2
Quintile 5	-1.8	n.a.	-3.3	-5.1
Population	-1.1	n.a.	-2.7	-3.9
<i>Oil</i>				
Quintile 1	-0.2	n.a.	-5.5	n.a.
Quintile 2	-0.4	n.a.	-6.0	n.a.
Quintile 3	-0.5	n.a.	-6.6	n.a.
Quintile 4	-0.7	n.a.	-7.0	n.a.
Quintile 5	-1.3	n.a.	-7.8	n.a.
Population	-0.6	n.a.	-6.6	n.a.

Source World Bank estimations from household budget surveys

Annex 2.2

See Tables [2.11](#) and [2.12](#).

Table 2.11 International monetary fund macrodata

Country	Subject descriptor	Units	Scale	2006	2007	2008	2009	2010	2011	2012	2013	2014
Djibouti	GDP per capita constant prices	National currency	Units	108,169.33	110,567.48	113,800.2	116,269.69	117,047.07	118,946.39	121,307.84	123,904.68	127,752.04
	Inflation end of period consumer prices	Index		116.765	126.303	137.985	140.974	144.918	155.96	159.9	161.7	165.4
	Population	Persons	Millions	0.753	0.774	0.796	0.818	0.841	0.865	0.889	0.914	0.939
Iran, Islamic Rep.	GDP per capita constant prices	National currency	Units	25,057,736	26,360,340	26,426,030	26,651,480	27,983,292	28,773,649	26,584,071	25,743,492	25,787,180
	Inflation end of period consumer prices	Index		48	58.8	69.2	76.5	91.6	110.4	155.885	186.579	223.894
	Population	Persons	Millions	70.496	71.278	72.18	73.201	74.339	75.15	76	76.978	77.969
Libya	GDP per capita constant prices	National currency	Units	7358.255	7696.338	7774.212	7599.614	7864.235	3037.559	6120.156	5464.247	4963.839
	Inflation end of period consumer prices	Index		106.629	114.713	125.871	126.284	130.483	165.252	159.18	161.894	174.012
	Population	Persons	Millions	5.686	5.782	5.877	5.964	6.053	5.943	6.032	6.122	6.213

(continued)

Table 2.11 (continued)

Country	Subject descriptor	Units	Scale	2006	2007	2008	2009	2010	2011	2012	2013	2014
Morocco	GDP per capita constant prices	National currency	Units	17,680.617	17,961.779	18,760.908	19,443.461	19,938.567	20,714.095	21,053.161	21,787.614	22,416.684
	Inflation end of period of consumer prices	Index		101.6	103.618	108	106.3	108.6	109.6	112.446	112.869	115.691
	Population	Persons	Millions	30.506	30.841	31.177	31.514	31.851	32.187	32.522	32.853	33.179
Tunisia	GDP per capita constant prices	National currency	Units	4367.983	4597.276	4756.819	4852.745	4943.176	4789.873	4914.562	4982.483	5066.098
	Inflation end of period of consumer prices	Index		105.331	110.73	115.182	119.882	124.691	129.876	137.603	145.923	153.713
	Population	Persons	Millions	10.128	10.225	10.329	10.44	10.547	10.674	10.778	10.918	11.06

Source IMF world economic outlook database April 2014

Table 2.12 Macrodata, prices, and subsidies in local currency (2014)

Country	Year	Macrodata ^a			US\$- PPP ^b	Price and subsidies in local currencies					
		Inflation	Population growth	GDP		LPG (13 kg)		Gasoline (1 L)		Diesel (1 L)	
Djibouti	2012	3.40%	5.60%	5.30%	104.104	Price	2948.4	Price	315	Price	215
Iran, Islamic Rep.	2013	20.00%	1.30%	0.20%	8,565,406	Subsidy	294.8	Subsidy	-6.3	Subsidy	26,875
Libya	2008	38.20%	5.70%	-36.10%	0.691		83,214.8		20,000		19,500
Morocco	2007	7.10%	6.40%	19.50%	4.178	Price	16,643	Price	4000	Price	3500
Tunisia	2010	23.30%	4.90%	2.50%	0.753	Subsidy	2	Subsidy	1.072	Subsidy	1.11
							18.9		12.8		0.8
							86.5		1.856		0.334
							7.4		0.186		

^aIMF World Economic Outlook Database, April 2014, and *WDI*^bUpdated to 2013 by the World Bank

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Author Biographies

Abdelkrim Araar received his Ph.D. in economics from Laval University in 1998. He is a World Bank consultant and a resource member at the Partnership for Economic Policy (PEP) network. Abdelkrim has been involved in designing and conducting training activities, developing training material, and conducting fundamental research. He has provided theoretical and technical supports to many researchers, especially those in developing countries. He is the coauthor, with Paolo Verme, of the Stata SUBSIM package. Also he is the coauthor, with Jean-Yves Duclos, of the book *Poverty and Equity: Measurement, Policy and Estimation with DAD*, the DASP Stata package, and DAD software.

Paolo Verme is a senior economist at the World Bank. A Ph.D. graduate of the London School of Economics, he was a visiting professor at Bocconi University in Milan (2004–09) and at the University of Turin (2003–10) before joining the World Bank in 2010. For almost two decades, he has served as adviser and project manager for multilateral organizations, private companies, and governments on labor market, welfare, and social protection policies. His research is widely published in international journals, books, and reports, and he has worked extensively on subsidies in the MENA Region and elsewhere. He is the coauthor of the subsidies simulation model SUBSIM (www.subsim.org).

The Quest for Subsidy Reforms in the Middle East and
North Africa Region

A Microsimulation Approach to Policy Making

Verme, P.; Araar, A. (Eds.)

2017, XLIII, 325 p. 90 illus., Hardcover

ISBN: 978-3-319-52925-7