ERF Policy Research Report

Equity and Inequality in the Arab Region

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ECONOMIC
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منتدى البحوث الاقتصادية

Foreword

This Policy Research Report (PRR) is part of a larger initiative, the Research Initiative for Arab Development (RIAD), aiming at addressing glaring knowledge gaps in five thematic areas: (i) equity and inequality, (ii) regional integration, (iii) natural resources and economic diversification, (iv) environmental economics, and (iv) institutional dynamics. Initiating research under any of these themes typically begins with a study to ascertain the importance of the area under consideration for economic development in the region, along with a critical review of the literature and identification of relevant research questions. The findings of the study are discussed in a workshop to gain further insights and verify these recommendations. The current PRR is the outcome of such a process in the area of equity and inequality, and the findings will guide the ERF research agenda over the next 3-5 years.

The authors of the report make a very strong case for devoting time and resources to the generation and dissemination of knowledge in the area of equity and inequality in the Arab region. They point out that most countries in the region have embarked on a reform process that entails a greater role for markets and the private sector in the context of greater integration in world markets. The problem is that insufficient attention has been given to equity and inequality in the reform process, which may erode support for further reform. This problem is compounded by lack of knowledge about monetary and non-monetary inequality in the region. Whatever research exists tends to be partial and focused on a few countries, namely Egypt, Morocco and Tunisia. Furthermore, this research hardly uses micro data and is produced largely by researchers outside the region. Accordingly, the authors propose more work on equity and inequality, especially in terms of measures, determinants and dynamics. In addition, they support the collection and harmonization of micro-data and making these data available to researchers.

While grateful to the authors and the workshop participants for their contribution to the ERF research agenda, I also want to congratulate the authors for a very careful and informative piece of work.

Ahmed Galal
Economic Research Forum

Preface

This report provides a review of empirical knowledge about income inequality in the Arab region, focusing primarily on the issues of data and measurement, and the characterization of its patterns and trends. It does not go much into policy analysis and the understanding of the causes and determinants of inequality. The review shows good progress over the last two decades in the availability of data and quality of measurement. However, the region remains far behind progress being achieved worldwide in terms of coverage and comparability across countries, improvements in quality and content of data, and, more importantly, accessibility to available micro-data which allow careful and state-of-the art analysis of inequality. The lack and unavailability of data are most serious for the rich Gulf countries and the poorest ACs. Within the constraints and limitations of the data, the available evidence shows a complex picture about inequality in the Arab region.

As a whole the region shows moderately high levels of inequality in terms of household expenditures compared to other regions of the world. At the same time overall regional inequality appears to be relatively stable, or changes are not statistically significant over the last 20-30 years for which comparable data are available. The patterns of inequality show quite significant variation across countries, with countries such as Morocco and Tunisia showing relatively high inequality while others such as Yemen, Egypt or Syria showing low inequality. Trends in inequality at the country level since the 1970s are also mixed, with the extent of disparities more likely to exhibit an upward trend when inequality is low and vice versa. One striking result is the weak time variability of the inequality indexes in most of the countries of the region.

Alternative measures of welfare distribution such as of horizontal inequality, polarization or inequality of opportunity have been widely used worldwide to supplement the Lorentz-based inequality criteria, but such measures are scarce in ACs, illustrating again the knowledge gap about inequality in the Arab region. We finally offer suggestions for a research agenda to better our understanding about the nature and determinants of inequality in the region.

We are grateful to Abdel Rahmen El-Lahga, Ahmed Galal, Peter Lanjouw, Branko Milanovic and Ruslan Yemtsov for providing some input and ideas and to Jamal Ibrahim Haidar for effective research assistance. We benefited also from useful comments and suggestions by participants at the Workshop on "Inequality and Regional Integration in the Arab World", Cairo, Egypt, November 21-22, 2008, and in particular from Jean-Yves Duclos, Djavad Salehi-Isfahani and Ali Abdel Gader Ali .

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Introduction

Issues concerning levels of inequality, changes in inequality, and their determinants remain at the heart of the development agenda both in the theoretical debate and policy discussions.[1] Several factors account for this strong interest. First, it is readily apparent that development has frequently been associated with increasing inequality.[2] Second, empirical studies have shown that growth generally reduces poverty but at the same time, it often contributes to the rise in income inequality.[3] This means that countries burdened with poverty could have achieved equitable growth if they were able to reduce the concomitant income inequality. Third, in contrast to the dominant trickle-down development approach of the 1950s and 1960s, in which inequality was believed to favor growth and development, the new thinking views inequality as hurting development, implying that it is important to fight inequality in order to achieve inclusive growth and development.[4]

Today, these issues are as relevant in the Arab region as they are elsewhere. This is perhaps why the study of equity and inequality in the region has generated so much interest. On the surface, it may be motivated by at least three reasons.[5]

The first is related to the fact that changes in inequality of the income distribution have implications on other welfare indicators, such as poverty reduction. Therefore, reducing inequality is seen as instrumental for achieving other objectives. For instance, it is well established that for a given average growth rate on income per capita in a country during any given period, the rate at which poverty is reduced would be higher if the initial level of income inequality were lower. In other words, the lower the level of inequality in income, the greater is the impact of economic growth in terms of poverty reduction. Policy makers who are interested in maximizing the poverty-reducing impact of growth may be interested in changes in the distribution of income, which may reinforce, rather than counteract, the effect of economic growth. They would be concerned if high economic (income per capita) growth is accompanied by slow gains, stable or increases in poverty because of higher inequality. On the other hand, they may be interested in an economic development process, which produces lower inequality and, therefore, greater poverty reduction for a given rate of economic growth.

The second reason is that equity or equality may itself be an objective in its own right and is considered as one of the dimensions of social welfare. Societies may be more or less tolerant of inequality and may value "equity" on its own right as a separate social objective. This concern may arise, for instance, in countries which achieve very high economic growth, large reductions in income poverty but with increases in inequality. This may be due not only to the fact that poverty reduction may have been greater if inequality did not increase, but because of the increase in inequality itself and is often related to issues of distribution across groups or regions. The concern about inequality may be related not only to income inequality but also to other dimensions such as access to public services like education and health.

The third reason, which has gained more prominence recently, is that inequality may play a major role in how political economy factors play out in a given country to determine policies and institutions, thereby impacting significantly on the growth and development path of the country. In the recent literature on the political economy of growth and institutional change, the distribution of income, as well as that of political power, play a critical role in the determination of how both economic and political institutions are shaped and may change or persist over time.[6] These institutions, in turn, determine the success or failure of a country to achieve higher economic growth and better development outcomes. In fact, observers and researchers have often argued that concerns about inequity and inequality have always been central to the political economy in the Arab World (AW) or Arab countries (ACs).

Some have argued that the move during the 1950s and early 1960s toward state-led and in some cases even socialist models of development can be explained by the high and even increasing inequality during the preceding period since the end of the 19th century. The "new social contract", which emerged during this period, had reducing inequality as one central ingredient. This was a major factor explaining the dramatic decline in poverty and significant improvement in human development indicators during the 1960s and until the early 1980s. To achieve this, governments adopted redistributive policies, which were notable by their scope, significance and persistence even in the face of difficult economic conditions. Others have argued that this same preference for equity has also been responsible for the slow progress toward more private-led, market- and outward oriented economies and the continued presence of many features of the old model of state-led development. The actual or perceived increase in inequality, which accompanies these reforms creates resistance and often leads governments to backtrack or at least slow the pace of reform. This has generally prevented the emergence of a new social contract, with countries "stuck" between an old model, which became ineffective and a new one which cannot be fully embraced.

The instrumental, ethical and political economy interest in inequality has often and traditionally been couched in terms of distributional outcomes, which relate to income, expenditures or assets. But the ethical and political economy issues are often more usefully expressed in terms of "equity" or "equality of opportunity": the concern is not with outcomes as such but with inequality that results from factors that do not fall under the control of individuals and would thus be considered non-equitable.

It is surprising to see how little attention the issue of inequality has received in research given its critical role in the economic development of ACs. The wealth of research on inequality in the context of developing countries and the controversies about the links between growth and inequality, or between globalization and inequality, have found limited echoes in the research on the Arab region. It is perhaps because of the limited access to micro-data from household surveys and the political sensitivity surrounding the issues of inequality.[7] And that explains why governments have not been keen to see this activity develop and may have even prevented collection of authentic data and research.

This monograph aims to help fill this gap by reviewing and assessing our knowledge and understanding about equity and inequality in the Arab region.

Chapter 2 provides a broad perspective on the development experience in the Arab World, which helps put the discussions on inequality in the proper broad context. In Chapter 3, we discuss the nature of data used to measure inequality, their sources and discuss a number of important issues pertaining to quality of the statistical information. In Chapter 4, we review the available evidence and its limits about the patterns of inequality with its various dimensions in ACs. Some of the questions we address here are: What are the inequality *levels* within countries, between the different *ACs*, and how did they *change* over time? How do the levels and trends compare with other regions? What are the welfare indicators used beyond consumption and income inequality? The literature dealing with the welfare distribution offers a wide range of methodologies to address such issues, both about the facts and about their explanation. In Chapter 5, we present some studies, which undertake the typical first step in understanding the patterns of inequality through various types of decompositions. Chapter 6 goes deeper into the understanding of inequality and reviews the literature related to the determinants

of inequality and more specifically how it relates to growth and various public policies. During the last decades, many countries have designed policies aimed at improving welfare distribution and poverty; access to public facilities and food subsidies are typical examples. Has the effectiveness of the redistributive policy been studied? If yes, what are the theoretical tools used? To what extent has available research dealt with behavioral responses to social programs? In Chapter 7, we draw a number of conclusions and recommendations about future directions for research. The ultimate objective of this work is to help stimulate a more aggressive research agenda in this area.

A Brief Overview of The Growth and Development Experience in The Arab Region

This chapter offers a brief overview of the growth and development experience in the Arab region spanning the last 5-6 decades.[8] We emphasize the type of development model which, despite the diversity of the countries' situations, has been largely followed in the region since the 1950s and early 1960s. This development model was based on strong governments, central planning of economic and social priorities, and wide-scale policies for redistribution and equity. It implied a strategy including nationalization of many private assets, state planning, industrial development through protected local markets, and vast resources directed to social development and large-scale public sector employment. We discuss the successes and limitations of the development model, driven to a large extent by the significant role played by oil revenues, and its collapse by the mid-1980s and the pressures for change since the 1980s. We review the economic growth implications and attempts at reform and the emergence of a new development model during the 1990s and 2000s. At the same time, we point out the emergence of the most significant and critical challenge in the region during that period: an extremely high growth of the labor force, which is increasingly young, educated and feminized.

Diversities and Similarities

The countries composing the Arab world are a diverse set in terms of size, geography, level of income, natural resource endowments, economic structure, human capital and skills, social structures, economic policies and institutions and so on. Table 1 and Figure 1 illustrate some of this diversity in terms of size and levels of income, where the countries are classified into four subgroups according to natural-resource wealth, labor abundance and level of income:

- *Resource-poor, labor-abundant* (RPLA) or **emerging** economies: Egypt, Jordan, Lebanon, Morocco, Tunisia, West Bank and Gaza
- *Resource-rich, labor-abundant* (RRLA) or **transition** economies: Algeria, Iraq, Syria
- *Resource-rich, labor-importing* (RRLI economies: the **rich** Gulf Cooperation Council (GCC) Countries (Bahrain, Kuwait, Oman , Qatar, Saudi Arabia, UAE) and Libya
- *Low Income Countries* (LICs): Comoros, Djibouti, Mauritania, Somalia, Sudan and Yemen.

Despite the diversity, there are many economic similarities among them. The region has been linked by a large resource-base. Oil (or more precisely hydrocarbons) provided the basis for rapid economic and social development throughout the region – not only for oil-producing economies but for resource-poor Arab economies as well, through remittances, trade, capital and aid flows. The commonality of resource-base also includes the lack of water resources, with the lowest renewable water resources per capita in the world. The region has been linked by policy, with similar models of economic development adopted by ACs since the 1950s and 1960s, based upon state-led planning, with strong social policies designed for redistribution and equity.

Table 1.
Economic indicators for the ACs, 2005

	GDP p.c. $ PPP	Total GDP $ PPP billions	Total GDP Current $ US Billions	GDP p.c. $ US current	Population Millions
Egypt	5049	353.4	98.8	1412	70.0
Jordan	4294	23.5	12.6	2304	5.5
Lebanon	10212	38.3	21.6	5741	3.8
Morocco	3547	107.1	59.0	1952	30.2
Tunisia	6461	64.8	29.0	2896	10.0
West Bank and Gaza	3587	12.9	4.0	1107	3.6
RPLA	*4876.5*	*600.1*	*225.0*	*1828.2*	*123.1*
Algeria	6062	199.4	101.9	3098	32.9
Iraq	3200	89.5	33.9	1214	28.0
Syria	4059	75.0	28.4	1535	18.5
RRLA	**4586.9**	**364.0**	**164.2**	**2069.8**	**79.4**
Bahrain	27236	20.2	13.4	18019	0.7
Kuwait	44947	110.4	80.8	32882	2.5
Libya	10883	64.2	41.5	7040	5.9
Oman	20334	51.0	30.8	12289	2.5
Qatar	68696	55.8	42.1	51809	0.8
Saudi Arabia	21220	490.6	315.3	13640	23.1
United Arab Emirates	33484	150.7	142.2	31601	4.5
RRLI	**23550.9**	**943.0**	**666.2**	**16638.2**	**40.0**
Djibouti	1964	1.5	0.7	936	0.8
Yemen, Rep.	2276	46.2	16.8	826	20.3
Sudan	2249	79.6	35.2	994	35.4
Mauritania	1691	4.8	1.8	631	2.8
Somalia	..	…	…	..	…
Comoros	1063	0.6	0.4	611	0.6
LIC	**2215.9**	**132.7**	**54.8**	**915.3**	**59.9**
Total	*6746.7*	*2039.8*	*1110.2*	*3672.2*	*302.3*

Source: World Development Indicators, World Bank.

Figure 1.
GDP per capita in ACs, 2005
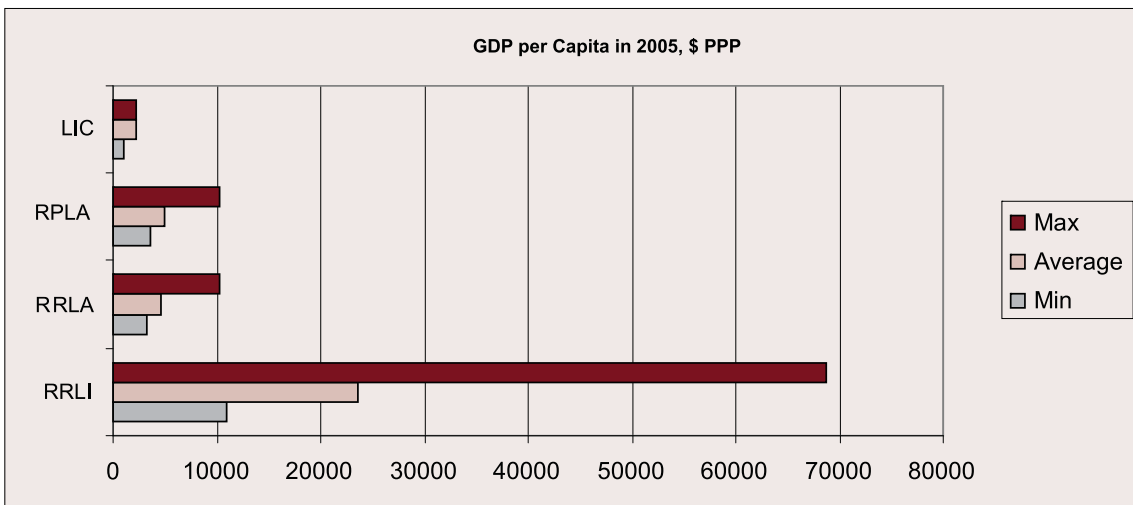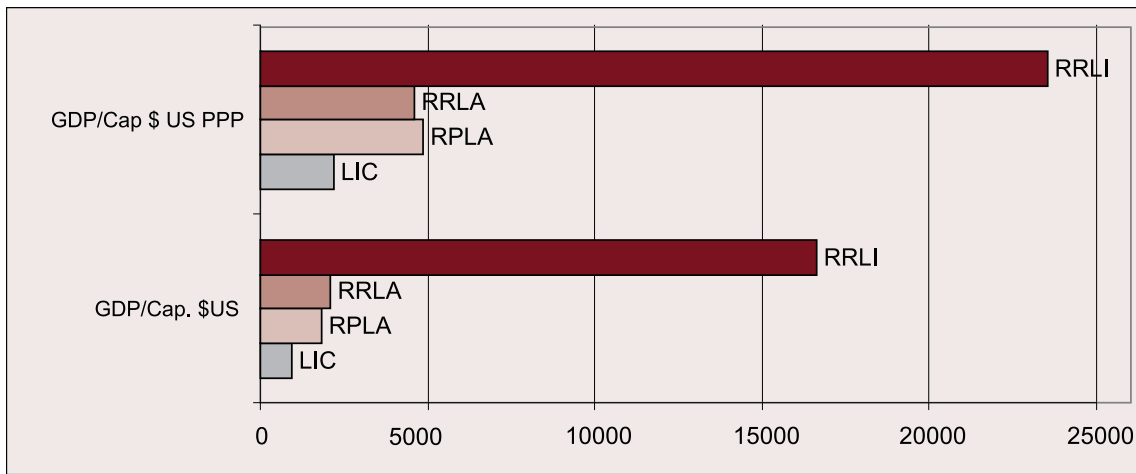
Source: World Development Indicators, World Bank.

Another important common feature among them has been the delayed demographic transition; the resulting dynamics of the population is illustrated in Figure 2. With a sharp drop in death rates and slow decline in fertility, population growth accelerated, reaching more than 3 percent a year in the mid-1980s, but then started a steady decline reaching around 2 percent by the early 2000s. This led to the all important youth bulge since the 1990s and the strong pressures from the high growth of the labor force.

Notwithstanding these strong similarities in terms of economic policy, natural resources, and the shared production base for economic growth and development, it is not surprising that many of the development challenges facing the ACs have been also similar: almost all have confronted stagnant growth since the decline in oil prices in the mid-1980s, and despite some measured economic reforms in most of the economies, growth has remained weak throughout the region during the 1990s. The recovery and spike in oil prices during the 2000s helped the revival of economic growth throughout most of the region. Despite the windfall benefits accrued from high oil prices many countries, nonetheless, have suffered directly or

Figure 2.
Population Dynamics in the Arab World, 1950-2050
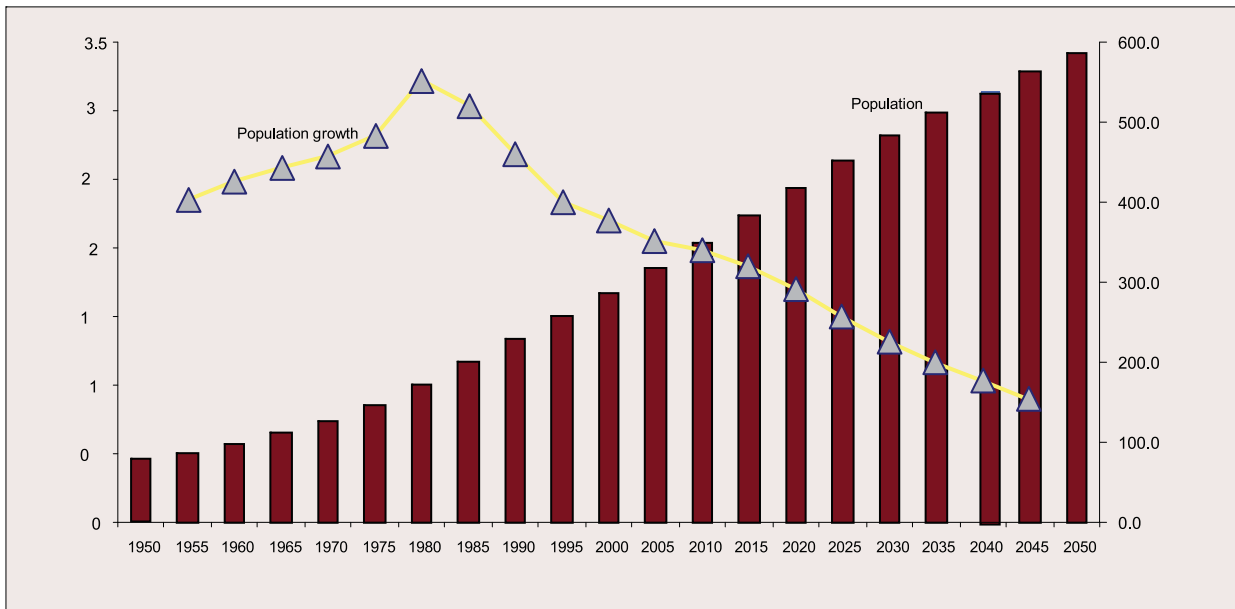
Source: Based on data from the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision and World Urbanization Prospects: The 2007 Revision.

indirectly due to regional conflicts and instability, deterring investment. And almost all of the Arab States are now facing one of the most pressing development problems to date: a burgeoning problem of unemployment, the result of both shrinking prospects for the main modes of employment creation in the past – labor migration and public sector employment -- and a rapidly expanding labor force.

The Old Development Model: From The 1950s to The Early 1980s

The historical model of development adopted throughout the Arab region during the early second half of the 20th century has shaped its development path. At the time, Arab leaders, just emerging from the shackles of colonialism adopted models of development based on strong governments, central planning, and wide-scale policies for redistribution and equity.

The model yielded early positive results

Early on, this model had strong payoffs. With large oil and oil-related revenues, in addition to directing large resources toward public infra-

structure, the ACs made substantial investment in education. This led to an increase in the average years of schooling of the adult population from less than a year in 1960 to more than 3 years in 1980 (Figure 3). Impressive gains in basic education coupled with heavy investments in healthcare resulted in substantial reduction in poverty and improvement in health indicators. Figure 4 shows the significant increase in life expectancy. Other health indicators such as child and women mortality at birth showed similar improvements.

Although there were very limited data on poverty in ACs before the 1980s, few estimates that are available for Egypt and Tunisia show dramatic declines. In Tunisia, poverty rate, based on $ 2/day threshold declined from 51.3 percent in 1965 to 16 percent in 1985, whereas in Egypt, it dropped from 82.2 percent in 1975 to 43 percent in 1990/91.[9]

But entailed significant costs as well

But the model also has had strong implications on the economic orientation of the Arab economies, on governance, and on employment creation. Economically, heavy protection and reg-

Figure 3.
Average years of schooling in MENA of the population aged 15 and above
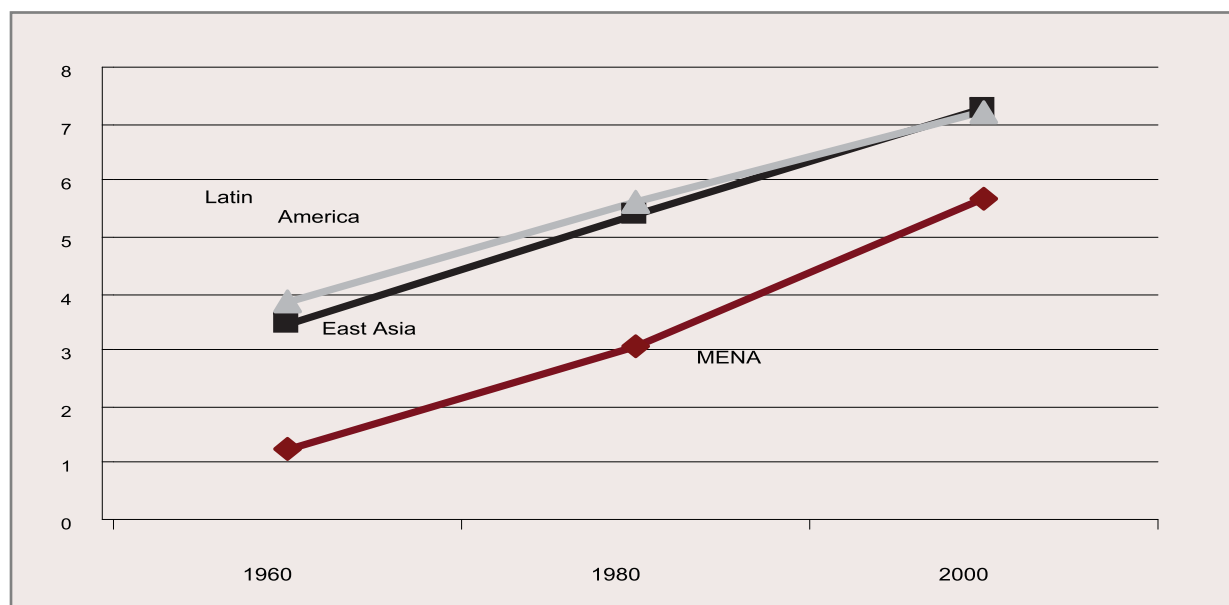
Source: World Bank (2007b), Table 1.5, based on Barro-Lee database. MENA: Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, UAE, West Bank and Gaza, and Yemen. East Asia: South Korea, Indonesia, Malaysia, Thailand, Philippine, and China; Latin America: Argentina, Brazil, Chile, Mexico, and Peru.

Figure 4.
Life expectancy at birth in MENA, total (years)
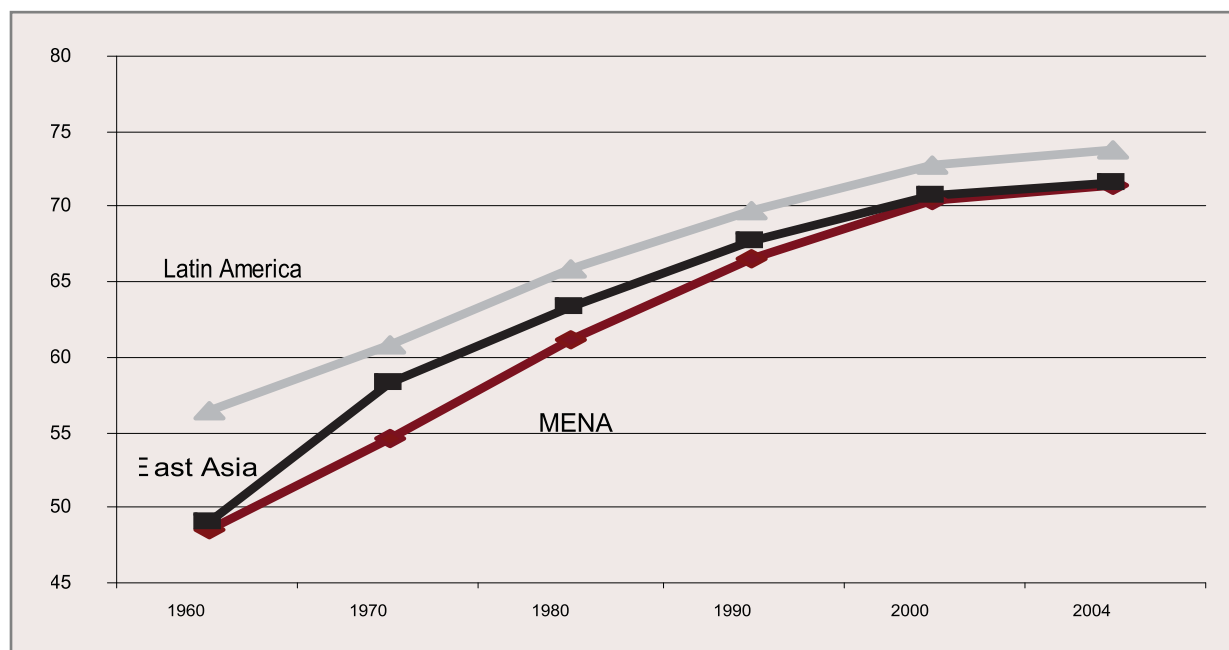
Source: World Bank (2007b), Figure 1.1, based on World Development Indicators. MENA: Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, UAE, West Bank and Gaza, and Yemen. East Asia: South Korea, Indonesia, Malaysia, Thailand, Philippine, and China; Latin America: Argentina, Brazil, Chile, Mexico, and Peru.

ulation of industry, along with overvalued and uncompetitive exchange rates, provided marked disincentives for the growth of a tradable goods sector in the Arab states. Oil resources relieved many governments of the need to tax their citizens and allowed them to redistribute substantial resources through vast welfare and social services programs. At the same time, this system of widespread redistribution of wealth reduced demands from Arab citizens for accountable and inclusive public institutions. Arab governance mechanisms lacked transparency, reflected in limited access to government information and carefully monitored freedom of the press. They lacked contestability, reflected in some of the most centralized governments in developing countries. And they also lacked inclusiveness, reflected in rural/urban inequalities in access to public services, gender inequalities in voice and participation in society, and in nepotism or patronage determining who gets public services or access to lucrative business opportunities and who does not.

The private sector that emerged under this model, mostly with government patronage, flourished not so much by being dynamic in a competitive environment, but often by supplying to protected domestic markets and generally "living off the state." Despite high growth rates during the oil boom years, investment in the Arab region became progressively unproductive. Though still positive, total factor productivity growth was cut in half in the region between the 1960s and 1970s.

The model also had significant implications on employment creation. Along with vast social welfare system, Arab governments redistributed resources through public sector jobs. This had been especially true for the GCC countries, where high oil revenues kept the public sector as the most attractive destination for nationals entering the labor force. Even in most of the non-oil producing economies, aid flows and remittances from citizens working in the Gulf permitted the public sector to grow to unprecedented levels.[10]

A major source of employment in the region came in the form of migration, with large numbers of Arab laborers working in the Gulf countries. At the peak of the oil boom in the early 1980s, some 3.5 million Arab migrant workers were employed in the Gulf States. In 1973-1984, official remittances totaled almost $22 billion in Egypt, $8.2 billion in Morocco, and $6.5 billion in Jordan. This some-

what eased the chronic unemployment situation back in the respective home countries.

The Oil Price Collapse and A Decade of Crisis During The 1980s

When oil prices collapsed in the mid 1980s, government revenues throughout the region fell dramatically, inflicting severe blows to the oil-producing as well as non-oil producing countries. Despite extensive external assistance, the flow of resources to the public sector slowed considerably. That, in turn, led to the substantial shrinking of government expenditures on social services and physical capital. For the region as a whole, public fixed investment was cut heavily, and growth in the physical capital stock per laborer declined by more than 60 percent from the 1970s.

Facing declining public revenues, governments struggled to maintain their redistributive commitments. The fiscal strains contributed to large macroeconomic imbalances. Productivity growth, already declining by the 1970s, plummeted over the 1980s. Growth collapsed under the burden of declining public spending and unattractive private investment climate, and continuing losses attributed to inefficiency. Economic growth per capita averaged a dismal 0.2 percent per year (Figure 5).

This, for the first time, led to the emergence of serious unemployment problem in the Arab states. With reduced public sector revenues, guaranteed employment in the public sector was no longer possible. Lower oil prices, rapidly rising domestic supplies of national labor force, and competition from lower-cost labor elsewhere in the world further dampened the GCC demand for labor from the rest of the Arab region.

An Uneven and Hesitant Reform Agenda

The lack of economic growth and deteriorating budget deficits prompted several of the economies to undertake macroeconomic stabilization and structural reform programs. This was aimed at encouraging private sector development so that it can become an engine of growth and employment creation. Macroeconomic stabilization was broadly achieved, but the pace of structural reform varied markedly throughout the region.

- A group of resource-poor countries, including Tunisia, Morocco and Jordan, were ahead of the rest of the ACs in implementing intensive reforms toward more open and private sector-

Figure 5.
GDP per capita growth in Arab States compared to other regions (percent)
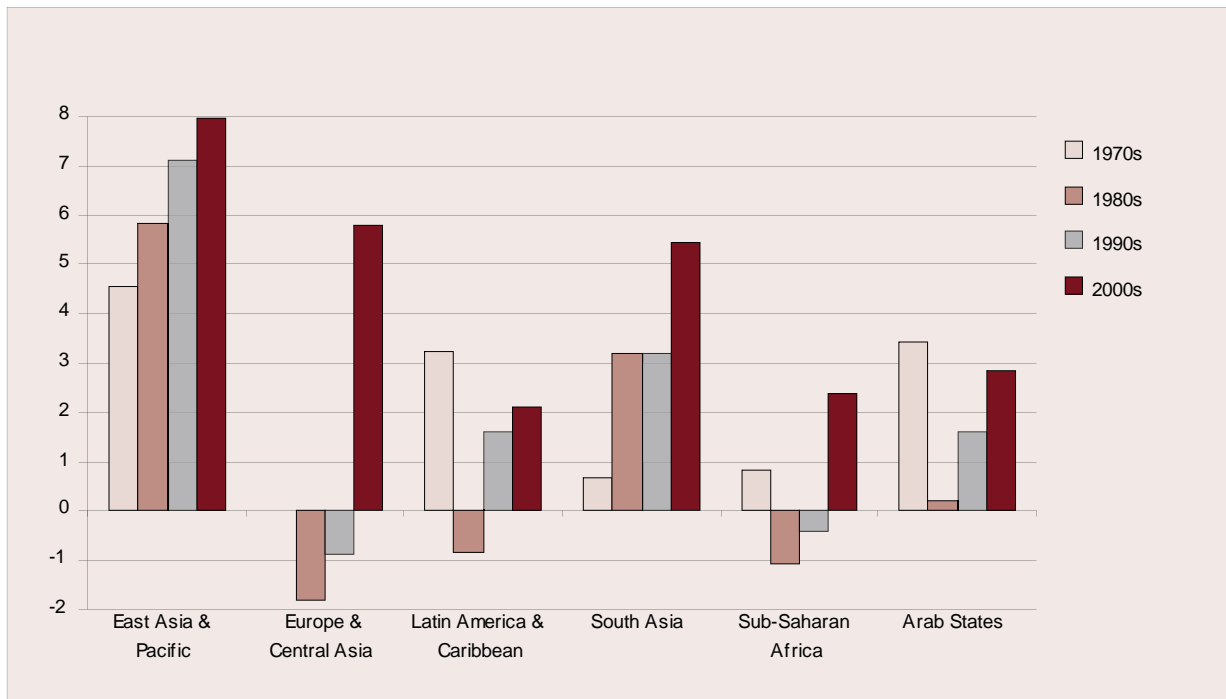
Source: World Development Indicators, World Bank.

led economies. As early as the 1970s, Tunisia introduced an "off-shore" export processing zone to facilitate trade. Both Morocco and Tunisia joined the General Agreement on Tariffs and Trade in 1987 and 1990 respectively, and became members of the World Trade Organization in 1995 when it was established. Their reform initiatives also included exchange rate liberalization, tax reforms, trade and financial sector liberalization, and privatization. All three signed Euro-Med agreements in the 1990s, (Tunisia in 1995, Morocco in 1996 and Jordan in 1997), and Jordan and Morocco signed free-trade agreements with the United States in 2000 and 2004 respectively. In general, the reform effort has been steady in these countries, and without policy reversals.

