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FOOD POLICY
REPORT

BEYOND THE ARAB AWAKENING

Policies and Investments for Poverty Reduction and Food Security

Clemens Breisinger, Olivier Ecker, Perrihan Al-Riffai, and Bingxin Yu

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International Food Policy Research Institute
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Acronyms and Abbreviations

AHDR	Arab Human Development Report
Arab-TI	Arab League Countries plus Turkey and Iran
FS	Food secure
FSC	Food-security challenged
GDP	Gross domestic product
GMM	Generalized methods-of-moments estimator
LMIC	Low- to middle-income country
MDG	Millennium Development Goal
MENA	Middle East and North Africa
NENA	Near East and North Africa
SPEED	Statistics of Public Expenditure for Economic Development
UAE	United Arab Emirates
WDI	World Development Indicators

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Executive Summary

This report aims to inform and stimulate the debate on key policy priorities for poverty reduction and food security in light of the Arab Awakening. Its findings are based on an innovative combination of datasets and rigorous economic analysis. Results suggest that poverty and income inequality in the Arab world are likely higher than official numbers have long suggested. Given that poverty indicators seem to be misleading for many countries in the region, the report introduces a new welfare measure reflecting food insecurity risks at both national and household levels to classify Arab countries into five risk groups. Regression analyses further show that, unlike in the rest of the world, manufacturing- and service sector–led growth, rather than agriculture-led growth, is most pro-poor in Arab countries. In addition, high levels of public spending in the Arab world do not do as much to stimulate growth as in other world regions, particularly in the case of education.

Three key policy recommendations emerge from this report: (1) improve data and capacity as the basis for evidence-based decisionmaking, (2) foster growth that enhances food security at national and household levels, and (3) significantly enhance the efficiency and retool the allocation of public spending. More generally, the report argues that the region urgently needs national dialogues about societies' joint vision and economic development strategies. Successful design and implementation of these strategies will require visionary leadership, sound laws and institutions, politicians who are accountable and listen to the voices of the people, and civil society that is patient and accepts the tenets of democracy. The Arab world is awake—it is time to move forward.

From Arab Awakening to Poverty Reduction and Food Security

The self-immolation of a young Tunisian man on December 17, 2010, sparked a wave of protests. This is widely regarded as the beginning of the historic changes still rippling through the Arab world. While this event has been the catalyst for unprecedented uprisings and led to the "Arab Awakening" and "Arab Spring," it is clear that the causes of unrest run deep and have accumulated over time. Several sources identify the causes of the uprisings as a lack of political democracy, freedom, and justice combined with crony capitalism and elitism that channeled economic progress into the hands of a select few (Shafik 2011; Nabli 2011; Galal 2011; *The Economist* 2011a). This political explanation is supported by the low and in some cases deteriorating rankings of many Arab countries in major governance indicators such as control of corruption, government effectiveness, and quality of public services (World Bank 2011b). Economists have attributed this regional movement to people's dissatisfaction with their standard of living, high unemployment, and growing inequalities. In Egypt, Jordan, Lebanon, Morocco, Syria, and Tunisia, for example, less than half of the working-age youth population is employed (Abdih 2011; Clark 2011). Food security has deteriorated in most countries in the region as a result of the global food price crises in 2007/08 and 2010/11 (Breisinger, Collion, et al. 2011; IMF 2011b). Sociologists have described the uprisings as an "existential" expression, a movement to reclaim Arab identity, dignity, and voice (Friedman 2011). In fact, many protesters have carried banners bearing the word *dignity*.

The Arab Awakening has most directly affected Bahrain, Egypt, Libya, Syria, Tunisia, and Yemen. However, it may also provide new impetus for change in other Arab countries. The Awakening presents great opportunities because many governments are in learning mode (Nabli 2011). But with the opportunities come significant challenges for governments and civil society. Countries in transition will likely see a sharp slowdown in economic growth and a related rise in unemployment in the short run. In addition, political fluidity, coupled with rising food and fuel prices,[1] has led to widespread increases in fuel and food subsidies, public sector wages, and other government welfare spending (EIU 2011; IMF 2011b). As a result, oil-importing countries in particular face growing budget gaps, with their fiscal deficits expected to reach approximately 8 percent of gross domestic product (GDP) in 2011 (IMF 2011b; *The Economist* 2011b). Inflation for both oil-exporting and oil-importing countries is expected to rise above

International and regional organizations classify countries in the northern part of Africa and western part of Asia differently. The United Nations organizations include 13 countries in the "Near East and North Africa" (NENA) region, the IMF and the World Bank include 21 countries in the "Middle East and North Africa" (MENA) region, and the Arab League of States includes 22 countries, which constitute the "Arab world." This report focuses on an intersecting set of these various country groupings, including all 22 member states of the Arab League (Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates [UAE], West Bank and Gaza, and Yemen) plus Iran and Turkey. Iran is part of MENA, and Turkey is part of NENA. South Sudan is considered part of Sudan because it had not gained independence when data was collected. For the group of Arab countries plus Turkey and Iran this report uses the abbreviation "Arab-TI." Wherever the report focuses on Arab countries excluding Turkey and Iran, it refers to the "Arab" region.

its 2010 levels, and foreign exchange reserves are also expected to suffer. Tourism has been negatively affected throughout the region, especially in Tunisia and Egypt, where the drop in arrivals was close to 45 percent in the first quarter of 2011 (World Bank 2011a). Foreign direct investments have taken a hit. Remittances too have fallen, especially in countries that would usually export labor to places now in conflict.

Mastering these short-term challenges will be critical for successful transition processes. Medium- and long-term prosperity in each country will require wider participation in decisionmaking and a transparent system of checks and balances to reach agreement on a broader economic roadmap and design development strategies. Successful strategy design and implementation will demand collaboration among different strands of society, including civil society, nongovernmental organizations, and the private sector. In this process, policy research can help identify pros and cons of alternative policy options and thus support a process of evidence-based and transparent decisionmaking. However, economic and development strategy research in the Arab region has a history of lagging behind research in other regions. The number of studies from authors based in Arab countries is relatively low, as measured by the number of peer-reviewed journal articles with an author whose institutional affiliation is in an Arab country. Growth in the number of publications between 1985 and 2010 has been almost entirely driven by records from Latin America and the Caribbean, Europe and Central Asia, and East Asia and the Pacific regions, not the Middle East and North Africa (Wagstaff 2011). Keyword searches of economics research papers also reveal an under-researched Arab world (IDEAS-RePEc 2011). Searches for "MENA" or "Arab" yield 10 to 15 times fewer research papers than searches for "Africa," "Asia," or "Latin America." There are several possible explanations for this low coverage, including a general lack of demand for applied economics and development strategy research from the region's governments, limited data availability, and insufficient data quality.

Nevertheless, several institutions and authors have analyzed Arab countries' major development challenges, most of which remain highly relevant after the Arab Awakening. Many have acknowledged that for MENA countries to prosper in the 21st century they urgently need economic diversification, market liberalization, a pro-poor growth focus, a stronger role for the private sector, an increased focus on improving income disparities, a shift from subsidies to targeted income transfers, and better governance (Harrigan and El-Said 2008; World Bank 2004; UNDP 2009; IMF 2011b). Food security presents a serious challenge for the region because of high dependency on food imports, diminished capacity for generating foreign exchange to finance food imports, rising food demand driven by continued high population growth, and limited potential for agricultural growth because of severe water constraints and water resource management issues (World Bank, FAO, and IFAD 2009; IFAD 2011; Breisinger et al. 2010; Ecker et al. 2010). In addition, several reports have pointed out potential discrepancies between the perceived and actual situations in Arab countries. For example, the 2009 *Arab Human Development Report* (AHDR) notes that "the fabled oil wealth of the Arab countries presents a misleading picture of their economic situation, one that masks the structural weaknesses of many Arab economies and the resulting insecurity of countries and citizens alike" (UNDP 2009, 9). Harrigan and El-Said (2010) were among those who predicted that if countries such as Egypt, Jordan, Morocco, and Tunisia did not reduce their youth unemployment rates—some of the highest in the world—they would likely experience "social unrest."

Expanding on these previous findings and in light of the Arab Awakening, this report aims to initiate and inform the debate on key challenges and policy options for poverty reduction and food security across the Arab region and in Turkey and Iran (Arab-TI region). The analysis underlying this report is built on a unique and innovative combination of datasets, including the World Development Indicators databank; the United Nations Statistical Division database (UNSTAT 2011); the Food and Agriculture Organization Statistics Division database (FAO 2011a); the International Food Policy Research Institute's Statistics of Public Expenditure for Economic Development; the Gallup World Poll (2011); several

reports of the Demographic and Health Surveys, Multiple Indicator Cluster Surveys, and Family Health Surveys; and primary data from socioeconomic household surveys conducted in Egypt, Syria, and Yemen. These data are used in combination for comparative statistics and cross-country regressions, which are the main analytical tools. In addition, the report draws on secondary literature to support and expand the original findings from the analyses, especially in the policy recommendations. It must be noted upfront that the regional nature of this report and some of the analytical tools used unavoidably lead to generalizations. However, the report strives to go beyond the regional level to point out important differences among countries. It organizes many data tables using a new Arab country typology and incorporates specific country-level results whenever possible.

The report has three sections. "Rethinking Development Progress" investigates perceived discrepancies between the data and people's actual living conditions. It does so by using alternative data sources to analyze development outcomes and then presenting a new typology of Arab-TI countries (Arab League countries plus Turkey and Iran—see note on page 1), which groups countries according to their food insecurity risk. "Analyzing the Impact of Economic Growth and Public Spending" assesses how much growth has translated into poverty reduction and how investments have translated into growth and social outcomes. "Summary and Policy Recommendations" highlights the major findings and identifies three strategic priority areas for urgent policy action beyond the Arab Awakening.

Rethinking Development Progress

Performance according to Millennium Development Goals

Millennium Development Goal 1: An Income-Based Indicator

Official poverty rates in most Arab-TI countries are lower than in many Asian and Latin American countries. Applying the $1.25-a-day poverty line, which is used to measure progress toward the first Millennium Development Goal (MDG), extreme poverty affects less than 5 percent of the population in all Arab-TI countries except Comoros, Djibouti, Mauritania, and Yemen (Table 1). Even when applying the $2-a-day poverty line, estimates suggest less than 20 percent of the total population in Arab-TI countries lives in poverty (WDI 2011).

Arab-TI countries are extremely diverse and include Qatar, the world's richest country (in terms of per capita GDP), as well as some of the world's poorest countries, including Comoros, Sudan, Mauritania, Djibouti, and Yemen. For example, the average GDP per capita in the five richest Arab-TI countries (Qatar, UAE, Kuwait, Bahrain, and Oman) is about 25 times higher than the average GDP per capita in the five poorest Arab-TI countries with recent reported data (Comoros, Mauritania, Sudan, Djibouti, and Yemen) (Table 1). The gap between the rich and poor across the Arab-TI countries becomes even more pronounced when applying global standards: the five richest Arab-TI countries are also among the richest quintile of countries globally, while Mauritania and Comoros are in the poorest quintile.

Despite the striking income inequality among Arab-TI countries, official numbers show income inequality within these countries is relatively modest. The Gini coefficient, which measures the distribution of incomes across a population, suggests that wealth is distributed fairly equally in all Arab-TI countries, indicated by Gini coefficients between 0.32 and 0.41 (Table 1). The only exception is Comoros, which has a Gini coefficient of 0.64, implying a highly unequal distribution of wealth. However, the officially reported numbers leave doubt about their reliability, especially in cases of countries with recent or ongoing uprisings. For example, Egypt ranks 19th out of 128 countries globally in income distribution equality, putting it ahead of countries like Canada, Belgium, and Switzerland, and Syria ranks 38th, above Italy and Vietnam (WDI databank 2011). These numbers appear questionable in light of the complaints raised by these countries' populations during the Arab Awakening.

Millennium Development Goals 2–8: Social Indicators

A more nuanced picture of the Arab-TI region's development progress relative to the rest of the world emerges when comparing income-based indicators with selected indicators measuring progress toward MDGs 2–8. For example, the Arab-TI region outperforms the reference group of low- and middle-income countries (LMICs)[2] when measuring the incidence of poverty at $1.25-a-day. Arab-TI countries' poverty rate is about 4 percent compared with 25 percent in LMICs. But the difference between the Arab-TI averages and LMIC averages in non-income MDG indicators is much less pronounced than in the poverty indicator, with the exception of HIV prevalence. And there is one indicator in which Arab-TI countries considerably lag behind the LMIC average: the share of women in nonagricultural employment—a clear indication of gender inequality in job opportunities. LMIC countries have a nonagricultural labor force that is 28 percent female, compared with only 17 percent in the Arab-TI region. When Turkey and Iran are removed from the regional average, the Arab region's child mortality and professional birth-care rates worsen considerably. The high per capita GDP of several Arab-TI countries and their high-income-country status (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE) suggest a larger positive difference between the Arab-TI average and

Table 1—Overview of selected Millennium Development Goal indicators and global country ranking (latest estimates)

	Income and income distribution				MDG 1		MDG 2		MDG 3	
	GDP per capita (PPP)		Gini coefficient		Poverty headcount ratio (at $1.25 a day, PPP)		Youth literacy rate		Share of women employed in non-ag. sectors	
	const. 2005 internat. $	*Rank*		*Rank*	% of total population	*Rank*	% of people ages 15–24	*Rank*	% of non-ag. employees	*Rank*
Algeria	7,421	*89*					91.8	*99*	13.1	*120*
Bahrain	32,233	*22*					100.0	*1*	9.6	*125*
Comoros	1,074	*162*	0.64	*124*	46.1	*81*	85.3	*108*		
Djibouti	2,106	*136*	0.40	*65*	18.8	*55*			26.7	*98*
Egypt	5,151	*101*	0.32	*19*	2.0	*27*	96.8	*79*	19.0	*109*
Iran	10,496	*70*	0.38	*54*	1.5	*22*	99.5	*33*	16.1	*114*
Iraq	3,222	*122*			4.0	*34*	98.7	*55*	12.1	*122*
Jordan	5,082	*102*	0.38	*51*	0.4	*11*			15.7	*116*
Kuwait	45,539	*8*								
Lebanon	11,868	*62*					99.7	*23*		
Libya	14,985	*51*					75.6	*124*	15.8	*115*
Mauritania	1,751	*144*	0.39	*58*	21.2	*58*			35.8	*81*
Morocco	4,081	*113*	0.41	*68*	2.5	*28*			20.8	*107*
Oman	23,333	*36*					97.6	*71*	21.9	*105*
Qatar	82,978	*1*	0.41	*69*			97.8	*69*	12.5	*121*
Saudi Arabia	21,321	*41*					97.6	*73*	14.6	*117*
Somalia										
Sudan	2,007	*140*								
Syria	4,295	*109*	0.36	*38*	1.7	*24*			16.3	*113*
Tunisia	7,512	*86*	0.41	*67*	2.6	*29*	99.4	*34*	25.0	*99*
Turkey	11,209	*67*	0.40	*63*	2.7	*30*	99.5	*30*	22.4	*102*
UAE	52,435	*4*					87.4	*102*	20.1	*108*
West Bank & Gaza							96.9	*78*	17.9	*111*
Yemen	2,243	*134*	0.38	*50*	17.5	*53*			6.2	*126*
LMICs	**5,038**		**0.40**		**25.1**		**91.5**		**28.4**	
Arab-TI countries	**8,508**		**0.37**		**3.5**		**97.3**		**17.4**	
Arab countries	7,481		0.36		4.6		95.7		16.4	
No. of countries		*180*		*128*		*107*		*148*		*166*
Lowest rank		*180*		*125*		*105*		*147*		*126*

(continued)

Table 1—Overview of selected Millennium Development Goal indicators and global country ranking (continued)

	MDG 4		MDG 5		MDG 6		MDG 7		MDG 8	
	Under-five mortality rate		Births attended by skilled health staff		Prevalence of HIV		Share of people with access to improved water source		Mobile cellular subscriptions	
	per 1,000	*Rank*	% of total births	*Rank*	% of people ages 15–49	*Rank*	% of people with access	*Rank*	per 100 people	*Rank*
Algeria	32.3	*89*	95	*31*	0.1	*44*	83	*19*	94	*87*
Bahrain	12.1	*43*	99	*11*					199	*3*
Comoros	104.0	*136*	62	*71*	0.1	*44*	95	*7*	15	*191*
Djibouti	93.5	*133*	93	*39*	2.5	*23*	92	*10*	15	*192*
Egypt	21.0	*71*	79	*55*	0.1	*44*	99	*2*	67	*126*
Iran	30.9	*87*	97	*23*	0.2	*43*	93	*9*	72	*120*
Iraq	43.5	*103*	80	*54*			79	*23*	63	*133*
Jordan	25.3	*78*	99	*10*			96	*5*	101	*72*
Kuwait	9.9	*34*	100	*1*			99	*2*	107	*63*
Lebanon	12.4	*44*	98	*19*	0.1	*44*	100	*1*	36	*165*
Libya	18.5	*64*					54	*42*	78	*110*
Mauritania	117.1	*143*	61	*73*	0.7	*38*	49	*44*	66	*128*
Morocco	37.5	*99*	63	*68*	0.1	*44*	81	*21*	79	*109*
Oman	12.0	*42*	99	*15*	0.1	*44*	88	*14*	140	*23*
Qatar	10.8	*38*	100	*1*	0.1	*44*	100	*1*	175	*6*
Saudi Arabia	21.0	*71*	96	*29*			96	*6*	177	*5*
Somalia	180.0	*159*	33	*101*	0.7	*38*	30	*52*	7	*196*
Sudan	108.2	*139*	49	*85*	1.1	*34*	57	*40*	36	*164*
Syria	16.2	*55*	93	*38*			89	*13*	46	*153*
Tunisia	20.7	*70*	95	*35*	0.1	*44*	94	*8*	93	*88*
Turkey	20.3	*68*	95	*32*	0.1	*44*	99	*2*	84	*106*
UAE	7.4	*28*	100	*1*			100	*1*	232	*1*
West Bank & Gaza	29.5	*85*	99	*12*			91	*11*	30	*173*
Yemen	66.4	*118*	36	*99*			62	*35*	16	*188*
LMICs	**51.1**		**73**		**0.9**		**84**		**61**	
Arab-TI countries	**38.4**		**82**		**0.3**		**86**		**74**	
Arab countries	43.9		75		0.3		82		73	
No. of countries		*192*		*186*		*146*		*190*		*206*
Lowest rank		*164*		*111*		*44*		*52*		*206*

Source: Based on data from World Bank 2011a.
Notes: Blank cell indicates that data are not available from the World Development Indicators databank. UAE = United Arab Emirates; LMICs = low- to middle-income countries; Arab-TI = Arab League countries plus Turkey and Iran; MDG = Millennium Development Goal; PPP = purchasing power parity.

the average of all LMICs than is actually shown by MDGs 2–8 (World Bank 2011a).

As is the case with poverty, there are significant differences among Arab-TI countries in all non-income MDG indicators. While most countries report youth literacy rates of 96–100 percent, Algeria, Libya, and Comoros have youth literacy rates of only 92 percent, 76 percent, and 46 percent, respectively (Table 1). The average mortality rate of children younger than five in the Arab-TI region is about 40 child deaths per 1,000 children alive, whereas in Comoros, Sudan, Mauritania, and Somalia, every tenth child dies before reaching the age of five, placing these countries within the quintile with the highest child mortality rate globally. On average, three out of four births are attended by skilled health workers in Arab-TI countries, but only about one out of three in Somalia and Yemen. Even in Egypt and Morocco, only 79 and 63 percent of children are born with assistance from professionals. More than 80 percent of the people living in Arab-TI countries have access to improved water sources, similar to people in LMICs on average, and Egypt, Jordan, Kuwait, Lebanon, Qatar, Saudi Arabia, and UAE have access rates above 95 percent. However, less than one-third of the population in Somalia, less than half in Mauritania, and less than two-thirds in Libya, Sudan, and Yemen have access to improved water sources.

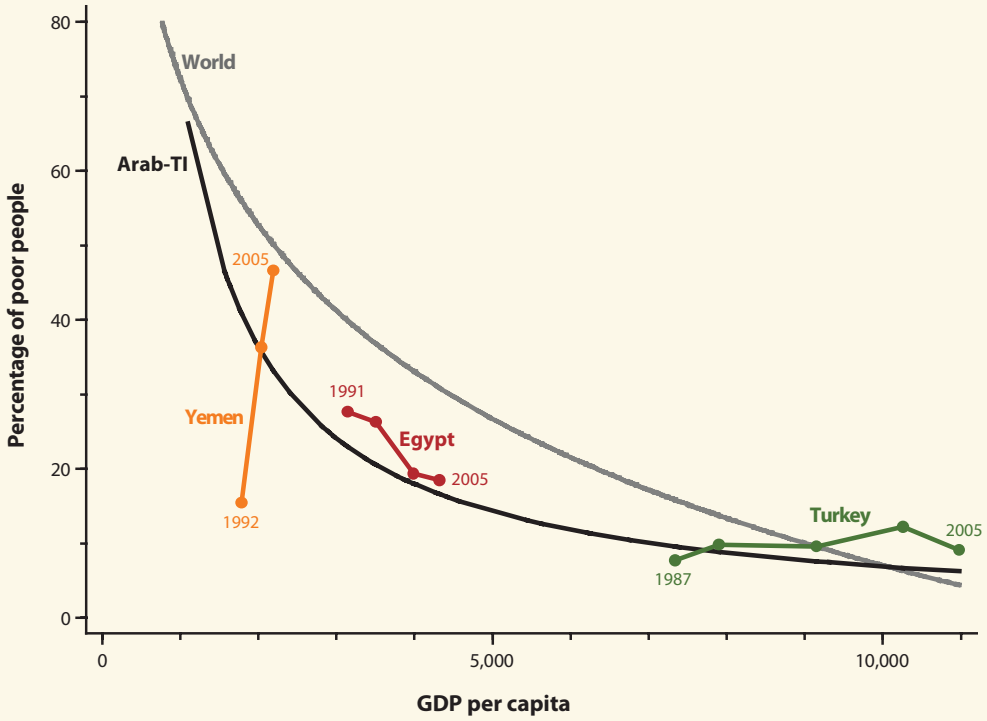
Revisiting Common Well-Being Measures

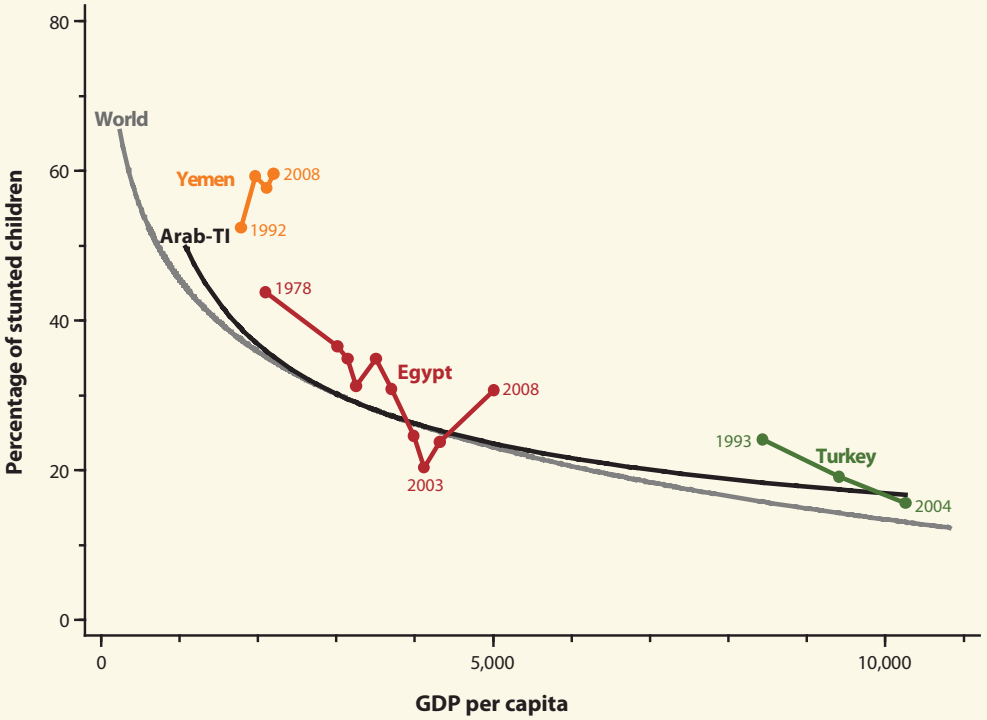
The official numbers measuring development progress described in the previous section show an Arab-TI region that is reasonably well-off based on income but still lagging in some social indicators. The picture becomes even fuzzier when one considers that the official numbers may be inaccurate. Those studying the Arab-TI region therefore face two problems: unreliable government-supplied data and traditional well-being measures that fail to completely measure well-being in the region. Solving these problems means looking to alternative data sources and well-being measures to more accurately assess the situation in the Arab-TI region.

The latest *Arab Human Development Report* states that "health data are insufficient, incomplete, and often unreliable, making it difficult to frame effective health policies or reach those in need" (UNDP 2009, 13). More generally, several experts have raised issues of low coverage, comparability, quality, and accessibility of data in the region (for example, Bibi and Nabli 2009). There is also a strong notion that data from official sources are frequently based on individual judgment provided by the relevant ministries rather than being collected in representative surveys and that official data are often not free of political interest. This seems to particularly be the case for indicators assessing people's living conditions and progress toward the MDGs—such as education, health, and water and sanitation infrastructure—which are often used to evaluate ministries and their staff. For example, many independent experts question literacy rates of 98–100 percent, rates of births attended by professional obstetricians of greater than 95 percent, and rates of access to clean and safe drinking water and functioning sanitation networks greater than 95 percent in several Arab-TI countries.

Income-based measurements to assess progress in improving poor people's living conditions may be particularly optimistic. To check on this often-voiced concern, we first explore GDP per capita growth's relationships to both poverty and child undernutrition (measured by child stunting) across Arab-TI countries and countries worldwide (and over time). (The prevalence of child undernutrition is a good indicator of general living conditions and poverty [as discussed in the following subsection] that is not income based). We then compare and assess the found relationships, aiming to identify a more accurate measure of people's well-being. For that, we estimate the relationships by using fractional polynomial regressions and graph the estimated curves (Figure 1).[3] The curves can be interpreted as the general poverty–growth and nutrition–growth paths along which an average Arab-TI country and an average country in the world move, given available data. Poverty is measured by the percentage of the population living on less than $2 a day at constant 2005 international prices.[4] Child undernutrition is measured by the percentage of children younger than five years who are stunted.[5] We also add trend lines for three selected Arab-TI countries (Yemen, Egypt, and Turkey) of different GDP per capita levels.

Figures 1a and 1b—Relationships between GDP per capita growth and the incidence of poverty and prevalence of child undernutrition in the world, the Arab-TI region, and selected countries





Sources: Based on data from WHO 2011, World Bank 2011a, UNSTAT 2011, and Ecker et al. 2010.

Notes: GDP per capita is based on purchasing power party, constant 2005 international dollars. Arab-TI = Arab League countries plus Turkey and Iran.

According to official numbers, economic growth in Arab-TI countries has generally translated into income poverty reduction rates higher than the worldwide average, while reduction rates in child undernutrition are similar. Comparing the Arab-TI and the global poverty–growth paths suggests that, at GDP per capita levels below $10,000, Arab-TI countries generally have more success in bringing down poverty as their national income grows (Figure 1a). For example, at a level of $2,000, 37 percent of the population in the average Arab-TI country lives below the $2-a-day poverty line compared with 53 percent in the global average. If per capita GDP grows to $3,000, poverty drops by 13 percentage points to 24 percent in the average Arab-TI country and by 12 percentage points to 41 percent in the global average. The regional average, of course, masks some outliers, such as Yemen, where slight GDP per capita growth was accompanied by a consistent, striking spike in the percentage of people living in poverty from 1992 to 2005.

The relationship between the prevalence of child undernutrition and GDP per capita in the Arab-TI region is similar to the global relationship until about the $5,000 level, at which GDP continues to climb steadily while child undernutrition levels off (Figure 1b). In individual countries the relationship between child undernutrition and GDP per capita is even more negative: for example, Egypt's prevalence of child undernutrition spiked significantly from 2003 to 2008, though GDP per capita continued to rise. Taking the child undernutrition levels as reference, this difference suggests that income poverty measures may not fully capture the realities of the well-being of the deprived population. It also raises concerns about the suitability of the typical income-based poverty indicator for measuring living standards.

Though improved data and more research are needed, at least two hypotheses can be offered here to explain the discrepancies between poverty-reduction measures in the Arab-TI region and the global average. First, as discussed previously, official poverty estimates may be inaccurate.[6] Second, poverty is typically measured by income alone;[7] in contrast, child undernutrition, an alternative measure of poverty, encompasses many factors besides income, most of which are, like health and education, also critical determinants of everybody's well-being and vulnerability (as discussed in detail in the next subsection). These non-income factors may be relatively less developed in Arab-TI countries and therefore are reflected in child undernutrition but not in poverty numbers based on income.

Measures of income inequality in the Arab–TI region, especially Gini coefficients, are also highly uncertain. For example, the latest AHDR notes "there is evidence to suggest that the inequality in wealth has worsened significantly more than the deterioration in income. In many Arab countries, for example, land and asset concentration is conspicuous and provokes a sense of exclusion among other groups" (UNDP 2009, 12). Evidence from a recent (still unpublished) analysis by the UN Development Programme seems to confirm that inequalities may be greater than official numbers suggest. Total household consumption results calculated from household surveys differ significantly from those calculated using national accounts. For example, Egypt's household surveys report only 39 percent of total private consumption reported in national accounts statistics, and Morocco's household surveys report only 59 percent. Moreover, this discrepancy has increased over time (UNSTAT 2011). The huge gap between household surveys and national accounts raises serious questions about both the consistency and quality of Gini estimates.

Another indication of a numbers mismatch is that people's satisfaction with living standards as measured by perception-based survey polls has deteriorated, possibly also indicating a deterioration of major welfare indicators. Satisfaction with living standards has fallen in most Arab countries in recent years, especially in Bahrain, Egypt, Libya, and other countries with high levels of civil disobedience (Breisinger, Collion, et al. 2011). About 35 percent of people in the Arab world (roughly 120 million people) are dissatisfied with their standard of living. The proportion of dissatisfied people is highest in Yemen and Iraq—two countries with lengthy conflicts. In Yemen, overall dissatisfaction among the population is driven more by the high prevalence of dissatisfaction (53 percent) than by the size of the population (about 23 million), whereas in Egypt, for instance, it is the sheer number of dissatisfied people that drives the results (Breisinger, Zhu, et al. 2011).

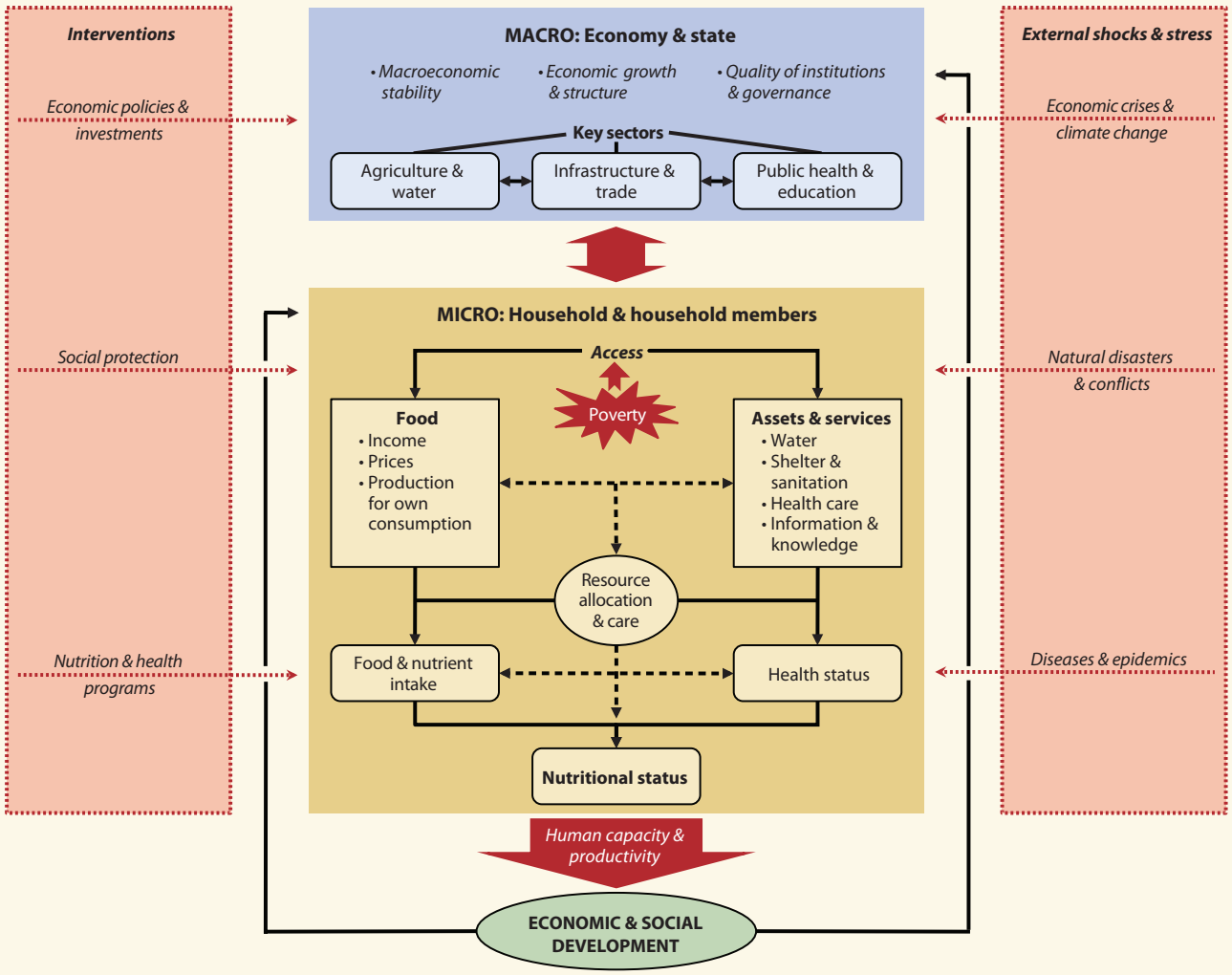
As pointed out in the 2002 AHDR, the definition of poverty in the Arab world should be expanded

to include dimensions other than income poverty. Indicators need to capture conditions such as insufficient and substandard social services—especially poor healthcare and education, inhumane living conditions for slum and shanty dwellers, a resource- and policy-constrained agricultural sector, and a dearth of effective and targeted social safety nets (UNDP 2002). Since this report goes beyond the traditional income–poverty dimension, looking instead to child undernutrition (based on anthropometric measures of growth retardation) to determine the level of human development progress, the analyses in the following sections will use child undernutrition as the main outcome variable. The next subsection presents a rationale for focusing on child undernutrition to capture the nexus of poverty and food security at the household level. It also proposes a new typology for classifying countries according to their food insecurity risk, incorporating critical macroeconomic determinants of food security in addition to the household-level dimension.

A New Typology of Arab-TI Countries

The poverty–food security nexus is one of the key development challenges facing Arab countries.

Figure 2—Conceptual framework linking food security and poverty to economic and social development



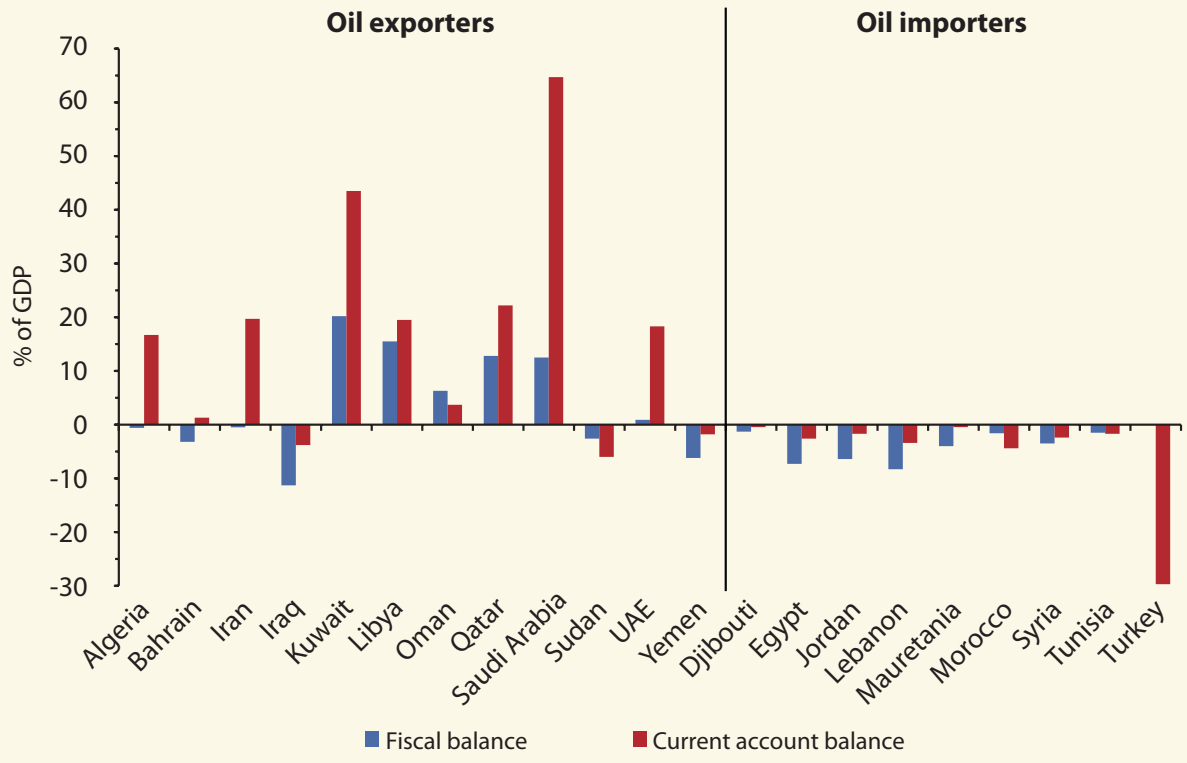
Source: Ecker and Breisinger forthcoming.

Poverty and food security are particularly closely linked in Arab countries due to high vulnerability to food-related "external shocks." Arab countries are exposed to global food price volatility, natural disasters, increasing water scarcity, and conflicts, all of which have direct and indirect impacts on people's well-being and nutritional status (Figure 2). Food security has a macro and a micro dimension. The macro-level dimension comprises the key elements of macroeconomic stability, economic growth, and governance, while the micro-level dimension includes household access to food and assets and services necessary for an individual to be healthy, which are typically constrained by poverty in food-insecure households (Figure 2).

At the macroeconomic level, there is broad and growing consensus that food security goes beyond the simple notion of food self-sufficiency (Diaz-Bonilla, Thomas, and Robinson 2002; Wilson and Bruins 2005; Yu, You, and Fan 2009; ESCWA 2011). Particularly in the Arab world, with its high food-import dependency and limited agricultural potential, a country's trade and budget balances play major roles in food security (Loefgren and Richards 2003; World Bank 2008; Breisinger et al. 2010). The general idea behind this "trade-based" view is countries that generate sufficient foreign exchange earnings from their exports (of goods and services), and thus have sufficient access to food imports from world markets, have no food-security problem. In Arab countries remittances also play an important role in foreign exchange earnings: oil exporters tend to be sources of net remittance outflows; oil importers are the sources of net remittance inflows. Finally, macro food security is related to the fiscal position of a country. Figure 3 shows that most oil-exporting countries (with the exception of Iran and Yemen) run fiscal account surpluses and all oil-importing countries run fiscal deficits.

To assess countries' food security at the macro level, selected items from this report have been used before to build an indicator of macro-level

Figure 3—Fiscal and current account balances in Arab-TI countries, 2007–10 average



Source: Authors' calculations based on IMF 2011b.
Note: No data for Comoros, Somalia, and West Bank and Gaza. UAE = United Arab Emirates.

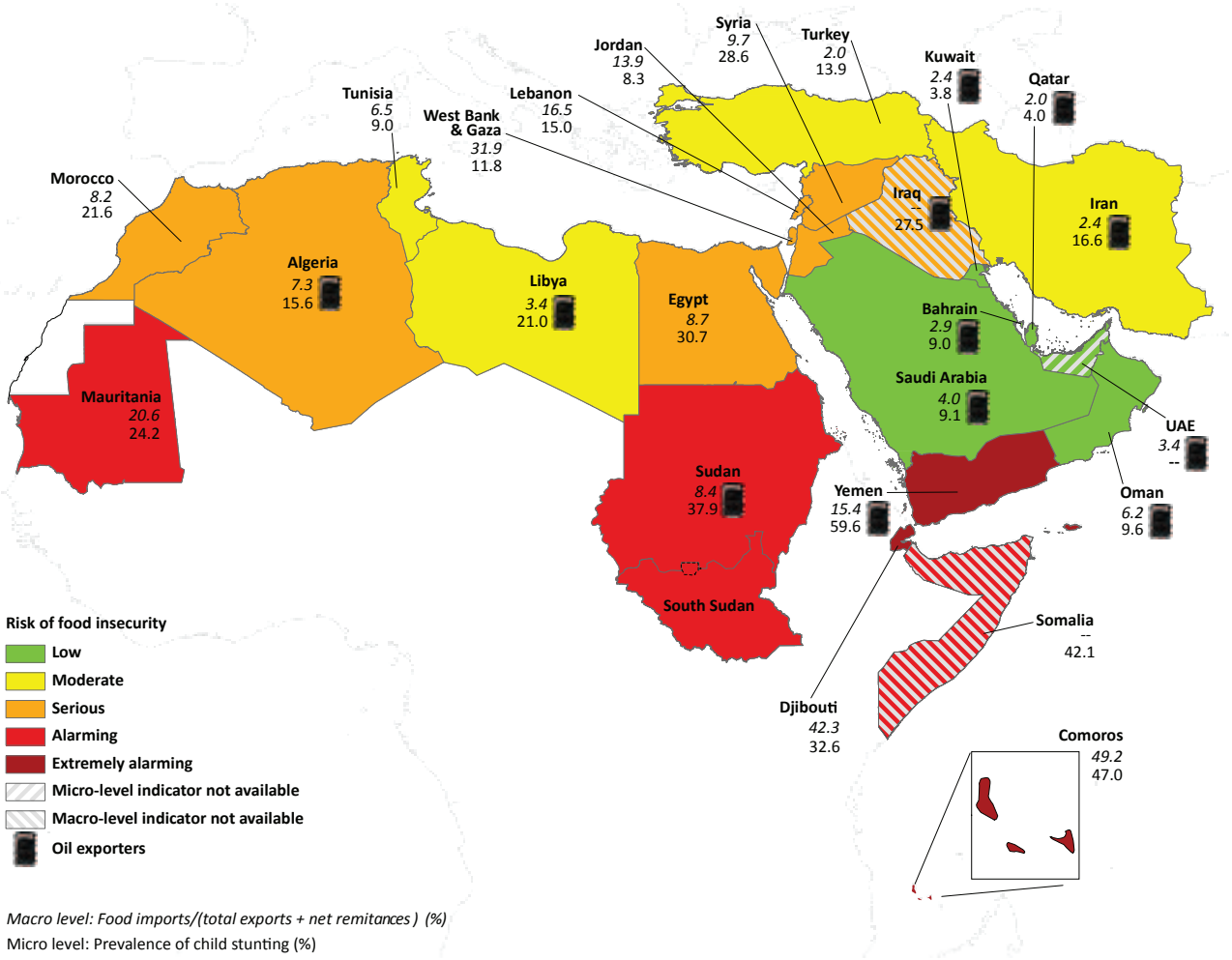
food security, specifically food imports and total exports (goods and services). A constructed ratio of food imports to total exports illustrates a country's ability to purchase food on international markets using its export revenues, while also taking into account food availability and food accessibility on the international market (Diaz-Bonilla, Thomas, and Robinson 2002; Yu, You, and Fan 2009). The measure also takes agricultural performance (and thus, indirectly, agricultural potential) into account, where a change in agricultural exports and a change in food production for the domestic market both directly affect food security. However, there is at least one major shortcoming of this measure: the conventional measure does not take into account remittances, often an important source of foreign exchange and direct incomes to households. To address this shortcoming and to account for the important role of remittances as a source of household income in several Arab countries, especially Lebanon, West Bank and Gaza, and Yemen, this report introduces an extended version of the conventional macro-level food security indicator that incorporates remittances in the ratio to more adequately capture the region-specific characteristics.