- Other resource-poor countries, including Egypt and Lebanon, have pursued reform more slowly and sporadically. Despite early reforms and aggressive macroeconomic stabilization in Egypt in the 1990s, reforms were partially reversed with escalating behind-the-border trade restrictions and significant exchange rate overvaluation. More recently, reforms have resumed, especially with the signing of a Euro-Med agreement in 2001 and more aggressively since 2004. Lebanon, with a legacy of destroyed physical and economic infrastructure and weaker institutions, had to contend with large macroeconomic imbalances.

- Another set of countries, with significant oil resources and large populations, includes Algeria and to a lesser extent Syria, and Yemen. They also pursued reforms, albeit gradually, and more sporadically than the early reformers. Algeria, with macroeconomic imbalances stemming from the collapse in oil prices, aggressively pursued macroeconomic stabilization, but structural reforms have been far more limited. Trade reforms initiated in the early 1990s were reversed in 1998, and then taken up again in 2001 with the signing of a Euro-Med agreement. Reforms in key areas, such as the financial sector and privatization, remain limited. In Syria, the trade and investment liberal-

ization, which begun in 1991, was not sustained, but resumed in the 2000s. While there has been modest progress in exchange rate unification and private sector regulatory reforms, broader structural reforms have been limited. And in Yemen, macroeconomic stabilization reforms have not been accompanied by more aggressive reforms to diversify the economy, despite relatively open trade policies. The investment climate remains poor, reflecting weak rule of law and property rights, ineffective regulatory frameworks, and security problems.

- The six GCC economies—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates—have long maintained an open trade system with free movement of capital and advanced financial systems. As oil prices plummeted, most countries cut expenditures, but still their budget deficits have generally increased. Some of the smaller GCC countries have encouraged growth in selected sectors such as entrepot trade (United Arab Emirates), and financial services and tourism (Bahrain and United Arab Emirates). Oman has made substantial efforts at broadening private sector participation and improving the investment climate, with privatization and changes

in its foreign capital investment law. In Saudi Arabia, reforms have progressed more slowly. There, the public sector still dominates economic activities and government revenues remain highly dependent on oil.

Growth Recovered but Remained Weak During The 1990s

In general, the structural reform agenda in the Arab region, despite its intentions, has been cautious, selective, and often subject to pause and reversals. The agenda avoided most governance reforms including opening up of political space, a prerequisite for any type of deeper reforms, which depend on the compliance and participation of all segments of the population. As a result, the reform effort stopped short of providing a substantially improved climate for growth and investment. This explains why the recovery in growth over the 1990s remained weak, with per capita GDP growing by an average of only 1.6 percent a year. However, it varied significantly among countries and sub-groups of countries (Figure 6). The resource-poor countries achieved the most gains, while growth in the resource-rich countries remained negligible.

Figure 6.

GDP per capita growth in the Arab sub-regions (percent)
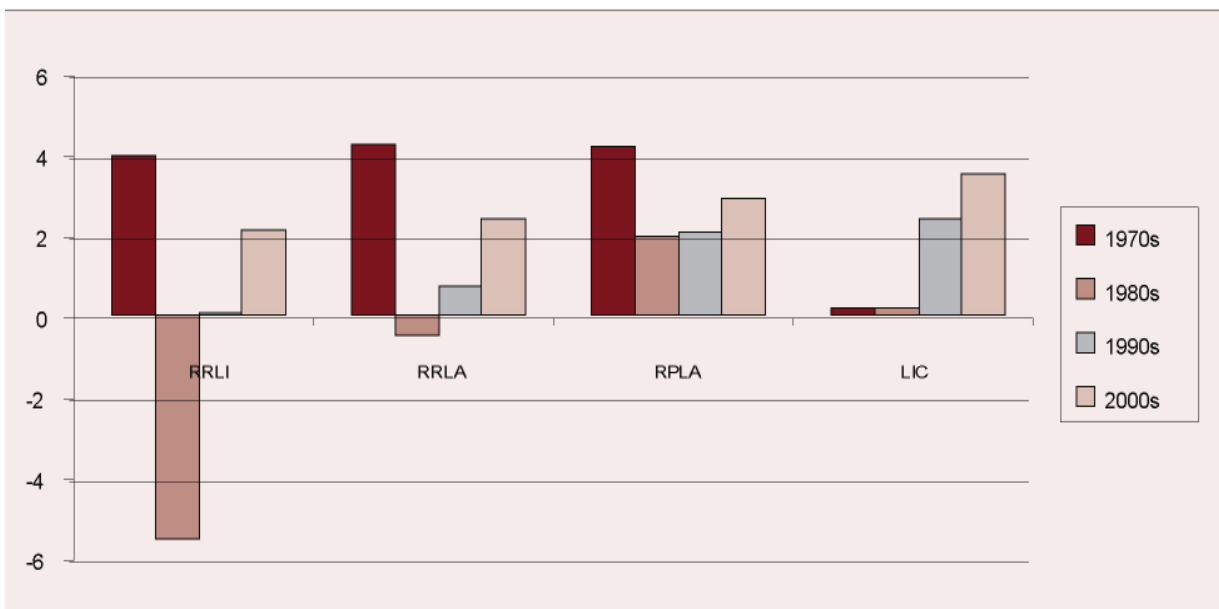
Source: World Development Indicators, World Bank.

Figure 7.
International poverty rate in ACs, (% of People living below $1.25 a day $ PPP 2005)
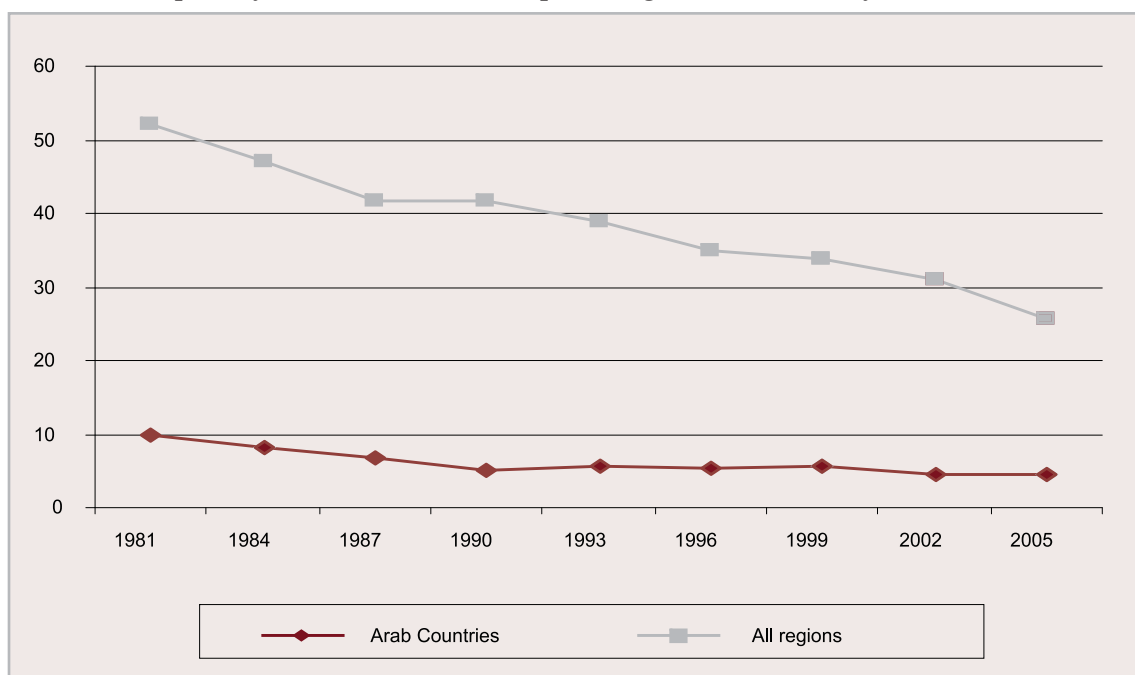
Source: Authors calculations based on Ravallion and Chen (2008).

Figure 8.
International poverty rate in ACs (% of People living below $2 a day, $ PPP 2005)
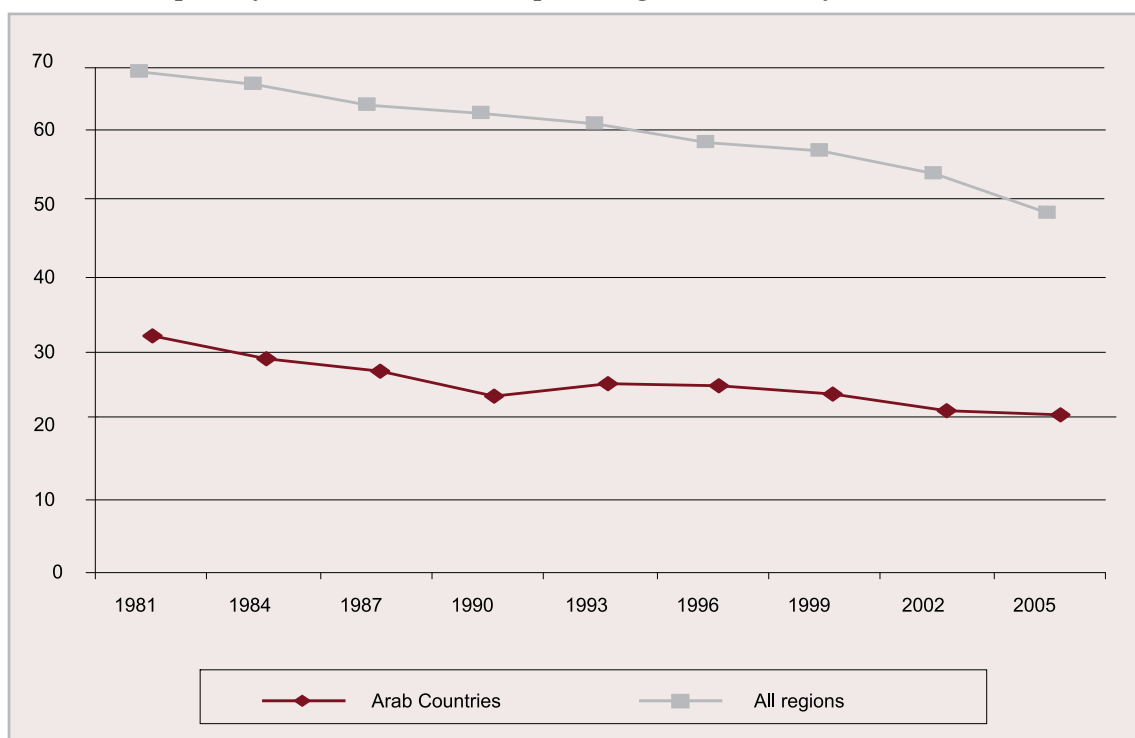
Source: Authors calculations based on Ravallion and Chen (2008).

And poverty continued to decline

Despite slower economic growth, poverty rate continued to decline, though at a slower rate than during the 1970s (Figures 7 and 8). This decline continued whether it is measured using the $1.25/day yardstick or the more meaningful poverty rate of $ 2/day. Using the latter, the poverty head count declined by more than one-third by the early 1990s but stagnated until the early 2000s.

Entering the 21st Century and the Employment Challenge

As it entered the 21st century, the Arab region has been facing numerous economic, social and environmental challenges. One of them is the problem of perennial water scarcity and its implications for its citizens and for the overall development prospects across the region. And there is the environmental challenge concerning the sustainability of the use of natural resources, including soil degradation and deforestation, desertification, preservation of the sea coasts as well as the deep sea resources. The twin problems of water

scarcity and environmental degradation will be more severe with the serious impact of climate change in the region. Above all, there are issues of poverty and exclusion, which are inextricably linked with the issue of population. Although population growth has slowed dramatically during the 2000s in many countries, reaching as low as 1-1.2 percent in Tunisia, Morocco and Oman; it still remains high for many countries such as Jordan at 2.5 percent per year, Syria at 2.7 percent, 2.8 percent in Kuwait and more than 4 percent in Qatar and the UAE. But perhaps the most daunting challenge facing the Arab world today is that of employment.

By the 1990s, as the Arab region faced an unprecedented challenge in job creation, the public sector, which used to be the major source of employment generation, could no longer be counted upon as it was in the past (Figure 9). This is largely because most branches of the public sector were already overstaffed, by as much as a third or more in some countries. More importantly, the public sector could no longer act as a refuge to vast num-

Figure 9.
Dynamics of labor supply in MENA countries, 1950-2020 (percent)
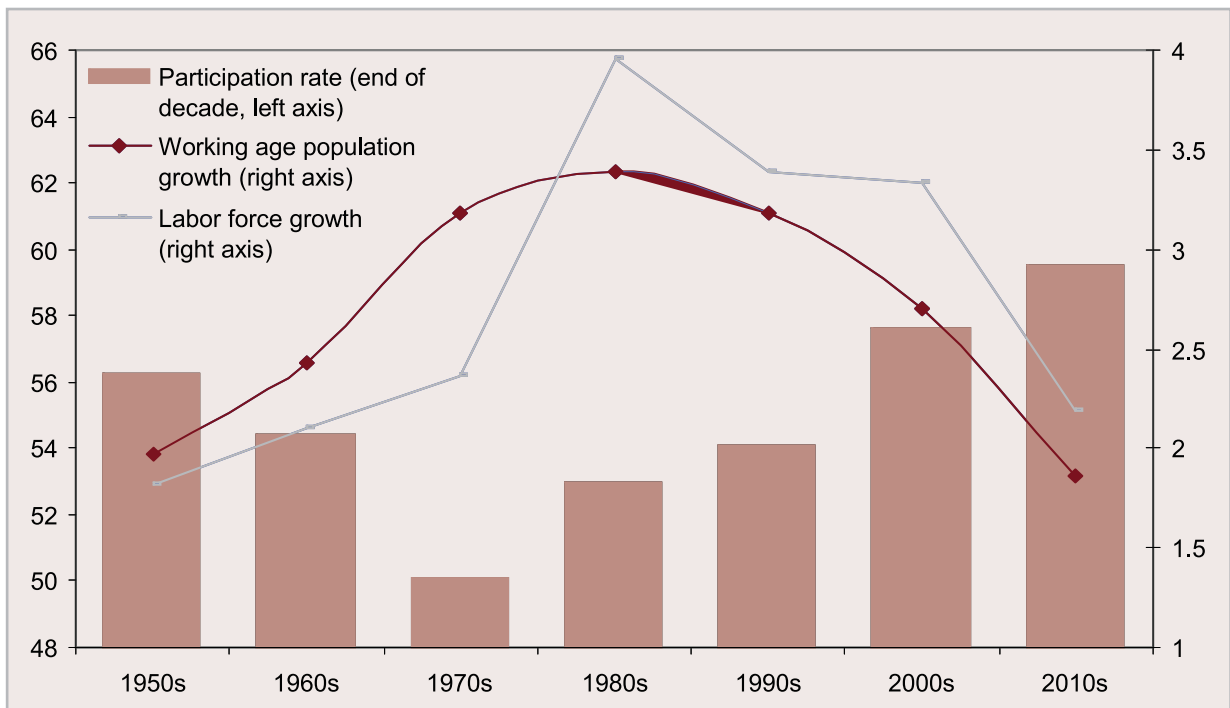
Source: ILO 1996 (pre-1980), ILO 2005.

bers of unemployed with the marked change in fiscal circumstances throughout the region.

One of the striking characteristics about the Arab world is the youth of its population. Two-thirds of the population is under the age of 30, making it the second youngest region in the world, behind Sub-Saharan Africa. To put it in perspective, in Europe, for instance, those under 30 comprise only a third of the population. The burgeoning youth population, better educated and demanding, obviously has higher expectations than their previous generation. Yet, at the same time, this group faces growing disappointment in the job market.

Labor market outcomes in the Arab region have steadily worsened over the 1980s and 1990s. According to official figures, with the joblessness increasing since the mid 1980s, unemployment stood at over 15 percent by the early 2000s. And unemployment fell disproportionately on the region's youth. For instance, in Egypt, first-time job seekers comprised more than 90 percent of all unemployed, and the number was almost two-thirds in Yemen and the UAE. Needless to say, these were workers entering the labor force with substantially higher levels of education than the generation before them. For instance, 20 years ago, the average years of schooling of the adult population in the Arab world was about 2 years; today, that level is around 5 years.[11] But lack of opportunities in the job market has increasingly prevented those better educated youth from realizing their economic potential.

Another characteristic of the Arab labor market had been that it was not only being dominated by the younger generation but at the same time it was being increasingly feminized. And the poor labor market outcomes, which characterized the Arab region, particularly impacted the women. While Arab women had the lowest labor force participation rates in the world, their engagement in the labor force had grown considerably over the last decades. But dwindling employment opportunities made their entry into the job market increasingly difficult.

Unemployment rates among women were on average 30 percent higher than their male counterparts. The gender gap in unemployment was particularly noticeable in countries like Bahrain, Syria, Egypt, and Saudi Arabia, where the unemployment rate among women was two to three times that of males. Along with other factors, such as unfavorable social norms and lack of supportive physical and social infrastructure, which have discouraged the involvement of Arab women in the labor force, the poor prospects they faced in the labor market have undoubtedly limited their participation.

Unemployment was not the only factor for poor labor market outcome, dismal wage prospects for the employed also contributed to it. Worker productivity, the basis for real wage growth, had increased only marginally over the 1990s, remaining far below than that of East Asia and the Pacific, South Asia, and Latin America and the Caribbean. As a result, real wages have stagnated or declined in half of the ACs since the 1980s, and only increased marginally in most other ACs.

But beyond the poor job prospects that have characterized the Arab region over the 1980s and 1990s, it became clear by the early 2000s that labor market pressures will continue to grow over the next two decades. A legacy of high population growth rates in the Arab region between 1950 and 1990, which peaked at 3.2 percent a year in 1985, has translated into some of the most intense pressures on labor markets observed anywhere in the world in the post-WWII period. The labor force was growing at a rate of 3.3 percent a year. That translates into some 37 million new workers entering the labor force between 2000 and 2010, swelling the total labor force by close to 40 percent in a span of only 10 years. Between 2000 and 2020, the labor force in the Arab states will have expanded by some 75 percent. In the span of 20 years, 74 million new jobs need to be created, just to absorb the growing labor force.

Given the prevailing dismal unemployment scenario, the rate of job creation must be accelerated. If the Arab region were to accomplish the more ambitious goal of absorbing the growing army of job seekers in addition to the 74 million new entrants into the labor force, close to 90 million new jobs need to be created by 2020. This figure is more than double the number of jobs created during the previous 20-year period in the Arab world.

By any comparison, the Arab region was facing an unprecedented challenge in terms of development due to labor market pressures. But for the Arab region, the need for accelerated job creation was coming just as two of the region's major

sources of employment creation over the past four decades, *public sector employment* and *labor migration,* are providing fewer and fewer jobs.

Recent Surge in Oil Revenues, Growth Revival and Reversal

With the unexpected surge in oil revenues since 2002-2003, there has been strong economic growth over the last few years in the region. The average GDP growth rate for the region as a whole, which was about 3.5 percent a year during the late 1990s, increased by 1 percentage point in the early 2000s and reached 6 percent over the past four years. In real terms, over the seven-year period since 2000, the overall GDP for the region has increased by 40 percent--an impressive growth performance by any standard. The surge in oil revenues was the main driver behind the spectacular growth performance. Total revenues from hydrocarbons rose from $180 billion in 2002 to $620 billion in 2007. But while the results in terms of growth have been driven to a large extent by the surge in oil revenues, the improvements in the fundamentals and their economic structures of the economies have played a role as well. A lot of reforms are being implemented with varying degrees of success across countries.

One of the major results of the observed growth over the recent period has been an improvement in the labor markets (Figure 10). First, the surge in growth from 3.5 percent to 6 percent has significantly boosted job creation in the region. Strong employment creation has also seen significant rise in women participation in the labor force. Second, this improvement has been mostly quantitative, and serious problems remain in terms of the quality of new jobs that have been created.

The revival of growth, which was most significant in the resource-rich countries, but also in the resource-poor countries, was driven to a large extent by domestic demand. Non-oil exports remained weak, despite some major gains recently in countries such as Egypt.

The steep slide in oil revenues in 2008 coupled with the global financial meltdown pose new additional challenges to the region. Growth has declined again in almost all countries, macro-balances are under stress and future prospects remain uncertain.

Major challenges lie ahead. The ACs will continue to face formidable employment problems over the next two decades. It will require creation

Figure 10.
Labor market indicators in ACs, 2000-2005
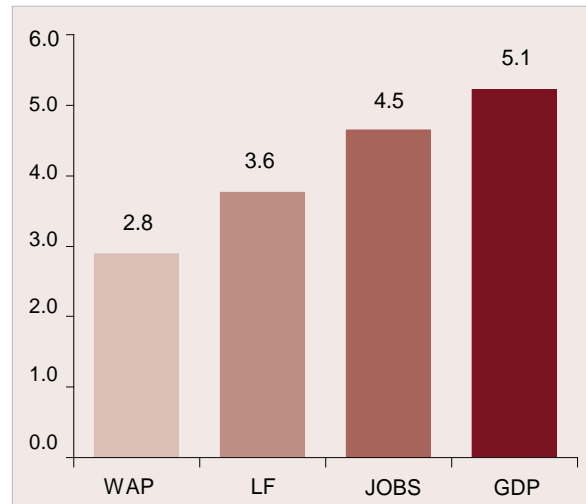
Note: WAP: working age population, LF: labor force, JOBS: employment; Countries included: Algeria, Bahrain, Egypt, Iran, Jordan, Kuwait, Morocco, Qatar, Saudi Arabia, Tunisia, United Arab Emirates, and West Bank and Gaza.
Source: World Bank (2007c), (Figure 2.10)

of millions of jobs annually in order to meet the growing demand from the increasingly educated and feminized labor force. This will require a greater role of the private sector, more integration with the world economy, as well as diversification of their economies.

The ACs are also facing challenges in terms of reforming their public services and the social safety nets they have developed over the last few decades. These reforms are often needed because of budget constraints, which do not allow continuation of the public expenditures at the previous scale. But even in countries which were able to "afford" such expenditures, concerns about efficiency and effectiveness of the interventions have been raised.

These transformations are complex and difficult as they may have significant distributional consequences. They pose problems of equity and have implications in terms of inequality with attendant consequences in terms of social stability, feasibility of reforms and institutional changes, as well as efficiency and future growth. These considerations make the study of equity and inequality at this stage all the more important for ACs.

Data Sources and Quality Issues

It has become common practice in studies and analysis on welfare distribution to infer inequality and poverty indices using micro-data from household surveys. Usually, these data come from nationally representative surveys on households' income, expenditures, and extensive socio-demographic characteristics-- such as household size and structure, region of residence, dwelling characteristics, and occupation status.

In this Chapter, we review the main sources of data, assess issues of coverage, timing and frequency, and sampling and quality of these data. This will help to better interpret the results of surveys, but also question some *stylized* facts and motivate greater attention to issues of comparability, common standards of quality and reliability.[12]

This review finds that data to measure and analyze inequality are scarce in ACs. For many countries, especially the richest and poorest ones, no or very limited information is available. While most countries undertake regular living standard household surveys, which are the most common source of such data, access to the data is very limited. In addition, micro-data, with few exceptions, is almost impossible to obtain.

There are many issues about the quality of the data. Standard household surveys are unable to capture the incomes of the richest sectors of the society; so, the available inequality measures are most likely a gross underestimation. Data are not validated by comparisons with other sources of data, especially in the labor market (wage statistics) or tax data, or even with robustness checks to outliers.

These findings should imply care in the use of the data. For instance, the way countries rank according to Gini indices in the Arab region (discussed in the next Chapter) may be, to a large extent, an illusion created by differences in characteristics of the data and on the particular ways in which the data is treated; there is no standardization of sampling and survey methods. The analytical results about the sources of inequality, or its changes over time or in response to a specific policy are also driven by quality and coverage differences in household surveys and by the way in which the data is treated.

Further to living standards household surveys, several ACs including Egypt, Jordan, Mauritania, Morocco, Sudan, Tunisia, and Yemen also conduct *Demographic and Health Surveys* (henceforth DHS). DHS provide valuable data on survivorship of parents, child mortality, schooling for children above 6, weight of women aged 15-49 and children under 5, ownership of assets, dwelling characteristics, and access to public services and facilities.

Given the DHS information, many scholars have suggested asset-based alternatives or complements to the standard use of living standards variables in characterizing the welfare distribution. As we will see in chapter 4, although micro-data records are often accessible to scholars from the DHS website,[13] very little work has been done to provide a broader and fuller picture of inequality based on non-income dimensions across ACs. Undeniably however, to raise the effectiveness of redistributive policies, further investigations

are needed on the determinants of inequality and their relationship to the asset-based measures of social welfare.

Another source of data for distributive analysis is labor surveys, which are undertaken in many ACs. But such surveys have rarely been used for studying inequality.

Household Surveys: Country Coverage, Timing and Frequency

Survey coverage of countries

A review of the main sources of data finds that data to measure and analyze inequality are inexistent or very limited in many ACs. However, they are increasingly available in most of them, but mostly not accessible to scholars and researchers. Table A-1 provides a summary of some of the statistical features of available household surveys in ACs. These countries can be classified into three groups in terms of existence and availability of household surveys.

The first group includes Somalia which, to the best of our knowledge, has not collected living standards data at all.[14] It also includes countries where surveys have apparently been carried out but accessibility to micro-data is either impossible or very limited: Bahrain,[15] Kuwait,[16] Libya, Saudi Arabia,[17] and Qatar.[18] This implies that there is no way of even calculating consistent summary indices on distributional patterns for these countries. Such indices may be high or low but the point is that they are either not calculated, or, if ever calculated, not published.[19]

An important issue about data in the group of countries with significant immigrant population is whether the household surveys cover or not this part of the population.[20] If the immigrant population is excluded, this may provide policymakers with information about nationals only which is of interest to them from the policy point of view. But without the immigrant population, the data will be partial and will not capture many dimensions of inequality, poverty or delivery of public services, which may be important as well.

The second group includes Comoros,[21] Iraq,[22] Lebanon,[23] Libya,[24] Oman,[25] Sudan,[26] and the United Arab Emirates (UAE).[27] These countries have started the collection of micro-data only lately or resumed recently after a long interruption and have at most two household surveys.

The third group includes countries, which systematically collect nationally representative household data on the distribution of income or expenditures and many other non-income characteristics. This is the case for Algeria, Egypt, Jordan, Mauritania, Morocco, and Tunisia, who have collected such data at least since the 1980s (and even before in some cases) and, more recently, Syria,[28] West Bank and Gaza,[29] and Yemen. All of them have at least three nationally representative household surveys and they publish, through local or international institutions, results on some distributional characteristics like mean expenditure, headcount poverty and *Gini* indices of inequality.[30]

It appears that there are serious gaps in terms of availability of data to carry out distributional analysis in the AW. The third group for which there is some data available on households' consumption or income constitutes about two-thirds of the total population of the Arab World, and are mostly the middle-income countries of the region. It should be noticed that the countries for which no or very little data are available are most of the richer oil-exporting countries (GCC and Libya) and the poorer ones (except Mauritania and Yemen). This is a serious problem – probably the most serious in terms of implications for work on inequality. The picture regarding inequality might look very different, if data were available for all countries. Chances are that other "unknown" countries in terms of their inequality will affect the regional standing.

Timing of surveys

In terms of timing, surveys typically span a full year and hence adjust for seasonality effects. The key issue is frequency of survey data collection. Most ACs have no regular annual household expenditure surveys (as in all OECD, Iran and many other developing countries in Europe, Central Asia, Latin America or East Asia). However, some have more or less regular surveys: Egypt's interval between surveys is 5 years (now reduced to 3 years), Morocco's – 6-7 years (expenditure survey-every 15 years, LSMS type survey – every 7-10 years), Tunisia – every 5 years, Yemen and Jordan – 5-7 years. This is not only a problem of comparisons and adequate feed back to policy makers (too infrequent surveys make it impossible). When surveys do not form a constant part of the work of

the statistical office, their conduct each time may create comparability problems (which is in fact the case in Yemen), making statistics on inequality changes difficult to interpret.

Distributive analyses in the AW are typically based upon summary statistics of the dispersion of incomes (or other welfare proxies) using cross-sectional surveys (i.e., surveys which observe households at a particular point of time). Nevertheless, snapshots of welfare distributions provide an incomplete and perhaps distorted picture of a lengthy process. Further, pursuing and fine-tuning the redistributive policies for improving social welfare require understanding about how households react to their existence and change. For all this, panel (or longitudinal) data, that is, surveys which record living standards information on the same sample of households observed over multiple time periods, are needed for measuring vulnerability and for understanding welfare dynamics. It is, therefore, important that the ACs collect panel data to monitor the dynamic of inequality and social welfare. This could be done using more frequent small-scale panel surveys, as opposed to the larger, usually five-year cross-section surveys. To enable effectiveness assessments of social safety nets, annual small-scale panel surveys should include basic information on household consumption, income and its sources, private and public transfers, and access to public facilities to generate intermediate indicators of social well-being.

Access to Data

Even for countries where survey data exist, the primary data are seldom accessible to scholars. Statistical institutes make available summary statistics based on the surveys, but access to the micro-data, which is essential to undertake quality research, is severely restricted. We are aware of no country in the Arab region, which provides unfettered or even easy access to the primary data for researchers, unlike what is common practice in developed countries and many developing countries. In some cases, *ad-hoc* access to such data for individual researchers is available, but it is not based on transparent and predictable rules.

Even for international organizations, such as the World Bank, access to the primary data is the most restricted in the Arab region compared to other regions (Iqbal, 2006). The time lag in the availability of the data is, similar to that of Sub-Sa-

haran African countries, the longest as compared to other regions (Ravallion and Chen, 2008).

Data Sources: Sampling Issues

Sampling size

In ACs, surveys appear to follow good practice in both sampling base and sampling size. Indeed, typically the sampling frame of surveys in MENA comes from the most recent censuses; samples are random and the sample sizes are sufficiently large to allow disaggregation by sub-national entities (e.g., 48,000 in Egypt for the 1999 survey, 7,200-15,000 in Morocco, more than 13000 in Tunisia in 2005).

Sampling design and urban/rural distinction

Typically, complex multistage sample designs are used in a way so that they incorporate stratification and clustering. Stratification ensures that a certain level of minimum information is obtained from each region of the country and/or socio-demographic group of the population. Population strata are typically geographically defined and often represent different regions or departments of a country.[31] Stratification by regional areas, for instance, guarantees the presence of enough observations to enable unbiased estimates for each of the stratum. Clustering makes the survey cost-effective by avoiding the selection of households that are widely dispersed from one another.

For all these reasons, Table A-1 shows that with the exception of Oman, all household surveys in the AW are a two-stage sample design. This typical sample design first draws clusters and then households. Rural/urban is an important stratification variable and lack of clarity of this distinction affects both the efficiency of sampling and interpretation of results. Indeed, administrative definitions of what is urban are often outdated and result from a slow political process of redrawing boundaries between administrative units (Egypt is a case in point). This results in mixing up rural, suburban and slum areas. This also increases the heterogeneity of areas from where the samples are drawn and may affect precision. In many countries (in Latin America, but also Turkey), different types of urban areas constitute different strata, which is especially important to capture adequately the population in slum areas (and follow the sampling strategy, which should

fit best these areas). This does not appear to be the practice in ACs.[32] There is no official definition of slums and stratification typically follows administrative boundaries (governorates or provinces). This is a missed opportunity to improve the coverage of the surveys.

Documentation and high rates of response

The issue of documentation is general and affects the whole process of data collection. In the case of sampling, it pertains to the usual problem of how to draw a sample based on a census, which is not recent (censuses are done every 10 years) in the context of rapidly growing and migrating population. Inadequate capturing of population movements, especially in newly developed areas (informal and formal settlements) may introduce a bias, which is not constant over time and across space. Such bias will affect the generalizations based on survey data to the population, especially the inequality indices. This time, however, (unlike in the case of stratification mentioned above) it will omit some inequality from the top (it is typically the better off, or socially more dynamic who move to the new construction areas).

In general, while principles of sampling (with the caveats noted above) are sound, its implementation in the field work poses problems. Samples typically produce randomly drawn lists of addresses (or identification instructions in cases where there are no addresses – like in slums or villages) that an interviewer has to visit during the survey. For such cases in which the address is not valid, no one is present at the address, or a household refuses to answer, there are "reserve" units, which an interviewer may go to fill in a quota of the field work.[33] This practice of "reserves" can be abused. Sampling lists may include reserves, which are as large as the main lists, and leave discretion to a field worker about how to select the households to be interviewed. This often violates the principle of random selection – in fact the surveying process becomes a series of trials to approach many households in a certain area until the target number is interviewed. No statistics is kept on how many household records brought by interviewers were checked against the actual people in the sampled addresses, and it is unclear what are the material incentives of field workers (e.g., whether their salary depends on filling the quota).