A key indicator for micro-level food security and more broadly for poverty is the prevalence of child undernutrition (as measured in this report by child stunting). In addition to the availability and quality of nutrition indicators (measured by anthropometrics) as discussed previously, the prevalence of undernutrition in children younger than five captures the food insecurity–poverty nexus by accounting for inequality and assessing progress toward sustainable development at the population level (Micklewright and Ismail 2001; Moradi and Baten 2005; Reinhard and Wijayaratne 2000). Young children's nutritional status tends to be most responsive to changes in living conditions and to be particularly vulnerable to food shortages and diseases, due to their high physiological nutrient requirements for growth, their special dietary needs, their often more direct exposure to adverse health conditions, and their dependency on adults. Poverty is characterized by insufficient income to acquire the quantity and quality of food needed, living in a disease-prone environment, poor access to quality health service, and lack of education and nutrition-relevant knowledge. Among the three common child anthropometric measures (that is, height for age, weight for age, weight for height), height-for-age scores (or, stunting), when compared with a healthy reference population, best reflect the cumulative effects of chronic food deficits and illness and are therefore good overall, long-term nutrition indicators.[8] Focusing on young children, who are typically the weakest household members, captures aspects of unequal intrahousehold resource distribution that are ignored when using household-level indicators such as income poverty or household food and nutrient consumption measures (Ecker, Breisinger, and Pauw 2011). Furthermore, at the country level, high prevalence rates of stunted children are usually associated with poor delivery of public services, especially in the health and education sector, and poor development of water and sanitation infrastructure; rapidly growing populations; low literacy rates and low educational attainment rates; and gender inequality. All of these are characteristics of underdevelopment usually found in countries with a high incidence of poverty. In the Arab-TI region, every fifth child younger than five is stunted, while the child-undernutrition prevalence in countries like Comoros, Somalia, Sudan, and Yemen is considerably higher (Figure 4).

The map in Figure 4 shows the Arab-TI countries classified in five categories according to their risk of overall food insecurity.[9] The Persian Gulf states, including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE, face a low risk of food insecurity. Iran, Libya, Tunisia, and Turkey exhibit moderate risk of food insecurity, whereas all other countries show serious, alarming, or extremely alarming levels of food insecurity risks. Among the countries at most risk are Yemen, Djibouti, and Somalia, followed by Mauritania and Sudan. In addition to the countries' food-insecurity risk status, the map also shows their status as oil importers or exporters (indicated with oil barrels). For presentation purposes throughout the remainder of this report, the five food security categories are aggregated into two groups: food-secure (FS) countries are at low risk of food insecurity, and food-security-challenged (FSC) countries encompass all other food-security risk levels. Given the important fiscal implications, the distinction between oil exporters

and oil importers is maintained throughout the rest of this report. Since all FS countries in the Arab-TI region are also oil exporters, the Arab-TI countries are grouped into three categories, that is, oil-exporting FSC countries, oil-importing FSC countries, and (oil-exporting) FS countries. Acknowledging that this classification may be too simplistic in some cases, the discussion of results will highlight critical differences between individual countries within the aggregate groups. In addition, the policy recommendations for food security are likely to be different depending on whether a country has a strong macro- or household-level food security challenge.

Figure 4—The risk of food insecurity in Arab-TI countries



Sources: Authors' calculations based on data from the FAO 2011b and World Bank 2011a.

Box 1—Methodology of Country Food-Insecurity Risk Typology

The map in Figure 4 categorizes countries according to their risk of overall food insecurity. The indicator of overall food insecurity risk comprises two components: a macro-level and a micro-level measure of food insecurity. (Maps representing the macro-level and micro-level food-insecurity risk indicators separately can be found in Figure A1.1 and Figure A1.2 in Appendix 1).

A country's macro-level food security is defined as the share of food imports divided by total exports plus net remittance inflows (food imports / [total exports + net remittance inflows]). The macro-level indicator captures the ability of a country to finance food imports through exports of goods and services and the net remittances received. Data on food imports as a share of GDP are from the Food and Agriculture Organization Statistics Division database (FAO 2011b), and GDP and total export data are from the World Development Indicators databank (World Bank 2011a). Net remittance inflows are calculated as the difference between remittances received and remittances paid, available from the World Development Indicators databank (World Bank 2011a). To ensure a certain level of robustness, all indicator values are generally computed as three-year averages over the period 2006–08 and complemented with the latest estimate in the 2000s, if no 2006–08 observations were available.

Consistent with the rest of the report, the prevalence of child undernutrition (expressed as a percentage) is used as a micro-level food-insecurity indicator. In general, the latest estimate since 2006 is used. If no observations were available after 2006, the prevalence of child undernutrition is projected using a general nutrition–growth elasticity of 0.11, estimated from a global cross-country regression model and country-specific GDP per capita growth rates. (For a description of the applied model, see Section 1 of Appendix 2.)

High-income countries have a low food insecurity risk. Low- and middle-income countries (LMICs) are classified into five groups by level of food insecurity risk: low, moderate, serious, alarming, and extremely alarming. The classification is carried out for the macro-level and micro-level components separately because of different sample sizes. Both samples include all LMICs with respective data. Thus, the food security situation in Arab-TI countries is compared with the food-security situation in LMICs worldwide. The macro-level food-security indicator is available for 127 LMICs, and the micro-level indicator for 130 LMICs. For both indicators, countries are grouped into quintiles. The categories of the macro- and micro-level indicators in combination define overall food-insecurity risk. The macro- and the micro-level indicators are equally weighted, while countries that fall in between two categories are assigned to the more severe one. (For example, if a country falls between serious and alarming, it would be assigned to the alarming category.) Table A1.1 in Appendix 1 reports the values of the macro- and micro-level food security indicators for Arab-TI countries.

Analyzing the Impact of Economic Growth and Public Spending

Findings from the previous section suggest that Arab-TI countries exhibit high levels of income inequality and food-insecurity risk. To change these unacceptable situations, one must understand their causes. Economic growth and the structure of public spending can contribute significantly to both income inequality and food-insecurity risk. Therefore, this section explores their contributions by first reviewing Arab countries' growth and nutritional outcomes. This is followed by a quantitative assessment of how Arab-TI countries compare with global averages when translating growth into nutritional outcomes and which sectors (agriculture, manufacturing, nonmanufacturing industry, services) have or have not contributed to people's well-being.

Economic Growth, Structural Change, and the Effects on Child Nutrition

Economic growth in Arab-TI countries has been modest, with slow or even negative growth in manufacturing and agriculture. Real GDP per capita growth averaged 1.7 percent in FSC countries and 0.8 percent in FS countries in the 1990s and 2000s.[10] Growth was mainly driven by the service sector, while manufacturing grew on average at a modest rate of 1.1 percent and 0.9 percent per year, respectively. However, several countries experienced negative per capita manufacturing growth, including Algeria, Iraq, Yemen, Comoros, Lebanon, Mauritania, Syria, the West Bank and Gaza, and Kuwait. The countries with the best manufacturing growth include Iran, Sudan, Jordan, Bahrain, and Oman. Agricultural sector performance has been dismal in most countries, with 13 countries exhibiting negative per capita growth rates (Table 2).

Economic growth did not create enough jobs for a rapidly expanding population; youth unemployment rates are more than twice the total unemployment rate, ranging between 20 and 30 percent in most cases, and will likely remain high or worsen, given ongoing uprisings in the Arab world (World Bank 2011a). Unemployment rates for Arab women are among the highest in the world, reflecting entrenched social biases against women (UNDP 2009). Low per capita growth rates, particularly in labor-intensive sectors such as manufacturing, explain the lack of job creation. In addition, much of the growth has translated into low-productivity and informal jobs, preventing economic growth from trickling down (World Bank 2004a). In general, the formal private sector, especially extracting industries, exhibits a weak job-generating capacity; education quality and type do not match labor market demand, especially in vocational fields (UNDP 2009).

Economic growth accompanied by structural transformation shows that the economy is dynamic, adapting and changing to meet the needs of a modern society. Structural transformation in many Arab countries has been slow, but it has been an important determinant of growth in Turkey. Figure 5 compares structural change in Turkey to that in Egypt. While average GDP per capita growth rates have been comparable between the two countries during the past 25 years, important social indicators differ considerably. For example, child stunting in Turkey is only half as prevalent as in Egypt, and Turkey is also ahead in most MDGs (Table 1). One possible explanation for this difference is that Egypt has seen very little change in its aggregate economic structure over the past 30 years, whereas Turkey exhibits typical signs of transformation, including a shrinking agricultural sector and a

Table 2—Child undernutrition*, economic growth, and nutrition–growth arc elasticities in the 1990s and 2000s

	Child undernutrition*		Annual growth per capita (%)			Arc elasticity		
	Prevalence (%), LE**	Annual change (% points)	GDP	AgVA	MaVA	GDP	AgVA	MaVA
FSC countries	**22.1** [1]	**-0.5**	**1.7**	**-0.1**	**1.1**	**-0.66**	**-0.80**	**-0.58**
Oil exporters	23.4 [1]	-0.6	1.1	0.0	1.1	-0.96	-2.82	-0.18
Algeria	15.9 [2]	-0.5	1.4	-1.5	-4.1	-1.49	1.67	0.73
Rural	17.2	-0.8				-1.83	2.04	0.89
Iran	20.4 [3]	-1.3	2.7	0.6	6.6	-1.94	-8.39	-0.77
Iraq	27.5 [1]	-0.1	-6.4	-0.4	-8.0	0.09	1.10	0.07
Rural	31.0	-0.3				0.16	2.02	0.13
Sudan	37.9 [1]	-0.1	3.7	1.2	4.8	-0.03	-0.11	-0.02
Rural	40.5	-0.3				-0.14	-0.49	-0.10
Yemen	57.9 [1]	0.4	1.5	-1.7	-4.0	0.45	-0.49	-0.24
Rural	62.1	0.5				0.53	-0.58	-0.28
Oil importers	21.1 [1]	-0.5	2.1	-0.1	1.1	-0.42	0.85	-0.91
Comoros	39.5 [4]	0.0	-0.8	1.8	-0.5	-0.11	0.04	-0.17
Djibouti	32.6 [1]	1.5	1.9	1.4	0.7	2.93	4.12	8.63
Rural	40.2	2.0				3.07	4.31	9.03
Egypt	30.7 [5]	-0.2	2.8	1.1	2.5	-0.20	-0.61	-0.24
Rural	31.7	-0.4				-0.30	-0.89	-0.35
Jordan	8.3 [6]	-0.6	2.3	-3.1	3.8	-1.09	1.33	-0.57
Rural	12.0	-0.9				-1.07	1.30	-0.56
Lebanon	16.5 [7]	-0.1	0.9	-0.4	-0.5	-0.52	1.25	1.07
Mauritania	28.9 [8]	-1.5	0.8	-1.8	-4.4	-3.13	1.75	0.88
Rural	32.2	-1.4				-2.77	1.55	0.78
Morocco	23.1 [7]	-0.6	2.2	2.3	1.4	-0.77	-0.73	-1.27
Rural	29.3	-0.5				-0.60	-0.57	-0.99
Somalia	42.1 [1]	2.2	0.6	0.6	1.0	11.76	11.90	6.86
Syria	28.6 [1]	-0.3	1.2	-3.1	-4.6	-0.79	0.39	0.28
Rural	29.0	-0.4				-0.99	0.49	0.36
Tunisia	9.0 [1]	-2.0	3.9	3.4	2.9	-1.35	-1.60	-1.91
Rural	12.7	-2.7				-1.33	-1.58	-1.88
Turkey	15.6 [7]	-0.8	1.8	-1.7	1.1	-1.63	2.03	-2.88
Rural	22.9	-0.8				-1.26	1.57	-2.23
West Bank & Gaza	11.8 [8]	0.1	-0.6	-9.0	-4.2	-1.71	-0.18	-0.30
FS countries	**8.3** [1]	**-1.0**	**0.8**	**-4.4**	**0.9**	**-8.60**	**2.34**	**-8.93**
Oil exporters	8.3 [1]	-1.0	0.8	-4.4	0.9	-8.60	2.34	-8.93
Bahrain	13.6 [9]	-0.1	3.0	-1.6	4.8	-0.11	0.24	-0.07
Kuwait	3.8 [6]	-0.8	1.3	-0.5	-3.0	-3.76	10.52	2.16
Oman	9.8 [6]	-0.9	2.5	-0.7	8.3	-1.14	5.24	-0.20
Saudi Arabia	9.3 [2]	-1.1	0.5	-5.3	0.4	-10.12	1.26	-11.23
Arab-TI countries (all)	**21.6** [1]	**-0.6**	**1.6**	**-0.3**	**1.1**	**-1.14**	**-0.61**	**-1.09**
Arab countries (all)	25.9 [1]	-0.3	1.3	-0.2	-0.2	-0.83	0.63	-0.73
LMICs	**29.1** [1]	**-0.9**	**4.6**	**0.8**	**4.3**	**-0.86**	**-0.44**	**-0.31**
A&P	29.7 [1]	-1.1	5.9	1.4	6.0	-0.74	-1.10	-0.33
EE&CA	17.5 [1]	-0.7	5.5	-0.1	3.9	0.17	6.04	-0.22
LAC	14.6 [1]	-0.6	1.6	-0.3	1.2	-2.20	0.69	-2.48
SSA	42.3 [1]	-0.2	1.7	-0.5	0.2	0.24	0.63	2.28

Source: Based on World Bank 2011a.

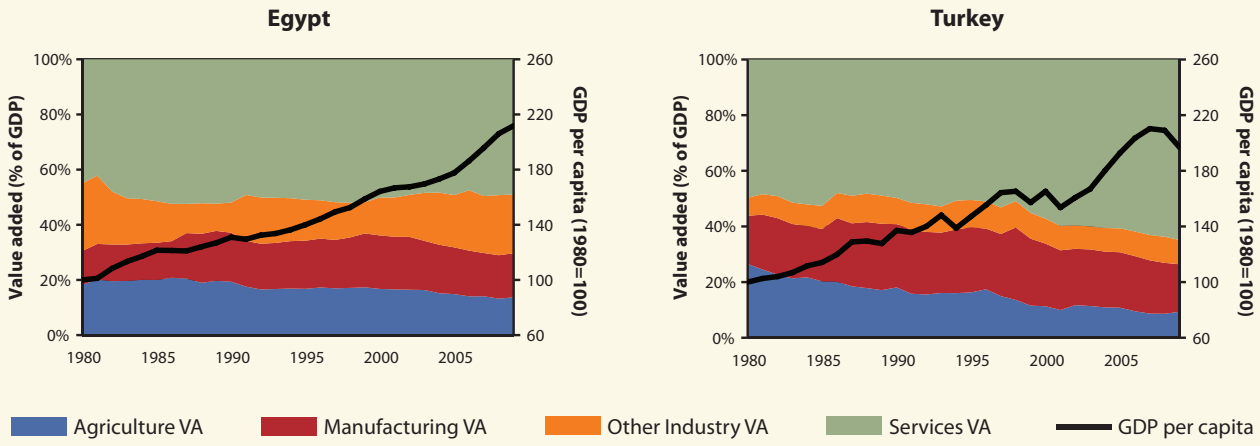
Note: AgVA = agriculture value added; MaVA = manufacturing value added; LMIC = low- and middle-income country; A&P = Asia and Pacific; EE&CA = Eastern Europe & Central Asia; LAC = Latin America and Caribbean; SSA= Sub-Saharan Africa; FS = food secure; FSC = food security challenged; Arab-TI = Arab League countries plus Turkey and Iran.

* Child undernutrition as measured by child stunting. ** Latest estimates (LE): [1]=2006, [2]=2005, [3]=1998, [4]=2001, [5]=2008, [6]=2009, [7]=2004, [8]=2007, [9]=1995.

growing service sector (Figure 6). Labor demand in Turkey has shifted from low-productivity activities to high-productivity activities, and this structural change has added to overall labor productivity growth. During two recent periods, structural change has contributed significantly to growth in Turkey: from 1990 to 2005, 1.4 percentage points on average per year (or 45 percent of average annual growth), and from 1999 to 2008, 2.0 percentage points on average per year (or 38 percent of average annual growth) (Rodrik 2010).

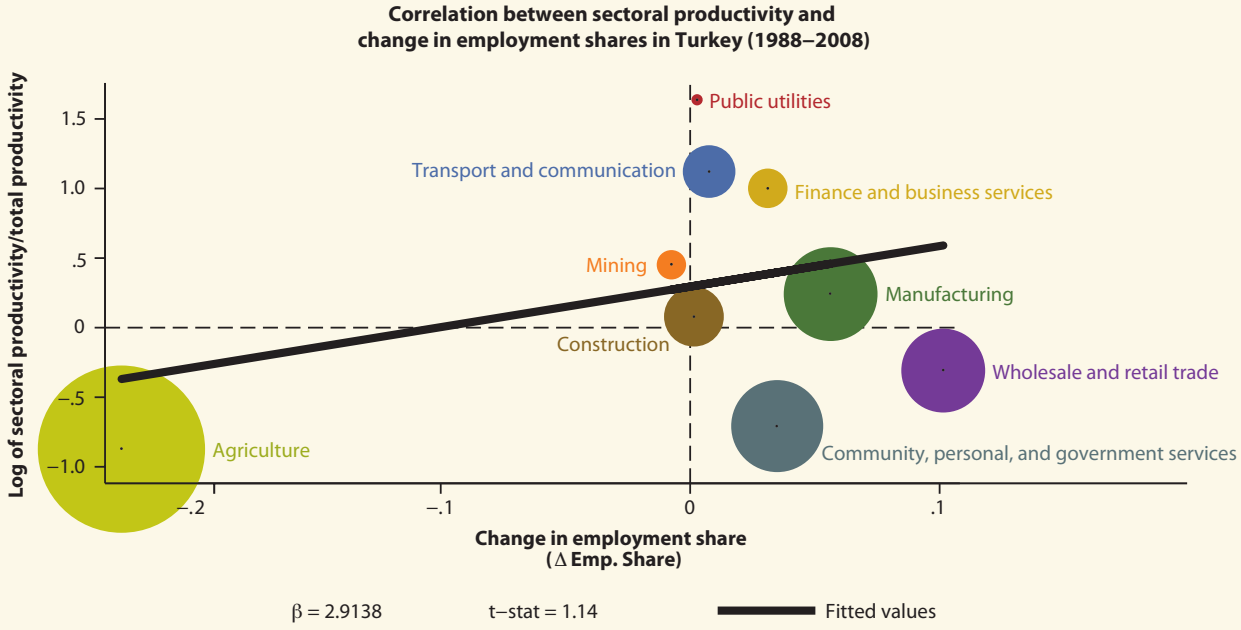
Even with modest growth and economic transformation in many Arab-TI countries over recent years,

Figure 5—Structural transformation in Egypt and Turkey



Source: Based on World Bank 2011a.
Note: VA = value-added.

Figure 6—The role of structural change in economic growth in Turkey



Source: Adapted from Rodrik 2010.

Notes: Size of circle represents employment share in 1988; β denotes coefficient of independent variable in regression equation: $\ln (p/P) = \alpha + \beta \Delta \text{Emp. Share}$.

child-undernutrition rates remain high—at 22 percent on average in FSC countries—and incidences are particularly widespread in the countries' rural areas (Table 2). FS countries together have a child-stunting prevalence rate of less than 10 percent and achieved an annual reduction rate in child-stunting prevalence that is double the annual rate of FSC countries (1.0 percentage point compared with 0.5 percentage point). Within FSC countries, prevalence rates do not differ much between oil exporters and oil importers (23 percent and 21 percent, respectively); oil exporters have been able to reduce child stunting slightly faster than oil importers (0.6 percentage points compared with 0.5 percentage points per year). (How much difference may relate to a difference in public spending patterns will be examined in the next subsection.) Larger differences can be found among countries. Of the FSC countries, Comoros, Somalia, Sudan, and Yemen have the highest prevalence of stunted children with rates around 40 percent or greater, whereas Jordan, Tunisia, and West Bank and Gaza have the lowest rates, around 12 percent or less. Countries with the fastest child-stunting reduction, more than 1 percent per year, are Iran, Mauritania, and Tunisia. The prevalence of child stunting markedly increased in Djibouti, Somalia, and Yemen. In all FSC countries with representative observations from rural areas, child stunting is more prevalent in rural than in urban areas, which is consistent with the global pattern (Smith et al. 2005). With the exception of Mauritania and Morocco, the annual changes in child stunting in both directions are greater for rural areas compared to the national average, indicating that nutrition in rural areas is generally more responsive to external shocks, mitigating interventions, and general developments. Child stunting in rural areas has declined most rapidly in Tunisia at an annual rate of 2.7 percentage points and increased most rapidly in Djibouti at an annual rate of 2.0 percentage points.

What Types of Growth Reduce Poverty in Arab-TI Countries?