Typically, response rate statistics and distribution of reasons for replacement of households in the original sample is helpful to assess the quality of field work and to correct possible biases – provided they remain reparable. Unfortunately, such statistics are seldom reported in a transparent way across the AW region. Hence, a response rate of 95 percent in Egypt and in Morocco may reflect serious efforts of statistical offices to contact and motivate respondents, but they also may reflect "cushions" embedded in the design of the samples to achieve a target sample size. High response rates due to multiple interview attempts until success is achieved may actually be quite misleading and create a false source of comfort.

The issue of apparently high response rate due to liberal use of replacements to the original sample is not unique to the AW. This is a strategy, which was also relied upon in some OECD countries' surveys before 1990s. But with the increased transparency of survey data collection, it is now much less popular and is thought to compromise the sample quality. Countries, which still rely on this strategy, are moving to a practice of stricter sampling implementation rules with actual response rate for all sampled households – without "reserves".[34]

Paradoxically, a high response rate in ACs is the most problematic aspect of the data. In the European Community Household Panel, the unit non-response rate for the first wave (which may be considered like a cross-section because attrition is not present) averaged 28 percent across countries – ranging from above 50 percent in Germany and Luxembourg to 10 percent in Greece and Italy (Peracchi, 2002). Information on non-response rates over the 1993-2000 period has been collected by Kordos (2002) for selected transitional countries. The average rate of non-response on household budget surveys across the countries over the period is also 28 percent, but that includes countries (such as Russia and Poland), which practiced replacements. It is hard to believe that ACs have superior levels of trust between statistical offices and populations to achieve unparallel success in obtaining 5 percent non-response.[35]

No statistician, of course, is going to willingly distort the information collected. But there are many aspects of survey data collection, and experience shows that when there is no scrutiny of professional community of data users, the ten-

dency often is to compromise over those aspects, which are the most difficult. Collecting data from randomly selected households with fixed limited budget is very difficult and risky (response rate may be so low to undermine credibility of data), and reserves may be regarded as necessary for success. But this success may in fact be a source of serious issues. Unlike in the case of Poland and Russia mentioned above, no information of the details of survey work is available from ACs, making it impossible to assess whether such problem is serious or not. There are two indirect ways to assess it. One is to compare "closed" official surveys with results of 'open' surveys from the same countries. Unfortunately, examples of truly independent, well-documented expenditure surveys in the region are extremely rare and mostly outdated (Morocco LSMS of 1991 is one example). The second is to look at the component of inequality and compare it with data from other countries, where biases of data are well understood. This will be done below under the rubric of "data validation".

Sampling errors

The dissemination and analysis of sampling variability measures often lag behind in the AW. In most cases, sampling error estimates are not computed, or, if ever estimated, not published. The notable exception of this is the World Bank's (2004b) report on poverty in Jordan based upon 1997 and 2002 household surveys and the Jolliffe et al.'s (2004) study on poverty and inequality measurement in Egypt using 1997 household survey. Standard errors for household expenditure estimates for all the sub-districts in Jordan are estimated to help judge the reliability for the estimates. The World Bank found, inter alia, that although standard errors were often weak for the most summary statistic estimates, the fall in inequality experienced by Jordan between 1997 and 2002 is not statistically significant. In addition, the computation of standard errors should take into consideration the multi-stage sampling. Typically, this would imply much higher standard errors as was found by the World Bank for Jordan and Jolliffe et al. (2004) for Egypt, where it was a multiple of 3 and at times reaching 5 in some Jordanian governorates or for some poverty measures in Egypt. Thus, ignoring the surveying process can have important implications for the understand-ing and the design of the redistributive policies.

Data Quality Issues

Income, consumption and components of expenditure

Household surveys in the AW typically provide information on:

i.   Socio-economic and socio-demographic characteristics (household size and structure, region of residence, and occupation status) of households and their living conditions (dwelling characteristics, possession of durable goods, etc.).
ii. Households' expenditure and consumption on different food and non-food items.
iii. Access to social infrastructure (including water, electricity, and roads) and public services (including education and healthcare).

However, with the notable exception of Jordan and Egypt, they do not include information on: (i) sources of **household income** including public and private transfers, land tenure and access, crops, access to credit, remittances, etc.; and (ii) labor market conditions and wages by gender. Further, we are not aware of any survey which includes parental background (such as education, labor status, etc.) and on some other individuals' circumstances such as the place of birth, race, ethnicity, etc. This is a serious handicap for comprehensive studies on inequality by income sources, the effects of public and private transfers on disparity, and on the extent of inequality of opportunities. Further, household surveys are often unable to capture the incomes (expenditures) of the richest sectors of society. Thus, even the available standard inequality measures are most likely a gross underestimation.

Most surveys in the world suffer not only from a unit non-response, which is a case when a whole household decides not to participate, but also from item non-response, that is when even participating households report distorted information on some part of their incomes or expenditures. Some surveys are better at minimizing these types of measurement error than the others. A common concern across the developing world is *income* reporting. This is for both the reasons of difficulties of measuring incomes for informal businesses and subsistence small farmers, as well as for the reason of not willing to report accurately

(for tax avoidance purposes or in fear of becoming a victim of crime).

ACs' statistical offices, in particular, are concerned that some individuals may choose to underreport their income deliberately, even if they have a precise idea of its value. This reflects a lack of trust between the respondents and field workers, and the concern over the anonymity, which may be compromised. Across the AW, as in other regions, survey-based estimates of income are often substantially less than survey-based estimates of consumption. While it is theoretically possible that consumption is exaggerated and income measured accurately, this is very unlikely. Instead, most evidence suggests that surveys underestimate the true level of household consumption. If underreporting is correlated with income or with income sources typically earned by specific sectors of society, it will introduce biases in inequality estimates.

Expenditures or consumption aggregates are portrayed as a way out of the difficulties in accurately collecting income data – to the point that some statistical offices do not utilize information on income collected in their surveys (e.g., Morocco or Egypt). However, measuring expenditures and consumption is by no means an easy way out. In fact, it calls for a much more complicated set of instruments, including detailed diaries of expenditures, which complicate the survey and increase their costs. Construction of consumption aggregates also requires conceptual clarity. Consumption is not a simple substitute for income; it is a different measure of welfare[36] and its construction allows looking at many issues, which do make sense only when taken together with incomes (e.g., lifecycle changes, vulnerability etc.)[37]

Consumption not only involves complex instruments for data collection, it also requires very careful procedures to aggregate different components and imputations. The most important are imputations for *in-kind consumption*, rents from owner-occupied or rent-controlled dwellings, treatment of *durables*, convention about *the measurement of consumption* of subsidized goods and services, and capture of *out of household* consumption.[38] They do not work in the same direction – the prevailing practices may over estimate and underestimate the true extent of inequality. The combined result of these problems is difficult to assess.

Typically, imputations of *in-kind consumption* in ACs are done by interviewers in the field – not the most reliable (LSMS Handbook), but acceptable method. It does, however, ignore stocks uses and is not integrated with agricultural modules, which allow a good check on the accuracy of consumption records. This may lead to some underestimation, especially in countries with large agriculture sector (Egypt).

For the *durables*, all surveys in ACs take the value of purchases and directly include it in the aggregate (be in expenditure or consumption). Because durable goods last for several years, and because it is clearly not the purchase of durables that is the relevant component of household welfare, they require special treatment when calculating total consumption (Deaton and Zaidi, 2002). It is the use of durable goods that contributes to welfare, but since use is rarely observed directly, it is typically assumed to be proportional to the stock of the goods held by the household. But in practice, instead of the user value of the stock of durables, the purchases of durables during the last year (recall period) are included in the consumption aggregate. This is known to increase the level of inequality.[39] Moreover, it also risks producing a spurious trend in inequality, as more durables purchases will lead to higher measured inequality.

Imputed housing is another source of problem. It is important to include imputed rent. A simple example shows the importance of this adjustment. Imagine three households that are exactly alike in their composition and total consumption. The first household rents its flat on the market, the second owns its flat and the third lives in a flat, whose rent is fixed by an old law and it represents only a fraction of its current rental value. The consumption aggregate would include the rental payment of the first household. If no value is calculated for the second household's housing, the second one would look poorer than the first, when we know that they are exactly the same. Additionally, the first, second and third household would have the different "measured" housing consumption level but we know that the welfare is the same. To avoid this type of mis-ranking of households, we need to estimate a value for the housing of the non-market renters (i.e., the second and third types of household). For households that rent their housing, it is assumed that the monthly (annual)

rental payment is equal to the amount of housing 'consumed' in that year. To ensure that the comparison of welfare levels between households is accurate, the value of owned or non-market rental housing value must be calculated or imputed.

The way it is done is typically through the self-reported values – the respondent provides an estimate of the rental value for owner-occupied housing. This information is not checked for consistency, outliers are not imputed or replaced, and there are no market tests on the reported values.[40] An important question is how reliable the information about estimated rental values is. If plausible, such "implicit rental value" can be used in place of actual rent. However, such measures must be treated with caution and carefully inspected prior to use. Quoting from Deaton and Zaidi (2002):

> "Implicit rent is a hypothetical concept, perhaps to the interviewer as well as to the respondent, and the numbers reported may not always be credible or usable. Even when people are apparently confident about their estimates, they may do a very poor job of reporting market rents."

Moreover, the rents of the households in rent-controlled dwellings are taken at face value and are not adjusted.

Subsidized goods are another issue, which is not accounted for anywhere in the ACs despite high degree of subsidization. If the subsidized goods are not available for anyone or they have close non-subsidized substitutes, using the subsidized prices for households who consume them may distort the degree of inequality. If, however, food subsidies are universal, using the subsidized prices over-estimate overall inequality as long as the budget share of subsidized goods are decreasing with income.

A common problem in ACs' surveys is an outdated practice of measuring *consumption outside of home*. Even though an increasing part of food consumption is in this form, surveys do not measure it with the same detail as the home consumption of food. Diaries remain household diaries (there was no experiments with personal diaries), and questions are extremely aggregated with long recall periods, making it likely that this component of consumption is not well captured. Over time, this may introduce a systematic underestimation

of welfare for the richer households.

The list of conceptual issues in the definition of consumption does not stop here. Some survey data include aggregate taxes, repayment of loans, interest payments, loans given to others, purchases of financial assets, infrequent and lumpy expenditures (like dowries), and remittances (both cash and in-kind).[41]

This review shows that there are many issues in constructing consumption measures which, if not properly addressed, could potentially make it as noisy and biased indicator as income. Surprisingly, a detailed discussion is seldom found about how a consumption aggregate is built in any of the survey documents or reports in ACs. This applies not only to the statistical offices or research papers, but also to the World Bank's poverty assessments. As argued above, based on various sources, the issue is more complicated than that and involves a number of choices which, even if kept implicit, do influence the results (inequality) and do affect the comparability of data on inequality.

Consumption or expenditure measures constructed without clear and harmonized rules over these issues are noisy. The signal to noise ratio in the inequality indices will be large, making comparisons over time or across countries meaningless, and our impression about country inequality can be misguided. The Luxemburg Income Study project for OECD countries, which was motivated by the objective of achieving comparability across countries and over time of inequality, relied on income as a welfare measure, which is easier to harmonize and build across many surveys. ILO and UN Statistical Commission (Canberra group) have also established very clear guidelines to improve quality of survey data on incomes, which were then followed by recommendations for more comparable expenditures and consumption statistics.

Comparison with other sources of data

An implicit assumption-- when using nationally representative income or consumption distribution indicators-- is that the statistics measure inequality among all individuals in society. Since household surveys use sampling, some subgroups might be underrepresented in the survey. If the richest and the poorest individuals are not sampled or are underrepresented, the estimate statistic of inequality will be biased. Therefore,

one indicator of survey quality is if the instrument is really able to capture information for the whole spectrum of income earners. The simplest way to validate data in such way is to compare the survey mean income or consumption with the estimate from other sources, and then to compare higher incomes to data from other sources.

Recently, there has been controversy about the discrepancy between aggregate measures of consumption from national accounts statistics (NAS) and survey estimates of consumption, especially in India where the difference is increasing. From the mid-1970s until the mid-1990s, measured average consumption in India, as reported in the National Sample Survey (NSS), appears to have fallen from 95 percent of the comparable NAS figure to only 60 percent and it is even lower now (Deaton, 2001). Several studies have examined the gap between measures of consumption expenditures obtained from household surveys and from NAS of consumption in India and the results of all of them caution against adopting the "means from NAS, distribution from surveys" approach, or any variant of it.

These differences between surveyed consumption and national accounts estimates also show up in other countries. For example, Triplett (1997) reports that in the U.S. per capita consumption in the national accounts grew 1 percent per year faster than per capita consumption in the Consumer Expenditure Survey (CEX) during 1984-94. Consequently, when the CEX estimates are calibrated to the consumption estimates from the national accounts, the downward trend in U.S. poverty rates is more pronounced (Slesnick, 1993).

ACs also exhibit the same level of discrepancy and trend between survey and national accounts data. The World Bank (2007) Poverty Assessment Update included a box, which discussed rather large discrepancy found in Egypt.[42] In Morocco, poverty assessment and poverty update noted differences between trends in national accounts household consumption and surveys, and proposed an "adjusted" measure of poverty (baseline survey multiplied by the growth rate from national accounts).[43] But these proposals or discussions spawned very little feedback from data users and do not seem to affect data producers. But unlike in other countries, these issues do not lead to a comparable research effort.

Table 2 shows an estimate of the discrepancy between measures of household consumption from household surveys and from national accounts. The measure of household consumption per capita from the national accounts we use is from the International Comparison Program (ICP) published by the World Bank (2008). It yields "individual consumption" per capita in international $ PPP for 2005, reported in Column 4 for a number of ACs, as well as other comparator developing countries. Column 1 provides household consumption per capita from national accounts, which is compared with individual consumption per capita from the ICP in current dollars shown in column 2. These figures are relatively close if not completely similar, which justifies using the ICP measure as good representation of the measure from national accounts. The measure of household consumption per capita from household surveys is obtained from the World Bank PovCalNet data set, which provides data based on surveys from developing countries, and is shown in column 3. The ratio of columns 3 and 4 provides a sense of the discrepancy between the two sources, which is pervasive in developing countries. Except for a couple of low-income countries, Mauritania and Kenya where survey measures are greater than what is given in national accounts, the household survey measure tends to be between 20 percent and 70 percent lower than the national accounts. If we exclude Egypt, the discrepancy for ACs tends to be on the lower side compared to other developing countries.

The degree of success in defining a sample that is informative about all sectors of society can also be gauged by comparing top of the incomes (or consumption) recorded in the survey with survey on incomes in USD of a manager of a medium- to large-size firm obtained from business surveys.[44] The comparisons with such benchmarks attempted in LAC and in Russia were quite striking and revealing. In LAC,[45] on average in the 16 countries for which information is available, the total income of the 10 richest households in the survey is very similar to the average wage of a manager. In 10 countries, on the other hand, the average income of managers is actually higher than the income of the 10 richest households. In Russia,[46] such comparison for a Moscow sample revealed that none of the HBS rounds has managed to interview even an accountant from a private firm. One important conclusion that emerges from these results is that

Table 2.

Consumption expenditures from household surveys and national accounts compared, 2005

	HH Consumption Exp. P.c. National Accounts Current $ US (1)	Individual Consumption p.c. ICP Current $ US (2)	HH Consumption p.c. From PovCal-Net (surveys) PPP $ US (3)	Individual Consumption p.c ICP PPP $ US (4)	Ratio (3)/(4)
Egypt	892	1086	1498	3812	0.39
Jordan	2240	2240	2702	3800	0.71
Mauritania	577	470	1334	1199	1.11
Morocco	1134	1262	1848	2250	0.82
Tunisia	1827	2029	2672	4371	0.61
Yemen	348	569	943	1461	0.65
Brazil			3344	5720	0.58
Chile			4948*	7438	0.66
Kenya			1348	1207	1.12
Mexico			3816	8860	0.43
Philippines			1188	2200	0.54
Romania			2268	7314	0.31
Turkey			2808	5714	0.49
Thailand			2280*	4491	0.50

Note: Col. (1) from World Bank databases on National Accounts; Col. (2) and Col. (4) from World Bank (2008): "Global Purchasing Power Parities and Real Expenditures: 2005   International Comparison program"; Col. (3) from the World Bank's PovCalNet, data for 2005 are computed by using the latest figure available from the household surveys and updating to 2005 applying the growth rate of Household Consumption expenditures in the national Accounts at constant $ US 2000. A (*) indicates that figure for Chile is for 2003 and for Thailand it is for 2004.

inequality is grossly underestimated because of extremely limited information on the richest individuals, but that the degree of underestimation differs from case to case. We do not know of any such comparisons done for MENA countries.

Another data validation tool practiced elsewhere is to look at the monthly average income or consumption of the 10 richest households in the survey. A large gap between this group and the rest of the distribution may show a sensitivity of inequality statistics to the presence of outliers.

Finally, work on comparing tax records (by income brackets) with the survey results is often used not only to assess which parts of the distribution are under represented, but also to "restore" the missing parts and to show the ranges for the real Gini. Such analysis is now available for a number of OECD countries[47] and for some developing countries, such as Argentina,[48] China, India,[49] Russia,[50] and Indonesia.[51] In the absence of tax data, researchers use accurate response rate statistics to restore the missing tails and assess possible ranges of inequality indices.[52] We are not aware of this type of work in MENA countries.

There are no attempts to check wage data reported in the surveys with the official wage statistics (for Egypt, these are available at ILO web site, LABSTAT). The new results of the census establishments have not led to work on comparing asset distribution in census and survey data. One modest attempt to use the household survey to estimate the average plot size for agricultural households and compare it to the MARL data on average farm size led to a revelation of a large discrepancy (0.9 *feddans* in the HICES and around 2 *feddans* in MARL data), but was discarded for not

using exactly the same definitions (household is different from farm).

Overall, there is no motivation or interest for doing such external validations as they are regarded more as attempts to "criticize" the data rather than to understand their true biases and meaning. This is a serious gap in the existing research on inequality-- a "basic" work that is necessary to better understand the available data.

Processing of data

According to Gottschalk and Smeeding (1997, 1998), the highest incomes in household surveys are usually measured with lower precision.[53] This is why World Income Distribution Data base (1999) by WIDER,[54] and most importantly – the Luxembourg Income Study (LIS) project made an effort to collect and make available primary data from surveys and to harmonize the data. Interestingly, according to LIS and LAC research, the ranking of countries is very sensitive and strongly affected by the incomes at the top of the distribution. The grounds on which conclusions about the relative position of each country in MENA and the differences with other regions are drawn should be treated with extreme caution.

Apart from the differences in household survey quality and characteristics, there are several important choices and assumptions behind inequality measures. For instance, to compute the conventional Gini, it is often implicitly assumed that:

i.   each member of the household has the same needs;

ii.   there are no economies of scale in consumption;

iii. missing and zero incomes are unreliable and are better to ignore;

iv.   prices do not vary a lot across the households of the survey (in different regions or in different months of the survey),[55] and;

v.   the best way to summarize the information on the distribution of income is to compute the Gini coefficient. (See Box 1 for technical definition of the Gini index).

We have used them because in MENA, it is standard to estimate inequality in this way, but in other regions, alternative methods, which are as valid or even more adequate, are traditionally employed. For instance, as noted by Atkinson, Rainwater and Smeeding (1995), there is a tradition in OECD countries for applying adult equivalence scales and to account for some economies of scale in consumption, but these practices are not common in MENA.

Demographic and Health Surveys

Further to living standard household surveys, most countries conduct Demographic and Health surveys (DHS); Egypt, Jordan, Mauritania, Morocco, Sudan, Tunisia, Turkey, and Yemen are typical examples from the AW. DHS yield basic data on age, sex, survivorship of parents, schooling for members of the household, education level (mainly of the household head), height and weight of women aged 15-49 and children under 5, child mortality, and access to health services. The DHS also offer valuable information on the ownership of assets (like a refrigerator, bicycle, car, radio or television), dwelling characteristics (such as type of toilet and type of walls, roof and flooring materials), and access to basic services (like electricity and piped water). In contrast to living standard surveys, micro-data records are often accessible to scholars free of charge from the DHS website.[56]

Like the living standard household surveys, the basic design of DHS involves stratification and clustering. Explicit stratification is usually based on geographical criteria such as the urban/rural breakdown and is introduced only at the first stage of sampling. Primary Sampling Units (PSUs) are selected independently in each stratum. Typically, the number of PSUs is large, ranging from about 300 to 500 for a sample of 10,000 households. DHS data are typically used to monitor and evaluate progress in maternal and child health and population programs. More often, they are used to shape policy and to adjust intervention program objectives, as well as for long-term health and population planning.

Given the DHS information, many analysts have recently suggested asset-based alternatives or complements to the standard use of living standard variables in characterizing the welfare distribution. This, however, raises a question: how one may aggregate at the individual level the available information on assets ownership into an individual metric of welfare, usually labeled as a composite welfare index. Two principal methods have been suggested in the literature. The first, suggested by Filmer and Pritchett (2001),

and Sahn and Stifel (2000, 2003), uses the Principal Component Analysis (PCA) method to weight the ownership of the different assets. The second, proposed by Booysen et al. (2005), commands the use of multiple correspondence analyses (MCA) in presence of dichotomous variables.[57] Some of these applications and their limits are reviewed in chapter 4.

Patterns of Inequality in the Arab Region

Most of the evidence on patterns of inequality in ACs is based on consumption expenditures from household surveys and focuses on distribution among individuals. The review of this empirical evidence on inequality in the ACs shows that although there is large variation among them, the level of inequality tends to place these countries in moderate or in the middle range of inequality as measured by consumption expenditures. Whereas most countries where data are available tend to exhibit moderate inequality by the 1990s, a few show very low inequality (such as Egypt, Syria or Kuwait), while some other show higher inequality (such as Tunisia and Morocco).

While there is very limited data on inequality going back to the 1960s, the few indicators available tend to show significant declines until the early 1980s, which together with high growth would explain the dramatic fall in poverty rates across the Arab World. Since the 1980s while there are no overall clear trends in inequality for most countries and periods, there is some evidence of increases in inequality for those countries, which start from low levels and declines for those with initial high inequality. Based on limited information, inequality in earnings appears to be relatively higher in ACs compared to other regions, which contrasts with the findings for inequality based on household expenditures.

Going beyond distribution among individuals, knowledge about alternative and recently developed aspects of inequality such as horizontal inequality, polarization or equality of opportunity is almost nonexistent for ACs.

The little evidence available on inequality in the distribution of other variables beyond income (education, health, and land) suggests that the ACs are among the most unequal. According to Bardhan et al. (1999), for example, initial distribution of assets may be a key variable for individuals' ability to climb up the income distribution ladder. In China, Ravallion (1998) found a significant negative effect of local asset distribution on individuals' consumption growth. Further, Deininger and Olinto (2000) showed that the interaction between asset inequality and a country's human capital stock is negative and significantly different from zero. These findings suggest that policies to expand education will have less impact in countries where the distribution of assets is highly unequal. We are not aware of serious studies on the complex link between growth, income distribution and inequality in the distribution of assets in the Arab world.

Inequality in the Arab Region in the International Context

During the 1990s and 2000s, several studies have surveyed and/or computed inequality measures across countries and over time. Deininger and Squire (1996) put together a large dataset of quintile shares and Gini coefficients for most countries since the 1960s. This panel data set, which greatly stimulated the empirical study of the links between inequality and other economic and political variables, was updated and extended in the UNU/WIDER-UNDP World Income Inequality Database (WIID, 2008) and are downloadable. [58]

To compare the extent of inequality in the AW

with that in other regions (like Latin America, South Asia, etc.), the Gini coefficient should ideally be applied to each region introduced into the analysis, as if it formed a single country. This would yield regional inequality indices that reflect both the weight of each country in the region to which it belongs, as well as inequalities between countries of the same region.[59]

Using this approach for each country for which nationally representative survey data are available, Milanovic (2002, 2005) takes mean income or expenditure per decile in PPP dollars (or for any other population shares, example 12 or 15 population groups). Each data point is weighted by the population it represents. For example, one decile in the Egyptian survey represents 1/10th of the Egyptian population. The objective is that the number of such data points be at least 10 by country in order to have a sufficiently precise description of its distribution. The aim of this methodology is to estimate a world Gini index. Applied to ACs for the years 1988, 1993, 1998 and 2002, this methodology enables to calculate a regional Gini, that is an index of inequality for all individuals in the 6 or 8 countries as if they lived in a single country. Table 3 provides the pan-Arab Gini and the between-countries Gini, which is calculated taking mean country incomes from household surveys in PPPs dollars and assuming that all individuals of a given country have the same mean income.

These "pan-Arab" Gini indices, which are around 38 percent, do not show a very high inequality level; they are about the same as inequality in the United States, or China or in the enlarged European Union. Further, over the 14 years for which distributive data are available, one may note the relative stability of the pan-Arab Gini index. The experienced fall of pan-Arab Gini (from 38.1 in 1988 to 36.7 in 2002) corresponds to an annual change of less than 0.27 percent. This is clearly quatitatively small to be confidently declared as statistically significant.

Looking at the between-countries Gini, Table 3 shows that it falls from roughly 16 points in 1988 to 5 points in 1998. Therefore, pan-Arab inequality seems to be mainly due to within-national boundaries inequality, and not for between-national disparities. These results, however, would be doubtlessly substantially changed, if Gulf countries were included, as illustrated by the inclusion of the UAE in 1998 (see footnote of Table 3). The in-

Box 1: The Gini Index

To portray the inequality level and change, it is important to note that the literature offers many ways of measuring the extent of the living standards dispersion. Popularized by Dalton (1920), the Gini index of inequality is the most extensively used measure of welfare distribution, which can be calculated as:

$$I^{Gini}(\mathbf{x}) = \frac{1}{2n(n-1)\overline{x}} \sum_{i=1}^{n} \sum_{j=1}^{n} \left| x_i - x_j \right|$$

$$= \frac{n+1}{n-1} - \frac{2}{n(n-1)} \sum_{i=1}^{n} (n+1-i)x_i \tag{1}$$

where $\mathbf{x} = (x_1, x_2, \ldots, x_n)$ is a vector of living standards x_i (income, for short) for a population of n individuals, when xi are ordered in increasing values, such that $x_1 \le x_2 \le \ldots \le x_n$ and $\overline{x}$ is the mean income.

The use of the *Gini* index is very common for three reasons. First, it is widely reported in official sources and international organizations that have access to primary data. Second, it is due to the intuitive interpretation of $I^{Gini}(\mathbf{x})$ as the average distance between all possible pairs of normalized incomes in the population. Third, it could be derived from the Lorenz curve; which yields the cumulative percentage of total income held by any cumulative proportion p of the population, when individuals are ordered in increasing income values. The *Gini* index can alternatively be given by the ratio of the area between the Lorenz curve and the equality diagonal to the area below the 45° line. Thus, the *Gini* value lies between 0, in the case of full equality, and 1 when one member of the population holds all of the available resources.

ter-country population-weighted Gini would then be surely much higher.

It is important to note that the pan-Arab Gini indices shown in Table 3 may underestimate the extent of Gini inequality over the Arab population. The Milanovic's methodology is based upon the implicit assumption of perfect equality within each decile of population. At first glance, this assumption could not be dropped in absence of direct access to micro data. However, the recent literature offers several possibilities to reconstruct individual data expenditure observations from cumulative expenditure shares (Lorenz curve or-

Table 3.
Overall inequality in the Arab world

	1988	1993	1998	2002
Overall pan-Arab Gini	38.1	37.7	37.0 *	36.7
Between countries Gini	16.1	7.4	5.3 *	
Number of countries	6	8	8	6
Morocco	Algeria Morocco Tunisia Egypt U/R Jordan	Algeria Morocco Tunisia Egypt Jordan Yemen Mauritania Djibouti	Morocco Tunisia Egypt Jordan Yemen Mauritania UAE Comoros	Marocco Egypt Jordan Mauritania Comoros Syria
Population included (in millions)	110	138	103	127

*Notes: * Excludes UAE, with UAE the overall Gini is 47.0.*
Source: Milanovic's calculation for the purpose of this paper using World Income Distribution downloadable from http://econ.worldbank.org/projects/inequality.

dinates). In this respect, Shorrocks and Wan (2008) have suggested a procedure which, in contrast to several alternative methods, ensures that the characteristics of the synthetic sample exactly match the reported Lorenz curve ordinates.[60] Thus, the precision of pan-Arab" Gini indices provided in Table 3 could be improved by applying such a procedure.

The available studies on MENA inequality in comparative perspective treat each country as one observation. The implicit value judgment, which underlines this choice, is that countries, not population, should get equal weight in ranking regional inequality. Regional *Gini* indices are then typically calculated as un-weighted averages of country indices during each considered period.[61]

The results of the main studies on regional inequality, conducted (notably) by Deininger and Squire (1996), Deininger and Olinto (2000), and Adams and Page (2003), are reported in Table 4. Of the 22 countries in the AW, only six are usually considered in the comparative studies (Algeria, Egypt, Jordan, Morocco, Tunisia and Yemen). In addition to them, Iran is typically included in these studies to represent the so-called MENA region.[62] Table 4 shows that the number of countries included in each region may vary from one study to another and between the different periods. Despite this, and except in few cases, the calculations

of the *Gini* indices made by the different authors are very comparable.

To facilitate the inequality comparisons between the AW and the ROW (Rest of the World), while providing a broader picture of welfare distribution across regions, Table 5 averages the *Gini* indices reported in Table 4 and supplements them by:

i. the income share ratio of the richest to the poorest quintile of the population;

ii. the GDP per capita taken from Adams and Page (2003);[63]

iii. the equally distributed equivalent (EDE) in Atkinson's (1970) terminology, referred to as x_e. (See Box 2 for definition and rationale for using this broader indicator of welfare). Normally x_e is calculated for each region using equation $x_e = \overline{x}(1 - I(\mathbf{x}))$; where $I(\mathbf{x})$ is an index of inequality for $\mathbf{x} = (x_1, x_2, \ldots, x_n)$ a vector of living standards x_i (income, for short) for a population of n individuals, when x_i are ordered in increasing values, and $\overline{x}$ is the mean income. However, to facilitate the computation of x_e, $\overline{x}$ is replaced by the GDP *per capita* and $I(\mathbf{x})$ is considered equal to the *Gini* index.[64]

Further, since no study includes the AW as a separate region, we rely on World Income Inequality Database and the World Bank publications to

Box 2: An integrated approach to inequality, poverty and social welfare analysis

The distributional pattern of income is not all that matters. If it were the case that inequality goes down simultaneously with a sharp fall in households' resources on average, most people would agree that aggregate welfare has worsened despite the inequality reduction. Further, basing welfare assessment only on inequality may conflict with the Pareto principle. For instance, an egalitarian distribution *A* where each person has one dollar a day, say, is far from being preferable, according to the Pareto's principle, to an unequal distribution *B* where the poorest has 1.1 dollars a day and the richest has much more. While relative deprivation should undeniably matter to social welfare assessments, it certainly cannot be advocated that absolute income gains, even unfairly distributed, are welfare worsening.

The opposite mistake of just looking at mean income is unsuitable as well. Mean income may grow, but inequality could also rise in such a way that the poor segments of the population are excluded from growth benefits, leading, thus, to a negative appreciation of the overall performance of the country under consideration, according to Rawlsian value judgments.[65]

Thus, on one hand, using inequality indices alone to characterize poverty and social welfare is relevant only when mean incomes are the same across the different distributions under consideration. On the other hand, mean incomes could not be an adequate proxy of welfare unless the different distributions present the same pattern in terms of fairness.[66] We need then to combine the strengths of both measures to yield a broader picture of welfare and poverty.

To see how this can be done, consider again a vector $\mathbf{x} = (x_1, x_2, \ldots, x_n)$ of living standards x_i (income, for short) for a population of n individuals, when x_i are ordered in increasing values, such that $x_1 \leq x_2 \leq \ldots \leq x_n$.[67] The most common summary index of a distribution is its mean, defined simply as:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i.$$

(2)

Let $x_e = W(x_1, x_2, \ldots, x_n)$ be a social welfare metric, which is non-decreasing in x_i, i.e., the rise in any income's person should not decrease the welfare level in harmony with the Pareto principle. For the purpose of linking the changes in social well-being to those of inequality, it is convenient that proportional changes in all x_i yield the same proportional effect on x_e:

$$W(\lambda x_1, \ldots, \lambda x_n) = \lambda x_e.$$

(3)

Therefore, putting $\lambda = \frac{1}{\bar{x}}$, equation (3) can be rewritten as:

$$x_e = \bar{x} W\left(\frac{x_1}{\bar{x}}, \ldots, \frac{x_n}{\bar{x}}\right)$$

(4)

One can consider that x_e attains its highest level when the available resources are equally shared among the population, $x_i = \bar{x}$ for all $i = 1, \ldots, n$, so that $W(1, \ldots, 1) = 1$. Otherwise, x_e for any unequal allocation cannot be greater than $\bar{x}$. Hence, x_e can be deemed as the equally distributed equivalent (EDE) income in Atkinson's (1970) terminology. Saying differently, x_e is the level of income which, if shared equally by all individuals, would produce the same level of social welfare as that yielded by $\mathbf{x}$. Clearly then, equation (4) can be alternatively expressed as

$$x_e = \bar{x}(1 - I(\mathbf{x}))$$

(5)

where $I(\mathbf{x})$ is an index of inequality corresponding to any social welfare evaluation leading (through

an appropriate increasing transformation function) to $f(\mathbf{x})$. It is defined as the distance between the mean income and the EDE income normalized by the mean income

$$I(x) = 1 - \frac{x_e}{\bar{x}}$$

(6)

and lies between 0 (perfect equality) and 1 (extreme inequality).

Interestingly enough, equation (5) combines the strengths of both conception of welfare analysis: it enables welfare comparisons by considering both the *nature* of welfare distribution and the *scale* of available resources.

For poverty comparisons, a similar approach can be followed by censoring the income distribution at the poverty line. To see how this can be done, let z be the poverty line and h be the population size of the poor. Censored incomes are therefore the income x_i for those in poverty ($x_i < z$) and z for those whose income exceeds the poverty line. Censored distribution is denoted by $\mathbf{x}(z) = (x_1, \ldots, x_h, z, \ldots, z)$. The mean of $\mathbf{x}(z)$ is denoted as $\bar{x}(z)$ and the EDE income is denoted as $x_e(z)$:

$$x_e(z) = \bar{x}(z)\big(1 - I(\mathbf{x}(z))\big)$$

(7)

It is however common in poverty analysis to express the living standards variable in terms of poverty gaps, $g_i(z)$, for income x_i and poverty line z as:

$$g_i(z) = \max(z - x_i, 0)$$

(8)

The distribution of poverty gap is $\mathbf{g}(z) = (g_1(z) \ldots, g_h(z), 0 \ldots, 0)$ when $g_i(z)$ are ordered in decreasing values, and average poverty gap of $\mathbf{g}(z)$ then equals $\bar{g}(z)$. Bibi and Duclos (2005, 2007a) have shown that distribution-sensitive poverty measures in terms of EDE poverty gaps can be expressed as:

$$P(z) = \bar{g}(z)\big(1 - I(\mathbf{g}(z))\big)$$

(9)

For the purpose of an integrated analysis of inequality, poverty, and social welfare, two principal approaches have been followed. The first consists in deriving inequality indices by specifying a class of social welfare evaluations (or poverty measures) and solving for the inequality yardsticks using equations (2) to (6) (or equation (7) instead of (5) for poverty analysis). This route is pioneered by Atkinson (1970) for social well-being evaluations. He suggests the following class of social welfare functions: [68]

$$x_e(\mathbf{e}) = \left[\frac{1}{n}\sum_{i=1}^{n}\frac{x_i^{1-\mathbf{e}}}{1-\mathbf{e}}\right]^{\frac{1}{1-\mathbf{e}}}, \forall x_i > 0, \mathbf{e} \neq 1$$

$$= \exp\left[\frac{1}{n}\sum_{i=1}^{n}\ln x_i\right], \forall x_i > 0, \mathbf{e} = 1$$

(10)

Clearly then, $\epsilon = 0$ yields the mean income, $\bar{x}$ which is an adequate welfare measure only if all people have the same income. Otherwise, using $x_e(0)$ will fail to capture the inequality in the income (or any other proxy of welfare/opportunity) distribution. This argues that $x_e(\epsilon)$ should not in general be greater than xe(0) to be sensitive to the presence of inequality among the population. This is achieved

only when $\epsilon > 0$. The parameter stands then for the degree of inequality aversion or the degree to which social welfare decision-maker trades off mean living standards for equality. As ϵ approaches infinity, inequality and social welfare are assessed upon the basis of Rawlsian judgments, i.e., they are judged using the standard of the worse-off:[69]

$$\lim_{e \to \infty} x_e(e) = \min \mathbf{x} = x_1$$

$$\lim_{e \to \infty} I(e) = 1 - \frac{x_1}{\overline{x}}$$

(11)

The second route is to start from a standard statistical measure of inequality, *Gini* index say, and enquire into its consistency with the principle of transfers and with a social welfare function (or a poverty measure).

Table 4.
Gini Index according to different sources

		Deininger and Squire (1996)			Deininger & Olinto (2002)		Adams and Page (2003)		
		Number of countries	Number of surveys	Gini	Number of countries	Gini	Number of countries	Gini	Head count ratio
East Asia	1970s	10	37	39.9	9	38.7	-	-	-
	1980s	10	46	38.7	9	39.3		39.6	23.7
	1990s	9	16	38.1	9	-		39.7	14.9
Europe &	1970s	5	21	34.3	15	32.9	-	-	-
Central Asia	1980s	8	39	35	15	30.3		25.7	0.2
	1990s	18	32	34.8	15			34.3	4.4
Latin America	1970s	15	34	49.1	17	50.3	-	-	-
and Caribbean	1980s	14	35	49.8	17	49.6		49.7	21.2
	1990s	12	19	49.3	17	-		48.4	14.9
MENA	1970s	3	5	41.9	6	41.8	-	-	-
	1980s	5	7	40.5	6	40.6	7	39.7	1.7
	1990s	4	4	38	6	-	7	35.7	2
South Asia	1970s	4	13	34	4	34.3	-	-	-
	1980s	5	17	35	4	35.1		31.1	36
	1990s	4	6	31.9	4	-		33.6	32.9
Sub-Saharan	1970s	5	6	48.2	7	44	-	-	-
Africa	1980s	11	16	43.5	7	38.5		41.2	24.6
	1990s	14	16	47	7	-		44.8	42.2

Note: The headcount ratio, i.e., the proportion of the population living in poverty, is calculated on the basis of a $ 1/person/day poverty line.
Ali (2003) has used Deininger and Olinto's (2000) results to compare the levels and the changes of inequality between the AW (represented by MENA) and the ROW.

calculate un-weighted means of Gini indices of ACs' averages in the 1980s, 1990s and 2000s.[70]

Two prominent findings emerge from the studies of Deininger and Squire (1996), Deininger and Olinto (2000), and Adams and Page (2003).

The first is the moderately high degree of income inequality of the MENA region as compared with the ROW. We see from Tables 4 and 5 that MENA is a medium inequality region. Their *Gini* statistics are lower than those of Latin America

(where inequality is the highest) and Sub-Saharan Africa, similar to those of East Asia, but higher than those of Europe, Central, and South Asia. Interestingly enough, inequality in MENA region appears to be a good proxy for inequality in the AW. In this respect, Table 5 reveals that the difference in *Gini* index between MENA and the AW for comparable periods is lower than one percentage point. Unfortunately, without access to micro-data, it is not possible to test whether such a

Table 5.
Social welfare comparisons between the ACs and the rest of the world

		Average Gini inequality	Average Gini equality	Ratio richest / poorest quintile	GDP p.c. (PPP, $ 1999)	x_e
East Asia	1970s	39.3	60.7	7.75	-	-
	1980s	39.2	60.8	7.26	2,328	1415
	1990s	38.9	61.1	6.48	3,439	2101
Europe & Central Asia	1970s	33.6	66.4	3.54	-	-
	1980s	30.3	69.7	3.53	6,209	4328
	1990s	34.5	65.5	4.28	5,300	3471
Latin America and Caribbean	1970s	49.7	50.3	14.68	-	-
	1980s	49.7	50.3	14.95	3,209	1614
	1990s	48.9	51.1	11.71	4,335	2215
MENA	1970s	41.9	58.1	-	-	-
	1980s	40.3	59.7	7.04	3,371	2012
	1990s	36.8	63.2	6.57	3,515	2221
ACs	1980s	40.5 (5)	59.5	7.9	3680	2189
	1990s	37.6 (15)	62.4	6.71	3241	2022
	2000s	38.5 (12)	61.5	-	3695	2271
South Asia	1970s	34.1	65.9	5.38	-	-
	1980s	33.7	66.3	5.38	966	640
	1990s	32.7	67.3	4.56	1,578	1062
Sub-Saharan Africa	1970s	46.1	53.9	10.95	-	-
	1980s	41.1	58.9	8.57	975	574
	1990s	45.9	54.1	10.17	1,083	586

Sources: Author's calculation in italic. For the ACs, un-weighted averages are calculated for the Gini indices reported in Table A-2 below and excluding Comoros, Kuwait, Oman and UAE. For the other regions, un-weighted averages are calculated for the Gini indices reported in Table 4. The ratio richest/poorest quintile and GDP p.c. correspond to the average of the results reported in Adams and Page (2003). The equally distributed equivalent (EDE) income (x_e) using the formula given by equation (5). Number of surveys is between parentheses. ACs includes Algeria, Jordan, Kuwait, Mauritania, Morocco and Tunisia for 1980s, Algeria, Egypt, Jordan, Kuwait, Mauritania, Morocco, Syria, Tunisia and Yemen for 1990s, and Egypt, Jordan, Lebanon, Mauritania, Oman, Syria, and Tunisia for 2000s.

difference is statistically significant.

The second is that over the 20-30 years for which the Gini index is computed, income inequality appears to be relatively stable over time within each geographic region. This does not mean that inequality, as measured by the Gini index, does not change over time. They do, by going either up or down, but at a magnitude which may reflect more the sampling variability rather than real movement. Further, even if these changes are statistically significant, they cannot be deemed as "economically significant" in the terms of Atkinson (2003a) for whom, only Gini variations greater than 3 percentage points represent a real distribution shift.[71] Looking again at Table 4, one may remark that only the MENA region would have witnessed an "economically significant" drop in its Gini inequality. However, only Adams and Page (2003) find a reduction in MENA inequality of 4-percentage points magnitude.[72] Therefore, this quasi-constancy in regional Gini naturally yields a relatively stable ranking of the different geographic regions in terms of inequality.

It is perhaps important here to point out the study of Li et al. (1998), who have analyzed the trend of Gini inequality for 49 developed and developing countries over the period 1947-1994. These authors have found no evidence of significant distributional change in 32 of the 49 countries. Further, in 10 of the remaining 17 countries, the change was so small to be confidently declared as statistically significant. According to Li et al. (1998), these results suggest that inequality is determined by a variety of structural factors, which themselves change only slowly such as the schooling quality, the distribution of assets, and the degree of political freedom.[73] El-Ghonemy (1998) conveys a very different picture of increased inequality for MENA during the period 1975-2000. However this finding is questionable since he uses absolute measures of poverty and inequality, namely the number of the poor, the number of undernourished children under five, and the number of illiterate adults which were on the rise.[74]

Deininger and Squire (1996) note, however, that such comparisons should not ignore the fact that Latin America *Gini* indices are income-based, while those of MENA are expenditure-based. They found that the income-based *Gini* indices are, on average, larger than those based on expenditure

by 6.6 percentage points. There are very few instances where we have measures of inequality based on expenditures and income in MENA. One such case is Jordan, where Shaban (1990) finds a Gini index of 35 percent for household expenditures and 40 percent for income in 1986, which illustrates well this kind of difference. Thus, making such an adjustment on Latin America indices bring them down to approximately 43 percent.[75] Although this adjustment does not radically alter the ordinal ranking of the different regions, it largely narrows the superiority of MENA and the AW in comparison to Latin America in terms of fairness and even reverses the superior ranking of MENA in terms of social welfare during the 1990s.

According to Adams and Page (2003), MENA has fared well relative to the other regions in income inequality and poverty levels thanks, in large measure, to the redistribution of oil rents through labor remittances and government jobs, which provided a cushion for the unemployed rural poor.[76] In terms of trends, MENA is among the rare cases that have experienced a positive growth, a reduction in their *Gini* indices and poverty headcount between the 1970s and 1990s.[77] Much of the inequality and poverty fall is driven, according to Adams and Page (2003), by a substantial rise in the income share accruing to the poorest quintile of the population. Finally, Adams and Page (2003) find that MENA region has achieved all of this with very low rates of GDP growth.

The aggregate picture, which emerges from the income share ratio of the richest to the poorest quintile of the population is, to a large extent, similar to that portrayed by Gini indices. Nonetheless, the former aggregates of inequality are not always completely congruent with the latter. For instance, despite the fact that during the 1990s the *Gini* coefficient for the AW was lower than that of East Asia, the income share of bottom quintile in East Asia was larger showing a better distributional outcome than the Arab region.

It is then important to note that spatial and temporal inequality comparisons between different regions of the world should be made with caution. It should be recalled from previous discussions about data that differences in surveying process, spatial variability of prices within areas of each country, and methods for computing income or expenditures between and within countries are

often significant, although diminishing. Thus, serious inequality comparisons should be accompanied by the computation of standard errors to test the significance of inequality differences.[78]

Another issue related to the reliability of regional comparisons of inequality should be mentioned. Indeed, Tables 4 and 5 show that while the number of countries included in the regions of Europe and Central Asia, East Asia and Latin America is important, regions like MENA, the AW, and Sub-Saharan Africa are underrepresented.[79] The number of surveys used in the latter regions is also weak, with fewer than two observations for each country on average, compared with more than three in former regions. Given the improvements in the coverage and the number of ACs having more than two household surveys since the end of 1990s, comparative studies on the level and trends of income inequality with other regions remain an important issue to be explored further.

Inequality across ACs

Like regional statistics on inequality, much of the available evidences about the welfare distribution in the ACs are based upon statistics published by international agencies, like the World Bank, national statistical offices, or similar agencies.[80] A diversity of summary indices about income or consumption are employed, the most common are the *Gini* coefficient and the proportion of the population whose standard of living falls below a given poverty line, that is the incidence of poverty (named also the headcount ratio). The main pertinent statistics across the ACs from the 1980s to the 2000s are reported in Tables A-2 and A-3.

In order to bring out a first snapshot about the situation of inequality and social welfare in the 13 ACs where distributional statistics from household surveys are available, Table 6 provides the 1999 expenditure-based *Gini* indices of inequality and the 1999 mean expenditure *per capita*. The estimates of the mean expenditure *per capita* are based on the most recent set of PPP exchange rates for 2005 (World Bank, 2008). It must be noted here that while PPP exchange rates are commonly used for comparing national poverty and social welfare, such comparisons should be interpreted with caution since they are very sensitive to marginal changes. However, inequality comparisons are not sensitive to the PPP exchange rates settings.

A useful way to make welfare comparisons is to combine the levels of inequality and of living standards by ranking countries according to their equally distributed equivalent (EDE) income as described in box 2, i.e., $x_e = \bar{x}(1 - I(\mathbf{x}))$, where $\bar{x}$ stands for the mean expenditure per capita and where $I(\mathbf{x})$ is considered to be equal to the *Gini* index. This is precisely given by the last column of Table 6, which shows that Kuwait and Oman performed well in social welfare. Except for these two countries, which are characterized by high level of *per capita* income, the non-oil exporting economies who performed well are Lebanon, Tunisia, Syria and Jordan. On the other hand, Egypt, Algeria and-- to an even greater extent-- Comoros, Mauritania and Yemen stood at the lower tail of the distribution ladder.

Table 6 does not show any significant correlation between the level of living standards and the Gini indices experienced by (or estimated for) the ACs in 1999. Table 7 summarizes the patterns of inequality among the 13 ACs.

To shed further light on the origin of these results, Table A-2 provides more information about the welfare pattern across the ACs. It appears from this table, for example, that the income share accruing to the richest quintile in Comoros, Mauritania, Tunisia, Algeria, Morocco, and Oman is roughly seven to 10 times the income share of the poorest quintile. These disparities should explain the high value of the Gini index for Comoros, Morocco and Tunisia in 1999 reported in the above table. Combined with a very weak mean income in Comoros, Mauritania and Yemen, social welfare level of these three ACs put them among the poorest in the AW and perhaps in the world too.[81]

Inequality over Time

The evidence regarding changes in inequality during the earlier periods of development after the 1950s is scarce. But the few available pieces show generally significant large declines in measures of inequality of expenditures in many countries. For Egypt, the Gini index declined from 43 in 1959 to 38 in 1975 (Hansen and Radwan (1982), Fields (1989), and Kandeel and Nugent (2000)).[82] In Jordan, it declined from 42 in 1973 to 33 in 1982 (Haddad, 1990) and to 34 in 1986 (Shaban, 1990); and for Sudan, it dropped from 45 in 1963 (Jain, 1975) to 39 in 1969 (Cromwell, 1977). But no such clear pattern is found in Morocco (Bellon, 1982), where inequality increases when using the Gini

Table 6.
Estimates of 1999 social welfare indices in the AW

		Gini inequality (expenditure)	(Interpolated) 1999 Gini [a]	(Interpolated) Gini equality [b]	Expenditure p.c. (PPP, $ 2005)	(Interpolated) 1999 Expenditure p.c. [a]	(Interpolated) 1999 x_e
Algeria	1995	35.3	35.3	64.7 (4)	1,441	1,359 (8)	880 (9)
Comoros	2004	64.3	64.3	35.7 (12)	1,133	1,133 (10)	404 (11)
Egypt	1999	32.8	32.8	67.2 (1)	1,346	1,346 (9)	905 (8)
Jordan	1997	36.4	37.4	62.6 (7)	1,819	1,929 (5)	1,208 (5)
	2002	38.9			2,107		
Kuwait	1999	36	36	64 (5)	10,792	10,792 (1)	6,907 (1)
Lebanon	2004	36	36	64 (5)	3869	3,481 (3)	2,228 (3)
Mauritania	1995	37.3	38.65	61.35 (9)	944	1,036 (11)	635 (11)
	2000	39			1,060		
Morocco	1998	39.5	40	60 (11)	1,557	1,580 (7)	948 (7)
	2000	40.6			1604		
Oman	2000	39.9	39.9	60.1 (10)	5,531	5,564 (2)	3,344 (2)
Syria	1997	33.7	34.7	65.3 (3)	1,577	1,640 (6)	1,071 (6)
	2004	37.4			1,810		
Tunisia	1995	41.7	41	59 (12)	1,849	2,116 (4)	1,249 (4)
	2000	40.8			2,189		
UAE	2007	38.3	38.3	61.7 (8)	n.a	n.a	n.a
Yemen	1998	33.4	34	66 (2)	1,084	1,073 (11)	708 (10)
	2005	37.7			1008		

Notes: (a) In absence of 1999 household survey, 1999 Gini index is interpolated using the average annual growth rate of Gini indices using the closer household surveys to the year 1999. The same methodology is applied to the 1999 mean expenditure p. c. PPP 2005. For Algeria and Lebanon, the average annual growth rate of the mean expenditure is calculated from the World Bank statistics about the household consumption expenditure p. c. while the Gini index is assumed unchanged. (b) Interpolated 1999 Gini equality is equal to 100 less the interpolated 1999 Gini inequality. Ordinal rankings are between parentheses.

Sources: Author's calculation (in italic) of Gini indices and mean expenditure p.c. PPP 2005 using data from the World Bank website (http://www.worldbank.org/povcalnet) except Gini indices for Lebanon, which is from El-Laithy et al. (2008), United Arab Emirates, which is from Bibi and El-Lahga (2009), Syria, which is from UNDP (2005), and Kuwait and Oman which are from Ali (2003). PPP 2005 for Lebanon and Syria are from the World Bank (2008). Expenditure p. c. for Kuwait and Oman are from macroeconomic data (not from HH surveys) reported in the World Bank databases and converted into 2005 PPP of the World Bank (2008).

index but declines during the 1960s and increases in the 1970s using the Theil index.

After the 1970s, the inequality trends became more mixed as Table A-2 illustrates. While many ACs show a relative stability in the inequality level, the change in disparity when it applies is frequently small and could reflect more changes in procedures (survey design, indicator of the households' welfare, content of the households' welfare, etc.)

rather than genuine disparity change. If we admit that this change is authentic, it is more likely to exhibit a slow upward trend when initial inequality is weak and vice versa. To put it differently, lower inequality countries tend to experience more periods of increasing inequality. However, countries, which experience some fall in inequality, often start from relatively higher levels.

Identifying inequality trends ideally requires

Table 7.
Patterns of inequality in ACs

	High inequality (Gini inequality ≥ 40)	Medium inequality	Low inequality (Gini inequality ≤ 36)
Four poorest Countries	Comoros	Mauritania	Yemen and Egypt
Medium Living Standards	Morocco and Tunisia	Algeria and Jordan	Lebanon and Syria
Three richest Countries		Oman and United Arab Emirates	Kuwait

that one be able to distinguish underlying disparity differences in the population being compared from sampling variations. Standard errors should be calculated, while taking into account the surveying process, prior to a serious characterization of the inequality trend. For this, we have calculated the standard errors for the Moroccan and Tunisian cases. This was possible thanks to our access to the whole Moroccan surveys of 1990/91 and 1998/99 and the whole Tunisian household surveys of 1980, 1985, and 1990 and to a large sample of the 1995 and 2000 surveys. For Morocco, we found that the 1990/91 Gini inequality was 39.3 percent while it was 39.5 percent in 1998/99 as shown in Table A-2.[83] The Gini difference roughly of 0.2 percentage points is not statistically significant as its standard error is equal to 1.35 percentage points. For the Tunisian case, Table 8 summarizes for any two dates whether the inequality change is statistically significant.

Overall, estimated standard error of Tunisian *Gini* indices varies between 0.6 and 0.9 percentage

points.[84] Estimated standard error of *Gini* changes vary between 0.89 and 1.35 percentage points. This means that inequality changes could not be confidently declared statistically significant when they are lower than 2 percentage points in absolute terms. The mixed results from the Moroccan and Tunisian cases prove (if need be) that direct access to micro record data and the consideration of the surveying process, which could be specific to each household survey, are a prerequisite for serious characterizations of the inequality outcomes over time in the AW.

Turning now to inequality trends which can be drawn from the results reported in Table A-2 in annex, we assume in the light of the Moroccan and Tunisian statistical tests that any change in the Gini index of inequality lower than 2 percentage points is not statistically significant. Further, we remove from the analysis the Gini indices computed from household surveys that are not of an acceptable quality. This includes, as mentioned in Table A-1 in the Annex, the 1987 and 1993 Mauritanian data

Table 8.
Changes in inequality in Tunisia

	1980	1985	1990	1995	2000
1980	**43.3** (0.92)	0.72 (1.21)	3.2 (1.11)	1.73 (1.12)	2.73 (1.18)
1985	Insignificant	**44.1** (0.78)	3.93 (1)	2.44 (1)	3.45 (1.1)
1990	Significant	Significant	**40.1** (0.62)	1.49 (0.89)	0.48 (0.97)
1995	Insignificant	Significant	Insignificant	**41.6** (0.64)	1 (0.99)
2000	Significant	Significant	Insignificant	Insignificant	**40.6** (0.75)

Source: Authors' calculation using micro-data from five household surveys.

and the 1992 Yemenite household surveys. Given these assumptions, Table 9 summarizes the trends in inequality across the ACs.

Despite some intertemporal variations in income inequality summarized in Table A-2, one may be struck by the overall weak time variability of the Gini indices in most of the ACs during the last two decades. For a first set of countries, which includes Egypt, Kuwait, and Morocco, the Gini changes are very small and could therefore be due to sampling variability rather than factual intertemporal inequality changes.[85] If one ignores the 1992 household survey of Jordan, this country could be included in this same set of countries. Otherwise, Jordan along with Syria would be a special case where inequality has significantly increased and then decreased. The understanding of the determinants of such an inverted U shape trend of inequality is an important issue for future research. Another set of countries includes Algeria and Tunisia, which have witnessed a large inequality drop between 1980s and 1990s.[86] For Tunisia however, inequality changes during the 1990s are not statistically significant as shown in Table 9. Finally, we have the case of Syria and Yemen which start from a low level of inequality tend to experience some rise in the Gini index.

A similar picture about inequality trend is also found in other detailed case studies of Egypt, Jordan, Morocco, and Tunisia. Their main findings are reported in Table A-3. Not surprisingly, differences in the estimates of *Gini* indices from one study to another based on the same household surveys are very common. These differences may be attributed to whether the whole or only a sample of the survey is used, the choice of the unit measure (household or individual), the treatment of durable goods (the use-value or the purchased value), and whether the inflation factor is taken into account. Unfortunately, the authors of these studies often omit to discuss these points, which are crucial for inequality characterization.

Zouari-Bouattour and Jallouli (2001) have characterized the trend of inequality in Tunisia using 1975, 1980, 1985, and 1990 household surveys. They found, *inter alia*, that while the *Gini* index stood at roughly 40.5 percent between 1980 and 1985, the Lorenz curves intersect. They conclude, there is "vagueness" during that period since the Lorenz curves intersect despite the rise in the proportion of expenditure hold by the four poorest deciles. Although the literature offers robust tools to tackle these issues, most analysts did not seek to investigate more and better such "vagueness".

Spatial and Temporal Comparisons of Inequality within ACs

Once again, much of the available studies on how income inequalities evolve over time and across the different segments of the population are based upon statistics published by national statistical offices, the World Bank, and the United Nations Development Program. Within each Arab

Table 9.
Trends in inequality in ACs

	High inequality	Medium inequality	Low inequality
Only one observation	Comoros	Oman and United Arab Emirates	Lebanon
No trend		Jordan if 1992 Gini is considered	Syria
Stable	Mauritania from 1995, Tunisia from 1990,	Jordan if 1992 Gini value is ignored.	Kuwait and Egypt
	Morocco		
Increasings	Morocco and Tunisia	Algeria	Syria, and Yemen from 1998
Decreasing	Tunisia between 1980s and 1990s	Algeria	

country, however, the most commonly used Gini index is often supplemented by the Lorenz curve.

Living standards vary markedly among AW citizens, not only between countries, but also within countries. Haddad (1990) found that rural incomes are more unequally distributed than urban ones in Jordan. However, in Yemen, while the World Bank (2002b) estimates based upon 1998 Household Budget Survey show a lower *Gini* index in rural areas than in urban areas, the urban Lorenz curve dominates the rural one up to the 20th poorest percentile of the population when the two curves intersect. The opposite results yielded by the Gini indices and the Lorenz curves call for deeper investigations into the inequality pattern. This can be done by putting more structure on the inequality measures that should be retained for urban-rural inequality comparisons.

In Syria, El-Laithy and Abu-Ismail (2005) estimates of the Lorenz curves confirm the rise of the overall inequality between 1996-1997 and 2003-2004. This change for the worse seems to be driven by an increase in urban inequality and this is proven by the urban Lorenz curves. More precisely, the 2003-2004 Lorenz curves are nowhere above those of 1996-1997 in urban areas and at the national level. However, Lorenz curves are almost identical for the two time periods in rural Syria. Under the assumption that these results are statistically significant (i.e., the sampling errors are not large enough), we may assert confidently that overall urban inequality, as measured by any indices satisfying the transfer principle, have worsened during the period under review.

Inequality of Earnings and Labor Markets

Inequality in other monetary indicators of welfare, such as hourly wages and earnings, should ideally supplement distributional judgments of consumption inequality. For instance, if people were completely free to choose hours of work, the distribution of hourly wages would become another primary concern in an equality-of-opportunity view of social fairness, at least within the same socio-economic group. Indeed, and as noted by Atkinson (2003a), the existence of differential wage rate between skilled and unskilled workers does not imply inequality if (and only if)

i. every person has an opportunity to acquiring skills;

ii. the adjustment factor of the skilled workers'

wage is not higher than erS where r is the real interest rate and S is the number of years required for the acquisition of skills. A higher adjustment factor in the long run reflects some barriers to acquiring skills and, therefore, a facet of inequality of opportunities.

Despite being the major component of income, earnings have been little studied in the ACs because of lack of quality data. Drawing on a UNIDO (2002) data base compiled from firm surveys, World Bank (2004a) suggests that MENA exhibits one of the highest wage inequality levels of all developing regions. However, if major oil-exporting countries are excluded from the MENA sample, earnings inequality improves; because wages inequality are much higher in oil-exporting countries than in more diversified ACs. Nonetheless, even non-oil exporting countries still lag behind Latin America and South Asia.

Firm-based surveys are often highly selective and the unemployed are naturally excluded. Ideally therefore, the estimation of wage inequality should be based on household surveys (that gather wages, earnings and expenditure simultaneously) rather than firm surveys. Nonetheless, if high hourly wages inequality is evidenced, one may ask whether a good world ranking of the MENA region in terms of income inequality and poverty is compatible with a bad ranking in terms of hourly wages inequality. This question raises, once again, issues about the extent to which currently available data present the whole picture about income distribution in the region and, specifically, whether moderate income inequality and poverty are achieved through factors that are not either recorded in household surveys, or adequately studied. Four such factors, which are briefly discussed below, need to be investigated further in the AW.

First, households' labor supply may smooth earnings inequality, which would be more linked to income inequality than hourly wages. However, if lower hourly wages are closely associated with larger household size, higher fertility rate will worsen inequality. To the best of our knowledge, studies, which address these issues on the basis of raw data, are lacking in the AW. Fortunately, further to expenditure, Egyptian Labor Market Panel Survey, Jordanian Expenditure and Income Survey, and Moroccan Living Standards Measurement Survey record information on house-

hold size, wages, and earnings. Such information would enable to infer the share of inequality to be attributed to hourly wages inequality (which is completely beyond the individual freedom of choice), to labor supply (which may depend to some extent and in some activity sectors on individual choice), to demographic size, and to other income sources.

Second, it is well known that hourly wages are biased against women and this gender inequality, along with many others, may greatly contribute to overall hourly wages inequality.[87] Because households are assumed to share their resources equally, it is not surprising to observe that an important share of overall inequality should vanish when one moves from wages to expenditure inequality. In reality, while some surveys in the Arab region enable to estimate discrimination by gender and other characteristics, it is not so easy to invalidate or validate equality of distribution in intra-household consumption in absence of micro-data at the individual level.[88]

Third, and as advocated by Adams and Page (2003), MENA fared well in terms of income inequality and poverty levels, thanks to the redistribution of oil rents through labor remittances.

Fourth, the UNDP (2002), and van Eeghen and Soman (1998) state that the ACs are marked by an unusually strong, cohesive system of social responsibility under which families provide sustenance to each other during hard times and income is redistributed through religious and charitable arrangements. But there are no serious studies on the volume and the microeconomic effects of these private transfers.

Alternative Aspects of Welfare Distribution

For decades, inequality and the Pigou-Dalton principle of transfers have been the widespread summary concepts upon which the distributional effects of changes in the economic environment have been evaluated. Policy makers and scholars have usually computed the effectiveness of policy changes on the basis of general Lorenz-based inequality criteria. Recent literature, however, stresses the multi-faced aspects of income distribution. Horizontal inequity, polarization, mobility, and inequality of opportunities are among the relevant aspects of the welfare distribution that have to supplement the Lorenz-based inequality criteria.

Horizontal inequity

It is conventional to assess the distributional movements of any public policy by computing the change in distributional summary statistics that the design induces. Such a change can come from three effects. First, the program can affect the average welfare of the population. Second, it may alter the distribution of welfare between those who initially had already an unequal welfare status. Third, it may fail to treat alike those who initially had similar welfare status. These three effects can be understood as corresponding to movements in average income, to variations in the vertical equality, and to changes in horizontal equity, respectively. The combination of these three effects in the context of poverty analysis captures the usual trade-off between targeting accuracy, vertical inequality and horizontal inequity components.

Horizontal inequity (HI) is a long-established inequality concept in the literature on inequality measurement, though it is a concept that has received less attention than vertical inequality in theoretical work. While this principle is generally well accepted, different rationales have been advanced to support it.

First, a policy which discriminates across comparable individuals is liable to create resentment and insecurity, possibly also leading to social instability and riots. This is supported by the socio-psychological literature, which shows that exclusion and discrimination have an impact both on individual well-being and on social cohesion.

Second, the search for vertical redistribution, which is a key objective of many programs and policies, is generally undermined by horizontal inequity since it pulls equals apart. Hence, a desire for horizontal equity (HE) can simply derive from an aversion to inequality, without invoking a separate normative basis for HE.

Third, HE can therefore be argued to be an ethically more robust moral criterion than vertical equality. Depending on one's ethical attitude toward distributive fairness, the implications in terms of vertical justice can vary considerably, but the principle of HE would appear to remain essentially invariant across analysts. This has led several authors to advocate a separate moral treatment for HE.[89] It should then be treated and assessed separately from vertical equality, and should form a criterion on its own in analyzing the trade-off between two policies. As in all trade-offs, it is

clear that violations of HE are often inevitable (although still regrettable), such as when some reforms are encouraged for economic efficiency or vertical equality reasons.

Very few studies exist on HE in the ACs. The exceptions are Ravallion and Lokshin (2004) for Morocco, and Bibi and Duclos (2005, 2007a) for Tunisia, which we discuss in chapter 6.

Polarization

Conceptualized and measured by Esteban and Ray (1994), Wolfson (1994), and more recently Duclos et al. (2004), polarization of income distribution has been analyzed extensively in the economic literature. Roughly speaking, income polarization means the extent to which a population is clustered around a small number of distant poles. Though linked, the concept of polarization is fundamentally different from that of inequality. Indeed, a population displaying high inequality, with few persons appropriating most income, is not a polarized society, simply because most people are concentrated around a same pole in the income space.

The conjecture that motivates studies of polarization is that the more polarized a society is, the more likely it seems that a conflict can break out. Consequently, finding an increase in income polarization could be a powerful mean to detect and predict possibilities of social unrest and perhaps civil conflict.[90]

While inequality measurements are focused on the vertical disparity between individuals' income, polarization measurements are sensitive to both vertical disparity between income poles (referred to as the *alienation* component) and the *identification* level of individuals within their respective pole. For a given pole, which is predetermined by an income range, the higher its population size (density) is, the more identified the group is. Thus, polarization measures are sensitive to the concentration of individuals around their expected income, as well as the extent of alienation (i.e., disparity between the different poles). As a result, local mean preserving Pigou-Dalton transfers at two extreme ranges of the income distribution will most likely lead to two better-defined poles; each with a clearer identification of itself and the other. In such a case, inequality will fall but polarization could be on an upward trend. Polarization measures would then yield additional information that inequality and poverty measurements fail to capture.

The literature offers several indices of income polarization that can be easily applied on other dimensions of welfare, like assets and access to public facilities. The most recent contribution is that of Duclos et al. (2004), who follow an axiomatic approach to polarization measurement. They then suggest a class of polarization measures that fulfill the *principle of population* and the *invariance scale*.[91]

Most empirical studies of income polarization have been applied to developed countries. Little is known about polarization from developing countries, especially from the ACs. To the best of our knowledge, the only exception to this is the paper of Ayadi and El Lahga (2005), who estimate one index of Duclos et al. (2004) and the *Gini* index using 1975, 1980, 1990, and 1995 Tunisian household surveys. Their results reveal the existence of a curvilinear time trajectory of polarization, with an increase, first over the 1980s followed by a notable decrease over the 1990s. Interestingly enough, the rise in the polarization measures during the 1980s coincides with the bread riots in Tunisia, giving likely empirical evidence (though statistically questionable) between income polarization and generation of social tensions. Further, the results show that the trends of inequality and polarization exhibit different patterns, with a relatively constant level of inequality over the period of study. Inequality analysis is then unable to capture everything relevant to distribution of expenditures. Lorenz-based inequality measures should then be supplemented by other distributional measures to capture, as much as possible, the changes in the other multi-faced aspects of distribution and their determinants. This matters in the Tunisian case and also in other ACs.