In the Arab-TI region, success in translating economic growth into reduction of child undernutrition fundamentally differs between country groups and individual countries. Arc elasticities (as reported in Table 2) measure the changes in the prevalence of child undernutrition associated with economic growth over a certain period; however, it is important to note that they do not identify the cause of the nutrition–growth relationship or the scale of growth's impact on nutrition (which are analyzed using regression estimations presented in following sections). Nonetheless, the arc elasticities provide important information on the country-specific association of progress in achieving nutrition improvement and economic growth by relating the two trends to each other. The elasticities measure the average, relative change in the prevalence of child undernutrition (as measured by stunting and expressed as a percentage) associated with 1 percent economic growth over a period of several years (during the last two decades) and thus allow for comparing long-term changes in nutrition outcomes across countries with different economic growth performances.[11] According to the arc elasticity coefficients, FS countries have been more successful in using overall economic growth to improve child nutrition than FSC countries, and oil-exporting FSC countries have had more success than oil-importing FSC countries, irrespective of the growth rates achieved (Table 2). This result holds when excluding the region's worst performer, Somalia, from the aggregate averages. In spite of positive overall economic growth of 0.6 percent, child undernutrition in Somalia increased by an alarmingly high annual rate of 2.2 percentage points from 2000 to 2006. Hence, every 1 percent of per capita GDP growth was associated with an almost 12 percent rise in the prevalence of child undernutrition in this conflict-stricken country.

Agricultural growth declined in both FSC and FS countries on a per capita level, though at considerably higher margins in FS countries. The modest decline of agricultural growth in the aggregate FSC countries is attenuated by only few a countries with an already substantive and further expanding agricultural sector such as Sudan (in the group of oil-exporting FSC countries) and Egypt and Morocco (in the group of oil-importing FSC countries). It is important to note that the arc elasticities identifying the association between nutrition improvement and sector growth should be interpreted relative to the direction of growth. For example, the agricultural sectors in Turkey and Yemen shrank by an annual rate of 1.7 percent on a per capita basis. While

Turkey's prevalence of child stunting declined by 0.8 percentage point per year, the same indicator increased by 0.4 percentage points in Yemen, resulting in a positive arc elasticity for Turkey and a negative one for Yemen (Table 2).

In line with overall economic growth, manufacturing growth was associated with reductions in child stunting in both FSC and FS countries (Table 2). At the aggregate level, the manufacturing sector has a growth rate lower than the overall GDP growth rate in FSC countries and higher in FS countries. There are no marked differences in the manufacturing growth rates in oil-exporting FSC countries compared with oil-importing FSC countries, which is similar to agricultural growth rates. Manufacturing growth was greatest in Iran, Jordan, and Sudan, with annual growth rates significantly greater than 3 percent. In Algeria, Iraq, Mauritania, Syria, West Bank and Gaza, and Yemen the manufacturing sector shrank by at least 4 percent per year. The high arc elasticity of child undernutrition with respect to manufacturing and overall growth in FS countries is the result of a significant reduction in the prevalence of child undernutrition from an already relatively low initial level and rather moderate growth rates (of less than 1 percent per year).

In rural areas, manufacturing growth also seems to be associated with reducing child undernutrition. In the 16 Arab-TI countries that managed to reduce the prevalence of child stunting, the manufacturing sector grew in 10 of them. The agricultural sector grew in only 5 countries that also experienced manufacturing growth (Table 2). In the FSC countries where both the manufacturing and agricultural sectors

Table 3—Estimated coefficients (elasticities) of the nutrition–growth models: Arab-TI region vs. rest of the world

	Arab-TI region				Rest of world			
	Sector VA share (% of GDP)	Overall growth	Ag. & non-ag. growth	Sector growth	*Sector VA share (% of GDP)*	Overall growth	Ag. & non-ag. growth	Sector growth
		1	*2*	*3*		*4*	*5*	*6*
Growth (per capita)								
GDP	*100.0*	-0.07			*100.0*	-0.12 ***		
AgVA	*15.3*		0.70 **	1.06 ***	*19.8*		-0.46 ***	-0.34 ***
Non-AgVA	*84.7*		-0.07		*80.2*		-0.08 ***	
MaVA	*13.3*			-0.39 *	*20.5*			-0.54 ***
InVA	*25.5*			0.03	*13.3*			0.11 †
SeVA	*45.8*			-0.27 **	*46.4*			0.00
Stunting level, lagged (t-1)		-0.16 †	-0.12	-0.09		-0.25 ***	-0.27 ***	-0.28 ***
F-value		2.2	2.8	3.4		2.2	2.3	2.5
R-squared		0.50	0.59	0.66		0.47	0.48	0.51
R-squared adjusted		0.27	0.38	0.47		0.25	0.27	0.30
Observations		66	66	66		340	336	336
Countries		20	20	20		97	96	96

Source: World Bank 2011a; UNSTAT 2011.

Notes: The dependent variable is the prevalence rate of child undernutrition (in percent). All models control for country-specific trend effects. The models were also run using data for the group of Arab countries only (excluding Turkey and Iran). The estimation results in both cases are very similar to the reported ones and therefore not presented here. VA = value-added; Arab-TI = Arab League countries plus Turkey and Iran; AgVA = agriculture value-added; Non-AgVA = nonagriculture value-added; MaVA = manufacturing value-added; InVA = other industry value-added; SeVA = services value-added.

*$p \leq .10$

**$p \leq .05$

***$p \leq .01$

† Coefficients are almost statistically significant (i.e., $p \leq .15$).

grew and child undernutrition declined (and with child undernutrition observations in rural areas), manufacturing growth was associated with greater reductions in the prevalence of child stunting in rural Morocco and Tunisia, and agricultural growth was associated with greater reductions in the prevalence of child stunting in rural Egypt and Sudan, as the arc elasticities indicate.

Overall Growth Does Not Lead to Poverty Reduction

Arc elasticities only suggest how growth may be associated with nutrition outcomes. The following paragraphs present results from more rigorous cross-country regression analysis. In general, there are four key components that link poverty and nutrition to sectoral growth: the direct growth component from the sector itself; the indirect growth component arising from spillover effects of growth in one sector on another (or multiplier effect); the participation component, reflecting the responsiveness of overall poverty to the GDP growth's sector of origin; and the relative size of the sector in the economy (Christiaensen, Demery, and Kuhl 2011). The cross-country regressions presented in the following take all these components into account.[12] To identify differences in the relationships between overall economic growth or sector growth and child nutrition in the Arab-TI region compared with the rest of the world, cross-country regressions are estimated for the two regional samples separately (Table 3).

Results from the model show that unlike in the rest of the world, overall growth does not translate into poverty reduction in the Arab-TI region. One percent in overall growth in the rest of the world leads to a reduction in the prevalence of child stunting by 0.12 percentage points, but the relationship in the Arab-TI region is statistically insignificant.[13] This finding raises important questions about how to make growth more pro-poor in the future. To start finding answers to these questions, the next step explores how growth at subsector levels—for example, in agriculture, manufacturing, nonmanufacturing industry, and service sectors—affects nutrition. Results can aid in understanding which sector may be most promising for poverty reduction, but also potentially point to sectors that need to be made more effective in poverty reduction and food-security enhancement. Table 3 shows that manufacturing-led growth and service sector–led growth reduce child undernutrition in the Arab-TI region, suggesting that growth led by these two sectors can be an important driver of poverty reduction and increased food security.

Consistent with previous studies' findings on growth's impacts on poverty (Christiaensen, Demery, and Kuhl 2011; Diao et al. 2007; World Bank 2007a), the effects of agricultural growth on child nutrition are positive and large on the global scale (Table 3, model 6). By contrast, agricultural growth does not have the same positive effect on nutrition in the Arab-TI region. Agricultural growth has a statistically significant negative effect on child nutrition in the Arab-TI region, suggesting that agriculture has not been a driver of poverty reduction and food-security enhancement in the Arab-TI region and revealing scope for improvement in the sector's poverty and food-security impact (in Table 3, model 3). Yet it should be noted that these elasticities measure relationships at the regional level and should not be overinterpreted with respect to individual countries. In fact, the arc elasticities discussed previously indicate much heterogeneity among Arab-TI countries. Table 2 shows that agricultural growth was associated with reductions in child undernutrition in some countries in the past, including Egypt, Iran, Morocco, Sudan, and Tunisia.

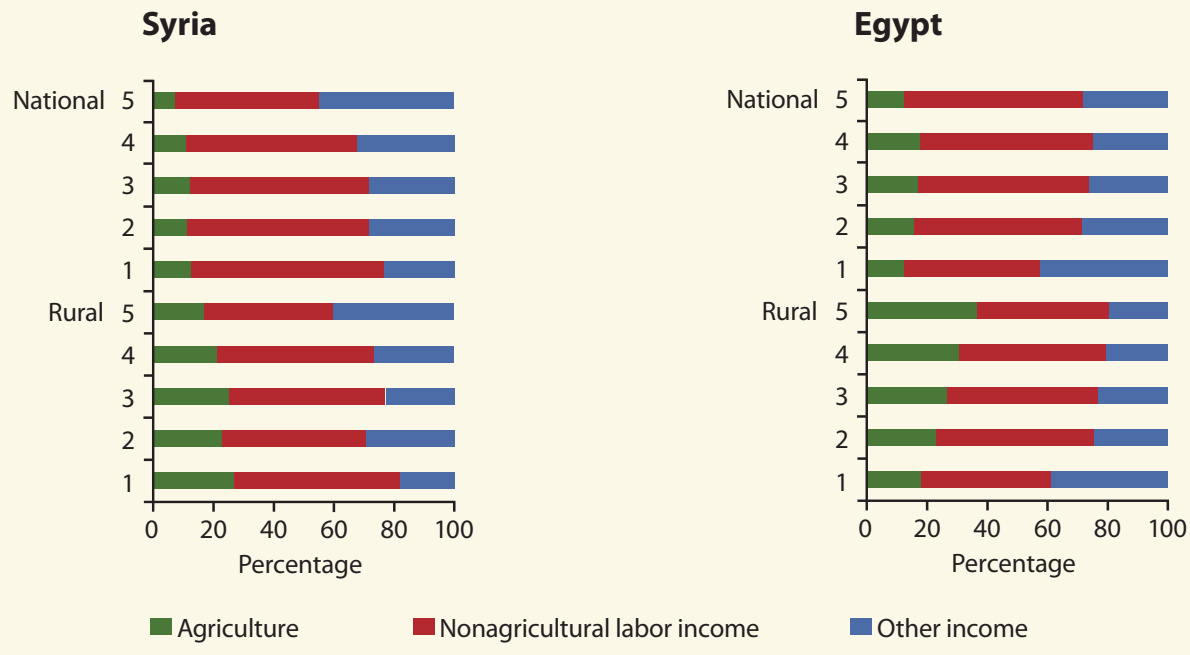
There are several structural reasons why agriculture in the Arab region as a whole may not translate into poverty reduction and improvements of people's well-being more generally. First, as previously mentioned, agriculture only constitutes about 15 percent of GDP in the Arab-TI countries on average and even less in Arab countries—significantly less than in other world regions and especially when considering LMICs only. Second, agricultural growth has been slow or even negative in many Arab-TI countries on a per capita basis in both FSC and FS countries (Table 2). While the slow growth may have several causes, one important cause is the severe water constraints in most Arab countries, which are bound to hamper agricultural development even more in the future. Third, most foods, and particularly staple foods, are imported, thereby limiting the potential consumer benefit of decreased food prices that would typically accompany agricultural productivity growth. In other

words, the linkage and multiplier effects of growth within the domestic economy are weak. Fourth, rising global food prices have a detrimental effect on nutrition that may explain the negative causality between agricultural growth and child undernutrition. For example, any increase in global food prices is likely to accelerate agricultural growth and increase malnutrition, an effect that is likely to be stronger in the Arab-TI region compared to the rest of the world. Finally, while about half the people in the region still live in rural areas (Figure 10 in the next section), the majority of rural people earn nonagricultural income.

In Syria and Egypt, for example, two countries with relatively high shares of agriculture in GDP (21 percent and 14 percent), households only earn about 10 percent and 15 percent of their incomes from agriculture, respectively (Figure 7). Even rural households earn the majority of their income from nonagricultural activities: 75 percent in Syria and 73 percent in Egypt (Figure 7). Within rural household groups, income patterns in Syria and Egypt differ substantially. In Syria the poorest earn relatively more of their income from agriculture than better-off households (27 percent); in Egypt it is the richer quintiles that earn a higher share of income from agriculture. Nonagricultural labor income is significantly higher in both countries at 45 and 55 percent, and households earn 18 percent and 19 percent from other incomes (transfers, capital income, and so on), respectively.

A recent study using a structural model for Yemen confirms that growth in private sector manufacturing and services reduces calorie deficiency and child undernutrition more than agricultural growth (Ecker, Breisinger, and Pauw 2011). An additional 1 percent annual growth in GDP driven by promising industry and service sectors leads to an average annual reduction of the percentage of calorie-deficient people by 0.22 percentage points and of the percentage of stunted children by 0.06 percentage points. The annual reduction rate for calorie deficiency is 15 percent higher than in the agricultural growth scenario; for child undernutrition, the reduction rate under the promising-sectors growth scenario is about one-third higher than in the agriculture scenario. Another reason for this, in addition to the structural reasons mentioned, is that

Figure 7—Share of income from different sources in Syria and Egypt



Sources: Based on Syria Central Bureau of Statistics 2007; CAPMAS 2010.
Note: 5 = richest quintile; 1 = poorest.

in Yemen it is the nonfarming rural population—not the farmers—that is the most malnourished population group.

Allocation and Growth Effects of Public Spending

Public spending is one of the key tools for governments to support private sector–led growth and achieve social outcomes. Government spending as a share of GDP is the highest in the Arab-TI region among all world regions and keeps expanding rapidly. However, it is important to note that the size of public spending does not necessarily translate into spending effectiveness and efficiency. In the Arab-TI region, 27 percent of GDP was spent on agriculture, education, health, infrastructure, social protection, and other sectors in 2007 on average, and 29 percent in the Arab LMICs (Table 4). Public spending in the LMICs in the Arab-TI region is much higher than in other world regions. Average public expenditure in Latin America and the Caribbean region, Sub-Saharan Africa, and Asia and the Pacific region varies between 16 percent and 18 percent of GDP. Total expenditure per capita in the Arab-TI region surged by about 10 percent per year during the 1990s (IFPRI 2011) and then slowed to around 5 percent per year in the 2000s, making public expenditure growth in the Arab-TI region more moderate compared to other world regions. Public expenditure in Asia and the Pacific, Eastern Europe and Central Asia, and Latin America and the Caribbean grew by about 10 percent over the period 2000–07 (Table 5).

Intensity and growth of public spending substantially varies across Arab-TI countries. The intensity of spending differs between FSC and FS countries in particular. FSC countries spent the equivalent of 27 percent of GDP on average in 2007, compared with 36 percent in FS countries (Table 4). Within FSC countries, public spending was slightly higher in oil-exporting countries (28 percent) than in oil-importing countries (26 percent). The share of public spending is highest in Yemen with 40 percent, followed by Jordan with 38 percent and the two FS countries Oman and Kuwait with 37 percent. In all FSC countries, public spending accounted for more than 20 percent of GDP in 2007, with only Djibouti, Tunisia, and Turkey spending less than 25 percent. Public spending grew slightly more rapidly in FS countries (7 percent per year) than in FSC countries (5 percent per year) on average, although there are large differences between countries (Table 5). Only Djibouti cut back on its spending, while Iran and Jordan increased spending by 9–10 percent annually. At the aggregate level, the main differences are between oil-exporting and oil-importing countries. Public spending grew 6.7 percent in oil-exporting FSC countries and by 5.4 percent FS countries, compared with 4.3 percent in oil-importing FSC countries.

Public spending on agriculture, education, health, infrastructure, and social protection are most critical for achieving poverty reduction and food security.[14] Relative to agricultural GDP, Arab-TI countries allocate about the same amount of resources to agriculture as all LMICs on average but significantly more than Latin America and the Caribbean and Sub-Saharan Africa. The average of agricultural expenditures in all LMICs accounts for 7.2 percent of agricultural value-added, compared with 7.0 percent in all Arab-TI countries and 6.9 percent in Arab LMICs (Table 4). Yet there are substantial differences among Arab-TI countries. The agricultural expenditure intensity is relatively low in several FSC countries, including Yemen (3.9 percent), Lebanon (1.2 percent), and Morocco (4.4 percent), indicating potential underspending. In addition, agricultural spending has dropped sharply in most Arab-TI countries, which agriculture's declining share in the economy can only partly explain. Per capita spending on agriculture in Arab countries has shrunk by 3.8 percent annually, while it has increased on average when Iran and Turkey are included in the regional average. Iran experienced the highest annual growth rate in the region at 17.4 percent. In addition to Iran, Lebanon and to a lesser extent Turkey are the only FSC countries that have increased agricultural spending. All others reduced public spending on agriculture, with Egypt and Syria making the largest cuts.

Arab-TI countries and Arab LMICs spend more on education than most other world regions on average, but public education expenditures grew much more slowly than in the rest of the world. Arab-TI countries devote 3.0 percent of GDP to education compared with 4.2 percent in Arab countries. This share is even higher when excluding high-income countries from the average (Table 4). Only LMICs in Latin America and the Caribbean region spent a greater share of their

GDP on education than Arab-TI LMICs (3.6 percent compared with 2.9 percent); when excluding Iran and Turkey, no world region spent a greater share than the Arab region LMICs (4.3 percent). Interestingly, FSC countries dedicate a slightly greater share of GDP to education than FS countries on average (2.9 percent compared with 2.0 percent), and oil-importing FSC countries spent a slightly higher share on education than oil exporters (3.0 percent compared with 2.8 percent). Countries that spent more than 5 percent of GDP on education include Jordan, Morocco, Tunisia, and Yemen; Iran, Lebanon, Syria, and Turkey spent less than 2 percent in 2007.

Much like agricultural spending, investing a large portion of GDP in education does not necessarily yield results: youth literacy rates, for instance, show no clear relationship between expenditures and educational achievements. Likely explanations are large differences in service quality and amount spent per person. Furthermore, the education budget in the Arab-TI region as a whole and particularly in Arab countries grew least across all world regions.

Table 4—Public spending by sector, 2007 (%)

	Agriculture	Education	Health	Infrastructure	Social protection	Total	Ag. exp. /AgVA
FSC countries	**0.7**	**2.9**	**2.5**	**0.9**	**4.7**	**26.6**	**6.9**
Oil exporters	0.8	2.8	1.7	1.9	6.7	28.1	7.9
Algeria	0.7	4.4	1.2	3.8	4.7	30.2	8.4
Iran	0.8	2.1	1.8	1.3	7.8	26.6	8.0
Yemen	0.4	5.8	1.4	0.1	0.0	40.3	3.9
Oil importers	0.7	3.0	3.1	0.3	3.5	25.7	6.4
Djibouti	0.1	3.2	1.1	0.0	0.0	22.9	3.0
Egypt	0.8	3.7	3.7	0.5	7.3	26.9	5.8
Jordan	0.6	5.3	2.7	1.6	10.6	38.0	20.6
Lebanon	0.1	2.3	0.7	0.5	2.5	33.6	1.2
Morocco	0.6	5.6	0.8	0.2	4.5	30.1	4.4
Syria	1.6	2.9	0.2	1.6	0.4	29.1	8.9
Tunisia	1.5	6.4	1.5	0.8	7.5	24.9	14.6
Turkey	0.5	2.0	3.6	0.0	1.5	23.5	6.1
FS countries	**0.2**	**3.7**	**1.7**	**0.7**	**6.1**	**35.6**	**29.2**
Oil exporters	0.2	3.7	1.7	0.7	6.1	35.6	29.2
Bahrain	0.1	3.4	2.3	0.6	0.7	25.3	20.5
Kuwait	0.2	3.3	1.7	0.2	9.2	36.7	72.9
Oman	0.2	4.7	1.5	1.8	1.7	37.3	13.6
Arab-TI countries (all)	**0.7**	**3.0**	**2.5**	**0.9**	**4.8**	**27.3**	**7.0**
Arab countries (all)	0.7	4.2	2.0	1.3	5.5	30.4	7.1
LMICs	**0.8**	**2.3**	**1.3**	**0.5**	**1.8**	**18.9**	**7.2**
Arab-TI	0.7	2.9	2.5	0.9	4.7	26.6	6.9
Arab	0.8	4.3	2.1	1.4	5.3	29.3	6.9
A&P	1.1	2.0	0.6	0.3	1.4	17.8	7.9
EE&CA	0.4	1.2	0.9	1.1	1.9	21.3	7.6
LAC	0.3	3.6	2.7	0.3	1.3	15.7	4.7
SSA	0.8	2.8	1.2	0.6	0.8	17.5	2.6

Source: Based on IFPRI 2011.

Note: Averages of aggregates are weighted by population size; A&P = Asia and Pacific region; EE&CA = Eastern Europe and Central Asia; LAC = Latin America and the Caribbean region; SSA = Sub-Saharan Africa; FS = food secure; FSC = food-security challenged; AgVA = agriculture value-added; Arab-TI = Arab League countries plus Turkey and Iran.

Per capita education spending in the Arab-TI region and Arab countries increased by 2.4 percent and 1.0 percent per year in 2000–07, respectively, compared with 10.9 percent in Latin America and the Caribbean, 9.4 percent in Eastern Europe and Central Asia, 8.6 percent in Asia and the Pacific, and 6.7 percent in Sub-Saharan Africa (Table 5). In Algeria and Kuwait, education spending declined by 3.9 percent and 0.9 percent, respectively. Also, Egypt's education spending increased by a relatively modest 0.2 percent per capita per year.