A special aspect of income polarization, the **middle class**, has been discussed intensively since the early 1980s. While there is a large debate about measuring the middle class, the main issue has been the claimed decline of the middle class in developed countries.[92] In the context of developing countries, there is no consensus either on the definition of the middle class.[93] But the issue has emerged as an important one in the literature over the recent period, with suggestions that the middle class plays a crucial role in entrepreneurship, policy reforms, and institutional and political change. In a recent study, Ravallion (2009) uses a

measure of the middle class, which is comparable across developing countries: the households with consumption per capita between $2 and $13 a day at 2005 PPP level: the lower bound being the median poverty line of developing countries while the upper bound is based on the US poverty line. He finds that in 1990 about one in three persons in the developing world belonged to the middle class, and the proportion has risen to one in two by 2005. For the MENA region, which includes most of the ACs and Iran, Ravallion (2009) finds that it has the largest proportion of the population, which can be considered middle class. This share, which was 75.5 percent of the population in 1990, increased only slightly to 78.7 percent in 2005.

Inequality of opportunities

Recently, a growing literature is trying to put the focus on the characterization of individual's opportunity sets, the measurement of the extent of disparity in a distribution of opportunities, and the design of redistribution mechanisms to raise the degree of opportunity fairness.[94] Quoting from the World Bank (2006a),

> Equity in the acquisition of human capacities—through early childhood development, formal education, health services, and social protection—is at the core of a strategy to equalise the opportunities for people to lead productive, fulfilling lives. Broad provisioning of these services is also good for development and poverty reduction through impacts on innovation, productivity, and social cohesion. (World Bank 2006a, p. 155)

Thus, justice is seen as requiring equality of opportunities, rather equality of outcomes. Moreover, equality of outcomes is seen outside the scope of justice as long as it is only the result of individual effort or freedom of choice. In this respect, Roemer (1998) distinguishes between the "circumstances" that individuals enjoy, which are independent of their own choices, and the "efforts" that they exert. Circumstances are exogenous to the individual, by definition, and differences in circumstances are argued to be morally irrelevant to outcomes, while efforts can lead to morally justified differences in achievements. In-

equality in wage rates, for instance, is equitable if all individuals face the same opportunity to acquiring skills (recall Atkinson, 2003a).

One simple way to shed light on the extent of inequality of opportunities in the ACs is to partition the whole population into N mutual exclusive groups, such that each group includes all individuals with identical circumstances. Examples of circumstances that may be used for such a partition of the whole population include parents schooling, gender, ethnicity, socio-cultural or religious origin, etc. Then, using inequality measures that fulfil the decomposability principle, one can readily decompose overall inequality into within-groups inequality and between-groups inequality.[95] Given that the effort levels are expected to vary within each group, the within-groups component of overall inequality could be deemed as the natural outcome of individuals' efforts variability. From the inequality of opportunity points of view, we can conclude that within-groups inequality should not matter in the redistributive policies as long as we admit that it is the result of individuals' responsibility; which is outside the scope of justice. However, if we agree that the between-groups inequality reflects only the variability of circumstances across individuals, thus we can use it as an estimate of the inequality of opportunities. According to the opportunity egalitarian ethics, since the variability of circumstances are beyond the individuals' responsibility, they are inequitable and should be tackled, through appropriate policies, by society. Undeniably, the literature offers more theoretically sound alternatives to study the distribution of opportunities.[96] But the approach we suggest above is easy to implement to fill in an important gap in knowledge of inequality of opportunities since the empirical applications using data sets from the ACs are (to the best of our knowledge) missing.

Income mobility as a proxy for equality of opportunity

The theory of inequality measurement is in general based upon cross-sectional distributions of income. However, it has long been recognized that snapshots of income distributions provide an incomplete and perhaps distorted picture of a more complex dynamic process. As Schumpeter (1955) argues, the distribution of incomes is like the rooms in a hotel – always full but not necessarily with the same persons. Although the anonym-

ity principle suggests that these rotations do not matter in inequality evaluation, two societies with the same snapshots of the income distribution may have different level of social welfare depending on the mobility of the population. This had led several authors, including Friedman (1962), to argue that income inequality, owing to a rigid system where each person stays in the same position year after year, may be more a cause for concern than the same level of income inequality associated with great mobility and dynamic change owing to equality of opportunity.

According to Stokey (1998), one cares about mobility not because individual rotations through income distribution are intrinsically valuable, but primarily because of the view –or the hope– that it helps attenuate the effects of disparities in initial endowments (or social origins, gender, etc.) on future income prospects. For Fields (2006), (income) inequality is not inherently wrong as long as society as a whole is getting richer, there is a safety net for the poor, and everybody, regardless of class, race, creed or sex, has an opportunity to climb up through the system. From this perspective, one can think (or hope) that mobility acts as equalizer of opportunities. Individuals living in societies with higher mobility measures have a better "opportunity to climb through the system" than individuals living in societies with lower mobility measures. Thus, analysis of the public redistribution policies should be supplemented by considering the changes in social mobility, and some indices to capture such mobility have been proposed (See Box 3).

We do not find any paper related to mobility issues in the ACs. In reality, mobility investigations require panel data that record the changes experienced by the same individuals or households sample over time. Only Egypt has embarked in this route with the Labor Market Panel Survey.[97] The panel extension of the Egyptian data base enables now to address this policy relevant issue, which is a fruitful area for future investigations.

Araar et al. (2008) argue that the time variability of individual incomes may generate uncertainty at the individual level. If individuals would prefer their incomes to be distributed as equally as possible across time (because they are risk averse), then this aspect of mobility can have a negative social welfare impact, thus making mobility, a priori, less desirable. Using panel data from Canadi-

> **Box 3: Mobility indices**
>
> Several scholars have suggested mobility indices to capture the extent to which mobility acts as equalizer and are surveyed in Fields (2005). Shorrocks (1978) was among the pioneers who have investigated this route by suggesting this index:
>
> $$M_{equalizer} = 1 - \frac{I^{Gini}(\overline{x}_1,...,\overline{x}_n)}{(1/T)\sum_{t=1}^{T} I_t^{Gini}(x_{1,t},...,x_{n,t})} \tag{12}$$
>
> where $(\overline{x}_1,...,\overline{x}_n)$ is the distribution of permanent income, $I^{Gini}(\overline{x}_1,...,\overline{x}_n)$ is the *Gini*-based life-time inequality and $I_t^{Gini}(x_{1,t},...,x_{n,t})$ is the *Gini*-based yearly inequality. The Shorrocks's (1978) mobility coefficient is bounded between 0 –perfect immobility– and 1 –perfect mobility. Perfect mobility equalization occurs if individuals have exactly the same pattern of income flow over the life cycle, i.e., $I^{Gini}(\overline{x}_1,...,\overline{x}_n) = 0$. In such a case, one will observe yearly inequality ($I_t^{Gini}(x_{1,t},...,x_{n,t}) > 0, \forall t$) simply because the time period used for measurement is too short. If however, each person stays in the same position with the same income over her life cycle, life-time inequality will be exactly equal to yearly inequality revealing then a likely great inequality in the individual's set of opportunities.

an survey, they show, inter alia, that the positive component of mobility (mobility as equalizer) is important, while the time variability of individuals' periodic incomes around their permanent income is significantly lowered by the progressive tax system.

We do not find any paper related to mobility issues in the AW. In reality, mobility investigations require panel data that record the changes experienced by the same individuals or households sample over time. Only Egypt has embarked on this route with the Labor Market Panel Survey, which is described in the appendix. The panel extension of the Egyptian data base enables now to address this policy relevant issue, which is a fruitful area for future investigations.

Inequality and Well-Being Beyond Income

It is increasingly recognized that individuals' well-being have dimensions that transcend levels of income. First, following Sen's (1985, 1999) philosophical arguments, well-being should be viewed in terms of *capabilities* and *functionings*, where *functionings* deal with what a person can do and *capabilities* indicate the freedom that a person enjoys in terms of functionings. Second, it is increasingly admitted that the focus should be put, not only on inequality of outcomes (often linked to the individuals freedom of choice), but on the measurement of the extent of disparity in the distribution of the opportunities set.[98] All these arguments are increasingly leading to an agreement among economists and non-economists alike that the articulation of the welfarist and non-welfarist contributions in a concrete form requires distributional evaluations beyond the income space (education, health, access to public facilities, wages, etc.) as a complement to the welfarist income approach.

Non-monetary inequality indices

In this perspective, several studies have surveyed and/or computed non-monetary inequality measures across countries and over time that are more linked to inequality of opportunities. Land, access to health and, mainly education are central to this literature, not only because they are very important for fairness, but their position also comes from their general availability in living standard surveys, which contrasts with the difficulty to obtain statistics for other relevant opportunities determinants.

It is well recognized that inequality over assets is critical, considering the opportunities associated with them. It is sometimes argued that there is a potential trade-off between greater equity in assets (through land reform, for example) and growth. Large inequalities in assets, however, have been shown to result in reduced opportunities and economic growth in many countries. Deininger and Olinto (2000) give evidence that assets disparity, approximated by land inequality – and not income inequality – has a relatively large negative impact on growth and reduces the effectiveness of educational interventions. These results suggest that, especially in countries characterized by high levels of asset inequality, more focus needs to be put on building up the asset endowments (of both physical and human capital) of the less well-off.

Some limited data on ownership of land in Egypt show a huge decline in the Gini index of inequality from 0.74 in 1950 to 0.66 in 1977 (Hansen, 1991), which is explained mainly by land reform after the revolution in 1952.

Deininger and Olinto (2000) compiled a large data set of land Gini for 60 countries across the world including five ACs and Turkey. Some pertinent land Gini coefficients are shown in Table 10. These results show that land distribution is highly unequal in the AW with land Gini ranging between 55 percent in Egypt and approximately 73 percent in Iraq.[99] On average, MENA shows a better pattern of land inequality than Latin America but lag behind East Asia.

Using education as an indicator of equality of opportunity, Hansen (1991) found that Turkey has had more success in raising the educational level of its general population than Egypt, even though the former spent less than the latter. He attributed the deficiency of the educational system in Egypt, in part, to the bias toward higher education and to the growing employment of graduates in a public sector (during 1980s) in which they have a zero or negative marginal product.

Thomas et al. (2001) argue that equal opportunities are closely linked to equal distribution of education. They put together a large dataset of education-based Gini coefficients based upon the distribution of the number of years of schooling for 85 countries, including many Arab ones, from 1960 to 2000.

Table 10 also shows the main computations of Thomas et al. (2001). Although these estimations, like income-based *Gini* international comparisons, are fraught with comparability problems (quality may vary from country to country), they enable a broad comparison of changes in education-based *Gini* inequality over time and across countries. Two results stand out from this Table. The first is that both Arab and non-ACs have experienced a continuous improvement over time. Education-based Gini coefficients have been declining from very high values because, at the beginning of 1970s, a high proportion of the Arab and non-Arab people in developing countries were analphabetic (with zero years of education). The second results reveal that Gini coefficients for individual countries in the AW are among the highest in the World, ranging from 44.3 percent in Bahrain

Table 10.
Non-welfarist indicators

	1980 Gini Educa-tion	2000 Gini Educa-tion	Land Gini 1986-1990	HDI index (2003)	HPI index	Lifespan 2003	Literacy 2003	No ac-cess safe water	GDP p.c. PPP 2003
Algeria	70.7	51,8	-	72.2	21.3	71.1	69.8	13	*6,107*
Bahrain	63.1	44.3	-	84.6	-	74.3	87.7	-	*17,479*
Egypt	78.8	51.8	54.9	65.9	30.9	69.8	55.6	2	*3,950*
Iran	72.7	51.7	62.3	73.6	16.4	70.4	77.0	7	*6,995*
Iraq	73.2	60.5	72.6	-	-	-	-	-	-
Jordan	61.3	44.3	67.6	71.3	8.1	71.3	89.9	9	*4,320*
Kuwait	63.1	52.1	-	84.4	-	76.9	82.9	-	*18,047*
Lebanon			-	75.7	9.6	72	86.5	0	*5074*
Libya	71.7 (1975)	63.1 (1985)	-	79.9	15.3	73.6	81.7	28	-
Mauritania			-						
Morocco				63.1	34.5	69.7	50.7	20	*4,004*
Syria	61.7	45.8	-	72.1	13.8	73.3	82.9	21	*3,576*
Tunisia	69.3	53.8	64.6	73.3	18.3	73.3	74.3	18	*7,161*
Turkey			59.5	75.0	9.7	68.7	88.3	7	*6,772*
Yemen	95.7	84.6 (1990)	-	48.9	40.3	60.6	49	31	*889*
AW	71	50.7	-	67.9		67	64.1	-	*5,685*
MENA		-	67						
East Asia		35	56	76.8		70.5	90.4		*5,100*
Latin America		37.3	81	79.7		71.9	89.6		*7,400*

Sources: Thomas, Wang, and Fan (2001) for education Gini, Deininger and Olinto (2000) for land Gini, UNDP (2006), for HDI and HPI.

Table 11.
Inequality in health outcomes

	Infant mortality 20% poorest Per 1000 live births	Ratio of poorest to richest quintile Infant mortality	Under five mortality Per 1000 live births	Ratio of poorest to richest quintile Un-der five mortality
Egypt, 2005	59	2.57	75.0	3.00
Jordan, 1997	35	1.52	42.0	1.68
Morocco, 2003-04	62	2.58	78.0	3.00
Yemen, 1997	109	1.82	163.0	2.23

Note: the quintiles are defined in terms of wealth.
Source: Macro International, 2007 Demographic Health Surveys, Calverton MD.

that both Arab and non-Arab countries have experienced a continuous improvement over time. Education-based Gini coefficients have been declining from very high values because, at the beginning of 1970s, a high proportion of the Arab and non-Arab people in developing countries were analphabetic (with zero years of education). The second results reveal that Gini coefficients for individual countries in the AW are among the highest in the World, ranging from 44.3 percent in Bahrain and Jordan to more than 52 percent in most other countries and even reaching 85 percent in Yemen; compared to an average of 37 percent in Latin America and 35 percent in East Asia. Although we do not find recent information about the average years of schooling to draw a fuller picture (in terms of EDE years of schooling), these levels of education-based Gini coefficients are inherently objectionable in the context of the likely closer link between education inequality and inequality of opportunities.

Another measure of inequality of health outcomes is obtained from Demographic Health Surveys for a few ACs. Table 11 shows infant mortality at birth and child- under-five mortality rates, which remain very high in Yemen while they are much lower in Jordan. The latter succeeded in reducing the level as well as inequality between the richest and poorest quintiles, while inequality remains high in Egypt and Morocco despite significant declines over time.

Multidimensional indices based on micro data

It is commonly asserted that welfare is a multidimensional phenomenon. Further to the theoretical foundations of multidimensional indices, linked to capability and opportunity, a practical consideration often justifies their computation: to what extent will multidimensional comparisons differ from one-dimensional ones and why? Given the relatively weak correlations that are often observed between income and other welfare variables, it should not be surprising to find cases where some one-dimensional measures show an improvement while others show opposite results. Thus, computing multidimensional indices may solve this issue as long as they are robustly built.

Multidimensional welfare measurement has recently gained importance as a complement to standard welfare measurement in terms of income or expenditure. The main issue then is how to define

the attributes for the multi-dimensional inequality or poverty analysis. For this, let us take the Atkinson's (2003b) example concerning income and access to housing. If the only reason that a family is poorly housed is low income so that they cannot afford better housing, then the income attribute is a sufficient indicator of well-being. If, however, a family is prevented by discrimination from living in better housing, then the housing standard acquires an independent dimension of welfare.[91]

Further to living standard household surveys, most countries conduct Demographic Health Surveys (DHS), which involve detailed information on education (mainly of the household head), child mortality, and access to healthcare services; Egypt, Jordan, Mauritania, Morocco, Sudan, Tunisia, and Yemen are typical examples from the AW. The DHS involves valuable information on the ownership of assets (like a refrigerator, bicycle, car, radio or television), dwelling characteristics (such as type of toilet and type of walls, roof and flooring materials), and access to basic services (like electricity and piped water). In contrast to living standard surveys, micro-data records are often accessible to scholars free of charge from the DHS website.[100]

Given the DHS information, many analysts have suggested asset-based alternatives or complements to the standard use of living standard variables in characterizing the welfare distribution. This obviously raises a question: how one may aggregate at the individual level the available information on assets ownership into an individual metric of welfare, usually labeled as a composite welfare index. Two principal methods have been suggested in the literature. The first, suggested by Filmer and Pritchett (2001), and Sahn and Stifel (2000, 2003), uses the Principal Component Analysis method to weight the ownership of the different assets. The second, proposed by Booysen et al. (2005), commands the use of multiple correspondence analyses (MCA) in presence of dichotomous variables.

In the Tunisian context, the second route is applied to 1988, 1994 and 2001 DHS by Ayadi et al. (2007). Advocating a non-monetary perspective to welfare measurement in the wake of Sen's capability approach, the authors estimate an individual composite welfare index based on household assets ownership (dwelling, TV, Radio, Refrigerator, etc.) and other living condition

indicators (education, access to water, electricity, etc.). Then, they calculate different poverty and inequality measures at the national and regional level. Interestingly enough, the results estimated from DHS are similar to those derived from standard income approach. Poverty unambiguously falls between 1988 and 2001 as first-order tests evidence. However, regional and rural/urban disparities remained unchanged. Unsurprisingly, poverty is essentially a rural phenomenon (rural areas contribute 75 percent to overall poverty). The Northwest and Central West (NW, CW) regions remained the poorest areas of the country. The inequality results, based on an absolute Gini index, show a clear downward trend between 1988 and 2001. Decomposition of inequality by regions shows that the poorest regions and rural areas highly contribute to overall inequality. They conclude that improvement in housing conditions and in the access to communication tools may be important to fight regional disparity and poverty effectively.

Knowing that the Gini p is not readily decomposable by subgroups, it is not clear how the authors have decomposed the absolute Gini index. Further, monitoring absolute inequality is questionable as most scholars agree that inequality is rather a relative concept. Absolute inequality indices rise when the mean welfare composite index goes up, while the share of everyone in total welfare is unchanged.

Two other challenges should be addressed to make MCA and the asset-based welfare comparisons more robust. The first is related to the treatment of the negative values systematically yielded by the MCA method to estimate composite welfare indices. The second is the absence of any evidence whether the asset-based measures of welfare should treat ownership of assets as equivalent over time and across regions or as different. Thus, for inter-temporal or inter-regional welfare comparisons, it is not clear whether the different DHS should be pooled to derive a unique weighting system for them or one should derive a weighting system for each available DHS independently of the others.[101] Arguably, one should make use of both methods to check whether the ordinal ranking of the different distribution holds is sensitive to the estimation method. Anyway, though the asset-based welfare comparison is an appropriate complement to standard income welfare analysis, especially if access to primary living standard data is limited, the empirical results from MCA should be interpreted with caution, given the various conceptual and methodological limitations of the asset index approach to welfare analysis.

In order to overcome some of these limitations, Maasoumi (1986) has devised alternative measures to gauge multidimensional well-being and of multidimensional inequality using axiomatic foundations (See Box 4). Several alternative methods, that enable more robust comparisons of inequality than that of Maasoumi (1986), have been suggested and are surveyed in Bibi (2005). The more recent one is suggested by Duclos et al. (2006). It would then be interesting to follow this route in order to draw robust multidimensional welfare and inequality comparisons within and between ACs. This is certainly another interesting field of research to be conducted in the ACs.

Box 4: Axiomatic approach to multidimensional welfare measurement

Maasoumi (1986) was among the first to derive measures of multidimensional well-being and of multidimensional inequality using axiomatic foundations. He has suggested finding a vector x_i that would be closest to the various J values x_{ij}, giving the welfare level the various individuals derive from these J indicators. Using concepts borrowed from the idea of generalized entropy, Maasoumi (1986) has shown that this composite indicator x_i will be an arithmetic, geometric or harmonic mean of the various variables value, x_{ij}. Then, an index measuring the degree of inequality of the distribution of this composite indicator x_i can be calculated, using entropy related inequality indices (as given by equation (15) in chapter 5). Despite its attractiveness, the discussions made earlier about the somewhat arbitrary choices of inequality indices also apply to the Maasoumi's (1986) method. Nonetheless, this approach seems not to have been applied in the context of the AW.

Several alternative methods, that enable more robust comparisons of inequality than that of Maasoumi (1986), have been suggested in the literture. The more recent one is suggested by Duclos et al. (2006). The authors generalize the one-dimensional robust comparisons of poverty and social welfare into a multidimensional context. To show how this can be done, they suggest the bi-dimensional multiplicative extension of the Foster-Greer-Thorbecke (1984) poverty measures:

$$P_{\mathbf{X}}(a_1, a_2, z_1, z_2) = \frac{1}{n} \sum_{i=1}^{n} (z_1 - x_{i,1})_+^{a_1} (z_2 - x_{i,2})_+^{a_2}$$

(13)

where z_j is the poverty line for the attribute j ($j = 1, 2$) and α_j captures the aversion to inequality in poverty in the jth dimension of welfare. $P_{\mathrm{X}}(z_1, z_2, 0, 0)$ gives an *intersection* bi-dimensional poverty headcount, i.e, the proportion of individuals with both of their well-being indicators below the poverty line. $P_{\mathrm{X}}(z_1, z_2, 1, 0)$ averages the poverty gap in $x_{.1}$ (given by $\max(z_1 - x_{i,1}, 0)$) for those that are poor in $x_{.2}$. $P_{\mathrm{X}}(z_1, z_2, 1, 1)$ averages the product of the poverty gaps in $x_{.1}$ and $x_{.2}$, and can be thought of as a bi-dimensional average poverty gap index, with the weights on the poverty gaps in one dimension being the poverty gaps in the other dimension. Analogous interpretations exist for other combinations of α_1 and α_2 values.

As in one-dimensional setting presented in subsection 5.2, $P_{\mathrm{X}}(z_1, z_2, \alpha_1, \alpha_2)$ is closely linked to *bi-dimensional stochastic dominance surfaces*. Robust poverty comparisons could then be based upon orders of dominance $s_1 = \alpha_1 + 1$ in $x_{.1}$ dimension of welfare and $s_2 = \alpha_2 + 1$ in $x_{.2}$ one. Thus, a necessary and sufficient condition for a distribution **Y** to s_1-s_2-order dominates a distribution **X** in terms of bi-dimensional poverty is: [102]

$$P_{\mathbf{Y}}(s_1 - 1, s_2 - 1, z_1, z_2) \leq P_{\mathbf{X}}(s_1 - 1, s_2 - 1, z_1, z_2), \ \ \forall z_1 \in [0, z_1^+] \text{ and } \forall z_2 \in [0, z_2^+]$$

(14)

Thus 1-1-ethical-order requires that bi-dimensional headcount poverty be lower in **Y** than in **X** for all possible pairs of (z_1, z_2) defined over their respective range. If 1-1-order bi-dimensional curves intersect even for weak values of z_j, higher ethical order can be investigated by increasing either of s_j or both s_1 and s_2 simultaneously. Either approach imposes further ethical principle on the effects of changes in either $x_{.1}$ or $x_{.2}$ on bi-dimensional poverty, and thus restricts the class of (bi-dimensional) poverty indices.

Drawing on the integrated framework to robust one-dimensional inequality, poverty and welfare measurement and extending the multi-dimensional robust poverty measurement suggested by Duclos et al. (2006), it would then be interesting to investigate deeply whether robust multidimensional welfare and inequality comparisons in the same way as developed in subsection 5.2 are accurate. This is certainly another exciting field of research to be investigated in the ACs.

Meanwhile, Bibi and El-Lahga (2008) have followed the Duclos et al.'s (2006) methodology to make robust bi-dimensional comparisons between Egypt and South Africa. They used 1997 Egyptian house-

hold survey and 1993 South-African household survey. The first dimensions of well-being considered I.e., $x_{.1}$, is total expenditure per capita (as proxy for monetary dimension of welfare) while the second, $x_{.2}$, is the years number of schooling (as proxy for access to education). These choices are guided by data avail-ability in both countries. For instance, there is no information on access to health services or safe water in these two surveys to focus more on distribution of opportunity. Bi-dimensional poverty is measured restricted to adult individuals old more than 16 years. Each income distribution is adjusted by its median value.[103]

The main findings of Bibi and El-Lahga (2008) are:
i.   Egypt first-order dominates South-Africa through the income dimension as long as we admit that the relative poverty line can not exceed 175 percent of the median income. Otherwise, second-order dominance relative income poverty tests should be run.
ii. South-Africa first-order dominates Egypt in terms of education attribute for a schooling poverty line starting from 0 to roughly 7 years. Otherwise, second-order dominance conditions should be checked.
iii. Complete bi-dimensional poverty comparisons (i.e., based upon a unique income poverty line fixed at 60 percent of the median income and a unique education poverty line fixed at 6 years of schooling) are not concluding. Some measures reveal less bi-dimensional poverty in Egypt while others show an opposite result.
iv. Robust (or partial) bi-dimensional poverty comparisons are not concluding for the ethical order (1, 1); as $\Delta P(z_1, z_2, 0, 0)$ switch sign at low values of z_j. They are not also concluding as long as $s_2 \geq s_1$. However, Egypt 2-1-order dominates South-Africa up to for a maximum relative income poverty line that is equal to 130 percent of the median income, no matter the education poverty line level. Further, the income range over which dominance conditions hold is larger for higher (s_1, s_2) dominance tests with $s_1 > s_2$.

Inequality Decompositions

One first step in understanding inequality is to undertake decompositions of aggregate inequality measures into various components. In this chapter, we review research work on inequality decompositions, which can be done according to groups (including gender and inter-generational inequality), regions, or by factor components.

The various and few studies involving decompositions of inequality between groups and regions show generally that most inequality is within-regions and within-groups. There is some evidence of increased inequality between regions in Egypt recently. Some work on sources of inequality in rural areas finds that the major one is land ownership. Non-farm income decreases inequality in some countries (Egypt) but increases it in others (Jordan). Government employment generally reduces inequality.

The area of gender and intra-household inequality is also one of the most important aspects in the analysis of the welfare distribution. While the literature on gender inequality is extensive, there seems, however, to be very little empirical investigations on this issue in the AW. The small number of studies which exist, however, tend to show that the unequal treatment against female workers is less important in public compared to private firms. This naturally raises concerns about gender inequality in the context of reforms toward more private sector-led economies and calls for further investigations to tackle this issue. The literature on intra-household inequality has, however, just begun growing and we are not aware of any studies, which address the issues related to inequality within households in the AW.

Decomposition by Groups/Regions

The most common first approach to understand inequality is to obtain a decomposition of the overall level into inequality between and within relevant groups. However, the Gini index is fully decomposable if (and only if) the incomes in one subgroup are less than those in the other subgroup (i.e., under non-overlapping partitions of the income distribution).[104] When the different partitions are overlapping, the Gini index could go down while inequality within all subgroups of the population has worsened and inequality between subgroups has not changed. Thus, it is obviously impossible to decompose the overall Gini variation into consistent contributions of within and between groups' inequality change. (See Box 5 for a technical discussion of issues of decomposability).

Some alternative inequality measures could be easily decomposed into intuitively appealing components of within-groups inequality and between-groups inequality. Shorrocks (1984) and Cowell (2000) show that any inequality statistics that fulfills some desirable principles such as the *Pigou-Dalton transfer* principle and the decomposability principle is a member of the Generalized Entropy (GE) class of inequality indices.[105] The well-known Theil's (1967) measure is such an index.[106]

Based on direct access to micro-data from 1995/1996 and 1999/2000, El-Laithy et al. (2003) have used the Theil index to decompose the overall expenditure inequality in Egypt into inequality between and within regions. Their main findings are that 87 percent of inequality at the national level in 1995/1996 can be explained by within-regions disparity, while 13 percent can be attrib-

uted to lack of fairness between regions. The corresponding figures for 1999/2000 are 82 percent and 18 percent respectively. The rise of inequality between Egyptian regions raises concerns about the rural development process and calls for further investigations in order to infer their determinants.

Shaban (1990) provides findings that 12-13 percent of national inequality measured by the Theil index of expenditures in Jordan in 1980 is due to urban-rural disparities, but this share increased to 16-17 percent in 1986.

Lanjouw (2004) has explored the poverty map technique to extend the inequality decomposition from the regional level into the *commune* level. This methodology involves detailed analysis of two main sources of data: a household survey and the population census. Using the Moroccan 1994 census and the 1998 household survey, Lanjouw (2004) has applied this methodology in order to decompose inequality between and within groups identified by progressively higher levels of geographic disaggregation. The results show that when inequality is decomposed by region, the dominant component is attributable to within-region inequality. However, as inequality decomposition is made at a narrower level (the commune level, for instance), the share of the between-component in total inequality increases.

Said (2007) has investigated the distributional pattern of real hourly wages in Egypt from 1988 to 2006 using the nationally representative 2006 Egypt Labor Market Panel Survey. The Theil index is decomposed through three different partitions: education level (8 groups), occupation (9 groups) and industry (14 groups). For each partition, within- and between-subgroups, inequality is computed for females and males, respectively. Like El-Laithy et al. (2003), the within group component is always the most important. For instance, the education effect constitutes no more than 10-12 percent of total inequality and shows

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Box 5: Inequality decompositions between groups/regions

Despite the appealing features of the ratio of the top to the bottom quintile of household income and the *Gini* coefficient, these distributional metrics present several drawbacks and are often confused. For instance, the ratio of the top to the bottom quintile is not sensitive to any equalizing transfer that arises both within the middle class and within each quintile. While the *Gini* index does, no matter when the transfer occurs over the distribution, a mean preserving transfer from a richer person to a poorer one has much greater effect on I^{Gini} if the two persons are near the middle rather than at either tail of the distribution. This explains why the *Gini* index may move at the odds of the ratio of the top to the bottom quintile of household income. Further, it is often argued that the absolute level of inequality is not the principal issue. Instead, one should worry more about inequality changes over time and inequality between salient groups. However, the *Gini* index is fully decomposable if (and only if) the incomes in one subgroup are all less than those in the other subgroup (i.e., under non-overlapping partitions of the income distribution).[107] When the different partitions are overlapping, the Gini index could go down while inequality within all subgroups of the population has worsened and inequality between subgroups has not changed. Thus, it is obviously impossible to decompose the overall Gini variation into some consistent contribution of within and between groups' inequality change.

Some alternative inequality measures could be easily decomposed into intuitively appealing components of within-groups inequality and between-groups inequality. Shorrocks (1984) and Cowell (2000) show that any inequality statistic that fulfills some desirable principles such as the *Pigou-Dalton transfer* principle and the *decomposability* principle is a member of the Generalized Entropy (GE) class of inequality indices:[108]

$$I^{GE}(\theta) = \frac{1}{\theta^2 - \theta}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i}{\bar{x}}\right)^{\theta} - 1\right], \forall x_i > 0, \theta \neq 0,1$$

(15)

where n, x_i, and $\bar{x}$ are as defined in subsection 2.2. In contrast to most inequality indices that lie be-

tween 0 and 1, the values of GE range from zero (perfect equality) to infinity (high level of inequality).[109] The parameter θ can take any integer value. It captures the aversion to inequality or the distribution sensitivity of the index. The more used values of θ are 0, 1 and 2. For $\theta = 0$, IGE(0) is simply the mean log deviation given by:

$$I^{GE}(0) = \frac{1}{n} \sum_{i=1}^{n} \ln \frac{\overline{x}}{x_i}, \forall x_i > 0$$

(16)

Notice that $I^{GE}(0)$ is, in accordance with the transfer sensitivity principle, more sensitive to changes that occur in the bottom distribution. $I^{GE}(1)$ is the well-known Theil's (1967) index. It is formally defined as

$$I^{GE}(1) = \frac{1}{n} \sum_{i=1}^{n} \frac{x_i}{\overline{x}} \ln \frac{x_i}{\overline{x}}, \forall x_i > 0$$

(17)

However, for $\theta > 1$, GE measures are more sensitive to changes that affect the upper tail of the distribution which make them less appealing for distributional judgments.

As stated above, one of the typical features of the GE family is that it is additively decomposable by subgroups of the whole population. The practical importance of the distinction between individual groups lies partly in the insights that it affords to the underlying economic and social factors' contribution to inequality and in the design of policies influencing it. Further, inequality becomes a more intense political issue when it is perceived to be related to discrimination against particular groups such as regional, gender, ethnic, race, or religious groups. Thus, overall inequality is a simple sum of the between groups inequality, denoted by $I^{within}(\theta)$, and within groups inequality, $I^{within}(\theta)$:

$$I^{GE}(\theta) = I^{between}(\theta) + I^{within}(\theta).$$

(18)

If we consider J mutually exclusive subgroups of population, the between groups component is calculated by awarding every person within a group that subgroup's average income $\overline{x}_j$. $I^{between}(\theta)$ is then given by

$$I^{between}(\theta) = \frac{1}{\theta^2 - \theta} \left[\sum_{j=1}^{J} f_j \left(\frac{\overline{x}_j}{\overline{x}} \right)^{\theta} - 1 \right]$$

(19)

where f_j is the population share of the group j.

The inequality within each group, $I_j^{within}(\theta)$, is calculated using the same formula than that used for $I^{GE}(\theta)$ (as if the subgroup j was a population in its own right). $I^{within}(\theta)$ is then obtained as a weighted average of $I_j^{within}(\theta)$:

$$I^{within}(\theta) = \sum_{j=1}^{J} f_j^{1-\theta} s_j^{\theta} I_j^{within}(\theta) \ \text{ where } \ s_j = \frac{f_j \overline{y}_j}{\overline{y}}$$

(20)

Clearly however, the weights assigned to $I_j^{within}(\theta)$ do not necessarily sum to 1 with the notable exceptions of θ equals either to 0 (the mean log deviation index) or 1 (the Theil's index). In the former case, $\theta = 0$, the weighting system is given by the population share of each subgroup (f_j) while in the latter, $\theta = 1$, the weighting system is given by the income share of each subgroup in the total income (s_j).

an inverted U shape trend from 1988 to 2006. The within education group contribution to overall inequality, on the other hand, appears naturally the most important and displays little trend mainly over the period 1988-1998.

It is important, however, to note that the subgroup decomposition of Theil index ideally requires that, firstly, the subgroups have equal variance (otherwise, other methods of analysis are required) and, secondly, the observations of subgroups are normally distributed.[110] Whenever one of these conditions (mainly the second one) is not fulfilled, retaining only the income mean vector to infer the between-group contribution leads to a severe loss of information that may confound policy implications relating to the priority given to fight between and within groups inequality.

In reality, none of the studies presented above have checked these conditions. Further, although they have direct access to micro data, none of them have statistically tested the significance of their findings.

Decomposition by Factor Components and Indices of Concentration

Households often have different sources of income (earnings, rent, farm-income, pensions, dividends, taxes, transfers, etc.) and types of expenditures (food, transport, clothes, leisure, etc.). It is then policy relevant to infer the equalizing effects of the different income components, mainly those directly linked to the redistributive policies (taxes, transfers, subsidy, etc.), on overall inequality. (See Box 6 for technical details).

Box 6: Decomposition of indices of concentration by factor components

Let us assume:

$$\mathbf{x} = \mathbf{x}_1 + \mathbf{x}_2 + ... + \mathbf{x}_J$$

where $\mathbf{x}$ is total income, $\mathbf{x}_j$ is the income derived from the source j, and $x_j(p)$ be the income level from the source j accruing to the individuals whose rank or percentile in $\mathbf{x}$ (and not in $\mathbf{x}_j$) is p. A similar definition applies if $\mathbf{x}_j$ is an expenditure item. Defining the *concentration curve* $C_j(p)$ as the cumulative percentage of incomes from the source j (y-axis) against the cumulative percentage of the population, p, where the incomes in $\mathbf{x}_j$ are ordered in increasing values of $\mathbf{x}$, one can aggregate the distance between p and $C_j(p)$ to compute a concentration index for each income source j [111]

$$I^C(\mathbf{x}_j) = 2\int_0^1 \left(p - C_j(p)\right)dp$$

Indeed, as the Lorenz curve is simply a weighted sum of the different concentration curves

$$L_\mathbf{x}(p) = \sum_{j=1}^{J} s_j C_j(p) \quad \text{with} \quad s_j = \frac{\overline{x}_j}{\overline{x}}$$

the Gini inequality in total income (expenditure) is similarly a weighted sum of the concentration indices

$$I^{Gini}(\mathbf{x}) = \sum_{j=1}^{J} s_j I^C(\mathbf{x}_j)$$

This approach is generalized by Shorrocks (1982) who provided a general decomposition by factors rule, which applies for any inequality measure satisfying the Pigou-Dalton principle. A factor contribution can be either positive or negative, depending on the factor providing a disequalizing or equalizing contribution. Using the Shorrocks rule, the contribution of j is negative when it is negatively correlated with total income, as is often the case of taxes or accurately targeted transfers.

In the context of the AW, these decompositions of indices of concentration have been used by Adams (2001), and Bouattour and Jallouli (2001).[112] Using two nationally representative sets of living standard household data from Egypt and Jordan obtained in 1997, Adams (2001) examined how different sources of income affect inequality in rural Egypt and Jordan. He divided total income for each rural household into five sources for Egypt and four for Jordan. The common sources are agricultural, public and private transfers, and rental. The fifth income source for Egypt is livestock. He found that nonfarm income has different impacts on inequality in the two countries. In Egypt, those in the lowest quintile receive almost 60 percent of their per capita income from nonfarm income, while in Jordan it is less than 20 percent. Nonfarm income decreases inequality in Egypt and increases it in Jordan. He also found that access to land accounts for this difference between the two countries. In Egypt, the cultivated land base is totally irrigated and highly productive. Its large rural population seeks access to land but because the land-to-people ratio is so unfavorable, only a minority of rural inhabitants actually own land. The rest, especially the poor, are forced to seek work in the nonfarm sector. By contrast, only 30 percent of Jordan's cultivated land base is irrigated and crop yields are low. So, its rural population does not press for access to land because the attractive economic rates of return are found in the nonfarm sector. Unlike Egypt's rich, their Jordanian counterparts earn less than 10 percent of their total per capita income from agriculture and more than 55 percent of it from nonfarm sources. Finally, he finds that the poorest quintile of the population in both countries depends heavily on government employment to decrease inequality. Government wages provide 43 percent of nonfarm income for Egypt's rural poor and 60 percent of Jordan's. But since both governments already employ far more workers than they can possibly use, advocating increased government employment to reduce inequality would not be a wise policy advice. From a policy standpoint, it would be better to reduce income inequality by focusing on nonfarm unskilled labor (for example, in construction, brickmaking, and ditch-digging), as an important income source.

Based on four Tunisian household surveys carried out from 1975 to 1990, Zouari-Bouattour and Jallouli (2001) did a similar analysis by decomposing the Gini inequality in total expenditure into a sum of the inequality in food, housing, and other expenditure items. They find that inequality in food expenditure is much lower than total inequality. But because of its high budgetary share $(\bar{x}_j / \bar{x}$), it represents roughly 30 percent of total inequality. Further, the fall in overall inequality experienced by Tunisia between 1975 and 1990 is principally driven by the equalizing effects of food consumption on total expenditure. In turn, increasing fairness observed in food consumption during the 1980s should be attributed to the generous and untargeted food subsidies that were in force until 1986. They also find that inequality in housing expenditure is much higher than overall inequality. However, inequality in this component is declining as part of overall inequality but at a slower rate, slowing down overall inequality reduction. Finally, from 1975 to 1990, concentration index of the other expenditure items (including mainly clothing, transport, healthcare and leisure) declined but, like housing, not as rapidly as the Gini index. As a result, the contribution of this component to overall inequality was increasing.

The analysis of both Adams (2001), and Bouattour, and Jallouli (2001) has the merit to shed some light on the equalizing or disequalizing effects of some income sources for the former and some consumption items for the latter. Their analysis would have yielded a more robust result if they were based on Lorenz curves and concentrations curves. Further, the decomposition made by Bouattour and Jallouli (2001) needs to be extended for better understanding of the equalizing role played by food expenditures. More precisely, if inequality is lower for food and the share of food is declining with rising income, one may expect that the equalized effect of food is slowed down and can even be reversed by the drop in the share of food expenditures.

In any case, both analyses of Adams (2001), and Bouattour and Jallouli (2001) are still scarce in the region and, given their policy relevance, should be strongly encouraged.

Regression -Based Inequality Decomposition

The practical importance of the *decomposability* by subgroup of an overall inequality statistics lies in the impact of some economic policies on vulnerable groups and the role that groups, rather than

unorganized individuals, may play in influencing the course of economic inequality. However, this basic approach allows grasping neither the effects of continuous variables (like age and experience) without loss of information, nor the magnitude of the marginal effects of households' characteristics on inequality.

In order to deepen investigations on the determinants of inequality, Morduch and Sicular (2002) along with Fields (2003) have suggested a specific regression-based model for inequality decomposition. The basic model uses a Mincer income-generating function to regress any proxy of welfare (income, expenditure, wages, etc., adjusted, if need be, for differences in individual needs, family composition, and prices faced) on household characteristics (age, education, household size, location, etc.): [113]

$$x_i = \mathsf{b}_0 + \mathsf{b}_1 w_{i,1} + ... + \mathsf{b}_J w_{i,J} + e_i$$

where $w_{i,\cdot}$ is a vector of characteristics of the pertinent household, and ϵ_i is a standard residual term. Once estimated, this linear model can be rewritten as:

$$
\begin{aligned}
x_i &= \hat{\mathsf{b}}_0 + \hat{\mathsf{b}}_1 w_{i,1} + ... + \hat{\mathsf{b}}_J w_{i,J} + \hat{e}_i \\
&= \hat{\mathsf{b}}_0 + \hat{x}_{i,1} + ... + \hat{x}_{i,J} + \hat{e}_i
\end{aligned}
$$

where each $\hat{x}_{i,j}$ is a "predicted" factor, equal to the product of a regression coefficient and its variable ($\hat{x}_{i,j} = \hat{\mathsf{b}}_j w_{i,j}$).

Neglecting the constant and the residual terms, this last equation is similar to the decomposition by source of income discussed above. Morduch and Sicular (2002) along with Fields (2003) exploited this parallel with the factor decomposition case, and applied the Shorrocks (1983) rule to relate inequality in $\hat{x}_i$ to contributions from $\hat{x}_{i,j}$. [114]

Adams (2001) used this approach to go a step further in decomposing two of the five income sources in rural Egypt described above, namely nonfarm and agricultural income. The independent variables used are linked to the size of land owned and rented, household demographic structure, education, region of residence, and other equipment owned. The estimation results show that the income flows from the household size, age and education variables are relatively fairly distributed, with similar shares going to the poorest and richest quantile of the population. This leads to small contributions of these factors to overall inequality. The distribution in landownership, farm equipment, and enterprises is uneven. However, only land-owned has a sizable effect on agricultural income in rural Egypt. Finally, nonfarm income decreases inequality because unequal access to land "pushes" poorer households out of agriculture and into the nonfarm sector. Although agricultural income is positively associated with land ownership in rural Egypt, that ownership is unevenly distributed in favor of the rich, so nonfarm income is not linked to land ownership and is thus more important to the rural poor.

In the line of Morduch and Sicular (2002), Adams (2001) did not discuss the treatment of the error term. However, these errors in the Mincer regression are usually interpreted as capturing the effect on living standards of factors that are not observable in household surveys, like natural ability, connections, and so on. Further, the residual term often accounts for a very large share of incomes dispersion, leading in some cases to decomposition results that leave about 70 percent to 90 percent of total inequality unexplained (Cowell and Fiorio, 2006). This led Wan (2002) to extend this approach so that one may infer the contribution of the constant and the residual term, further to the observable factors, in overall inequality as measured by any index.

Gender Inequality

The Mincer equation may also be used to check whether income distribution is biased against some population groups (elderly, women, rural, etc.). In this respect, Chishti and Khalaf (2000) have estimated the relationship between earnings, human capital and gender in Kuwait. To achieve this goal, total earnings are regressed on education and experience using data from Civil Service Commission database, which only covers public sector employees.[115] This Mincer equation is performed for men and women separately. The results showed that the returns for education are higher for female employees, while the returns for experience are higher for men. However, the estimated results have not been extensively used to yield a broader characterization on the link be-

tween gender and earnings inequality in Kuwait.

To better our understanding of gender inequality, one can follow, for example, the Blinder (1973) and Oaxaca (1973) approach by estimating the Mincer equation for men and women, separately. Then, the income gap in the mean between male ($\overline{x}^m$) and female ($\overline{x}^f$) can be decomposed into the contribution of pure discrimination effect and contribution of the difference in their endowments

$$
\begin{aligned}
\overline{x}^m - \overline{x}^f &= \overline{w}^m \hat{b}^m - \overline{w}^f \hat{b}^f \\
&= \overline{w}^m (\hat{b}^m - \hat{b}^f) + (\overline{w}^m - \overline{w}^f) \hat{b}^f \\
&= \overline{w}^f (\hat{b}^m - \hat{b}^f) + (\overline{w}^m - \overline{w}^f) \hat{b}^m \\
&= \underbrace{\overline{w}(\hat{b}^m - \hat{b}^f)}_{\text{Pure descrimination effect}} + \underbrace{(\overline{w}^m - \overline{w}^f) \hat{b}^*}_{\text{Endowment effect}}
\end{aligned}
$$

where $\hat{b}^*$ is the (weighted) mean of male ($\hat{b}^m$) and female ($\hat{b}^f$) endowment returns. The second (third) line of the equation yields a decomposition of the income gap evaluated at the male (female) set of average income-generating characteristics and the fourth line is the weighted mean of the two possibilities (the sharing rule of Shapley (1953)). While the discrimination effect (if evidenced) is unambiguously unfair, the endowment effect may be justified as long as it is only the result of individual freedom of choice.[116]

This is exactly the approach followed by Said and El-Hamidi (2005). They have used micro-data from Egypt and Morocco to characterize the evolution in the magnitude of gender hourly wages during 1990s. The explanatory variables included in the Mincer regressions are related to education, experience and region of residence. Further, to ascertain whether trends in returns to endowments translated into altering overall wage inequality in the Egyptian and Moroccan labor markets, they have studied wage differentials along two lines, public-private sector and male-female.

Said and El-Hamidi (2005) have found that the pure discrimination effect is positive in both Egypt and Morocco but it is less important in public than in private sector. Further, the discrimination effect is declining both in Egyptian public sector (from 7.8 percent in 1988 to 3.2 percent in 1998) and in private sector (from 39 percent to 12

percent). In Morocco, however, public and mainly private sector became much more discriminating in wage payments to women as a result of more comprehensive privatization of the economy during 1990s. The pure discrimination effect rose from 3.5 percent in 1991 to 5.8 percent in 1999 in public sector and from 19.7 percent to 42 percent in private sector during the same period.

Despite the indubitable importance of Said and El-Hamidi (2005) findings, the approach they have followed does not allow to check whether the two components of the gender wage gap are greater at the bottom or at the upper end of the distribution. It is increasingly admitted that the effects of covariates can differ along the wage distribution. Thus, (censored or uncensored) quantile regressions procedures are more attractive than ordinary least square method since they allow one to capture the discrimination effect and the endowment effect over the whole conditional distribution of the living standards variable. Further, Said and El-Hamidi (2005) did not estimate by how much the pure discrimination effect contributes to overall and gendered inequality in Egypt and Morocco. Indeed, the gendered Mincer equations allow, for instance, to simulate the counterfactual wage that women (men) would earn if they were paid like men (women). Having the real and the counterfactual distributions, one can infer the effect of pure discrimination on the within-groups, between-groups inequality, and overall inequality. Similar robust tests could be applied within and beyond the gender concern to better our understanding of the determinants of inequality in the AW.

Intra-Household Inequality

Inequality statements based on individual welfare indicators are seldom conducted in the distributive analysis literature. Income or consumption measures of inequality are usually calculated based on household surveys using a measure of per capita consumption or income for each household. While there may be data on income earned or time use patterns by individuals, consumption data is typically collected at the household level. If a household has total consumption x_i and number of members n_i, this is treated as n_i observations of consumption x_i/n_i each; rather than n_i observations of effective consumption $x_{i,j}$ for each member j ($j = 1, \dots, n_i$) of the household i.

At best, inequality measures are based on adult equivalence scales. This is not really surprising since reliable individual consumption measures are generally hard to obtain. That is why consumption data are typically collected at the household level. Such an approach to inequality measurement implicitly assumes a perfect equality within the household, where consumption is allocated according to members' needs. There is however, growing evidence that household's resources are unfairly distributed among its members. Further, the recent literature on collective household behavior shows that the household consumption varies with the source of income in the household,[118] and other extra-household environmental factors, which affect the allocation of resources within the household. [119]

Because of these considerations, ignoring intra-household inequality poses a number of problems. First, it necessarily leads to underestimation of overall inequality. For instance, having access to individual level calorie-intake data from a household survey conducted in the Philippines, Haddad and Kanbur (1990) have calculated measures of inequality and poverty based on both the effective individual consumption ($x_{i,j}$) and the per capita consumption (x_i/n_i). Not surprisingly, the traditional method (based upon x_i/n_i) will always understate inequality as measured by "Lorenz-sensitive" measures. The understatement is found to be significant, ranging from 30 percent to 40 percent in the Philippines' case.[120] More recently, Lise and Seitz (2007) show that the use of adult equivalence scales underestimates the level of cross sectional consumption inequality by 30 percent in the UK.

Another important issue is how intra-household inequality varies with household welfare. In other words, as households become better off, does intra-household inequality increase or decrease? This is an important issue for policy makers. In reality, members' shares depend closely on their decision powers or threat points on household's decision process. Thus, similar members, according to some ethical criterion, may be discriminated in the allocation of resources within a household. When public authorities target social benefits to some specific group of individuals, their action can be altered by intra-household allocation of resources and the targeted members may be not reached. For instance, in many developed coun-

tries, there is a continuing debate as to whether child benefit should be paid through the tax system (so that it would typically be the father who should be targeted) or through the social security system (so that it would typically be the mother who picks up the check at the social security office). This debate, of course, would be pointless if the income source does not affect the living conditions of children.[121] Using a household bargaining model, Kanbur and Haddad (1995) provided some theoretical arguments in favor of the inverted-*U* pattern of intra-household inequality.[122] Under certain conditions, they show that, as households are richer, the distribution of resources within their members may be characterized by an initial phase of increasing inequality succeeded by a phase of diminishing inequality. In a companion paper, Haddad and Kanbur (1992) found empirical evidence for such a relationship for calorie intake data from the Philippines.

Finally, it is perhaps important to discuss the cases in which we can safely ignore intra-household inequality when comparing income distributions. More precisely, is there a circumstance where reducing inequality across household also reduces it across individual, even in the presence of intra-household inequality? Couprie et al. (2008) showed that if disadvantaged members have more bargaining power in lower-income households, then transferring money to poor households does in fact benefit disadvantaged members, but not necessarily as much as advantaged members. This condition is non-parametrically tested on French data, and it is not rejected. However, it is important to note that in such a circumstance, redistributive transfers tend to be robustly welfare improving (through generalized Lorenz curve dominance) but not necessarily inequality decreasing as Lorenz curve tests remain based upon x_i/n_i instead of $x_{i,j}$ are not concluding.

To round off this discussion, one may confidently argue that the issue of intra-household resource allocation is certainly one of the most exciting new areas in the analysis of income distribution. Once intra-household equality hypothesis is challenged, a number of interesting theoretical, empirical and policy issues arise, which the literature has only just begun tackling. Data collected at the individual level are, nevertheless, needed to undertake research in this area.

Inter-Temporal Inequality

Since the seminal paper of Deaton and Paxson (1994), a growing literature recognizes the importance of inter-temporal choice on the dynamics of inequality in consumption and earnings. In its simplest version, the relationship between inter-temporal choice and inequality is derived from the permanent income hypothesis (PIH) with uncertainty. According to PIH, an individual's consumption does not change except when the consumer receives new information, so that expected consumption in any future is equal to the current consumption:

$$c_{i,t+1} = c_{i,t} + u_{h,t+1}$$

where $c_{i,t}$ ($c_{i,t}+1$) is the consumption level of individual i in period t (t+1) and $u_{i,t+1}$ is the consumption component in period t+1 that comes from new information received by i after period t. Given the set of information known by i in period t, this perturbation (innovation in Deaton and Paxson's (1994) terminology) has a zero expectation, a zero covariance with $c_{i,t}$, and a variance equal to σ_{t+1}. Hence, we have

$$\text{var}\, c_{t+1} = \text{var}\, c_t + s_{t+1}$$

where the variances are taken across the cross section of individuals (or households), and is the cross-sectional variance of consumption innovations. Clearly then, if consumption disparity is calculated by the variance, inequality is increasing over time. If the zero covariance between $c_{i,t}$, and $u_{i,t+1}$ assumption is not rejected, so that the distribution of consumption at time t+1 is the distribution of consumption of time t with the addition of mean-zero random perturbation, then the Lorenz curve of consumption in t will lie nowhere above the Lorenz curve of consumption in any later period. As a consequence, any inequality index which fulfills the Pigou-Dalton transfer principle (see Annex 2), will show increasing inequality through time.

It is important to note the crucial role of uncertainty in driving the increasing inequality. In absence of uncertainty ($\sigma_{t+1} = 0$, for all t), the PIH predicts constant consumption over time, so that inequality is set by the distribution of lifetime resources, and once set, remains constant over time.

In the presence of uncertainty, however, consumers adjust their consumption whenever they get new information. Provided that everyone does not get the same news, the flow of new information will constantly act to widen the disparity of consumption. The consumption pattern of any group of the population will then lead to an increasing inequality over time.

The fact that the inequality of consumption and income is increasing over time for any population group does not necessarily imply that inequality is increasing for society as a whole. For any given cohort, consumption and income inequality is expected to rise as the cohort ages, so that inequality should be on the rise for any age group. What happens to aggregate inequality will depend on:

i.   whether new generations inherit the inequality level of their ascendant, so that each new generation starts their lives with a higher level of inequality, leading to an increasing overall level of inequality; or
ii. whether there is no inheritance of inequality, so that each generation begin with the same starting level of inequality, and overall inequality is constant.

The Deaton and Paxson's (1994) framework is then consistent with any pattern of overall inequality so that only empirical investigations may highlight which one is valid for a given society.

In order to implement the Deaton and Paxson's (1994) framework, Marku and Salehi-Isfahani (2008) have used long series of cross-sectional household expenditure and income surveys in Iran, taken between 1984 and 2004, which allowed them to track cohort income and expenditures for 21 years. They have used data from these surveys to construct profiles of income and expenditure for individual cohorts as they age. They found evidence that all cohorts born before the mid-1950s experienced gains in lifetime earnings relative to older cohorts. Nevertheless, the younger cohorts born after 1960, who were in their early 20s during the 1979 revolution, lost in terms of lifetime real earnings relative to their predecessors.

The natural consequence of the Deaton and Paxson's (1994) intertemporal model is that the dynamic of consumption inequality within cohorts is informative about the impact of income shocks and about the validity of intertemporal consumption behavior. Jappelli, and Pistaferri (2006) have

rejected this argument since measures of consumption inequality do not always provide an accurate picture of household behavior. According to Jappelli and Pistaferri (2006), consumption inequality is a static concept, and as such it cannot handle violations of the life cycle-permanent income hypothesis. They argued-- to tackle robustly the issues of intertemporal inequality-- that one should call for the analysis of consumption mobility (see Box 3). The important question is then which intertemporal model should be adopted, an issue which is important to explore in the future research.

Growth, Public Policies and Inequality

Going beyond analytical and statistical decompositions to characterize inequality, research to understand the determinants and impact of inequality has pursued three tracks. The first one has focused on the links between growth and inequality and its implications for poverty reduction. The first part of this chapter will review work on this subject in the Arab region. The general pattern of findings is that the growth component was the main source of the continuous poverty reduction in ACs. The redistribution effect however, has generally worked against the poor by slowing the growth effect. Inequality changes have often played against the poor. Only Egypt has experienced a redistributive effect in favor of the poor even during the contraction periods. These findings are, nevertheless, very sensitive to the choice of the poverty line and poverty measure.

The second track focused on the impact of public policies on inequality. In the rest of the chapter, we review research on the impact of three types of policies, which have played a major role in the ACs' economic and social development strategies: trade and openness, social expenditures, and investment on human capital and consumer subsidies. For trade, almost all the studies reviewed explore the impact of trade reforms, particularly the removal of trade protection on agricultural production on poverty and inequality. The findings are mixed, with some studies showing a positive impact on inequality in Tunisia, while those on

Morocco find no impact or a negative impact on rural-urban inequality. Despite the perceived critical importance of social expenditures, especially on education and health, in reducing inequalities and equalizing opportunities in ACs, there are very few studies, which assess this impact and how it has changed over time. The few available findings show a mixed picture in terms of the impact of social expenditures on equality. Some studies find a direct positive impact, especially of education expenditures on inequality, while others show an insignificant and even sometimes negative impact.

Consumer subsidies have been extensively used as a mechanism to redistribute incomes in ACs. The level and extent of these subsidies became very large by the 1980s; and despite various reforms and attempts at reducing them, they still remain significant. Many studies focused on food subsidies and found that they had a significant impact on inequality, as they tend to benefit the poor relatively more than the rich in relative terms. Other subsidies, which are as important if not more, such as for energy products, have received less attention in the AW.

The distributional impact of a number of dimensions of market reforms has not been explored in the Arab region, such as reforms of financial markets, development of the private sector and privatization, civil service reforms, domestic price liberalizations beyond those of basic foods and energy products, and sectoral policies such as

agriculture. Knowledge and research about the impact of taxation on inequality is strikingly non-existent.

Another subject, which is important for the region and may have significant implications for inequality, relates to two dimensions of the labor markets: migration and public employment. (This will be briefly discussed toward the end of the chapter). But there is very limited research in this area, and the few available studies on the effect of migration and public employment suggest a positive impact on poverty reduction. However, the findings show a positive impact for migration on income inequality but no clear pattern of impact for public employment.

The third track has dealt with the impact of inequality on economic growth and the political economy of policy and institutional change. Studies in this area in the ACs have been almost non-existent and are not reviewed here.

Growth, Inequality and Poverty

Growth and inequality

The literature about the link between economic growth and inequality is very contentious with limited robust findings about causality and significance of impact from global experience. The findings are country and context specific. For instance, Milanovic and Ersado (2008) find that economic growth in the former communist countries during the transition period was unequalizing, with a significantly negative impact on the bottom two deciles and a positive one for the top two deciles.

Work in this area related to ACs is almost nonexistent. Daymon and Gimet (2007) estimate a Kuznets curve based upon a simple regression of the Gini index on the mean income and the squared mean income. They find that with the exception of Kuwait, the ACs are situated at its left side and far from the turning point (i.e., the stage when growth leads to lower inequality).

Growth and poverty

One of the reasons one is interested in inequality is its role in determining poverty outcomes. When successive surveys are available, it is useful to calculate the share of the total change in poverty, which is due to the change over time in mean income and that which is due to the change in income inequality. This enables us to check whether

these two factors work in the same or in opposite directions and to suggest policy interventions accordingly. The most popular approach used to achieve this goal, used in the AW and elsewhere, is that of Datt and Ravallion (1992). The change in any poverty measure between the date *t* and *t*-1 is decomposed as the sum of a growth component, a redistribution component, and a residual term. The growth component corresponds to the poverty change that would have been observed if the Lorenz curve observed at *t*-1 had not shifted. The redistribution component is the poverty change that would have been achieved if the mean income at t was that observed at *t*-1. The residual term originates from the interaction between growth and redistribution effects. (See Box 7 for the technical details).

In Morocco, for instance, Abdelkhalek (2005) has found that poverty sharply increased between 1990 and 1999 both in urban and in rural area. The growth component was the principal factor of this deterioration. The distributive factor exacerbated the growth effect in rural regions but slowed it down in the urban area. The author did not provide the net effect at the national level.

In Syria, El-Laithy and Abu-Ismail (2005) identified three distinctly different regional patterns in terms of the effect of distributional factors on the national poverty rate decline from 33.2 percent in 1996 to 30.1 percent in 2004. First, while poverty in most urban regions could have dropped by 5.9 percentage points had the distribution of income remained unchanged, the extent of reduction in poverty resulting from growth was actually hampered by an increase in inequality. Second, the rural southern region had very different patterns of growth, with increases in per capita expenditures occurring with better income distribution, ultimately leading to a decrease in poverty. The third pattern, found in the rural north-eastern region, combined a decrease in per capita expenditures with a worsening of the income distribution – both factors contributing to a worsening of poverty levels.

In Tunisia, Ayadi et al. (2005) and Lahouel (2007) have shown that the growth component was the major factor of the continuous poverty headcount reduction from 1980 to 2000. The redistribution effect was generally either weak or had an opposite to that of growth.

In Egypt, El-Laithy et al. (2003), and Kheir-El-

Box 7: Decomposing poverty changes

Let $\mathbf{x}_t$ be the income distribution observed at date t and r be the growth rate in the mean income between t and t-1. The poverty change can then be decomposed as

$$P(\mathbf{x}_t, z) - P(\mathbf{x}_{t-1}, z) = \underbrace{\left(P\big((1+r)\mathbf{x}_{t-1}, z\big) - P(\mathbf{x}_{t-1}, z)\right)}_{PGE_1: \text{ Pure growth effect}} + \underbrace{\left(P(\frac{\mathbf{x}_t}{1+r}, z) - P(\mathbf{x}_{t-1}, z)\right)}_{PRE_1: \text{ Pure redistributive effect}} + \mathrm{e}_1$$

(21)

Clearly then, the Datt and Ravallion method is based upon the initial period, $\mathbf{x}_{t-1}$, as the reference one to infer the different origins of a poverty change. An alternative route uses the final distribution as a reference for the same decomposition

$$P(\mathbf{x}_t, z) - P(\mathbf{x}_{t-1}, z) = \underbrace{\left(P\big(\mathbf{x}_t, z\big) - P\left(\frac{\mathbf{x}_t}{1+r}, z\right)\right)}_{PGE_2: \text{ Pure growth effect}} + \underbrace{\left(P(\mathbf{x}_t, z) - P\big((1+r)\mathbf{x}_{t-1}, z\big)\right)}_{PRE_2: \text{ Pure redistributive effect}} + \mathrm{e}_2$$

(22)

Since there is no ethical justification for a given reference than another, a middle way is to use the Shapley rule, which enables to infer the contribution of the growth effect and the redistributive one in a fair manner. Applied to the decomposition of a poverty measure, the Shapley value induces a sharing rule, which allocates for the growth effect the average of the two possible growth measures (from (21) and (22)) and likewise to measure fairly the redistribution effect. This rule has also the advantage of removing the residual terms, since ϵ_1 and ϵ_2 sum to zero:

$$P(\mathbf{x}_t, z) - P(\mathbf{x}_{t-1}, z) = 0.5(PGE_1 + PGE_2) + 0.5(PRE_1 + PRE_2).$$

(23)

A similar approach in terms of proportional change in poverty when there is a positive growth rate of 1 percent was suggested by Kakwani and Pernia (2000). To the best of our knowledge, the only application of this methodology was made for Jordan by the World Bank (2004b).

Although the advantages of the sharing rule of Shapley, the Datt and Ravallion approach dominates the empirical applications in the MENA region. Several of these studies are made by the World Bank. See, for instance, the World Bank (1995, 2004b).

Din and El-Laithy (2006) have found that the redistribution effect has often led to a net reduction of poverty even between 1990 and 2004, when the average annual growth rate in the mean income per capita was negative (roughly -2 percent). This general pattern of findings, however, hides other movements over some sub-periods or at regional level. For instance, from 1995 to 1999, growth and redistribution components worked in opposite directions in the Metropolitan region, where reduction in poverty (-9.18 percentage points) resulting from increased per capita mean expenditure was hampered by worsening inequality (1.07 percent-age points). Rady et al. (2003) did similar decompositions for Egypt from 1974 to 1976. Although they have presented the Shapley's rule, their empirical illustrations are only based on the approach of Datt and Ravallion (1992). In contrast with El-Laithy et al. (2003), and Kheir-El-Din and El-Laithy (2006), they applied equation (21) using several poverty measures and poverty lines. Interestingly enough, they have concluded that the growth effect and the redistribution effect are very sensitive to the somewhat arbitrary choice of the poverty line and poverty measure. They have not, however, applied rigorously the robustness

analysis, which we are now going to present in the context of pro-poor growth.

The results derived from Datt and Ravallion's (1992) decomposition can potentially and arbitrarily depend on the choice of a poverty line and of a poverty index. One way to overcome this limitation is to see how the impact of growth (or contraction) is distributed across the income distribution. Since the Chen and Ravallion's (2003) paper, who introduced the concept of growth incidence curves (GIC), most poverty and inequality comparisons in the AW have used this approach. (See Box 8).

Kheir-El-Din and El-Laithy (2006) have es-

Box 8: Growth incidence curves

Ravallion and Chen (2003) have defined their so-called "*growth incidence curve*" (GIC), given by:

$$g(s = 1, p) = \frac{y(p)}{x(p)} - 1 \geq 0, \quad \forall p \in [0,1]$$

(24)

where $g(s=1, p)$ is the growth rate in income of the pth quantile, and $s=1$ refers to the first-order principles. The well-known results of the stochastic dominance literature enable Ravallion and Chen to show that if the GIC lies above zero everywhere, then there is (social welfare) first order dominance. If the condition (24) holds, growth component computed using the Shapley rule (equation (23)) will never be negative, no matter the poverty line and the poverty measure selected. If further $g(s=1, p)$ is a decreasing (increasing) function for all p, then inequality falls (rises) for all inequality measures satisfying at least the *Pigou-Dalton-Transfer* principle. This means that the redistributive effect given by equation (23) will always reinforce (hamper) the growth effect. Finally, if the GIC switches sign, thus one can not predict whether higher order dominance holds by looking at the GIC alone.

As shown in subsection 5.2, one can either restrict the range variation of p by looking for restricted first-order pro-poor growth or test second-order pro-poor growth. More details are in Bibi (2006) or Duclos and Araar (2006).

When first order conditions do not allow to test pro-poorness of growth, one route is to follow Son (2003) who has used similar equations to (44) and (46) to define her *poverty growth curve* (PGC), given by

$$g(s = 2, p) = \frac{\overline{y} L_y(p)}{\overline{x} L_x(p)} - 1 \approx g_L(p) + g_{\overline{x}} \geq 0, \forall p \in [0,1]$$

(25)

where $s=2$ refers to the second-order principles, $g_L(p)$ is the growth rate in income share accruing to the poorest p proportion of the population and $g_{\overline{x}}$ is the growth rate in the mean income. If the PGC, g($s=2$, p), lies above zero everywhere, then there is (social welfare) second order dominance. In contrast to the GIC, the estimation of PGC requires according to Son (2003) only decile shares and mean incomes to be drawn. Such statistics are usually published by local and international agencies and these make the estimation of PGC straightforward, albeit with only 10 observations.[123] Nonetheless, this remains interesting in the context of the reluctance characterizing many official institutes of statistics to share primary data with scholars in the AW.

Clearly again, second-order pro-poor judgments are less demanding than first-order ones. By tolerating that a large rate of growth for the poorer may sometimes be enough to offset a negative growth rate for the less-so-poor, they relax the first-order basic requirement; which stipulates that all quantiles of the poor should experience a positive growth rate. An example of this is shown by the Figure 5 for the Algerian case. Indeed, while Algerian growth incidence curve switches sign at $p = 10$ and $p = 30$ as Figure 4 illustrates, preventing then restricted first-order dominance, income losses of the poorest

second decile seem to be largely offset by gains of those standing at the first poorest decile so that the Figure 5 shows a *restricted second-order* dominance up to $p = 90$ percent.

Notwithstanding, even second-order pro-poor conditions could be deemed severe from Rawlsian point of view. This led Bibi (2006) to extend pro-poor judgments to any ethical order.