Arab-TI countries spend about 2.5 percent of GDP on health, which is less than in Latin America and the Caribbean but more than in other regions (Table 4). However, per capita health expenditures grew much more slowly than in most other regions in 2000–07, similar to education expenditure patterns (Table 5). On a regional level, public spending on health increased at a lower rate only in LMICs in Asia and the Pacific (5.7 percent compared with 9.5 percent in Arab-TI LMICs). Again, similar to education expenditure, FSC countries devote a greater share of

Table 5—Annual growth rate of public spending per capita, 2000–07 (%)

	Agriculture	Education	Health	Infrastructure	Social protection	Total	Ag. exp./AgVA
FSC countries	**1.0**	**2.5**	**9.5**	**-0.6**	**13.1**	**5.2**	**0.7**
Oil exporters	9.7	1.0	4.7	-0.1	11.0	6.7	-7.0
Algeria	-2.3	-3.9	1.5	21.3	4.5	1.5	5.1
Iran	17.4	5.3	5.6	-7.6	12.9	9.4	-13.5
Yemen	-0.3	4.3	4.8	2.6	-32.6	7.5	4.8
Oil importers	-2.8	3.5	11.6	-2.6	16.1	4.3	4.5
Djibouti	-13.9	1.9	-3.7	-0.3	-0.3	-0.3	21.6
Egypt	-6.1	0.2	0.2	-2.2	76.6	5.5	8.5
Jordan	-1.8	7.8	4.1	16.2	18.3	9.9	11.2
Lebanon	4.4	3.1	0.7	-3.0	14.8	4.5	-0.6
Morocco	-2.0	4.3	3.8	-20.3	11.2	4.6	5.9
Syria	-3.7	9.6	-8.5	-1.5	7.7	3.9	4.2
Tunisia	-2.5	6.3	1.0	5.5	8.1	3.9	4.6
Turkey	0.1	4.7	27.8	-13.6	1.1	3.5	0.9
FS countries	**4.0**	**1.7**	**1.7**	**12.4**	**10.1**	**7.2**	**-2.1**
Oil exporters	4.0	1.7	1.7	12.4	10.1	7.2	-2.1
Bahrain	2.6	6.7	8.3	5.8	22.4	6.7	0.3
Kuwait	10.2	-0.9	1.0	-1.9	11.6	7.0	-5.6
Oman	-3.4	5.1	0.2	21.9	-1.1	7.8	4.4
Arab-TI countries (all)	**1.1**	**2.4**	**9.0**	**-0.1**	**12.8**	**5.4**	**0.6**
Arab countries (all)	-3.8	1.0	0.8	9.0	16.7	4.8	6.3
LMICs	**7.0**	**8.0**	**12.2**	**5.0**	**11.8**	**9.1**	**-3.0**
Arab-TI	1.0	2.5	9.5	-0.6	13.1	5.2	0.7
Arab	-4.0	0.9	0.7	8.6	18.8	4.2	6.5
A&P	9.3	8.6	5.7	6.5	13.2	9.8	-4.4
EE&CA	4.9	9.4	11.1	13.0	5.8	11.1	-3.3
LAC	-0.8	10.9	24.6	1.2	11.5	10.4	4.7
SSA	6.6	6.7	11.8	4.2	12.9	5.4	-3.7

Source: Based on IFPRI 2011.

Note: Averages of aggregates are weighted by population size; A&P = Asia and Pacific region; EE&CA = Eastern Europe and Central Asia; LAC = Latin America and the Caribbean region; SSA = Sub-Saharan Africa; FS = food secure; FSC = food security challenged; AgVA = agricultural value-added; Arab-TI = Arab League countries plus Turkey and Iran.

GDP to health than FS countries, and oil-importing FSC countries devote more than oil-exporting FSC countries. In addition, there are large differences among countries: Turkey's health expenditures rose by a high annual rate of 27.8 percent per capita over the period of 2000–07, achieving the second highest spending rate (3.6 percent) among Arab-TI countries in 2007; Egypt's health expenditures, which were slightly higher than Turkey's in 2007 (3.7 percent) grew by only 0.2 percent over the same time period. Syria and UAE drastically cut back their health spending, reaching the lowest expenditure level in the region, accounting for only 0.2 percent of GDP in 2007. Also, Lebanon's per capita health expenditure grew by only about 0.7 percent of GDP in 2007, which is the third-lowest share in the region. In addition to Turkey, Iran and Bahrain increased health spending by more than 5 percent per capita per year in 2000–07. In 2007, Bahrain, Egypt, Jordan, and Turkey spent more than 2 percent of their GDP on health, and Lebanon, Morocco, Syria, and UAE spent less than 1 percent. Similar to the patterns for education expenditure, comparisons of health expenditure and performance in terms of MDGs 4 to 6 reveal no clear relationship, implying that there are also marked differences in the amounts spent per person and the quality of health services. Yet Djibouti's poor performance in several health-related MDG indicators may be the result of continuous underspending in the health sector: since 2000, public spending on health declined by an annual rate of 3.7 percent, reaching an expenditure level of 1.1 percent of GDP in 2007, which is among the lowest rates in the Arab-TI region and lower than the average in Sub-Saharan Africa.

Spending on infrastructure, which refers here to transportation and communication, in the Arab-TI region and particularly in Arab LMICs is high according to global standards; however, the Arab-TI region is the only region where infrastructure budgets have shrunk, albeit slightly (Table 4). The decline in infrastructure spending is particularly pronounced in oil-importing FSC countries, where spending has declined by 2.6 percent per capita per year, while spending has sharply increased by 12.4 percent in (oil-exporting) FS countries (Table 5). In total, eight out of 15 Arab-TI countries cut their per capita infrastructure spending, including Iran, Djibouti, Egypt, Lebanon, Morocco, Syria, Turkey, and Kuwait. The most drastic cuts occurred in Morocco (20.3 percent) and Turkey (13 percent), whereas infrastructure spending sharply increased by more than 15 percent per capita per year in Algeria, Jordan, and Oman.

Arab-TI countries and Arab LMICs in particular have by far the highest level of spending on social protection: more than double that of Eastern Europe and Central Asia and more than four times that of Sub-Saharan Africa (Table 4). In the Arab-TI region, social protection expenditures are also by far the highest single spending account, amounting to 4.7 percent of GDP on average, and 5.3 percent in Arab LMICs. Social protection spending is higher in FS countries than in FSC countries and exceeds 5 percent of GDP in Iran, Egypt, Tunisia, and Kuwait and even 10 percent in Jordan. In Arab LMICs, the social budget grew at an annual rate of 18.8 percent per capita per year between 2000 and 2007 and thus outpaced any other public spending account in the region, as well as public expenditure growth in any other region (Table 5). While only Yemen drastically cut social protection expenditures by 32.6 percent per capita per year, and Oman cut its spending by a much lower rate (1.1 percent). Expenditures surged in Egypt by an annual rate of 76.6 percent and grew by more than 10 percent in Iran, Jordan, Lebanon, Morocco, Bahrain, and Kuwait.

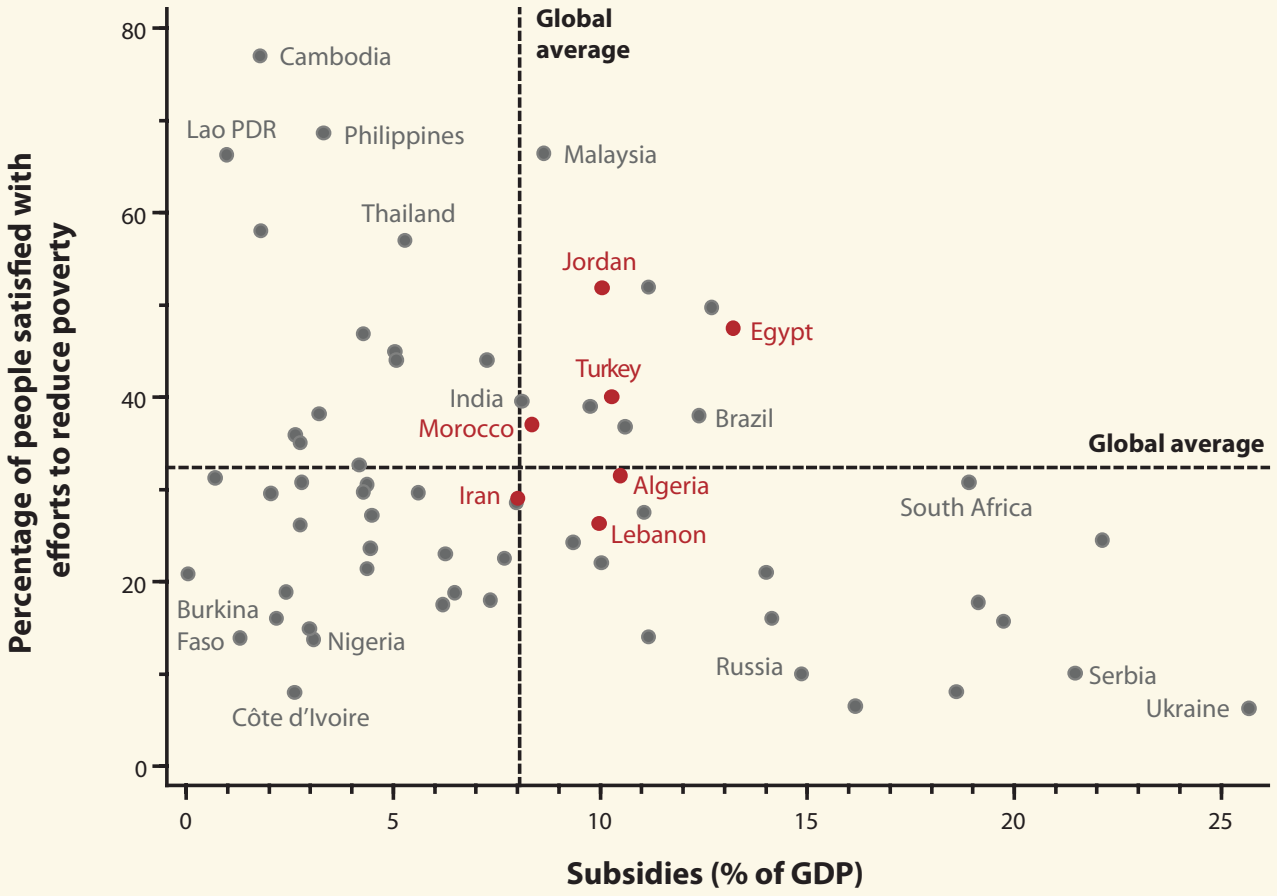
Fuel and, in some countries, food subsidies are often higher than more targeted social spending despite the broad evidence that fuel subsidies in particular strain public finances, distort markets, and provide only a blunt tool in the fight against poverty. In Egypt and Yemen, for example, petroleum subsidies account for more than 4 percent of GDP; other countries that retain substantial fuel subsidies are Tunisia, Jordan, Sudan, and Syria (IMF 2011b).[15] It is usually the better-off households that disproportionally benefit from petroleum subsidies, while targeted social protection measures are more effective and efficient in reducing poverty (Coady et al. 2006; Coady et al. 2010; Breisinger, Engelke, and Ecker 2011; Bacon and Kojima 2006). Several countries, including Egypt, Syria, and Jordan, also retain food subsidies—ranging from 1 to 2 percent of GDP—which are often considered more pro-poor. In Egypt and Syria, food and fuel subsidies (accounting for about 20 percent of public spending) are more

than two-fold higher than spending on social protection programs and health combined. To add to the evidence on the relationship between the level of subsidies and people's well-being, Figure 8 explores an alternative indicator from the 2011 Gallup World Poll dataset. Consistent with the existing literature, comparing subsidies to people's satisfaction levels reveals no clear trend linking the level of subsidies in a country to the people's perception of how the poor are treated, suggesting that subsidy levels are largely unrelated to the poor's well-being.

While the preceding discussion reveals differences and changes in spending priorities between world regions and Arab-TI countries, it only carries limited information on the impact of public spending. Therefore, the following analysis examines the relationship between public spending and economic performance and gives answers to important questions such as whether and to what extent public spending supports economic development in the Arab-TI region.[16]

Similar to the nutrition–growth relationships, the relationships between public spending and growth outcomes in the Arab-TI region differ considerably from the rest of the world (Table 6). In both the rest of the world and in the Arab-TI region, increasing public spending has a positive effect on economic growth. However, this positive effect is much smaller in the Arab-TI region, raising important questions about the efficiency of public spending. To further explore this finding, total government expenditure is disaggregated first into social-sector expenditures (education, health, and social protection combined) and productive-sector expenditures (agriculture and infrastructure combined) and then into the individual

Figure 8—Public satisfaction with government poverty-reduction efforts compared with government spending on subsidies



Sources: Based on Gallup World Poll 2011 and World Bank 2011a.

sectors. Results show that in the rest of the world, social-sector spending is a driver of growth. However, these positive effects are more limited for the Arab-TI region, especially when focusing on the short-run effects (indicated by the reported coefficients). Findings from the model suggest that spending one additional international dollar in the Arab-TI region yields only about half the growth of a dollar spent in the rest of the world, indicating a large potential for improving the allocation and efficiency of social-sector spending in the Arab-TI region (Table 6). Further exploring social spending by sector reveals that the growth effect of health spending is positive in both the rest of the world and the Arab-TI region, and about the same in magnitude. But while education spending in the rest of the world is a major determinant of growth, education spending in the Arab-TI region as a whole has a negative effect on growth, raising serious concerns about the quality of education systems and the effectiveness of public service delivery more broadly.

Table 6—Estimated coefficients (short-run elasticities) of the growth–public spending models: Arab-TI region vs. rest of the world

	Total		Main sector aggregates		Main sectors	
	Arab-TI	*ROW*	*Arab-TI*	*ROW*	*Arab-TI*	*ROW*
Growth (per capita), lagged (t-1)	0.964 ***	0.876 ***	0.993 ***	0.906 ***	0.948 ***	0.964 ***
Public spending (per capita)						
Total expenditures	0.027 *	0.085 *				
Social sectors			0.029 **	0.054 **		
Health					0.020 ***	0.016 **
Education					-0.019 ***	0.017 ***
Social protection					0.008 **	-0.004
Productive sectors			-0.003	0.011		
Agriculture					-0.004	0.009
Infrastructure					0.002	-0.012 **
Other expenditures			-0.006	0.002	0.021 **	0.020 ***
Constant	0.150 **	0.543 **	-0.039	0.543 ***	0.313 ***	0.147
Arellano-Bond test for AR(1), *p*-value	0.031	0.008	0.029	0.007	0.028	0.003
Arellano-Bond test for AR(2), *p*-value	0.240	0.104	0.268	0.033	0.265	0.023
Observations	316	1,146	316	1,146	316	1,146
Instruments	82	82	138	138	222	138
Countries	14	55	14	55	14	55

Source: World Bank 2011a and UNSTAT 2011.

Note: The dependent variable is GDP per capita growth. All models control for country-specific trend effects. The reported coefficients can be directly interpreted as short-run elasticities, indicating the immediate effect of public spending on growth. Long-run elasticities of public spending, which measure the effect of current spending on growth in subsequent years, can be derived by dividing the coefficients through the coefficient of the lagged growth variable. The models were also run using data for the group of Arab countries only (excluding Turkey and Iran). The estimation results in both cases are very similar to the reported ones and therefore not presented here. In addition, model modifications reveal that countries' status as an oil importer or oil exporter related to their food-insecurity risk is not statistically significant in any model specification. Arab-TI = Arab League countries plus Turkey and Iran; ROW = rest of world.

* $p \leq .10$

** $p \leq .05$

*** $p \leq .01$

† Coefficients are almost statistically significant (i.e., $p \leq .15$).

Summary and Policy Recommendations

This report has used innovative data and tools to identify three key focus areas for policymakers and civil society in Arab countries directly and indirectly affected by the Arab Awakening. Findings suggest that poverty and income inequality levels are higher than official numbers suggest. In addition, inequalities between the young and the old (in terms of employment opportunities), men and women (in terms of participation in employment), and rural and urban areas (in terms of living standards) are among the highest in the world. There are also vast disparities among Arab-TI countries, with Kuwait, Qatar, and UAE ranking in the top 10 countries in terms of per capita income, and Comoros, Djibouti, Iraq, Mauritania, Sudan, and Yemen in the bottom third of global income distribution. In addition, disparities in all major MDG indicators are very high, particularly those related to health, such as the child mortality rate and the prevalence of child undernutrition.

Given that existing welfare indicators such as income poverty seem to be misleading for many Arab countries and given the importance of food security for the region, this report introduces the risk of food insecurity as a new measure of well-being, combining (1) food imports as a share of total exports plus net remittances and (2) the prevalence of child undernutrition (measured by child stunting). There are important conceptual and practical advantages to this combined macro–micro approach, including capturing the Arab-TI regions' exceptionally high dependence on food imports (and thus vulnerability to global food price volatility) and the fact that data for almost all countries is available for compiling this innovative index. The index classifies countries into five groups based on their level of food insecurity risk. Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE face low levels of food-insecurity risk. Algeria, Iran, Libya, Turkey, and Tunisia exhibit moderate food-insecurity risk, whereas all other countries experience serious, alarming, or extremely alarming levels of food-insecurity risk. Among the countries with the most food-security risk are Somalia and Yemen, followed by Mauritania and Sudan. The Arab-TI countries are also differentiated by whether they are net oil importers or exporters. This distinction is important given that oil provides significant export earnings for half of the Arab countries and creates fiscal flexibility for governments, which is particularly critical in times of high global commodity prices.

Economic growth on a per capita level has been slow during the past 20 years in many Arab-TI countries and even negative in per capita terms in some countries. Very low annual growth rates (less than 1 percent per capita) were mainly concentrated in conflict-affected countries, including Iraq, Lebanon, West Bank and Gaza, and Somalia. Growth throughout the region has been especially modest in agriculture and manufacturing. Agricultural growth in countries at risk of food insecurity averaged 0.3 percent per capita per year, with negative growth rates for Algeria, Iraq, Yemen, Jordan, Lebanon, Mauritania, Syria, and West Bank and Gaza. While limited agricultural growth can be partly explained by natural resource constraints, manufacturing growth has also been lagging behind other world regions. Manufacturing in Arab-TI countries grew at a modest 1 percent per year on average, and several Arab countries experienced negative per capita manufacturing growth, including Algeria, Iraq, Yemen, Comoros, Lebanon, Mauritania, Syria, West Bank and Gaza, and Kuwait. The countries with the

best manufacturing growth rates include Iran, Sudan, Jordan, Bahrain, and Oman.

Results of this report also show that economic growth does not trickle down to the poor in Arab countries as much as it does in the rest of the world. In other world regions, 1 percent GDP per capita growth reduces the prevalence of child undernutrition by 0.12 percentage points on average; however, statistical evidence did not reveal the same relationship between GDP growth and child-undernutrition reduction in Arab-TI countries. Furthermore, the strong and positive relationship between agricultural growth and reductions in child undernutrition found in other world regions does not apply to the Arab-TI region. There are several structural reasons to explain why agriculture in many Arab countries may not have translated into poverty reduction, including slow agricultural growth in most countries over the past 20 years, the fact that the rural poor earn a large majority of their income from nonagricultural activities, and the finding that it is not always the poorest that depend most on agriculture. In Egypt, for example, the poorest 20 percent of rural households earn only 18 percent of their income from agriculture, whereas the richest 20 percent of rural households earn 36 percent of their income from agriculture. However, it is important to note that there are differences among countries that the cross-country econometric analysis could not fully capture. For example, agriculture will likely have to play an important role in poverty reduction in countries with large agricultural potential, such as Sudan; and agriculture continues to serve as a social safety net in countries such as Egypt, especially in times of crisis. In terms of manufacturing- and service sector–led growth (particularly growth led by the private sector), the Arab-TI region resembles the rest of the world, and results show these sectors drive improvement in poor people's well-being. This type of growth, combined with productivity-driven structural change, has also proven successful for poverty reduction and economic development more broadly in many Asian and Latin American countries, as well as in Turkey.

Government spending is an important tool for supporting private sector–led growth and improving food security. Low- and middle-income countries in the Arab world (and the Arab-TI region) direct the largest share of GDP to public spending compared with all LMICs across the globe. As expected, public spending is highest in FS countries. Within the group of FSC countries, public spending by oil-exporting countries was higher and grew faster during the past years compared with oil-importing countries. Arab-TI countries as a group allocate about the same amount of resources to agriculture (relative to agricultural GDP) as other world regions. Yet Lebanon, Morocco, and Yemen spend very little on agriculture, indicating potential underspending. Spending on infrastructure is comparable to Eastern Europe and Central Asia. But within the region, there are diverging trends in FS and FSC countries: spending has declined by 2.6 percent per capita per year in oil-importing FSC countries, while spending has sharply increased by 12.2 percent in (oil-exporting) FS countries. As for education and health, Arab-TI countries spend more on education and less on health than the average of all LMICs, but budgets in both categories have shrunk in recent years. In a trend that diverges from overall spending, FS countries' spending on education and health grew less than in FSC countries, and that of oil-importing countries grew faster than oil-exporting countries. Arab-TI countries have by far the highest spending on social protection of all world regions which is driven by large public sectors and related benefits such as pensions. In addition, fuel and, in some countries, food subsidies are often higher than spending on social protection programs and health, and these subsidies are often inefficient and ineffective. Despite these relatively high levels of public spending, overall public spending in Arab-TI countries contributes less to economic growth compared with the rest of the world. These findings clearly suggest a large scope for improving the efficiency and effectiveness of public spending, for which selected measures will be discussed in more detail under policy priority area 3.

Several key policy recommendations emerge from this analysis, including the urgent need to (1) improve data and capacity for evidence-based decisionmaking, (2) foster growth that enhances food security, and (3) revisit the allocation and efficiency of public spending. While these priority areas apply in general to all Arab-TI countries, the urgency to act is greater in FSC countries, and measures may differ in countries with macro- compared to micro-level food insecurity

risks. However, it is important to note that the extent to which these and other desirable reforms can be implemented is limited for several reasons. "Reform" has a negative connotation for many people in the Arab world, mainly because policies have often been designed and implemented using a top-down approach, and certain reforms, including trade liberalization and privatization, have previously bypassed the majority and instead benefited only a few. In addition, in Egypt, Tunisia, and elsewhere, many people were hoping for more jobs and better lives when they took to the streets and are now faced with fewer jobs and growing poverty. Policymakers' space for action is further limited by the fact that the Arab Awakening unfolded (and continues to unfold) in the midst of a global crisis, where the debt crisis in Europe and the United States is likely to slow global economic growth prospects and may limit trade prospects and external financial support to the region. In addition to potentially limited foreign aid inflows, extensive fiscal measures such as increases in public-sector wages and subsidies in the run-up to and during the Arab Awakening have left governments, especially in oil-importing countries, with large and growing fiscal deficits and thus limited scope for stimulus measures.