To achieve this goal, Bibi (2006) has defined, EDE income (see equations (8) to (9) and (33)) as: [124]

$$x_e(\mathrm{a},z) = z - \left[P_x(\mathrm{a},z)\right]^{\frac{1}{a}} \quad \forall \mathrm{a} \geq 1 \tag{26}$$

Further, he has shown that for $\alpha > 1$, the EDE income, $x_\alpha(z)$, is generally lower than the mean income of the censored distribution, $\bar{x}(z) = x_e(1,z)$, such that a natural measure of the equality index is then given by:

$$E_x(\mathrm{a},z) = \frac{x_e(\mathrm{a},z)}{\bar{x}(z)} \quad \forall \mathrm{a} > z \tag{27}$$

Using equations (50), (26) and (27), Bibi (2006) has shown a necessary and sufficient condition for growth to be s-order pro-poor is that: [125]

$$g(s,z) = \frac{\bar{y}(z)E_y(s-1,z)}{\bar{x}(z)E_x(s-1,z)} - 1 \approx g_{\bar{x}(z)} + g_{E(s-1)} \geq 0 \quad \forall z \in [0,+\infty[\tag{28}$$

where $g_{\bar{x}(z)}$ is the growth rate in the mean of the censored income distribution and $g_{E(s-1)}$ is the growth rate in the equality index. As *s* approaches infinity, *s*-order pro-poor growth is computed upon the basis of Rawlsian judgments:

$$\lim_{s\to\infty} g(s,z) = \frac{\min \mathbf{y}}{\min \mathbf{x}} - 1 > 0 \tag{29}$$

Equation (29) is very instructive. It tells us that for a positive growth rate in the mean income, if the GIC lies below zero at the lowest quantile, the growth pattern can not receive the label of *pro-poor* for any ethical order whatsoever.

timated the Egyptian GIC using the 1991, 1995, 1999 and 2004 household surveys. They have noted that the mean real per capita expenditure has been declining over the whole period of study, as well as during the first and third sub-periods. It has increased only during the second sub-period (1995–1999). GIC for the whole period is decreasing over all quantiles, implying that inequality declined, as higher quantiles are declining more rapidly than lower quantiles. The annualized percentage rise in per capita expenditure is estimated to have exceeded 10 percent for the poorest two percentiles, declined steadily, to reach zero around the 30th percentile and turned negative to reach

-2 percent (the average growth of per capita expenditure) around the middle of the eighth decile and continued to decline thereafter. This indicates that over the whole period under consideration, expenditure distribution has markedly improved, with a clear decline in poverty incidence.

El-Laithy and Abu-Ismail (2005) have shown that poverty in Syria decreased between 1996 and 2004. This decline was driven by large increases in mean expenditure per capita (roughly 2 percent per year in average). However, growth rates at the national level were not fairly distributed among the population. For instance, the lower percentiles of the expenditure distribution grew at a lower

annual rate than the average rate, indicating that growth was accompanied by a rise in expenditure inequality.[126]

Ayadi et al. (2005) have estimated the GIC for Tunisia from 1980 to 2000 at the national, urban, and rural level. The analysis by sub-period shows positive growth rates for almost all percentiles over all five-year periods. A noticeable difference between the 1980s and the 1990s is that while GICs are declining in the first period, implying an improvement in income distribution, particularly in rural areas, they are essentially rising in the 1990s, with the exception of the rural GIC in the second half of the 1990s, which was declining. Thus, contrary to the 1980s, the pro-poorness of growth (the rate at which growth is translated into poverty reduction) was hampered during 1990s by an increasing trend of inequality.

To synthesize the findings of some of these papers and showing the growth pattern in other ACs, we have estimated the GIC for Algeria, Egypt, Jordan, Morocco, Mauritania, Tunisia, and Yemen. (Figure 11 depicts the estimates of the growth rate by income percentile).

The findings show that the GIC of Tunisia, Jordan, Mauritania, Morocco and Yemen do not switch sign. However, only Tunisia, Mauritania and (to a lesser extent) Jordan have a positive growth over the entire income distribution. While the Tunisian and Moroccan GIC are roughly horizontal, the Mauritanian one displays an upward sloping across different quantiles, meaning that the growth distribution has not impacted significantly on the income distribution for the former countries but it has worsened the income distribution for the latter economy.

The GIC of Algeria switches sign at a lower value of p. This is an example of an equivocal outcome, where one is unable to rank unambiguously the distributions in terms of poverty (or the pro-poorness of growth) and social welfare. One can use second-order conditions to test the pro-poorness of growth (or recession) in these countries.[127]

Figure 11.
Growth incidence curves
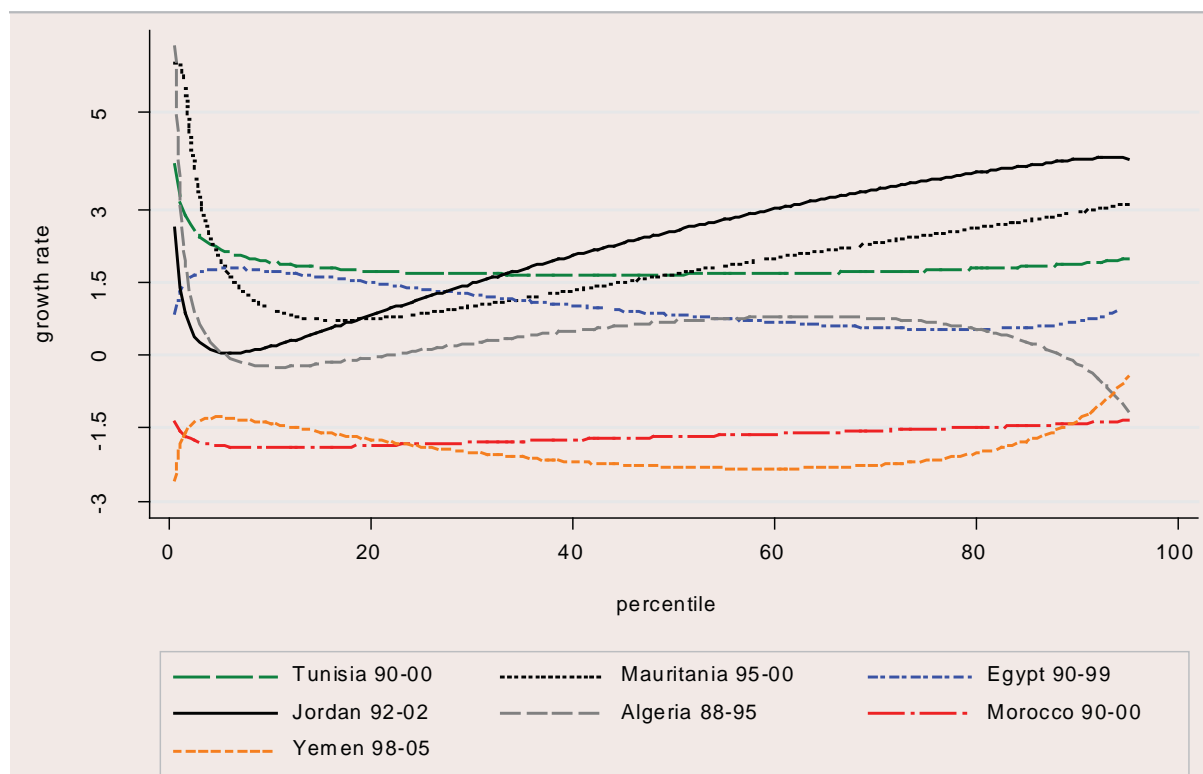
Source: Authors' calculation using the World Bank LSMS micro-data: http://www.worldbank.org/povcalnet

Trade, Redistribution and Inequality

In developing countries, the debate on the impact of trade openness and globalization on inequality has been rich and contentious. In the Arab region, this debate has been contentious, but less rich than in other regions. This is in part due to the traditionally limited openness to trade in the region and the fact that trade liberalization has been undertaken more recently and slowly than other regions. But, the shift from a state-led, inward-oriented model of economic development to one more dependent on external markets and the private sector has produced anecdotal evidence of-- and substantial public debate over-- perceived increasing inequality of incomes.

The paper by Bourguignon and Morisson (1989) is one of the first to discuss the role of trade orientation on inequality in the case of Morocco. They find that while wage dispersion in many export sectors contributes significantly to overall income inequality, it is not necessarily the case that the level of inequality within sectors is related to the export-orientation of the sector, but it is more commonly related to the distribution of assets and endowments.

In the context of ACs, the study of the distributional effects of trade liberalization and the potential role of complementary public policies to mitigate (if proved) the negative effects of openness has been carried out mostly by using Computable General Equilibrium Models (CGE). Two main approaches have been used. The first and the most common one is an extended version of the unique representative household approach into a multiple representative households within a layered micro-simulation model. The second one integrates as much households as in the household survey within an integrated micro-simulation approach. Given that these models require the availability of Social Accounting Matrices (SAMs), work has been mostly limited to Egypt, Morocco, and Tunisia, which have annual detailed SAMs since the early 1980s.[128]

The layered CGE-micro simulation or top-down technique consists in stratifying as much as possible the representative household into a small number of homogenous groups according to occupation, location, or income criteria. Then, the CGE model is simulated to generate a full vector of commodity and factor prices pertaining to a policy shock. These are finally fed into a separate household survey, where households within the same group are assumed to face the same income and price changes while the magnitude of such changes vary only between groups. This naturally leads to an underestimation of the evolution in the between-groups inequality as a result of the simulated policy change.

Lofgren et al. (1999) have constructed a standard recursive CGE model to quantify the distributional effects of the free trade agreement between Morocco and European Union (EU).[129] The model includes several rural and urban production activities, factors of production and four types of households: rural poor, rural non-poor, urban poor, and urban non-poor. Two international markets are distinguished-- the EU and the ROW. While tariff unification with EU and removal of non-tariff barriers boost growth for non-agricultural sectors, it slows down the rural agriculture sector. In turn, the negative income and growth effects in rural areas increase poverty and the urban-rural income disparity. Two accompanying policies to trade liberalization with EU are then simulated: a non-distorting transfer program to compensate the owner farmers and a skill-upgrading program to increase the stock of rural skilled labor. The second option shows a stronger effect on the two rural households, followed by the urban poor while the urban non-poor face a minor growth deceleration. The authors have concluded that trade liberalization with accompanying redistributive policies can lead to win-win outcomes: the welfare of all household groups grows more rapidly than if status-quo policies are followed.

A similar model was used by Fan et al. (2007), who have focused their study more on the reallocation of food subsidies in Egypt to promote both economic growth and equity.[130] For this purpose, two sets of policy experiments are simulated. The first analyzes the removal of the subsidies channeled to the two richest quintiles and uses the resultant savings toward more public investment in agriculture, infrastructure, or education and health. The second scenario completely eliminates the price subsidy and uses the resultant savings, both to the above-mentioned sectors and to finance a new safety net program based upon direct cash transfers to fully compensate the two poorest quintiles. Simulation results show that the two scenarios would lead to more economic growth and less poverty than universal food sub-

sidies with better outcome in terms of growth and equity from the second scenario.

Ravallion and Lokshin (2004) attempt to estimate the likely effects of trade reform in Morocco. They simulate a reform, which entails the de-protection of cereal producers, through substantial reductions in tariffs on imported cereals. The price changes are estimated using a general equilibrium model and the welfare impacts are estimated using a money metric of utility and a household survey. Their results suggest that the trade reform would increase overall consumption inequality in Morocco. However, this was entirely due to the reform's impact on horizontal inequality. Indeed, the vertical component (i.e., the contribution of the inequality in gains conditional on income) is inequality reducing. Further, the horizontal welfare impacts are correlated with household demographics and location as these characteristics influence the net trading positions of the households in relevant markets. They conclude there is no obvious basis for thinking that these are characteristics that stem from choices for which one would fairly ask the households themselves to bear the adverse consequences of reform.

Most of the above-mentioned studies are based upon complete orderings, that is, upon somewhat arbitrary measures of inequality and poverty as discussed so far. One of the exceptions to this rule is the Bibi and Chatti (2006) study. The household bloc of their CGE model is disaggregated into six household groups, identified by their income source-- two rural (landholders and agricultural laborer) and four urban (unskilled in the formal sector, unskilled in the informal sector, skilled, and capitalists). The layered CGE model is extended so that a larger fraction of the intra-group inequality could be captured.[131] To see how this can be done, the authors use the equivalent income to calculate the change in real incomes at the household level. Thus, although households within a same group are still considered facing the same price changes following a given shock, as they do not have the same budgetary share for each good, they will differ in terms of household-specific consumer price index.

In this study, the authors have simulated the impact of a progressive trade liberalization accompanied by public spending on infrastructure, education and health. The increment of these public expenditures is financed through a pro-gressive removal of consumer subsidies. One of the most important results of this study is that trade reform would improve the living standards of most households. However, one can note that the growth incidence curve (GIC) from 2000 to 2015 exhibits an upward sloping across different income quantiles. This means that while curbing absolute poverty, this pro-growth policy is likely to be accompanied by a fair rise in inequality. Further, policies aimed at improving infrastructure and human capital shift down the growth incidence curves (GICs) in the short run but push them above those related to consumer subsidies in the long run. Since GIC pertained to CS do not intersect those related to more investment in human capital, there is no need then to test second order of dominance. However, GICs were not really informative about the distributional pattern of economic growth. For instance, some GIC displayed for the short run effects are approximately horizontal. This means that the Lorenz curves do not really shift at the beginning period under consideration, and the economic growth is to some extent, distribution-neutral.

These results seem to confirm some trade-offs between short- and long-run policies. Policies like cash transfers conditional on keeping children from poor families in school are needed in the short run to smooth the negative impact of the policy changes that enhance economic growth, curb vulnerability, and boost poverty reduction in the long run. Indeed, in absence of conditional cash transfers, it is very difficult to ensure that people living either in extreme poverty or in vulnerability will benefit from more investment in education, for instance, due to the opportunity cost of schooling time that is higher for the poor.

In contrast to the previous approach, the integrated one enables to directly incorporate into a unique framework the behavior of as many households as is found in a household survey. While this approach enables to circumvent the principal drawback of the top-down technique, it requires primary access to both micro-data records and SAM and, secondary access to reconcile household data with those collected from the SAM. This is required to ensure full consistency between the micro-data records and the CGE model predictions.

Chemingui and Thabet (2008) have constructed a standard integrated CGE model to simulate

the impending Tunisian removal of tariffs on agricultural products with the EU under a free trade agreement signed in 1995. The model is focused on the agricultural sector –with detailed treatment of agricultural activities– and includes only 397 households among the 10415 involved in the Tunisian 1995 household surveys. Three scenarios of reforms are simulated. The first consists of evaluating the effect of phasing-out tariffs on manufactured products imported from EU; the second looks at the effects of tariff liberalization on all imports from the EU, including agricultural products, and; the third deals with the impact of tariff dismantling on imports from the ROW. The effects of these reforms on poverty and inequality are captured through the changes of three standard poverty indices and the Gini coefficient.[132] Assuming the representativeness of the household sample, the authors have concluded that the second scenario, for example, would have a positive impact on income distribution of the whole population as the Gini index would fall from 41.7 in the original position to 40.9 in the case of full removal of tariffs with EU.[133] As for the impact on poverty, the results critically depend on the choice of the poverty measure. The percentage of the poor would fall from 8.1 percent to 7.7 percent of the population, while the deficit of poverty would rise from 1.72 percent to 1.83 percent of the poverty line. On one hand, such results normally call for testing to determine whether the observed differences in inequality and poverty indices are statistically significant and, on the other, to gauge the robustness of the results through partial orderings.

Abdelkhalek (2006) has also followed this route. He has used a 1998 SAM and household survey to build a standard integrated CGE model with 5129 households including their sampling weight (i.e., as may households as is found in the 1998 Moroccan living standard household survey), and 34 activities from the 1998 input-output table and SAM. The economic shock he has simulated is a partial removal of tariffs with EU as stipulated by the free trade agreement. Simulation results show that tariff reduction does not yield a statistically significant change in the poverty measures and the Gini inequality index. Deeper analysis reveals that the distribution of proportionate gains and losses at each household's income per capita are uniformly distributed, which explains the distri-

bution-neutral nature of trade liberalization.

Social Expenditures, Human Capital and Inequality

Public expenditures on infrastructure, health and education are usually expected to improve equality in opportunities, total factor productivity, and growth. In ACs, high expenditures on social services such as education, health as well as other infrastructure have always been seen as major redistributional mechanisms. In turn, these mechanisms have helped to achieve large gains in terms of access to these services and poverty reduction. Public expenditures on education have been consistently higher than in comparator countries, (World Bank, 2007b). Surprisingly, few studies have attempted to quantify the effects of the social expenditures on inequality in the region.

Van de Walle (2004) considers the geographical aspects of poverty and social outcomes in relation to the impact of public spending programs in Morocco. She finds that social programs are well targeted toward the rural poor, who obtain substantial benefits but not to the urban poor.

The more common approach to assess the impact of social expenditures on inequality in developing countries is the so-called *benefit incidence* analysis.[134] It combines the cost of providing "assignable" public services with information of their use from household surveys in order to generate distributions of the benefit from the publicly-provided services.[135] *Concentration curves* can also be drawn to robustly characterize the equalizing or disequalizing effects of the distributions benefit from each publicly-provided service, like education or health.[136] For example, one may check whether child mortality is more unequally distributed to the disadvantage of poor children in one country than the other, or whether inequalities in elderly healthcare are more pronounced in some countries than in others.

In this respect, the distribution of public spending on education across household deciles (ordered in increasing values of household income) in many ACs have been frequently studied by the World Bank.[137] Based on the Yemeni 1998 household survey[138], World Bank (2002b) findings suggest that public spending on education as a whole *favors the poorest households.* The poorest 10 percent of households gained 12 percent of the total public education subsidies, while the richest 10 percent

gained 7 percent. However, the degree of equity in the benefit-incidence analysis differs by level of education. While public spending on basic education favors the poor, spending on universities and vocational training is heavily tilted toward the rich. The poorest 10 percent of households received 13.3 percent of the spending on basic education, while the richest received 5.3 percent. The pattern is the opposite in university spending: the poorest decile benefited with 6.5 percent as opposed to the richest decile, which gained 15.1 percent. However, spending on secondary education appears to be equally distributed across the different deciles.

Households-based benefit-incidence analysis may lead to an overestimation of the redistributive incidence of education spending, as poor households tend to have more school-aged children. For this purpose, the World Bank (2002b) did the same exercise with individuals (instead of households) as unit of measure, when households are ordered in increasing values of household's income *per capita*.[139] As expected, the education subsidies across individual deciles are less equalizing. For instance, the poorest decile gains 9.7 percent of the total education spending, while the richest gains 10.8 percent. Nonetheless, as the concentration curve of education public spending is presumably closer to the line of perfect equality (i.e., it lies everywhere above the income Lorenz curve), the equalizing effects of public expenditures on education remain significant although less important than in the case of a more perfect targeting.

In reality, one should go a step further in analyzing the incidence of public subsidies on education before making definitive distributional judgments. In addition to having more school-aged children, poor households may have less enrolled school-aged children than the better-off for a given school-aged children size. Thus, to check whether public subsidies on education effectively improve the opportunities for the poor as much as for the non-poor, the estimated benefit from education subsidies accruing to each household should be adjusted by enrollment ratio of that household (i.e., the ratio of the enrolled children to the school-aged children size). Many other applications are possible and they could shed more light on the evolution in the opportunities fairness offered by public spending in the AW.

Using 1997 Egyptian household survey, Datt et al. (1998) have revealed that the distribution of years of schooling is biased against the poor, women, and rural people.[140] Interestingly enough, the information on accessibility and financial reasons suggests that increasing years of schooling for the poor does not require building more schools but requires reducing the opportunity cost of going to school. Attending school is too costly for the poor either because of direct costs or because it reduces the amount of time they can work. These costs are evidently high for the poor relative to the anticipated returns from further schooling. Augmenting poor household income through conditional cash transfers (CCTs) could be an important means of addressing the policy goal of reducing the schooling deficit of the poor children and improving their opportunities. While CCTs have proliferated in several Latin American countries to tackle the schooling issue, their effectiveness have not been really experienced in the AW.[141]

Other studies have assessed the impact of social expenditures on inequality using econometric approaches. Daymon and Gimet (2007) have used panel data from 1980 to 2003 from 19 ACs and several aggregated indices to estimate the effects of public expenditures by specific item, related to human capital and social equity, in a simple inequality equation

$$Gini_{i,t} = \sum_i b_j Y_{j,i,t} + \eta_i + h_t + e_{i,t}$$

where $Gini_{i,t}$ is the Gini index of country i at date t, $\mathbf{Y}$ includes variables related to access to child healthcare, public spending on education, the efficiency of the education system, the gender ratio of access to education, access to internet, the level of freedom, and other typical variables of control.

The results show that with the exception of child access to healthcare and access to internet, the other variables related to human capital and social equity have a direct impact on reducing inequalities. According to the authors, the paradoxical healthcare and internet effects suggest that in the AW improving access to medical care, and to information and communication technology would only have a positive effect on reducing inequalities in the long run. Therefore, reducing inequality requires the promotion of freedom and

human capital.

The Daymon and Gimet (2007) study fails to account for the complex interactions between inequality and other relevant variables, such as growth and poverty. Laabas and Limam (2007) have attempted to analyze the impact of some public policies on economic growth, income inequality and poverty in the AW. They have used a larger panel of countries and a simultaneous equation model with three endogenous variables namely growth, inequality and poverty

$$g_{i,t} = f_1(Inv., Openness, Social\ E\ xp\ enditures, Initial) + e_1$$
$$Gini_{i,t} = f_2(g_{i,t}, Social\ E\ xp\ enditures, Others) + e_2$$
$$P_{i,t}(\alpha, z) = f_3(Gini_{i,t}, \frac{\overline{x}}{z}) + e_3$$

where $P_{i,t}$ (α, z) is a poverty measure, *Inv.* stands for the investment ratio to GDP, *Openness* is measured by the ratio of trade to GDP, *Initial* is the 1975 income level, *Others* includes variables –such as cereal production, inflation, etc.– and *Social Expenditures* is an aggregate ratio of public spending on education, health, housing, transfers, subsidies, and social security to GDP. The data used are related to 77 countries-- 52 of which have two different household surveys and 25 have only one survey. Estimation of the set of simultaneous equations are made for three poverty measures, the headcount ratio   ($\alpha = 0$), the intensity of poverty ($\alpha = 1$) and the severity of poverty ($\alpha = 2$).

The results pertaining to the AW show that social expenditures affect income distribution positively but they do have a negative impact on economic growth. In other words, poverty is affected only indirectly by social policies through their positive impact on income distribution and negative effect on growth. The net effect is positive given the higher elasticity of poverty to income distribution than to income growth. The results also show that openness has a positive effect on growth and a negative impact on income distribution.[142] This yields a net negative effect on poverty for the same reason mentioned above. All these results support the idea that growth-promoting policies need to be accompanied by redistributive-promoting policies in order to avoid marginalization of the poor.

A similar methodology is applied by Abdelkhalek and Rockmore (2007) to Morocco, and Bibi and Chatti (2007) to Tunisia. They used the same set of equations to study the effects of social public investments at the regional level. In both studies, the authors have used different proxies for public spending in education and health because of the absence of data on the distribution of public spending by region. In this respect, the number of health dispensaries and the literacy rate by Moroccan region are used among the explanatory variables in the study on Morocco; while the enrolment rate, the number of students by classroom, coefficient of students by tutor, and number of hospital beds per capita in each region are used among the lagged independent variables in the study on Tunisia.

Estimation results reveal that in Morocco, higher numbers of dispensaries and lower rates of illiteracy have the expected effect on inequality and poverty but these effects are not statistically significant. In Tunisia, however, investment in education appears to be an important correlate of economic growth. The focus on improving the condition of the poor through investment in education impacts indirectly on inequality and poverty through economic growth. The inequality and its square describe a parabolic inverse-U shape effect on growth, which is consistent with Kuznets' (1955) theory. The initial level of the regional mean income per capita does not show the existence of conditional convergence across the different Tunisian regions. Finally, public spending in health infrastructure seems to be positively associated with inequality and, indirectly, with poverty. One possible reason of this result is the bias of public spending on health in the rural area, where at least 65 percent of the poor live. All these results, according to Bibi and Chatti, seem to prove that while growth contributed to substantial poverty reduction in Tunisia, inequality slowed down slightly from 1980 to 2000. Some of the public policies that have boosted economic growth may have also precluded inequality to fall. Since a rise in inequality works against poverty reduction, pro-growth policies should ideally be accompanied by redistributive policies.

Consumer Subsidies and Inequality

ACs, at least since the 1970s, have put in place extensive safety nets to address the issue of widespread poverty (See Table A-4). Among the large variety of public redistributive programs applied in the AW that are expected to have an immediate

impact, what really have monopolized the attention of scholars and the international organizations are the consumption subsidies (CS) effects. Their central position in the literature stems from their observability in household surveys, their large use as one of the most redistributive tools in the Arab region, and their presumed failure to achieve cost-effective redistributive goals. The World Bank findings (1999) describe the food subsidy programs of a number of MENA countries in which CS ranged from 1 percent to 5 percent of GDP in 1995. Thirteen out of 14 MENA redistributive interventions in Coady et al. (2004) study indeed consist of food subsidies. As initially small CS often grow with political pressure and population, their budgetary and efficiency cost can become hard to sustain, prompting numerous calls for reforms for many years in many contexts.[143]

To describe the extent of targeting errors, *leakage* and under-coverage rates are often computed. Rates of leakage are typically defined as the proportion of total transfers going to the pre-transfer non-eligible. Definitions of under-coverage are usually linked to the ratio of the number of beneficiaries in a target group (example, the poorest quantile) to the total number of persons in that group. Cornia and Stewart (1995) have calculated the extent of these errors from food subsidies for several developing countries including Egypt and Tunisia. The Egyptian system has two main elements: a general unrestricted subsidy on coarse and refined flour and bread; and ration cards for other basic commodities. Tunisia has general unrestricted food subsidies on cereal, oil, milk and sugar. They have found that Egypt's food subsidies show very low exclusion rates, in both rural and urban areas (slightly higher in the rural areas). However, leakage rates tend to be large if all subsidies going to the top three-quarters of the income distribution are included. Naturally, they are much lower if one only includes the subsidies going to the top quarter of the population. The authors concluded that targeting -- in terms of leakage -- would be improved if the subsidy on coarse flour and the basic rations were maintained, while other interventions were abolished. In Tunisia, food subsidies are universally available and this naturally removes the under-coverage issue. However, leakages there are high, with upper-income groups receiving three times the absolute benefits available to the lower-income groups. When looking at these errors by item, they have noted considerable variation according to commodity, with extremely high leakages on milk (over 90 percent), and much lower ones for hard wheat than for the other commodities. They concluded that leakages could be significantly reduced, while maintaining negligible under-coverage, by concentrating the subsidy on hard wheat.

Coady et al. (2004), and Bibi and Duclos (2007a) have criticized the use of leakage and under-coverage as indicators of the redistributive effects of social programs. These ratios focus only on who gets the transfers, not on how much households get. This means that the ability of a policy to concentrate benefits on a given group of the population should not be confused with its impact on inequality, poverty and social welfare; the former is only one determinant of the latter.

In Egypt, El Edel (1982) has attempted to gauge the impact of different taxes and subsidies on inequality, measured by the Gini index, with a distinction between indirect taxes, direct taxes, and price subsidies to food consumption.[144] Overall, he found that the tax system in that country would be progressive. The Gini index before taxes and subsidies would be equal to 40.4 percent in 1974-1975. This level would be decreased by 0.6 percentage points through indirect taxes, 3.26 percentage points through price subsidies, and increased by 1.33 percentage points through direct taxes. These results reveal that food subsidies are the main device for redistributing income. However, direct taxes, unexpectedly, would lead to increased inequity. According to Hansen (1991), the reason must be that direct taxes, as defined in El Edel's study, include and are dominated by employee contributions to social security, a typically regressive form of direct taxation in Egypt.

Bibi and Duclos (1997) have used inequality indices and social welfare measures to contrast the effectiveness of CS with a counterfactual system based upon simple lump-sum tax – involving the same overall net tax revenue for the government. To compute the extent of efficiency loss related to distortionary indirect tax-subsidy system, they have estimated a complete demand system using a large sample from the 1990 household survey.[145] The estimation results revealed that the efficiency loss from the current tax-subsidy system, as measured by the excess burden, would approximate 2.65 percent of the government tax revenue.[146]

These losses are more than compensated by the distributional gains of CS. On one hand, the fall in inequality indices varies, according to the aversion of the social decision maker, between 17.8 percent and 26.6 percent. On the other, the improvement of the social welfare metrics varies from 1.86 percent to 3.57 percent according to whether the poor are granted the same weight or a greater weight than the rich in the calculation of the social welfare statistics.

Because subsidy rates could be deemed as negative indirect tax rates, an alternative route to study the redistributive effects of CS could be followed by applying the theory of optimal taxation developed by Newbery and Stern (1987). One of the theory's basic ingredients is a socially-weighted cost-benefit ratio specific to each commodity. This ratio involves distributional value judgments normalized by economic efficiency considerations. Distributional judgments typically grant a greater weight to the gains and the losses of the poor than that granted to the non-poor; economic efficiency considerations take into account the fiscal impact of the behavioral reactions to changes in indirect tax and subsidy rates.

This methodology is extensively followed across the Arab region. For instance, Laraki (1989) has estimated the price parameters of a demand system in Morocco to simulate the social welfare impact of various CS reforms. He has concluded that the time is ripe for moving toward removal of current subsidies and development of low-priced "inferior" goods, which would decrease the cost of the CS without hurting the poor. Adams (2000) has focused exclusively on the distributional pattern of food subsidies (ignoring the economic efficiency considerations) to measure the targeting performance of the Egyptian CS schedule. Using the 1997 household survey, he has found that the Egyptian poor tend to benefit more than the rich from CS. These results are driven by those for *baladi bread* as the per capita expenditure on this item declines sharply with income. This suggests that for urban areas, *baladi bread* is a good target for increasing subsidies. In the rural areas, however, *baladi wheat* flour is the better target to redistribute purchasing power in favor of the poor.

Similar analyses for the Tunisian case conducted by Newbery (1995) and Tuck, and Lindert (1996), and based exclusively upon the distributional characteristics of commodities, have advocated reductions in the subsidy rates on *tender wheat* in order to increase them on *hard wheat* and *cooking oil*. Tuck and Lindert (1996), and the World Bank (1999) reported that by adopting these reforms in 1993, Tunisia has successfully transformed its CS program from one in which more absolute subsidies are transferred to the rich to one in which the poor benefited more even in absolute terms.

The redistributive gains estimated by the same authors (1996) and the World Bank (1999) are not, however, drawn from a nationally representative household survey. They were rather estimated on the basis of a small-scale household expenditure survey conducted in 1993, which covers only the Tunis region. Further, these studies, like that of Adams (2000) for Egypt and of the World Bank (1999) for several MENA countries, omit to take into account the fiscal impact, which would result from the households' reactions to changes in indirect taxes. This is because consumption elasticities were neither estimated nor used in those studies. They could not therefore weight efficiency of the distributive criteria.

Bibi and Duclos (2005) have used the Atkinson's (1970) general cost-of-inequality approach to decompose the total change in a distribution-sensitive Foster-Greer-Thorbecke (1984) poverty index into the three components of variations in average income, of vertical equality and horizontal equity (HE). To illustrate their methodology, they compare the outcome of the Tunisian food subsidy program with that of a counterfactual one based on regional targeting – involving the same overall budgetary outlay for the government. They find that the regional targeting reduces more the average poverty gap because it involves lower leakages to the non-poor (almost 22 percent less). Regional targeting of transfers would violate, however, considerably more HE (i.e., it would introduce greater disparities among those poor of initially similar welfare status) than that of the current system of food subsidy.[147] But the HE violations, which would arise with this hypothetical reform, would not be enough to offset its higher vertical effect (a greater reduction in vertical inequality) and lower rate of leakage. This is because the horizontal and vertical inequality are given the same weight; so that violations of HE count in the policy assessment only in so much as it adds to the vertical distances between individuals.

To address this issue, Bibi and Duclos (2007a) extend their framework by allowing differential weights on the horizontal versus vertical components of the impacts of targeted transfers. This clearly shows that the larger the preference to HE, the more important is social loss from socio-demographic targeting compared to that of food subsidy. This underlines the fact that socio-demographic targeting is judged less and less desirable as the policymakers' ethical dislike for treating equals unequally is increased. Thus, although commodity targeting involves relatively high leakages to the non-poor and low vertical equity, the fact that it is more horizontally equitable than socio-demographic targeting may render it preferable for policy purposes, so long as preferences to classical HE is sufficiently strong (roughly two-fold that of vertical equity).

This clearly implies that if one follows the critics of any policy reform, who focus solely on the losers, principally among the poor, then one risks derailing the prospects for important poverty and (vertical) inequality-reducing policy changes. At the same time, it must be recognized that to undervalue or even ignore the horizontal heterogeneity in impacts can give a seriously incomplete picture, and an unnecessarily narrow basis for the design. Hence, taking horizontal equity seriously can have important implications for the design and the understanding of redistributive policies. In the context of the AW, this has proved to be an important issue in Morocco and Tunisia. However, very little research exists on this issue in other ACs.

Bibi and Duclos (2007b) have proposed a methodology to identify revenue-neutral directions for poverty-alleviating and social welfare-improving tax reforms. The search for such reforms is done "robustly", that is, over broad classes of poverty measures and social welfare. They also highlight the importance of stating clearly under which set of ethical criteria the desirability of potential indirect tax reforms is assessed. To show how this can be done in their empirical illustration, Bibi and Duclos (2007b) have tested, in retrospect, the desirability the 1993 Tunisian reforms suggested by Newbery (1995), and by Tuck and Lindert (1996). Their findings suggest, for instance, that reducing subsidies on *soft wheat* to finance a subsidy increase on *hard wheat* would reduce any poverty measure as long as the poverty line is not greater than 85

percent of the reference poverty line but would not do so at higher poverty lines.[148] Thus, since it is difficult to rule out all poverty lines above 85 percent of the reference poverty line, such a reform would not be safely declared welfare-improving. Their results clearly show that taking account of the distortionary cost of subsidy rates, the robustness of welfare judgments, and the representativeness of the household survey can have profound implications for the design and understanding of the initiated reforms.