The following policy priority areas and related recommendations take these specific political and economic realities into consideration. Therefore, they mainly focus on measures that do not place additional financial burdens on the countries and are largely budget-neutral.

1. Improve data and capacity for evidence-based decisionmaking.

It is critical that policymakers and voters base their decisions on realistic baselines, because decisions based on flawed data can lead to significant financial losses and damage to economies and people. In addition, admitting that some official numbers (such as official poverty and inequality indicators) may underestimate the extent of the problems many Arab countries face will help to increase the credibility of policymakers and allow them to set targets against which future progress can more realistically be assessed. For these reasons, countries should develop and improve availability, accessibility, and quality of data.

Data often exist but are withheld by governments and related agencies. These existing data, such as household surveys, social indicators, national accounts, consumer prices, and others, should be made available immediately online. Several countries such as Egypt, Morocco, Tunisia, Syria, and Yemen have carried out household budget surveys in recent years, which are the main sources for estimating poverty and conducting related policy analyses. Yet none of them is publically available, and even local analysts often have only extremely limited access to the raw datasets. Key indicators for assessing progress toward the MDGs and other development goals do not exist for many countries. For example, the World Development Indicators database (World Bank 2011a) provides recent income inequality estimates at the national level for only half of all Arab-TI countries, while data by rural–urban disaggregation is available for even fewer countries. Another example is the national accounts data often published with significant time lags (sometimes of several years) and produced only on an annual basis, instead of quarterly, as is common in most middle- and high-income countries. Data on consumer prices at the national and local market levels, which are important for food-insecurity risk and impact analysis, are often inaccessible. Such data should be published in a coordinated and consistent way in national, regional, and global online databases.

In addition to the lack of access, the quality of data matters for policy analysis. In the short run, alternative data can compensate for the lack of reliable data. As demonstrated in this report, these alternative data sources include the Demographic and Health Surveys, Multiple Indicator Cluster Surveys, and the Gallup World Poll, all of which are available for many Arab-TI countries. In the medium to long term, countries have to improve the capacity of staff in statistical offices, ministries, and related agencies to collect, analyze, and evaluate relevant data. New technologies such as personal digital assistants (PDAs), global positioning systems (GPSs), user-friendly software, and flexible interfaces have vastly improved in recent years and often have built-in quality-control mechanisms. Focusing on national and subnational regional offices in staff training can greatly improve the quality of data during collection and processing. There is also large scope for regional cooperation

given the multitude of cross-country data (trade, migration, water flows, and others) and potential for knowledge exchange and transfer.

Providing government budget data organized by detailed categories, function, and subnational levels could greatly enhance public spending analysis and allocation. Data on spending on agriculture, infrastructure, education, health, and other areas are often only available by aggregate sectors (including the data used for the public spending analysis in this report). Countries should expand this data to include a detailed subsector breakdown that allows for more specific analysis of the return on investments. For example, it would be interesting for analysts and policymakers to know what type of infrastructure spending—such as investments in roads, irrigation, electricity networks, railways, or harbors—is the most effective at enhancing growth or reducing poverty. Public spending data collection should be expanded to include the subnational distribution of government resources, which is not included in most databases. This kind of information could help identify potential biases in rural–urban allocation, reveal distribution by governorates, and, more generally, give support to subnational development strategies.

2. Foster growth that enhances food security.

Fostering economic growth is key to enhancing food security, yet different types of growth are likely to be more conducive to enhancing food security at macro or household levels or both. For improving food security at the macro level, export-led growth improves the balance of payment position and generates foreign exchange revenues for food imports. Enhancing food security at the household level requires inclusive growth, which generates jobs and incomes for the poor. Growth, combined with appropriate tax systems, also generates government revenues that can be directed to public spending on food security.

Supporting growth that strengthens macro-level food security is particularly important for those countries with high macro-level vulnerability, such as Algeria, Egypt, Jordan, Lebanon, Sudan, Syria, Yemen, Comoros, Djibouti, Mauritania, Morocco, and the West Bank and Gaza (Figure A1.1). Finding the "right" path to export-led growth is likely to depend on countries' initial conditions, such as geographic location and natural endowments, among other factors. In terms of geographic location, Mediterranean countries can benefit from their proximity to Europe, an export market for "traditional" goods and services such as fresh or processed fruits and vegetables and tourism. In addition, there is a growing market for nontraditional exports such as renewable energy. Mediterranean countries can use their vast potential for solar energy production to meet this growing demand. Access to the sea also makes many Arab countries attractive places for setting up special zone industrial clusters. Important lessons learned from Egypt's experience attracting foreign direct investment to its Northwest Suez Special Economic Zone can be applied to sectors such as textiles and garments, petroleum equipment, automobile assembly, and electrical equipment. These lessons highlight the importance of expecting long planning horizons (10–15 years from start to full operation), including special economic zones in national and urbanization strategies, and creating legislation and infrastructure conducive to these plans (Brautigam and Xiaoyang 2011).

Fostering growth that improves household-level food security must become a key priority, especially in countries with high levels of poverty, including in Djibouti, Egypt, Iraq, Sudan, Somalia, Libya, Mauritania, Syria, and Yemen (Figure A1.2). Results from this report show that growth led by the manufacturing and service sectors is most pro-poor (Table 3), but many countries have seen dismal manufacturing growth, and the manufacturing sector's poverty-reducing effects in Arab-TI countries are weaker than in the rest of the world. Thus, Arab-TI countries need country-level analysis to find the binding constraints on accelerating growth and to identify country-specific reasons why growth does not reach the poor to the same extent it does in other world regions. For example, growth diagnostics for Egypt suggest that inefficient bureaucracy and financial services, high public debt levels, and lack of education are key issues that constrain private sector–led growth (Enders 2007). For Morocco, key constraints include low women's educational coverage, poor institutional capacity, and biased export incentives (López-Cálix 2005). For oil-exporting countries, managing Dutch disease effects—such as overvalued

exchange rates and distortions in the labor markets, both of which compromise the competitiveness of the domestic manufacturing sector—is an important cornerstone of pro-poor growth policy. In addition, and to make growth inclusive, governments need to expand targeted social safety net programs in countries where they are already in place and establish such programs in countries lacking established safety net programs. Labor-intensive public works programs, conditional cash transfers and in-kind transfers, and unemployment insurance are essential for protecting the food insecure. Safety nets should be effectively combined with gender-sensitive interventions that increase the productive capacity and improve the health and nutrition of vulnerable households and individuals (Fan, Torero, and Headey 2011).

Fostering export-led, inclusive growth and targeting transfers to poor households require substantial improvements in institutions and legal frameworks for firms and individuals. The "governance gap" that exists throughout the region has to be closed through improvements in public administration and public accountability overall. It is crucial to build healthy governing institutions in the Arab world so that they are able to provide, make available, and improve opportunities for individuals and private firms to contribute to human and economic development.

Agricultural growth may play a role in enhancing macro-level food security either through growth in agricultural exports or food production for the domestic market. It may also provide incomes to the rural poor. However, the finding that agricultural growth is not pro-poor in the Arab-TI region calls for revisiting the sector's roles, which have traditionally included job creation for the poor, provision of a safety net in times of crisis, development of lagging regions, and provision of environmental services. Structural transformation within the sector still has potential for creating jobs, especially for lower-skilled workers who are often poor. For example, more laborers are required to produce vegetables than to produce cereals, providing huge opportunities for countries with a large share of irrigated cereal production, such as Egypt and Syria, to switch to export-oriented cash crops. In addition, smallholder agriculture continues to provide an important safety net function for farmers and their family members, especially during times of crisis. To support the development of rural areas and lagging regions and the provision of environmental services, Arab governments should shift policies and investments to agriculture and related rural activities through targeted "green box" measures including subnational comprehensive regional development programs and research and development (Minot et al. 2010). Morocco and Tunisia are two countries with significant agro-processing and related export sectors that absorb important surpluses of rural labor, and their experience may provide important lessons for other Arab countries. Subnational development programs, for example for upper Egypt or northeast Syria, should have agricultural supply chains as key components (IFAD 2011). These components would include boosting agricultural productivity in high-value crops, linking farmers to agribusinesses, promoting producer organizations' access to markets, and supplying public services such as health and education.

When designing country-specific growth strategies, emerging challenges should also be closely integrated as they can severely compromise growth. Projections show that in all Arab countries, except Djibouti and Lebanon, water scarcity is likely to become much worse, causing those countries to suffer from extreme water scarcity by 2050 (Figure A3.1). Continued high population growth is likely to put additional pressure on water and other natural resources but may also provide opportunities for development through higher density, specialization, and shorter distances. Assuming that urban areas will not be able to absorb a rapidly growing rural population quickly, rural development must continue to play an important role (Figures A3.2 and A3.3). In addition to constraining economic growth, natural resource scarcity plus projected strong impacts of climate change may also exacerbate conflicts in the region, which already exhibits the highest number and intensity of conflicts in the world (Table A3.1). Evidence shows that countries in political transition (such as Egypt, Tunisa, and Libya) are often at the highest risk of conflict (Collier and Hoeffler 1998). In the context of the Arab Awakening, pessimists frequently point to experiences from Eastern Europe and Sub-Saharan Africa in which power vacuums have led to an increase in civil wars led by armed groups (Kaldor 2006; Duffield 2001). The more optimistic view points to new opportunities that

emerge from the fall of authoritarian regimes, including unique momentum for political and economic reforms. However, more research is needed to support policymakers in their quest to lead a peaceful and successful transition process. In this context, two important interlinked questions need to be answered: (1) What are the major causes of conflicts in Arab countries? and (2) What measures can eliminate these causes?

3. Revisit the efficiency and allocation of public spending.

Arab countries urgently need to assess the efficiency and allocation of public spending. In general, most oil-exporting countries with fiscal space will find it easier to compensate for inefficiencies by increasing spending, while oil-importing countries with fiscal deficits are likely to have to rely mainly on reallocation of spending and improving spending efficiency. However, both oil importers and oil exporters should have a genuine interest in achieving higher returns on their spending. A wide array of country-specific factors affects public expenditure efficiency, such as the level of economic development, size of the public sector, public-sector competence, governance, political stability, security of property rights, and others. As in the case of growth strategies, investment plans have to account for country-specific conditions, and, importantly, they should be linked closely to growth strategies at subsector and subnational levels to ensure maximum consistency and development impact.

As a key element of increasing efficiency, public services need to be overhauled in order to better serve the people and achieve the desired outcomes. Results of this report show that social-sector spending, and most critically education spending, is much less effective in the Arab-TI region compared to the rest of the world (Table 6). This finding is consistent with the often-heard notion that the education systems in most Arab countries have produced schools and universities that lack good technology, appropriate curricula, or motivated teachers and that pump out a large volume of graduates with high career aspirations who do not have skills matched to the labor markets. However, given that education is the foundation for achieving inclusive growth, Arab policymakers will have to prioritize education to address existing skill gaps, better respond to labor market signals, and stimulate knowledge-based capabilities, matching opportunities in the global as well as regional and local economy (UNDP 2009). For example, a growth strategy that builds on manufacturing-led growth for improving food security as suggested by the findings of this report will require building a strong, competitive, and relevant vocational education system. From a demand perspective, the alternative to a general education—vocational training—must be made worthwhile and competitive. Governments should employ national media to dispel the current negative perception of a vocational education and career. Within a national plan, the government should portray both education systems—general and vocational—as complementary in their national development goals. For general education, the curriculum across all education levels should be modified to be competitive, not just nationally but also internationally. Public-sector employment should be consolidated, and teacher and instructor salaries and training must also become competitive in order to align instructor incentives with the government's and people's aspirations of achieving prosperity.

These priority areas may provide a starting point for governments, be they established, in transition, or newly elected, to improve the lives of the people. What is urgently needed are national dialogues about the joint vision of society, not only in terms of political systems, but also economic development pathways. Governments and citizens should be considering key questions: What should the economy look like in 20 years? What relationship should the country have with the global economy and neighboring countries? How much inequality and redistribution are acceptable and necessary? Development strategies based on a joint vision should have answers to more specific questions: Which short- and medium-term goals should be achieved? And what are realistic ways to achieve them? Successful design and implementation of these strategies will require visionary leadership, sound laws and institutions, politicians who are accountable and listen to the voices of the people, and a civil society that is patient and accepts the tenants of democracy. The Arab World has awakened. It is time to take the next steps.

APPENDIX 1

Food-Insecurity Risk Typology

Table A1.1—Composition of the food-insecurity risk indicator and country ranking in Arab-TI countries

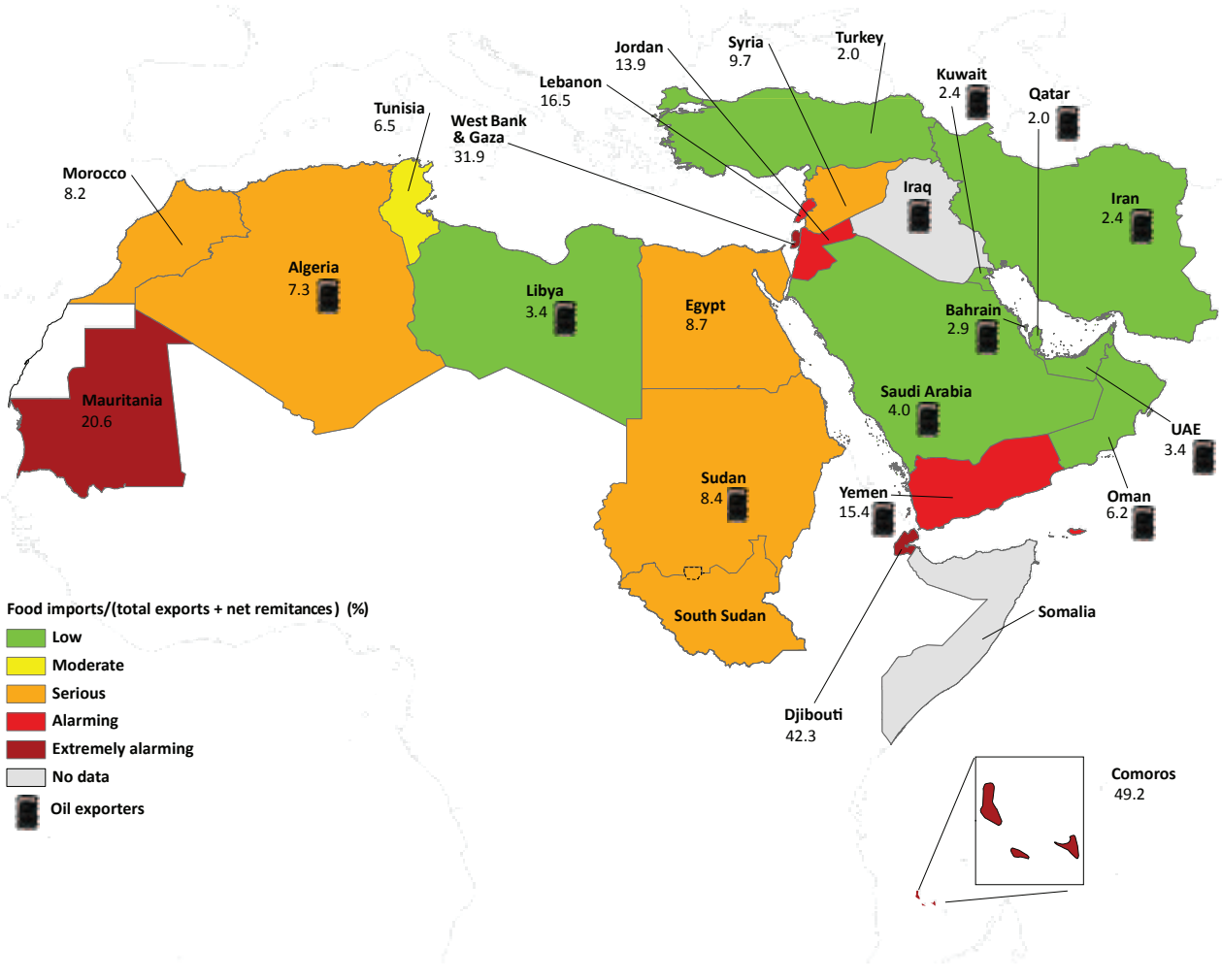
	Food imports (% of GDP)	Total exports of goods & services (% of GDP)	Remittances (net inflows) (% of GDP)	Macro food security (food imports/ (total exports + net remittances)	Micro food security (% of stunted children)	Overall food security (average of macro and micro indicators)	Food-security status
Oil exporter							
Algeria	3.5	47.2	1.4	7.3	15.6 **	11.4	serious
Bahrain	2.5	96.5	-8.6	2.9 *	9.0 **	5.9	low
Iran	0.8	32.3	0.4	2.4	16.6 **	9.5	moderate
Iraq					27.5 [3]		serious
Kuwait	1.4	65.1	-6.2	2.4 *	3.8 [4]	3.1	low
Libya	2.3	68.7	-1.2	3.4	21.0 [5]	12.2	moderate
Oman	3.1	57.6	-8.2	6.2 *	9.6 **	7.9	low
Qatar	1.2	57.5		2.0 *	4.0 **	3.0	low
Saudi Arabia	2.4	65.3	-4.4	4.0 *	9.1 **	6.5	low
Sudan	2.0	19.6	4.1	8.4	37.9 [3]	23.2	alarming
UAE	3.1	89.3		3.4 *			low
Yemen	7.5 [1]	38.0 [1]	11.0 [1]	15.4	59.6 [3]	37.5	ex. alarming
Oil importer							
Comoros	8.3	14.3	2.6	49.2	47.0 **	48.1	ex. alarming
Djibouti	21.8	48.5	3.0	42.3	32.6 [3]	37.4	ex. alarming
Egypt	3.2	31.1	5.3	8.7	30.7 [6]	19.7	serious
Jordan	9.6	52.9	15.7	13.9	8.3 [4]	11.1	serious
Lebanon	5.3	22.9	9.5	16.5	15.0 **	15.7	serious
Mauritania	11.0	53.2	0.1	20.6	24.2 [6]	22.4	alarming
Morocco	3.6	35.8	8.3	8.2	21.6 **	14.9	serious
Somalia					42.1 [3]		alarming
Syria	3.8	36.8	2.0	9.7	28.6 [3]	19.2	serious
Tunisia	3.8	54.6	4.8	6.5	9.0 [3]	7.7	moderate
Turkey	0.5	23.0	0.2	2.0	13.9 **	8.0	moderate
West Bank & Gaza	10.0 [2]	14.0 [2]	17.4 [2]	31.9	11.8 [5]	21.9	serious

Source: Based on World Bank 2011a and FAO 2011b.

* High-income countries; ** predicted for 2008.

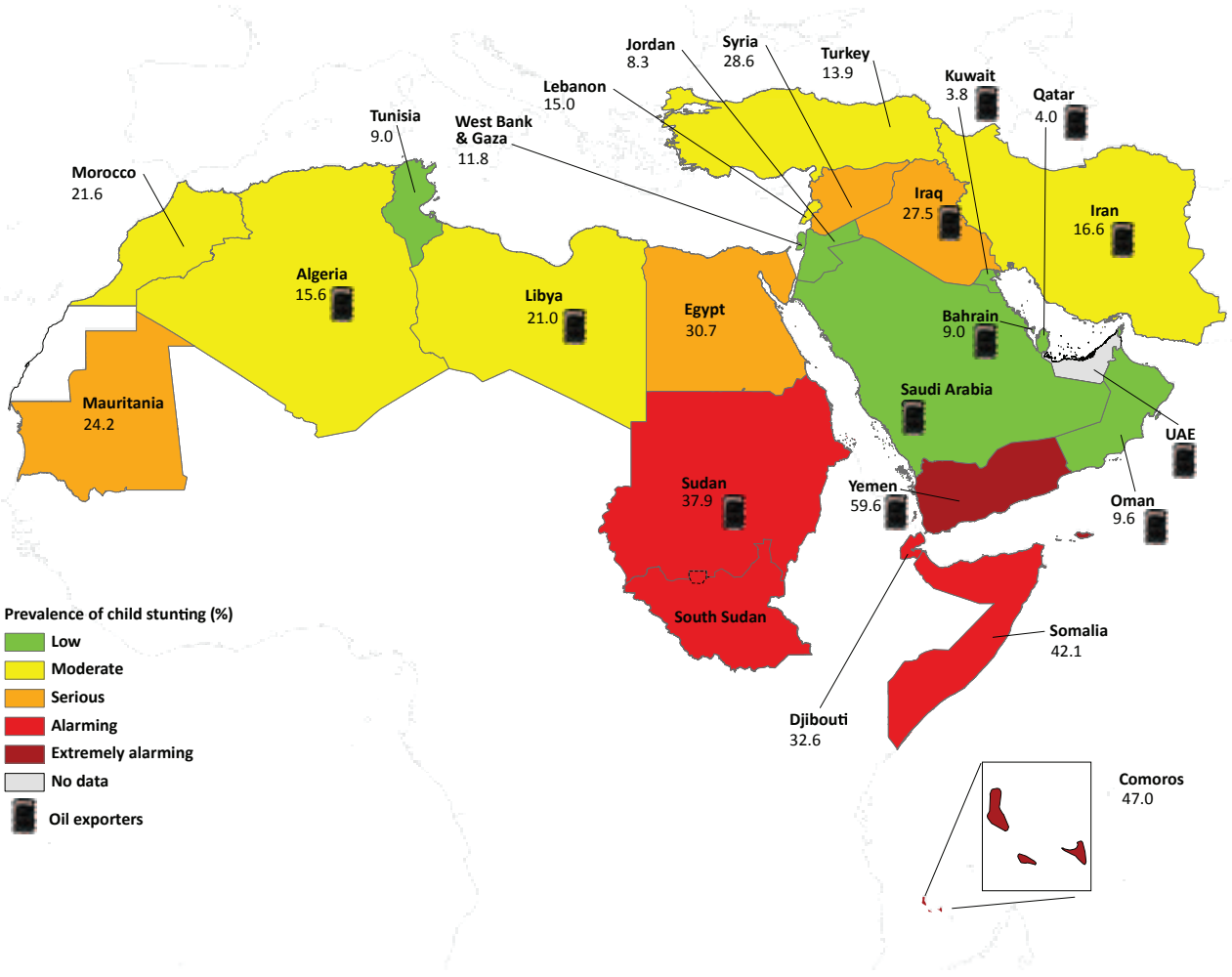
Latest estimates: [1] = 2003, [2] = 2005, [3] = 2006, [4]= 2009, [5] = 2007, [6] = 2008.

Figure A1.1—Macro food-insecurity map: Arab-TI countries



Sources: Authors' calculations based on data from FAO 2011b and World Bank 2011a.
Note: UAE = United Arab Emirates.

Figure A1.2—Micro food-insecurity map: Arab-TI countries



Sources: Authors' calculations based on data from FAO 2011b and World Bank 2011a.
Note: UAE = United Arab Emirates.

APPENDIX 2

Methodology of Econometric Estimations

This appendix contains explanations of the specifications for the nutrition–growth, and growth–public spending models presented in Section 3, "Analyzing the Impact of Economic Growth and Public Spending." It also briefly describes the underlying theory. The overall objective is to analyze the impact of economic development on poverty at the supranational level, particularly for the Arab-TI region (the Arab League countries plus Turkey and Iran). Given the serious doubts about the reliability of common income poverty measures for many countries in the region, the prevalence of poverty is proxied by the prevalence of undernutrition among children. In general, there are two main channels through which economic development translates into improved nutrition outcomes (and poverty reduction): First, growth in GDP may lead to higher household incomes, better economic access of the undernourished population to nutritious food and nutrition-relevant services, and, consequently, an improved nutritional status. Second, investments in public sectors relevant for nutrition, such as health and education, may improve people's physical access to available services, the availability and quality of needed services, and, ultimately, nutrition outcomes. Investments in public sectors can also contribute to economic growth—for example, through the construction of new hospitals and schools. This analysis focuses on the nutrition–growth and growth–public spending relationships.

The choice of the models used to analyze the relationships is constrained by the availability and quality of national and subnational data, especially for Arab countries. The analysis dismantles the linkages among economic growth, public spending, and nutrition outcomes, and thus it models the effect of growth on nutrition and the effect of public spending on growth separately. The applied estimation models are reduced-form models that are suitable to explore assumed relationships between variables. Given the regional focus of this analysis (and data limitations at subnational levels), cross-country data are used to detect and explain differences in the relationships for the Arab-TI region compared with the rest of the world. Comparing the Arab-TI region to the rest of the world is particularly useful in terms of adopting lessons learned from other regions. Thus, the guiding research questions are the following:

1. Do overall economic growth and sector growth contribute to nutrition outcomes at different margins in the Arab-TI region compared with the rest of the world?

2. Does public spending contribute to overall economic growth at different margins in the Arab-TI region compared with the rest of the world, and what is the effect of spending in the critical public sectors?

1. The Nutrition–Growth Model

It is well established in the nutrition economics literature that there is a causal relationship between economic development and improved nutrition outcomes, along the lines outlined in the conceptual framework in Figure 2. Several previous studies showed that the nutritional status of children improves with growing household incomes in a statistically significant manner and at decreasing margins, and that the potential of income growth for reducing child undernutrition is distinctly limited (Alderman, Hoddinot, and Kinsey 2006; Behrman and Wolfe 1984; Christiaensen and Alderman 2004; Haddad et al. 2003). Other factors are critical for children's nutrition and may be even more important than the incomes of their households. These include education and specific knowledge of the parents, particularly the child's mother; gender equality; spread of infectious diseases and child immunization; and access to clean drinking water, hygienic sanitation, and good maternal and child healthcare (Behrman and Deolalikar 1990; Black, Morris, and Bryce 2003; Block 2004; Glewwe 1999; Smith, Ruel, and Ndiaye 2005; Thomas 1990). Many of these factors tend to also improve with economic growth in the long run. Some more recent studies show that overall economic growth measured as GDP per capita

indeed translates into reduced child undernutrition at the population level (for example, Headey 2011; Ecker, Breisinger, and Pauw 2011).

To estimate the growth effects on nutrition over time, the present analysis applies models with variables in first differences, unlike most previous studies, which use a levels approach. In first-difference estimations and in a cross-country setup, the dependent nutrition variable and the deterministic variable(s) measuring national income or sector value-added enter the model in relative terms (for example, GDP per capita growth rates) rather than absolute values (for example, GDP per capita in international dollars), as in estimations in levels. However, the levels approach involves two main drawbacks (Headey 2011): First, the interpretation of levels pertains to the very long run. For example, the levels approach is suited to explain differences in the levels of undernutrition across countries, which have emerged over centuries and decades rather than years, but it is less suitable to estimate the relative changes in the prevalence of undernutrition due to economic growth, as intended in this report. Second, the levels approach allows accounting only for stationary, country-fixed effects, not for country-specific trend effects that may occur in time-series data. Hence, if these fixed effects are correlated with the error term, the estimates are biased (Christiaensen, Demery, and Kuhl 2011). An example of this bias is that widespread chronic undernutrition in a country affects the country's economic performance in the long run through reduced human capacity and productivity (Fogel 1994). Our first-difference estimations overcome these drawbacks.

Using time-series data from a cross-country sample, estimations in first differences were recently applied to estimate the growth effects on the prevalence of (income) poverty (Christiaensen, Demery, and Kuhl 2011) and, in modified form, to estimate the growth effects on the prevalence of child undernutrition with a focus on India (Headey 2011). The estimations in this report adopt the basic approach of these previous studies but use model specifications adjusted to the context of the study purpose.

Let N_i be any decomposable measure of nutrition and Y_i any measure of national income in country i. The (point) elasticity of nutrition (levels) with respect to income (levels) in country i is then defined as

$$\eta_i = \left(\frac{dN_i}{N_i}\right) / \left(\frac{dY_i}{Y_i}\right) = \frac{dlnN_i}{dlnY_i}$$

The proportionate change in nutrition is divided by the proportionate change in income. For small changes, the nutrition-income elasticity can be approximated by:

$$dlnN_i = \eta_i dlnY_i \,. \tag{1}$$

Following Christiaensen, Demery, and Kuhl (2011), the income elasticity of nutrition (η_i) in Equation (1) is denoted as the participation component and $dlnY_i$ as the growth component of the nutrition change ($dlnN_i$) in country i. Since not all growth processes generate an equal amount of overall growth and an equal amount of nutrition change, overall growth is decomposed into agricultural and nonagricultural growth. Nonagricultural growth is further decomposed into manufacturing, other (nonmanufacturing) industry, and service sector growth. Depending on the structure of a country's economy, the level of growth, and the extent to which sector growth translates into nutrition changes (World Bank 2000), the participation and growth components may differ considerably across sectors. Accordingly, growth in national income (Y_i) can be approximated by the sum of the share of weighted growth rates of sectors (Christiaensen, Demery, and Kuhl 2011), so that Equation (1) can be rewritten as

$$dlnN_i = \sum_x (\eta_{ix} s_{ix}\, dlnY_{ix}), \quad \text{with} \quad x = Ag, nAg; Ag, Ma, In, Se. \tag{2}$$

In Equation (2), η_{ix} refers to the participation component of the sector x in the country i's economy, s_{ix} is the share of sector x's contribution to national income i (Y_i), and $dlnY_{ix}$ is the sectoral growth rate. In the first growth decomposition, overall growth is split into growth in agricultural (Ag) and nonagricultural sectors (nAg). In the second decomposition it is split into growth in agricultural, manufacturing (Ma), other industry (In), and service (Se) sectors.

The sectoral participation component (η_{ix}) measures the response of overall nutrition to aggregate growth originating in the particular sector, that is, the sector growth effect controlled for the sector's size (Christiaensen, Demery, and Kuhl 2011). It indicates the extent to which all the undernourished children depend on overall growth generated in this sector. The coefficients produced by the regressions yield only this "reduced" elasticity directly. However, it is of particular interest when asking to which sector an investment and growth policy should give priority when reducing undernutrition is the policy objective. When the participation components of all sectors are equal ($\eta_{Ag} = \eta_{nAg}$; $\eta_{Ag} = \eta_{Ma} = \eta_{In} = \eta_{Se}$), the source of growth no longer matters for determining the nutrition effect of growth, and Equation (2) collapses to Equation (1). Hence, the nutrition effect of growth in a particular sector ($dlnY_{ix}$) may differ from that in another sector because of a different sector size or, if sectors are of equal size, different marginal effects of the (equal) sector growth rates on nutrition (Christiaensen, Demery, and Kuhl 2011). The latter is the case when one sector employs more undernourished individuals than others, for example.

In this analysis, the extent of undernutrition is measured by the prevalence of child stunting expressed as a percentage, the level of national income is measured as GDP per capita, and the sector shares in the overall economy are given by the percentage of sector value-added (VA) in total GDP. GDP and sector value-added are available annually, while child stunting is surveyed irregularly and infrequently across countries (about every five years on average). Given that the dependent variable is already measured in relative terms, that is, the percentage of stunted children in the population of all children, the basic model of Equations (1) and (2) is slightly modified for estimation. Following Headey (2011), the equations of the empirical model are estimated as

$$\Delta N_{it} = \eta \Delta lnY_{it} + \varphi N_{it-1} + \gamma Z_i + u_{it} \tag{3}$$

and

$$\Delta N_{it} = \sum_x (\eta_x s_{xt-1} \Delta lnY_{ixt}) + \varphi N_{it-1} + \gamma Z_i + u_{it}, \quad \text{with } x = Ag, nAg; Ag, Ma, In, Se, \tag{4}$$

where ΔN_{it} is the percentage-point change in the prevalence of child stunting in country i and time period t, and ΔlnY_{it} and ΔlnY_{ixt} are the overall and sector-specific growth rates, respectively, in the same time period. This model specification produces coefficients of the nutrition–growth effects (η, η_x) that can be directly interpreted as nutrition–growth (point) elasticities. These elasticities give the average percentage change in the prevalence of child stunting due to 1 percent GDP growth or 1 percent overall GDP growth generated by a particular sector, respectively. Given that the percentage change in child stunting may be subject to the initial child stunting level, assuming declining margins in reducing child undernutrition, the prevalence of child stunting initial to period t (that is, the prevalence rate at the end of period ($t-1$) ($N_{it}-1$) enters the equations as a deterministic variable. Yet the estimates of the models may still be biased by omitted or unobserved variables that are correlated with the deterministic variables while also affecting the dependent variable. To control for these country-fixed trend effects in a general manner, the equations are augmented by a set of country-specific dichotomous variables (Z_i).[17] As an example of such a bias emerging over time, an increasing child vaccination

rate may be an outcome of accelerated growth because of growing funding for child health campaigns. Vaccination stimulates children's immune systems to resist against diseases causing nutrient loss (through diarrhea, for example) and reducing nutrient absorption and appetite. Higher vaccination rates improve more children's nutritional status, in addition to the positive nutrition effects resulting from higher incomes directly. In Equations (3) and (4), η (and η_x), φ and γ are the coefficients to be determined by the regressions, and u_{it} is a white-noise error term.

To identify differences in the nutrition–growth relationships in the Arab-TI region compared with the ROW, the presented models are run for the sample of Arab-TI and ROW countries separately. Growth is decomposed in its sector components stepwise, so that the relationship is successively estimated for (1) overall growth; (2) agriculture and nonagriculture growth; and (3) agriculture, manufacturing, other industry, and service sectors growth.

Both the prevalence of child stunting and GDP and sector value-added (as a share of GDP) are obtained from the World Development Indicators databank (World Bank 2011a). Child stunting data are complemented with data from Ecker, Breisinger, and Pauw (2011) for Yemen, and GDP and sector value-added are complemented with data from the UN Statistics Division database for 2011. Since GDP data partly differ between the World Development Indicators databank and the UN Statistics Division database, missing values are computed based on the level values from available years in the World Development Indicators databank and growth rates from the UNSTAT database (UNSTAT 2011). In those few cases where the prevalence of child stunting was available before or after the GDP observation period, child stunting rates are interpolated to yield child stunting estimates for the beginning or end year of the GDP observation period. All estimations are weighted by population size in the years of observation divided by the number of the observed years in order to obtain an average based on population size and accounting for the unbalanced nature of the sample.

The models have several important limitations, which emerge mainly from limitations in the data, and these need to be kept in mind when interpreting the estimation results. The models do not identify the channels through which GDP growth and sector growth translates into reduced child undernutrition. For example, it is not possible to determine by how much improved child nutrition results from increased food expenditure due to higher household incomes directly or indirectly through improved access to education and health care or changing norms. One might incorporate several proxy variables for different channels such as literacy rates, immunization rates, rates of improved water and sanitation access, gender equality measures, and so on. These, however, would reduce the number of observations tremendously, because they are not consistently available and, in the case of many Arab-TI countries, are missing altogether. Furthermore, including such variables could cause an endogeneity problem, since these indicators tend to improve with economic growth resulting from higher public spending on education, health, and infrastructure. Thus, by omitting these variables, the model focuses on the nutrition-income link. The nutrition effects of growth in informal sectors cannot be studied because of a lack of data. Finally, despite the fact that estimations in first differences are generally less prone to endogeneity problems than level-based estimations, it is hardly possible (or desirable) to control for all potential sources of resulting biases.

2. The Growth–Public Spending Model

Governments can foster economic growth by increasing public spending on investments and consumption, and they can prioritize sectors through adjustments in public spending allocation. Growth effects of different types of public expenditure have been widely studied for many developing countries, including Arab countries such as Egypt (Fan et al. 2007). Some studies, including Devarajan, Swaroop, and Zou (1996), Gregoriou and Gosh (2009), and López (2004), have also analyzed growth–public spending relationships in a cross-country context. The current analysis contributes to this body of literature and adopts an established approach for estimation of

the empirical model. A general production function explaining national income as an outcome of different types of capital input (including human, social, and physical capital) provides the theoretical foundation of growth–public spending models (Fan, Zhang, and Zhang 2002).

Estimating the effects of fiscal policy on growth involves several data requirements and econometric concerns (Roodman 2006). First, the growth process is dynamic, with current growth influenced by that in the past. This calls for using time-series data and including growth during the previous period(s) as regressor(s) in the equation. Second, there may be arbitrarily distributed fixed individual effects in the data. This argues in favor of panel setups, where variation over time can be used to identify parameters, and against cross-section regressions, which must essentially assume fixed effects. Third, some regressors may be endogenous. In addition to the deterministic variable(s) of past growth, having current government expenditure as regressor can yield biased results if it is not accounted for. Current government expenditure can be assumed to be predetermined but hardly strictly exogenous, since past growth and growth expectations influence current budget allocation.

Given these features, linear dynamic panel-data models, which include lags of the dependent variable as covariates and contain unobserved panel-level effects, provide an appropriate estimation approach. Arellano and Bond (1991) derived a consistent generalized methods-of-moments (GMM) estimator for these models, which is often called "difference GMM." To provide a more powerful alternative, the Arellano-Bond estimator was augmented by Arellano and Bover (1995) and fully developed by Blundell and Bond (1998). This version is known as "system GMM." Both estimators are designed for dynamic panels with a large number of panel variable observations and a small number of time period observations and may contain fixed effects separate from them, idiosyncratic errors that are heteroskedastic and correlated within but not across individual observations of the panel variable (Roodman 2006).[18] Since the estimators are designed for general use, they do not assume that good instruments are available outside the immediate data set but rather that the only available instruments are "internal," which are constructed based on lags of the instrumented variables (Roodman 2006). Dynamic panel-data models with difference or system GMM have become increasingly popular growth–public spending models and have been used in a cross-country framework by Gregoriou and Gosh (2009) and López (2004), for example. Roodman (2006) provides an introduction to linear panel-data models and the difference and system GMM estimators and developed a flexible STATA code for estimation of system GMM models (*xtabond2*). This analysis applies the system GMM estimator, because it reduces finite-sample bias, increases efficiency, and is robust to any patterns of heteroskedasticity and cross-correlations.

Following Roodman (2006), the basic dynamic panel-data model is given as follows:

$$y_{it} = \beta_1 x_{it} + \beta_2 w_{it} + u_{it}, \text{ with } u_{it} = v_i + \varepsilon_{it}. \tag{5}$$

The indexes i and t denote the individual and the time period observation. y_{it} is the dependent variable, and v_i comprises unobserved individual-level effects. x_{it} is a vector of strictly exogenous covariates (which depend on neither current nor past ε_{it}), and w_{it} is a vector of predetermined covariates (which may include the lag of the dependent variable) and endogenous covariates, all of which may be correlated with the individual-level effects.[19] β_1 and β_2 are vectors of parameter to be estimated, and ε_{it} is a white-noise error term. The basic assumptions are as follows:

$$E(v_i) = E(\varepsilon_{it}) = E(v_i * \varepsilon_{it}) = 0 \quad \text{and}$$
$$E(\varepsilon_{it} * \varepsilon_{js}) = 0 \quad \text{for each } i, j, t, \text{ and } s, \text{ and with } i \neq j. \tag{6}$$

Transforming Equation (5) into first differences eliminates a potential source of omitted or unobserved variable bias in the estimation by removing v_i from the equation. However, differencing variables that are predetermined but not strictly exogenous makes them endogenous (Roodman 2006). The difference and system GMM estimators, therefore, instrument the differenced variables, which are not strictly exogenous, with all their available lags in levels. Arellano and Bond (1991) also developed a test for autocorrelation in first differences that can render some lags invalid as instruments and determine which statistics are automatically displayed when using Roodman's STATA code.[20]

A weakness of the original Arellano-Bond estimator is that lagged levels are poor instruments for first differences if the variables are close to a random walk (Roodman 2006). In addition, difference transformation may remove the long-term effects incorporated in the raw data from the estimation equation, and resulting estimates capture the short-term effects only (here, within one budgeting year) (Hsiao 1986; Munnel 1992). However, if the original equation in levels is added to the system, additional instruments can be created, increasing estimation efficiency (Arellano and Bover 1995). This equation consists of variables in levels instrumented with lags of their own first differences and requires the assumption that the differences are uncorrelated with the unobserved individual-level effects (v_i). Thus, the system GMM estimator uses both levels and first differences to instrument the endogenous variables, while the difference GMM estimator uses first differences only. Roodman's STATA code for system GMM performs tests of overidentifying restrictions and reports their statistics by default. The performed tests are the Sargan test of overidentifying restrictions, the difference-in-Sargan tests of exogeneity of instrument subsets for the standard estimation specification, the Hansen test (in addition to the Sargan test) of overidentifying restrictions, and the difference-in-Hansen tests of exogeneity of instrument subsets for the robust, one-step estimation that is the specification used in this analysis.

In the estimation model, the dependent variable (y_{it} in Equation 5) is countries' annual GDP per capita that also enters the equation as lag for the previous year on the right-hand side of the equation and thus as an endogenous variable (included in vector w_{it} in Equation 5). Current government expenditure per capita (and its item subtotals) is the deterministic variable of main interest and assumed to be predetermined but not strictly exogenous (included in vector w_{it} in Equation 5). The lag of GDP and current expenditure variables are specified to be used as bases for GMM-style instruments, as described in Holtz-Eakin, Newey, and Rosen (1988) and Arellano and Bond (1991).[21] It is further specified that one instrument for each variable and lag distance is computed, rather than one for each variable, time period, and lag distance, as in the standard specification of Roodman's STATA code. To generally account for external shocks affecting the countries' economies and varying over time (such as changes in world interest rate or prices), a vector of dichotomous variables identifying the years of observations is introduced in the estimation equation, treated as strictly exogenous, and specified as a set of variables to serve as standard instruments. Both the Arellano-Bond test statistics for autocorrelation and the Sargan/Hansen test statistics of overidentifying restrictions suggest that most of the models presented in this report yield statistically valid estimates.[22] All continuous variables enter the model in logarithms (of levels), so that the estimated coefficients can be directly interpreted as short-run elasticities. In addition, long-run growth elasticities with respect to government expenditure(s) can be easily computed by dividing the estimated coefficient(s) of the government expenditure variable(s) by one minus the estimated coefficient of the lagged growth variable (if coefficients are statistically significant).

The growth–public spending analysis follows the same principles of a stepwise decomposition as the nutrition–growth analysis. The growth–public spending relationship is estimated for Arab-TI countries and ROW countries separately, while the regression is successively run for (1) total current government expenditures; (2) social sector, productive sector, and other sector expenditures; and (3) health, education, social protection, agriculture, and infrastructure expenditures and other sector expenditures. These sector expenditures are described in Table A2.1 in detail.

Public spending data are available from IFPRI's Statistics of Public Expenditure for Economic Development (SPEED) database (IFPRI 2011). The GDP data are the same ones used in the nutrition–growth model. All estimations are weighted by population size in the years of observation divided by the number of the observed years in order to obtain a population size-based average and account for the unbalanced nature of the sample.

The models have several important limitations that emerge mainly from data limitations and need to be kept in mind when interpreting the estimation results: The number of countries with available data is relatively small, with 14 from the Arab-TI region and 55 from low- and middle-income countries in the ROW. By looking at annual growth and current government expenditure, the estimations pertain to the short run rather than the long run. Yet the returns to investment, especially of large infrastructure projects such as ports, airports, and road networks, materialize many years after the initial investment and over a long time period that may be out of the time horizon of this analysis. Because of missing data, the analysis also cannot differentiate between recurrent and capital expenditure shares having fundamentally different growth effects, and investments of the private sector cannot be factored in. Finally, public sector expenditures can be highly correlated and may lead to biased estimates in the most disaggregated model specifications.[23]

Table A2.1—Definition of public spending items (according to IMF Government Finance Statistics classification)

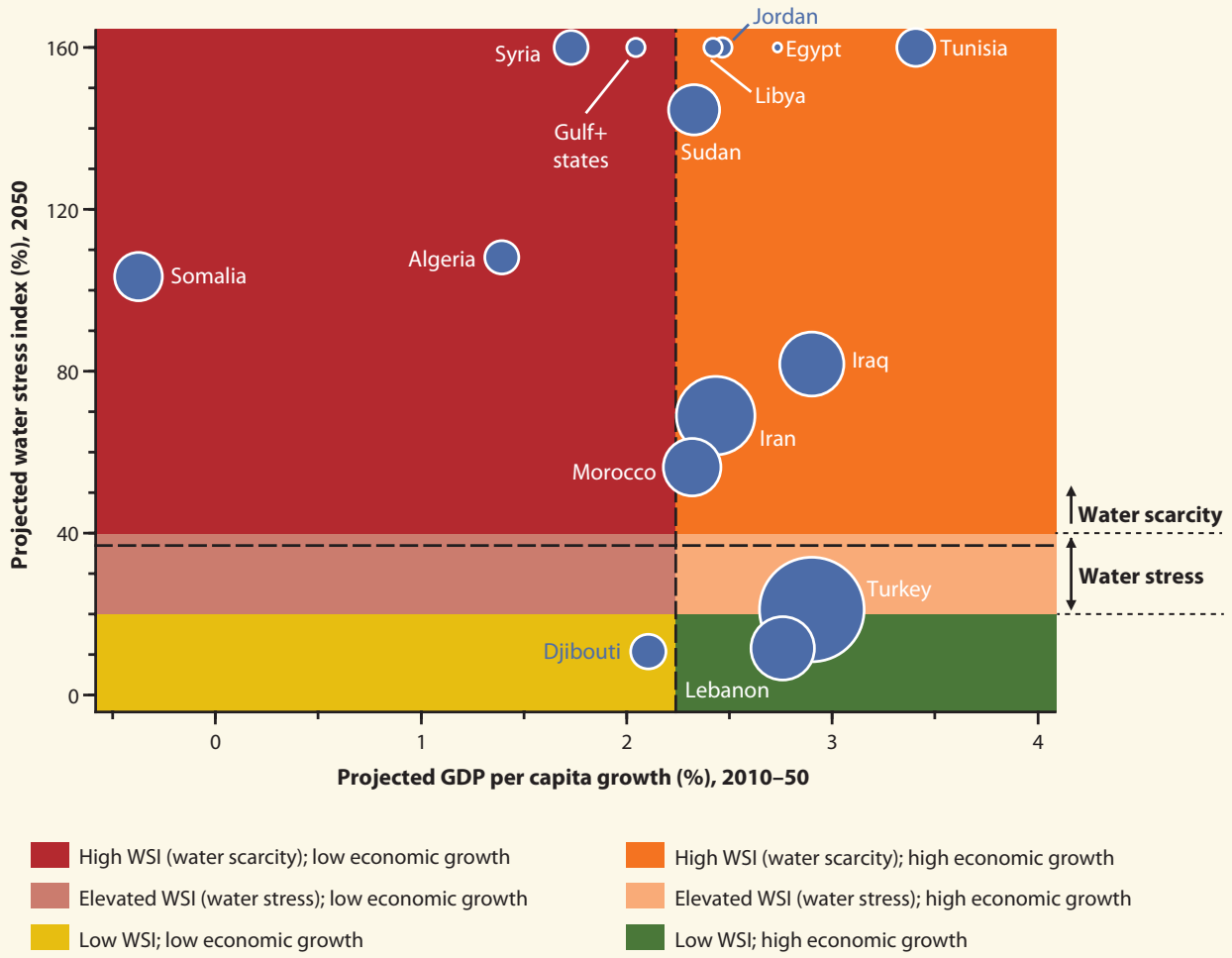
Sector	Definition
Health	Administration, operation, or support of overall health policies, plans, programs, and budgets; preparation and enforcement of legislation and standards for the provision of health services; production and dissemination of general information, technical documentation, and statistics on health.
Education	Expenditures on services provided to individual students and expenditures on services provided on a collective basis.
Social protection	Transfer payments, including payments in kind (to compensate for reduction/loss of income or inadequate earning capacity); administration, management, or operation of social security affairs involving chiefly provision of benefits for loss due to sickness, childbirth, or temporary disability resulting from industrial and other accidents—includes maternity benefits; administration, management, or operation of retirement, pensions, or disability plans for government employees, both civil and military and their survivors; administration, operation, and support of old age, disability, or survivor's benefits; unemployment compensation benefits; family and child allowances; welfare affairs and services (children's and old age residential institutions, handicapped persons, and other residential institutions).
Agriculture	Administration of agricultural, forestry, fishing, and hunting affairs and services; conservation, reclamation, or expansion of agricultural land and water; supervision and regulation of the agricultural industry; operation or support of agriculture; compensation, grants, loans, or subsidies to farmers in connection with agricultural activities; construction or operation of flood control, irrigation, and drainage systems; production and dissemination of general information, technical documentation, and statistics on agricultural affairs and services; grants, loans, or subsidies to support commercial agricultural activities.
Infrastructure	Administration of affairs and services concerning operation, use, construction, and maintenance of road, water, railway, air, and pipeline transport and communication systems and facilities; supervision and regulation of transportation and communication users; construction or operation of transport and communication systems and facilities; production and dissemination of general information, technical documentation, and statistics on transport, communication system operations, and construction activities.

Source: IMF 2011a.

APPENDIX 3

Growth Challenges

Figure A3.1—Water stress and economic growth outlook in Arab-TI countries



Source: Author's graph based on IFPRI's IMPACT model and data from World Bank 2011a, and FAO 2011a.

Note: Persian Gulf states included here are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE, and Yemen. Data for Comoros, Mauritania, Sudan, and West Bank and Gaza are missing.

The bubble graph shows the relationship between projected water stress in the Arab-TI countries in 2050 and projected long-term economic growth from 2010 to 2050. Water stress in a country is measured by the Water Stress Index (WSI)—an index of total water withdrawals as a share of internal renewable water resources developed by Veolia Water (2010). A country is considered "water stressed" if the WSI value is between 20 and 40 percent, and "water scarce" if the index value is above 40 percent. These two thresholds represent degrees of sustainability of water withdrawals from river basins within the borders of a country. It should be noted that several Arab-TI countries traditionally withdraw large shares of their water from rivers that are filled for the most part in other countries, as is the case in Egypt, and desalinated sea water, as several Persian Gulf states do; these do not appear in the internal water resources measurement of the countries. The volume of a bubble (not the cross-section area of the bubble) is proportional to the total internal renewable water resources per capita in 2010. The dashed horizontal line represents the global average WSI value projected for 2050. The dashed vertical line represents the global average economic growth rate projected for 2010–50.

Table A3.1—Conflicts in the Arab-TI region

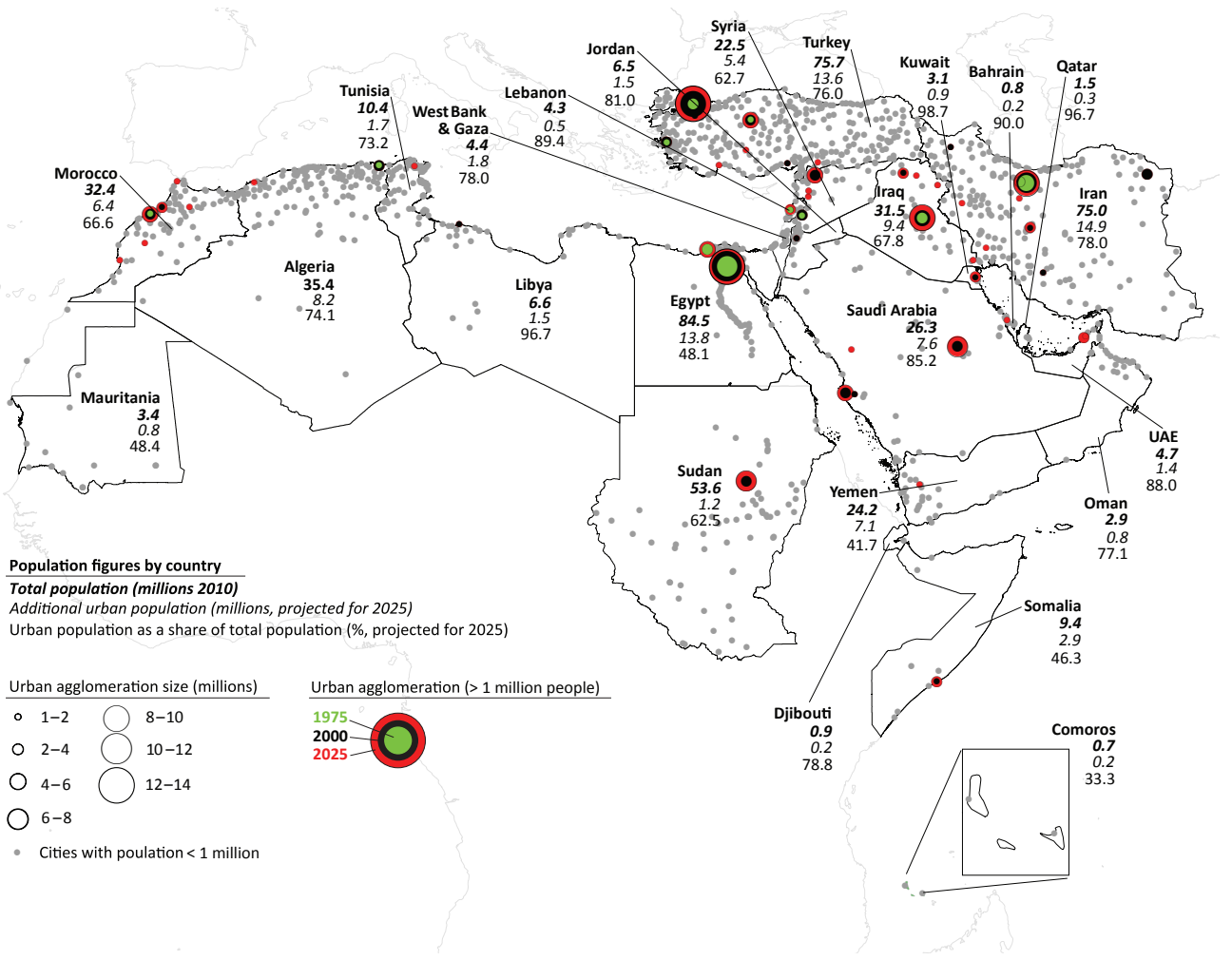
	Major episodes of political violence - Polity IV									
	Number of societal and interstate conflicts (average intensity; 1–10)						Number of societal and interstate conflicts			
	1980–1989		1990–1999		2000–2008		2009	2010	2011	2009–2011
Food-security challenged countries	**45**	**(5.82)**	**60**	**(4.02)**	**40**	**(4.08)**	**4**	**4**	**7**	**15**
Oil exporters	*16*	*(7.38)*	*36*	*(4.58)*	*28*	*(4.00)*	*3*	*3*	*4*	*10*
Algeria	0		9	(4.00)	5	(4.00)	0	0	0	0
Iran	8	(8.50)	8	(4.00)	0		0	0	0	0
Iraq	1	(8.00)	8	(4.50)	9	(4.33)	1	1	1	3
Libya	0		0		0		0	0	1	1
Sudan	7	(6.00)	10	(6.00)	9	(5.33)	1	1	1	3
Yemen	0		1	(1.00)	5	(1.00)	1	1	1	3
Oil importers	*29*	*(4.97)*	*24*	*(3.17)*	*12*	*4.25*	*1*	*1*	*3*	*5*
Comoros	0		0		0		0	0	0	0
Djibouti	0		4	(1.00)	0		0	0	0	0
Egypt	0		8	(1.00)	0		0	0	1	1
Jordan	0		0		0		0	0	0	0
Lebanon	10	(8.20)	2	(7.00)	3	(2.00)	0	0	0	0
Mauritania	1	(2.00)	0		0		0	0	0	0
Morocco	10	(3.00)	0		0		0	0	0	0
Somalia	2	(5.00)	10	(5.00)	9	(5.00)	1	1	1	3
Syria	6	(3.33)	0		0		0	0	1	1
Tunisia	0		0		0		0	0	0	0
Food-secure countries	**10**	**(3.20)**	**12**	**(3.33)**	**10**	**(1.00)**	**0**	**0**	**0**	**0**
Oil exporters	*0*	*0.00*	*2*	*(5.00)*	*5*	*(1.00)*	*0*	*0*	*0*	*0*
Bahrain	0		0		0		0	0	0	0
Kuwait	0		2	(5.00)	0		0	0	0	0
Oman	0		0		0		0	0	0	0
Qatar	0		0		0		0	0	0	0
Saudi Arabia	0		0		5	(1.00)	0	0	0	0
United Arab Emirates	0		0		0		0	0	0	0
Oil importers	*10*	*(3.20)*	*10*	*(3.00)*	*5*	*(1.00)*	*0*	*0*	*0*	*0*
Turkey	10	(3.20)	10	(3.00)	5	(1.00)	0	0	0	0
Arab countries plus Iran and Turkey*	**2**	**(5.35)**	**2.8**	**(3.90)**	**2.1**	**(3.46)**				
Asia and the Pacific	4.5	(4.42)	3.8	(3.95)	2.7	(3.53)				
Eastern Europe & Central Asia	0.6	(3.18)	1.2	(2.86)	0.4	(2.78)				
Latin America & Caribbean	2.6	(3.62)	1.5	(3.42)	0.6	(2.88)				
Sub-Saharan Africa	2.1	(4.00)	3.1	(3.31)	1.8	(2.89)				

Source: Center for Systemic Peace 2011.

Note: Countries with conflicts are those with major episodes of political violence. Major episodes of political violence are situations characterized by the systematic and sustained use of lethal violence by organized groups that result in at least 500 directly related deaths. Such episodes include international violence, international war, independence war, civil violence, civil war, ethnic violence, and ethnic war. See http://www.systemicpeace.org/ for more information.

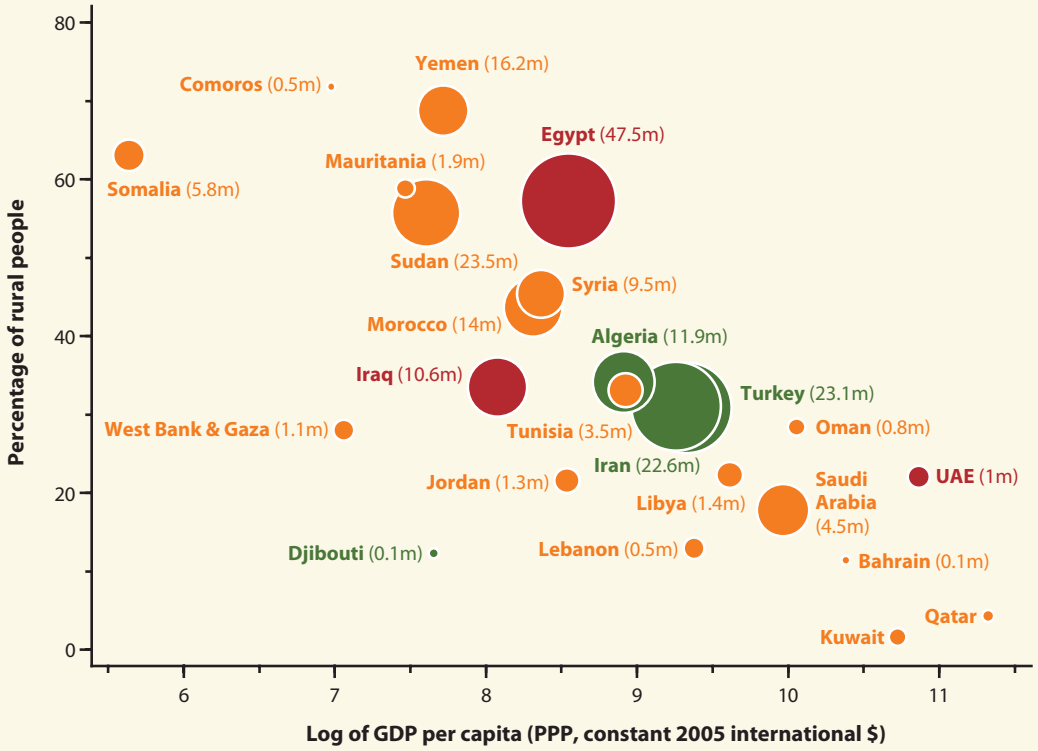
Given that the MEPV data extend only to 2008, the figures are updated for the Middle East and North Africa (MENA) region by gathering documented conflict events that occurred between 2009 and 2011 for each country of the region. The data were retrieved from various sources ranging from news agencies to research institutes. The identified conflict events were treated following a similar coding scheme as defined in the MEPV codebook, by considering new and ongoing conflict episodes that resulted in at least 500 directly related deaths.

Figure A3.2—Projection of population growth and urbanization in Arab-TI countries until 2025



Source: Authors' map based on United Nations Department of Economic and Social Affairs 2009.

Figure A3.3—Rural population in perspective in Arab-TI countries



Source: Authors' graph based on World Bank 2011a.

Note: The graph presents aspects of the relationship between the proportion of the rural population and national income in a four-dimensional manner. First, the position of a country on the map indicates the relationship between the percentage of rural people in a country and the national income per capita of the country, measured by the GDP per capita at purchasing power parity (PPP) in 2005 international dollars, which is plotted on the x-axis in logarithmic terms (so that a logarithmic relationship across the countries appears as linear in the graph). Second, the bubble size reflects the size of the total country population in 2009, and the absolute number of rural people in each country is reported in parentheses. The volume of a bubble (not the cross-section area of the bubble) is proportional to the population size. Third, the color scale of a bubble indicates the growth of the rural population from 1990 to 2009 relative to the total population growth; green indicates that the rural population declined, orange that the rural population grew but at a lower scale than the total population, and red that the rural population grew overproportionally compared with the national average.

Notes

1. The region imports 30 percent of the world's wheat. World wheat prices rose 40 percent during the six-month period from fall 2010 to early 2011, and 75 percent from March 2010 to March 2011 (IMF 2011b; World Bank 2011a).
2. We chose to compare Arab-TI countries to the reference group of LMICs despite the fact that Arab-TI countries also include high-income countries. This is because in terms of population, the vast majority of the Arab-TI population lives in low- and middle-income countries and less than 8 percent in high-income countries.
3. The estimate includes two steps. In the first step, nonparametric regressions are applied and the results plotted to gain evidence on the general functional form of the relationships. Locally weighted regressions are applied on data on per capita GDP and the prevalence of poverty and child undernutrition respectively from all sampled countries (and of all available years, spanning a period from 1966 to 2010), using Stata's "lowess" (locally weighted scatter plot smoothing) command. (The chosen bandwidth of the lowess curve is 0.8, which is Stata's standard bandwidth. The results of the nonparametric regressions are not reported in this document but can be obtained from the authors upon request.) Given the shape of the curves for both relationships, fractional polynomial regressions of degree one are applied to the data of the whole sample and the Arab-TI country subsample in the second step to determine the specific functional form and plot the predicted lines of the relationships.
4. All dollars refer to 2005 international dollars unless otherwise stated.
5. See next subsection for the rationale for using the prevalence of child undernutrition as an indicator of poor living conditions.
6. It is unlikely that the prevalence of child undernutrition is systematically and significantly underestimated in the Arab-TI region since children's physical growth guidelines are universally standardized, and prevalence rates are determined by relating individual anthropometric measurements to averages of an international reference population.
7. Poverty is pronounced deprivation in well-being. This includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity (World Bank 2012; adapted from Haughton and Khandker 2009).
8. For more information on the various child undernutrition indicators, see WHO (1995) and WHO (2006).
9. Figure A1.1 and Figure A1.2 in Appendix 1 show the macro- and micro-level indicators, respectively, mapped separately.
10. All GDP growth rates throughout the report are given in real terms.
11. This information cannot be retrieved from cross-country regression models because they presuppose a general relationship averaged over countries.
12. See Appendix 2 for a detailed description of the estimation models.
13. The significance levels of the estimated coefficients in the models for the Arab-TI region could be influenced by the relatively low number of observations available.

14. See Appendix 3 for a detailed description of the composition of the public spending accounts categories.

15. In response to the recent revolutionary movements in the region, several governments have increased subsidies, which is not reflected in the data presented here (Breisinger, Collion, et al. 2011).

16. The methodology is described in Appendix 2 in detail.

17. The model was also tested without country trend effects and with a constant term but produced similar results. Estimates are not reported but can be received from the authors upon request.

18. The full sample used in this analysis contains data from 69 countries and a maximum of 28 years (1980–2007).

19. Predetermined variables are potentially correlated with past errors, while endogenous variables are potentially correlated with present and past errors.

20. The system GMM estimator is consistent only if there is no second-order serial correlation in the idiosyncratic error term of the first-difference equations.

21. An alternative approach is to assume government expenditures as exogenous. That, however, requires transformation of the expenditure variables. A standard approach is to compute expenditure stocks assuming fixed interest and discount rates and analyze changes in expenditure shocks rather than changes in current expenditures (for example, Fan, Zhang, and Zhang 2002; and Fan, Hazell, and Thorat 2000). This approach is ruled out for the present analysis mainly because available data lack important information. An accurate construction of stocks requires detailed data about the composition and type of government expenditures such as shares of investment and consumption expenditures for all countries and by sector and investment expenditures by type of investment.

22. The Arellano-Bond test statistics are reported in Table 6. They reveal that autocorrelation becomes a problem in the models with the highest level of disaggregation and particularly in the models using the sample of all non-Arab-TI countries. Nonetheless, the presented specification was chosen for all estimations for reasons of consistency (and thus comparability across models) and lowest levels of detected autocorrelation overall. Sargan/Hansen test statistics are not reported but can be received from the authors upon request.

23. See also previous footnote.

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