Audet et al. (2007) have used a similar approach to study the effects of the Egyptian CS program expansion to include *rice, pasta, tea, macaroni, beans, margarine* and *lentils*, while removing subsidies on *tamwin bread*. Using a broad class of poverty and social welfare measures, they have found that increasing indirect taxes on *macaroni* to finance a subsidy rise on *tamwin bread* would result in a reduction of all poverty indices, which are sensitive to inequality within the poor. This result and other similar studies led to conclude that the changes brought to the list of subsidized food items have not always been relevant for reducing inequality and poverty.

A word of caution is warranted at this point. One of the main concerns with these theoretical frameworks is that they are very short term in nature. In particular, they take the nominal income of the population as given. Government revenue and thus the supplies of public goods are also taken as given. A long-run solution to the basic problem of inequality, poverty and social welfare in ACs will almost certainly involve significant changes in both of these variables. In particular, provision of good education and healthcare are arguably the key ingredients to a long-run solution. This implies, *inter alia*, that the empirical structure of consumption on which the analysis of indirect taxes CS are based can theoretically be incompatible with a structure that is best for long-run equalization of opportunities.

Other Reforms, Taxation, Oil Revenue and Inequality

A variety of other public policies and reforms undertaken by developing countries can have an impact on the distribution of income and access to public services. These include macro-economic policies and inflation, liberalization of financial markets, development of the private sector and

privatization, civil service reforms, labor markets reforms, domestic price liberalizations beyond those of basic food and energy products, and sectoral policies such as agriculture. The distributional impact of such reforms has generally not been explored in the Arab region.

One specific policy area, which has been central to the work on inequality in developed countries, concerns taxation. But in ACs, the policy issues regarding taxation vary considerably between countries. The tax system tends to be endogenous with respect to oil revenues. For major oil-exporting countries, particularly the GCC countries, income taxes, as well as indirect taxes, are practically nonexistent. Governments get their revenue from the rents on natural resources, and these rents are distributed in a number of ways including expenditures on public services. But the implications of this system on inequality have not been studied yet. For natural resource-poor countries, taxation is an important source of government revenue, and policies have tended, over time, to increase the share of taxes, both direct and indirect, in GDP. But little work has been done to understand the implications of taxation regimes and their changes on inequality. This is obviously an area where there is scope for much research.

Migration, Public Employment and Inequality

There are two dimensions of labor markets, which have received some attention in the work on inequality in the Arab region: migration and employment in the public sector.

In the Arab region, migration is perceived to have played a major role on inequality. There have been large migration flows from the resource-poor countries to Europe during the 1960s and to the resource-rich countries in the region during the 1970s and early 1980s.[149] This resulted in large flows of remittances, which became a major source of income in many countries. Despite the importance of migration and remittances for many ACs, there has been little research on the impact on inequality and poverty. This raises several questions: How much is remitted to various countries? What kind of migrants remit? What is the poverty difference between remittance-receiving households group and non-receiving remittance group? Is there a level of inequality between remittance-receiving and non-receiving households? How do remittances affect vertical and horizontal inequal-ity in various countries or various regions within the same country? Do remittance-receiving households behave differently in terms of labor supply, consumption and investment than non-receiving remittance households? While all these issues are policy relevant, limited access to micro-data is considered, once again, to be the main obstacle to addressing them in the AW. [150]

Adams and page (2003) argue that MENA fared well in terms of inequality and poverty reduction, thanks to the redistribution of oil rents through remittances and government employment. To support their argument, they have estimated simple econometric models using a set of 50 developing countries, including seven from MENA. These models link either the poverty or the inequality level to mainly the level of remittances as a share of GDP, or the level of public employment as a share of total employment in each country (along with other control variables). Tests on the impact of remittances on poverty suggest that remittances significantly reduce poverty in the MENA region than in the other developing countries.[151] The general pattern of findings changes, however, when they examine the impact of public employment on poverty. The econometric results show that while public employment does not have a statistically significant impact on poverty in the developing countries as a whole, it does statistically reduce the incidence and the deficit of poverty in the MENA region. Finally, when the Gini coefficient is used as the dependent variable, neither remittances, nor public employment appear to have a significant impact on inequality in the region. On the basis of these results, Adams and page (2003) have concluded that remittances from abroad and public employment may have been spread well across the whole population, reducing the absolute poverty but leaving the overall inequality situation unchanged.

Using household surveys from Egypt and Jordan, Adams (2001) found a very different picture concerning the impact of public employment on inequality. Income from government employment represents the largest share of non-farm income in both countries (43 percent in Egypt and 60 percent in Jordan). Nonetheless, the relative contribution of government employment to nonfarm income inequality is lower than its share of nonfarm income. Thus, additional increments of income from public employment will reduce, *ceteris paribus*,

nonfarm income inequality. He argued, however, that since both governments already employ far more workers than they can possibly use, advocating increased government employment to reduce inequality would not be a wise policy advice.

Both of the above studies do not estimate the level of poverty and inequality under a counterfactual scenario without public employment and/or remittances. To the best of our knowledge, the treatment of the counterfactual issue has not been addressed in the AW. To establish the counterfactual in Guatemala, for instance, Adams (2005) has used predicted income functions to estimate per capita household incomes in two scenarios: a counterfactual one, which includes an imputation for the home earnings of international migrants had they stayed home; and including remittances. The results show that the receipt of international remittances decreases the poverty headcount by 1.6 percent and the poverty deficit by 12.6 percent. With respect to inequality, his findings show that higher income groups benefit more in absolute terms than the poor. For instance, those in the top quintile receive twice the value of remittances compared to those in the lowest quintile (29.4 percent versus 15.9 percent). However, remittances, as a share of the households' income, exhibit a downward sloping across different income deciles (over 60 percent for the poorest decile and less than 18 percent for the richest one). As a result, remittances have also proved to decrease inequality in Guatemala. We are not aware of similar studies using household data from the ACs.

Variations in aggregate welfare indices implied by remittances (and or public employment scheme) can be attributed to their impact on the mean income, to changes in the welfare distances between remittance-receiving and non-receiving households of pre-remittance unequal welfare status and/or to emerging disparities in welfare among households of pre-remittance similar welfare status. A general cost-of-inequality-approach (similar to that given by equation (7)) that decomposes the total change in social welfare level into a sum of indices of each of these three components is policy relevant. This decomposition can serve to integrate horizontal and vertical equity criteria in the assessment of the different origins of the welfare change implied by international remittances and/or public employment. The evaluation of these three components, and the possible policy responses to them, remains scarce both within and outside the AW.

Directions and Priorities for Research

A number of important messages emerge from the previous chapters, which we hope, can help in the design of a research agenda on equity and inequality in the ACs. First, the data and knowledge about inequality of outcomes and opportunities is fairly weak in the region. While some measure of inequality are available in a number of countries, the general view is that: (i) data are completely nonexistent and or unavailable for a significant part of the region; (ii) for those countries where some data exist they tend not to be available in a format, which is useful and necessary for quality research; (iii) access to primary data when possible tends to lag behind, and; (iv) the quality of data collection is not consistent across countries.

Second, there has been some research on inequality issues in the region but they tend to be very partial, mostly based on individual efforts and initiatives, focusing on a very limited set of countries-- Egypt, Morocco and Tunisia. Moreover, this research is mostly outside the region, and the work by local researchers has been very limited. Very little research, using micro-data, has been possible due to the limited availability of such detailed information.

Third, the state of knowledge and understanding about inequality, its determinants and dynamics remains very under-developed in the Arab region compared to the best practice in both developing and the developed world. The available knowledge in the region is not adequate to help contribute in a meaningful way to the discussions about the current critical issues confronting policy making.

Aside from this clear knowledge gap, there remain a number of policy issues, which are of special relevance in the context of the current development policy debates and challenges. The following issues are often subject to a lot of debates and speculation, often without a good empirical basis:

- Are the ongoing policy and institutional transformations in the ACs leading to higher inequality? What are the implications of the reduced direct role of the state in the management of the economy and the greater role of markets, the private sector? Is increased opening to the global economy in terms of lower trade barriers, greater capital flows and access to technology resulting in increased inequality?
- The old system of provision of public services and the wide ranging safety nets are under pressure and reforms are undertaken in different forms and at different speeds. Are these reforms negatively affecting the gains achieved in terms of equality of opportunity in the region?
- In many countries of the region, there is a perception that the middle class is being squeezed by more economic polarization in societies, but there is no clear evidence for such polarization.
- How do these changes in inequality and perceptions about equity affect the dynam-

ics of political and institutional change? Do they limit the incentives for undertaking reforms and undermine future growth?

- How does the existence of large resource rents in many countries of the region and the volatility of oil revenues affect the level and changes in inequality?
- What are the implications of the widening inequalities across countries caused by the rents from natural resources? Are the equalizing effects of migration observed in the 1970s and 1980s still present? If not, are there alternative mechanisms?

These findings and the importance of the diverse policy issues point to a number of directions for research. First, a program to improve access and quality of data is of the highest priority and is discussed below. Second, based on this review, a number of themes appear to be of high priority in view of the need to improve the understanding about inequality, its dynamics, its determinants and the implications of the major economic and social policy and institutional transformations the countries of the region are undergoing. This set of proposed projects, which are briefly discussed below, ought to be designed in such a way as to:

- Emphasize the data collection and quality improvement, which are crucial to make significant progress
- Focus on countries where adequate data are available, but make a special effort and positive discrimination to broaden the research to countries where knowledge and research have remained very weak until now
- Allow for flexibility in terms of analytical approaches to be used in order to take advantage in the best possible way of available data and take account of their limitations
- Focus as much as possible on specific policy questions, which are of interest to the policy-making debates in the region and stimulate medium-term policy-thinking and interest in equity in the region.

A Program to Improve Access and Quality of Data for Understanding and Monitoring Inequality

The availability, access and quality of data

on inequality are the most pressing issues for research in this area. While any other single project, which deals with specific policy issues, should have a data component, there is a clear and urgent need to have a self-standing and separate project devoted entirely to data with a long-term perspective on inequality. Organizations, such as the Economic Research Forum, can play a major role in improving the situation and opening the way for further and more systematic research.

The work can be organized under three areas:

(i) collecting and harmonizing existing data on equity, inequality and poverty in as many countries in the region as possible and making these data sets available to researchers. In the process, attention will be given to countries, where data are scarce and on improving data quality and comparability to help the adoption and standardization of global best practices in survey methods in the region. More specifically, the work will include:

- Collecting and making available standard data (household surveys) to be used for analysis on inequality, focusing on access to micro-data sets. This effort will also include the collection of panel (longitudinal) data to facilitate research on vulnerability and the dynamics of inequality.
- Collecting data on alternative measures and dimensions of inequality such as health, education, and physical assets
- Helping, where necessary, the undertaking of specialized surveys that will, for example, complement standard surveys, and conduct surveys that include more fully consumption of publicly provided services, and other non-market sources of consumption

(ii) using the data to address many of the knowledge gaps identified in the second section of the paper, examples of the questions to be addressed:

a. Measurement inequality. This activity will cover several dimensions of inequality, including:

- assessing the consistency of the databases and the computation of improved inequality indictors (including Gini coefficients) to compare the levels of inequality and the extent of convergence (or divergence) among countries;
- using the vertical and horizontal concepts

to measure inequality among individuals in the ACs;

-    making welfare comparisons among countries, using the concept of distributed equivalent income;

-    using the non-monetary poverty and inequality indicators to capture other aspects of inequality such as developing consistent multidimensional measures;

-    developing other measures of inequality to capture other forms of inequality, for example, geographically or geopolitically;

b.   Decomposition of inequality. This will be carried out using different methods (including the Theil index) to decompose inequality into within-groups and between-groups inequality;

c.   Polarization. This will include measuring the extent of polarization in different ACs where data are available, with a special focus on the changing size of the middle class;

(iv) extending the work on labor survey and analysis, of the type undertaken in Egypt, to a couple of countries in the region. This project will include both data collection covering a large sample with a view to creating a longitudinal data as well as the conduct of research on different aspects of labor markets, with a special focus on the link between employment and inequality.

Public Policies and Expenditures on Social Services and Equality of Opportunity

Social expenditures have been a very important and active mechanism for redistribution in ACs over the last 4-5 decades. They played a central role in achieving substantial gains in terms of health and education, as well as poverty reduction indicators. But efficiency and budget constraints are pressing countries to reform the prevailing system, which has focused on publicly financed and delivered services. The general direction is toward introducing a greater role for the private sector in the delivery of public services, a greater contribution of households, and better targeting.

However, research has been very limited with respect to the distributional impact of public expenditures on achievements in education and health, especially in terms of their effect on equality of opportunity. It is important, therefore, to de-

velop a research agenda, which allows us to better understand past experience. This is imperative not only in terms of the impact of social expenditures but also the broader range of the policy and regulatory reforms related to the provision and financing of education, health, and infrastructure services such as water, electricity, and telecommunications.

The project would use the concept of equality of opportunity. Income inequality has many sources, not all of which are equally objectionable. A general consensus often emerges around concerns about inequalities in welfare outcomes because individuals face different opportunities. Such differences in basic life chances can be distinguished from differences in levels of individual effort, and are commonly felt to warrant specific attention from policy makers.

Recent methodological research has yielded promising new avenues for establishing empirically the extent to which individuals in a given society face different opportunities. The research defines population profiles based on the opportunity sets of people from different genders, ethnicities, regional origins and family background. It ranks them in terms of average achievement in various educational, health and income indicators, and compares those rankings to standard poverty profiles. An ongoing application of this research to Turkey examines the "incidence" of public expenditures in terms of the opportunity profile. Such analyses are both feasible and of considerable interest to the Arab region.

A combination of opportunity profiles and poverty maps (described above) might generate a finely disaggregated tool for investigating how different policies reach different social groups in various countries – and what changes might be desirable. Impact evaluations of particular policies may also (in principle) be disaggregated in terms of their impacts on different social groups.

A further strand of research into inequality of opportunity has proposed a new method of decomposing income inequality aimed at highlighting differences between population groups. When population groups are defined in a way that should not matter in a context of equal opportunity – such as race, gender or parents' education – between-group differences in income inequality offer a window on inequality of opportunity. Emerging research underscores that the

way population groups are defined is central, and illustrates that the method can yield important new insights into data from multiple countries. A research program that focuses on the Arab region and that defines groups in a contextually grounded fashion can be hoped to shed light on the dimensions of inequality of opportunity of greatest relevance to the region.

Inequality and Human Development

Research in the Arab region has focused little on a number of dimensions of inequality, which have received a lot of attention elsewhere in the world. These dimensions relate to various aspects of human development characteristics of individuals, which are associated with unequal access to resources, empowerment and opportunity. The idea is to broaden the scope of analysis of inequality beyond that between individuals and households in order to analyze inequality within the family, between generations, and how the position of individuals changes through time.[152]

INTRA-HOUSEHOLD INEQUALITY

This type of inequality is related to the power relations within the household-- between husband and wife, and the level of access by children to household resources. Gender role specialization is important for the balance of power within the household. Where fertility is high and women specialize in home production, they generally have lower bargaining power. In these circumstances, the resources going to child education is negatively affected. Inequality in the age and education composition of spouses is important for child outcomes. All these considerations are related to growth. Women's labor supply and child education are obvious factors that derive from intra-household allocation, which have important implications for growth. Lack of power within the household, especially where it derives from the legal environment set by the state, has important implications for political economy as well.

It is important to note that intra-household allocations have probably improved for education in ACs and the gender gaps in education and labor market participation have narrowed. These should translate into more equitable intra-household allocations in future, something that is not easily picked up in the standard measures of income and expenditure inequality.

AGING AND INTER-GENERATIONAL INEQUALITY

Population growth in the Arab region reached extremely high levels in the 1970s and 1980s, and still remains high in many countries despite significant declines recently. Rapid population growth places enormous burdens on states' resources as these people need access to clean water, food, medicine, education, and so on. High population growth rate also places strains on the economy in terms of creating new jobs in order to absorb the growing labor supply.

As economic growth continues to raise incomes in the region, and as social development proceeds in the direction of greater empowerment of women in society, population growth rates will continue to decline. Recent research on inequality has highlighted the links between population growth and inequality (Deaton and Paxson, 1997). Notably, it has been shown that in economies where inequality increases with age (such as Taiwan, USA or Britain) changes in the structure of the population will affect overall levels of inequality. In particular, declines in the rate of population growth will tip the structure of the population toward the elderly so that the older, more unequal generations will become more heavily represented and the younger, more equal generations will be less heavily represented. Such a process will tend to increase overall inequality.

To what extent will inequality in the Arab region rise in coming decades as a result of these population dynamics? Detailed analysis is required in order to ascertain just what kind of role demographic change is playing in the ongoing process of distributional change.

Demographic and economic shifts produce major changes in the opportunities open to various generations. For instance, in the ACs, access to education is compromised by the fact that this education is not very productive in the modern labor market, which is dominated by the private sector. In the old days, the public sector was the main employer of new, educated labor market entrants, so it influenced greatly what the state required in terms of completion of degrees rather than acquisition of productive skills. Furthermore, the social contract emphasized job security for older workers, which consequently inhibited younger workers from smoothly transitioning from school to work. Waiting time for workers with high school

education is measured in years rather than months as in other regions.

Transfers from parents help youth survive the long period of transition, so inequality of access in favor of the older generation is in part compensated for by transfers from parents to older children. But consumption or income is not the most important thing for youth, who need jobs and access to housing in order to feel as productive citizens. Underdeveloped credit markets also limit access by the young to affordable housing. Lack of access to housing for young workers often means unwanted delay in marriage, which imposes large costs, mostly psychological, on youth in terms of family life as well as career development.

Looking a decade or so forward, intergenerational issues will arise for older individuals, who may depend on transfers from their children for support in old age.

INTER-TEMPORAL INEQUALITY

This type of inequality is usually known as income mobility and poverty dynamics and is most important when viewed from the welfare and political perspectives. A country in which the same 25 percent of the population is always poor is quite different from the one in which the same poverty rate is composed of different individuals every year. Panel data is needed for this type of work.

Mobility is related to concepts of vulnerability and income insecurity. One would want to know if income insecurity has increased over time. The growth of private sector, which offers less job security but is the destination for most new workers (especially the poor), has likely increased income insecurity and vulnerability in ACs. Globalization and various types of market-oriented reforms have changed the level of security individuals receive from education and employment.

Long-term trends in inequality, and the political economy of institutional change

Understanding long-term trends in inequality is important for understanding institutional and policy changes.

There is a long standing view, anchored in social and religious beliefs, that "equity" is an important social objective in Arab societies. The shift toward a new development model in the 1950s, which is based on a stronger and more active role of the state, is sometimes explained by these attitudes, which gained political support and subsequently led to the major political shifts. The concerns for equity remain strong and subject to much political debates. The perceptions as well as the actual changes in inequality are likely to have implications in terms of support for policy and institutional change. Understanding these social attitudes and perceptions and how they shape political preferences and influence policies is an important theme, which is hardly explored in the Arab region.

The relevant dimensions of inequality, which may be a subject of study are not only the standard income disparities but may involve the ethnic (in a few countries) and geographical (in most countries) disparities.

ANNEXES

Annex 1

Table A-1.
Some features of the household surveys in the AW

Household surveys Country / year	Numb house-holds	Census Frame year	Strata (S) Clusters (PSU)	Representativeness	Number of visits	Comparability	Income vs. expenditures
Algeria 1988	10,368		10 strata, Three-stage				*Data on consumption, 1995 and 2000 surveys include income*
1995	5,910		10 strata	National representative			
2000	12,150	1998	Three-stage	National representative			
Comoros 1995	2,004	1991					*Data on expenditures (enquete exploratiore sur le budget de consommation)*
2004	2,998	2003	3 S, 249 PSU		2 a two-weeks		*Data on expenditures (enquete integrale aupres des menages)*
Djibouti 1996	2,380	1983 a quick update of cartography in 1996	16 clusters in 3 strata (i.e. 16 districts in 3 regions: Djibouti - other urban - Rural)	Cover the population in rural (sedentary only), urban and semi-urban areas.	One	Non rigorously comparable, does not allow a panel analysis	*Data on consumption, income and assets*
2002	16,415	2002	13 clusters in 3 strata		One		*Data on expenditures*
Egypt 1990 / 1991	15,000						
(CAPMAS) 1995	14,805	1986-93	5 strata, 611 PSU		10 a month	Good because similarity of the sampling frame.	*Data on expenditures, and income and main sources (either for individuals or households depending on source type)*
(official) 1999 / 2000	47,949	1996	5 strata, 603 PSU	Nationally representative at governorate and urban/rural levels	10 a month		
2004 / 2005	48,000	1996	5 S, 1072 PSU		10 a month		
Egypt 1997	2,500	1986- 93	5 strata, 125 PSU	Nationally representative at urban- rural level.		1999 survey is a subsample of 1997 survey	Expenditures, income and its sources.
(IFPRI) 1999	348		5 strata, 19 PSU	Not representative			

Table A-1.
Some features of the household surveys in the AW, (continued)

Household surveys Country / year	Numb house-holds	Census Frame year	Strata (S) Clusters (PSU)	Representativeness	Number of visits	Comparability	Income vs. expenditures
Iraq 1988							*Limited information available*
2004	21,668	For 15 governorates: 1997 census frame. For Irbil and Duhouk: 2004 enumeration. For Sulaimanya: 2004 population frame for an education project	1997	Old census and imperfect frame			*Sever measurement errors of income.*
2006 / 2007	18,144		56 strata				*Income and expenditures measures*
Jordan 1992	7,614	1979	8 strata, 400 PSU	Nationally representative at governorate and urban/ rural levels	4 a year	*1992 and 1997 are comparable but 2002 to less extent*	*Include expenditures, income and its different sources.*
1997	5,972	1994	8 strata		4 a year		
2002	12,792	1994	12 S, 1066 PSU	National representative at the province level			
2006							
Kuwait 1987	4000	?	?	Nationally representative of both nationals and expatriates	?	?	
1999	2884	?	?	Nationally representative of both nationals and expatriates	?		
Lebanon 2004	13,003	Housing enumeration	1250 PSU	National. representative at national level		(Palestinians excluded)	*No information about income or its sources*

Table A-1.
Some features of the household surveys in the AW, (continued)

Household surveys Country / year		Numb house-holds	Census Frame year	Strata (S) Clusters (PSU)	Representativeness	Number of visits	Comparability	Income vs. expenditures
Libya	2002 / 2003	11,520 (theo-retical) 11111 (effec-tive)	Household surveys of 2000 (actu-alized)	32 strata (shaabia) and urban / rural + Random in the second level	Nationally representative and urban - rural level	one (one month)	Yes with the 2008-2009 survey	*Information on expendi-ture and on income and its sources*
	2008 / 2009	19,680	2006 census	22 strata (shaabia) and urban./rural. Random in the second level	Nationally representative and urban - rural level	one (one month)	Yes with the 2002-2003 survey	*Information on expendi-ture and on income and its sources*
Mauritania	*1985* *1987/88* *1989* *1992/93* *1995/96* *2000*	*3,540* *1,600* *1,600* *5,860* *3,540* *5,865*	*Different sampling design*		*Not Nationally*		*Sampling frame improved in 1995. Good comparability between 1995 and 2000 surveys*	*Normally both but small food and non food items collected before 1995. Limited information and uncertainity about availability of some of the surveys.*
	2004	10,000						*Limited information available*
	2008							*Limited information available*
Morocco	1985	14,205	1982					
	1990	3413	1982	7 strata, 420 PSU			Improved since 1990.	
	1998	5129	1994	13 strata, 432 PSU	Nationally representative at urban- rural level			*Information on income and its sources since 1998*
	2000	14243	1994	16 strata, 1250 PSU				
	2007	7200	2004					
Oman	2000	5,000		Random	Nationally representative of both Omani and expatriates			*Include expenditures, income and its different sources.*

Table A-1.
Some features of the household surveys in the AW, (continued)

Household surveys Country / year		Number households	Census Frame year	Strata (S) Clusters (PSU)	Representativeness	Number of visits	Comparability	Income vs. expenditures
Palestine	1996	4,546						
(West Bank	1997	3,270	1997					
and Gaza	1998	3,000	enumeration	2 strata	Nationally representative		Comparable	*Income and expenditures*
	2001	3,500						
	2004	3,097						
	2005	2,778						
	2006	1,616						
	2007	1,714						
Sudan	1978 / 1980	6,189	1973 Population census		Northern provinces			*Income and expenditures*
	2009	13,200 Northern States: 7,920. Southern States: 5,280		44 clusters for each state	Northern and Southern provinces			*Income and expenditures*

Table A-1.
Some features of the household surveys in the AW, (continued)

Household surveys Country / year		Numb house-holds	Census Frame year	Strata (S) Clusters (PSU)	Representativeness	Number of visits	Comparability	Income vs. expenditures
Tunisia	1980	5,944	1975	4 strata, 647 PSU	Nationally representative at the governorate and urban / rural Levels	7 a week and 2 others spaced 10 days	Good because similarity of the sampling frame.	*Large food and non-food items but no information about income or its sources.*
	1985	7,454	1984	4 strata, 666 PSU				
	1990	7,734	1984					
	1995	10,800	1994	4 S., + 900 PSU				
	2000	12,960	1994	4 S, 1080 PSU				
	2005	13,392	2004	4 S, 1116 PSU				
UAE	2007	13,992	2005	7 Strata	Nationally representa-tive at regional level of both nationals and expatriates (8 regions)			Include expenditures, income and its different sources.
Yemen	1992	9,152	1992	4 S, 704 PSU	No because absence of weights		No comparable because one is not representative	
	1998	15,120	1994	12 S, 840 PSU	Nationally representative at the regional level			1998 and 2005 surveys include income and its sources either for individuals or households depending on source type
	2005	*7431*	2005	*1250 PSU*	Nationally representative at the regional and urban / rural levels		*1998 and 2005 surveys are comparable.*	

Sources: WIID (2008) and Iqbal (2006); Algeria, World Bank (1991); Comoros: Lachaud (2005); Egypt, Kheir-El-Din and El-Laithy (2006), El-Laithy et al. (2003) and IFPRI (1997, 1999); Iraq, http://www.iq.undp.org/; Iraq, World Bank (2009); Lebanon, El-Laithy et al. (2008); Libya: information obtained from Touhami Abdelkalek; Palestine: Palestinian Central Bureau of Statistics website ; Syria, UNDP (2005) and Kabbani (2006); Tunisia, World Bank (2004a); Jordan, World Bank (1995) and author's access to micro data; Yemen, World Bank (2002b).

Table A-2.
Social welfare indices in terms of current consumption in the AW

		Poverty Headcount ($ 2/ person/day)	Gini (expenditure)	Ratio richest / poorest quintile	Expenditure p.c. (PPP, $ 2005)	x_e
Algeria	1988	26.6	40.1	7.21	1,512	905
	1995	26.1	35.3	6.12	1,441	932
Comoros	2004	66.9	64.3	8.4	1,133	404
Egypt	1990	31.2	32	4.71	1,211	823
	1995	30.5	30.1	4.2	1,174	820
	1999	23	32.8	4.7	1,346	905
	2004	22	32.1	4,6	1,350	916
Jordan	1986	2.72	36	6,01	2,658	1700
	1992	16.9	43.4	8.44	2090	1183
	1997	13.6	36.4	5.92	1819	1156
	2002	12.85	38.9	6.92	2107	1288
	2006	4.4	37.7	6.29	2521	1570
Kuwait	1987	-	34.7	6.5	-	-
	1999	-	36	7.57	10,792	6,907
Lebanon	2004	-	36	6.14	3869	2476
Mauritania	1987	67.1	43.9	11.5	732	410
	1993	70.9	50	8.85	850	425
	1995	51.5	37.3	6.9	944	592
	2000	47	39	7.37	1060	647
Morocco	1984	31.7	39.2	6.87	1,355	824
	1990	18.1	39.2	7.03	1,865	1,134
	1998	26.82	39.5	7.22	1,557	943
	2000	26.87	40.6	7.48	1,604	952
	2007	16.1	40.9	7.34	1,937	1,145
Oman	2000	-	39.9	9.3	5,531	3,324
Syria	1997	-	33.7	5.32	1,577	1,045
	2004	-	37.4	5.67	1,810	1,133

Table A-2.

Social welfare indices in terms of current consumption in the AW (continued)

		Poverty Headcount ($ 2/person/day)	Gini (expenditure)	Ratio richest / poorest quintile	Expenditure p.c. (PPP, $ 2005)	x_e
Tunisia	1985	15.1	43.4	9.28	1,688	955
	1990	8.8	40.2	7.85	1,815	1,085
	1995	9.3	41.7	8.5	1,849	1,079
	2000	5.7	40.8	7.98	2,189	1296
	2005	4.2	41.3	8.13	3,138	1840
UAE	2007	-	38.3	7.1	-	-
Yemen	1992	17.3	39.4	7.52	1,894	1,147
	1998	39.5	33.4	5.57	1,084	722
	2005	50.1	37.7	6,31	1,008	628

Sources: Author's calculation (in italic) of Gini indices and mean expenditure p.c. PPP 2005 using data from the World Bank website (http://www.worldbank.org/povcalnet) except Gini indices for Lebanon which is from El-Laithy et al. (2008), United Arab Emirates which is from Bibi and El-Lahga (2009), Syria which is from UNDP (2005), and Kuwait and Oman which are from Ali (2003). PPP 2005 for Lebanon and Syria are from the World Bank (2008). Tunisian poverty measures which are calculated from household surveys and 2005 Tunisian's indicators, which are calculated from a generated distribution using information on the expenditure distribution published by l'Institut National de la Statistique (2007) and assuming lognormal distribution. For the last purpose, we have used the last version of the Distributive Analysis Stata Package (DASP) of Araar and Duclos (2007), which readily enables to generate any distribution using some observations from the Lorenz curve by applying the Shorrocks and Wan's (2008) procedure. Expenditure p. c. for Kuwait and Oman are from macroeconomic data (not from household surveys) reported in the World Bank databases and converted into 2005 PPP of the World Bank (2008). Similar Gini indices are reported in the UNDP (1999) report, the World Bank (2002a), and the World Bank (2005) (http://devdata.worldbank.org/wdi2005/Table2_7.htm).

Table A-3.
Income or expenditure Gini index from other sources

Algeria (Expenditure)				
Year	WIID (2008)	Chen et al. (1993)	Deininger and Squire (1996)	Milanovic (2005)
1988	40.1	38.7	38.7	38.73
1995	35.3	-	-	35.33
2000	-	-	-	

Comoros (Expenditure)	
	Lachaud (2005)
1995	44.3
2004	55.7

Djibouti (Expenditure)				
Year	World Bank (PovCalNet)	WIID (2008)	World Bank (2006b)	Milanovic (2005)
1996	36.77	38.1	39.5	38.1	932
2002	39.96	40.9	40.9		404
2006			40		823

Egypt (Expenditure)					
Year	World Bank (2002a)	Adams and Page (2003)	Rady et al. (2003)	El-Laithy et al. (2003)	Kheir-El-Din and El-Laithy (2006)	Hansen (1991)
1975		-	-	-	-	38
1981		-	31.8	-	-	-
1990		-	30.5	-	44.6	-
1995	34.5	34.5	32.8	34.5	34.5	-
1997		35.0	-	-	-	-
1999	37.8	37.8	-	37.8	36.2	-
2004		-	-	-	32	-

Iraq			
Year	WIID (2008) (Income)	ESCWA (1999)	UNDP
1993		37	
1998		51	
2003	35.1		
2004	41.5		

Jordan					
	WIID (2008)	Adams & Page (2003) (Expenditures)	World Bank (1994, 2004b) (Exp.)	Shahateet (2006) (Income)	UNDP (2005)	Chen et al. (1993)
1980	44.2	-	-	-	-	
1986	-	36.1	-	-	-	
1992	40.0	40.0	43	-	-	40.66
1997	-	36.4	37.9	33.9	36.4	
2002	38.8	-	37.6	39.6	-	

Table A-3.
Income or expenditure Gini index from other sources (continued)

Mauritania (Expenditure)				
Year	WIID (2008)	Deininger and Squire (1996)	Christiaensen et al. (2002)	Milanovic (2005)	
1988		42.53		42.53	932
1995	38.9		39	37.8	404
2000					823

Morocco (Expenditure)					
Year	Bourguignon and Morri-sson (1989) (income)	Adams and Page (2003)	Deininger and Squire (1996)	Chen et al. (1993)	Abdelkhalek (2006)	UNDP (2005)
1980	54					
1984		39.7	39.19	39.19	40.8	-
1990		39.3	39.2	39.2	39.2	-
1998		39.5			39.5	39.5
2000	-				48	-

Tunisia (Expenditure)					
Year	Adams and Page (2003)	World Bank (1995)	Deininger and Squire (1996)	Chen et al. (1993)	Zouari-Bouattour and Jallouli (2001)	Lahouel (2007)
1980	-				40.5	45.5
1985	43	43.4		43.43	40.6	45.3
1990	40	40.1	40.2		37.5	40.1
1995	-				-	41.7
2000					-	40.6

Yemen				
Year	Adams and Page (2003)	World Bank (2002b)	World Bank (PovCalNet)	Milanovic (2005)	WIID (2008)
1992	39.4		39.4	39.45	39.45
1998		34.4	33.4		21.78
2005			37.7		37.7

N.B. Gini indices of Comoros estimated by Lachaud (2005) are calculated over households as the unit measure and not over individuals. Dif-ferences in the estimates of Gini index from a study to another based on the same household surveys may be attributed to whether the whole or only a sample of the survey is used and whether the inflation factors (see subsection 3.2) is used. Unfortunately, the authors of these studies often do not discuss these points.

Table A-4.
Social safety nets in the AW

Program	Population Target	Budgetary cost	Leakage and under-coverage	Overall impact
			Algeria	
Family allowance	67- million	1.2% of GDP	Large leakage : no link between income and eligibility	Not well studied
School allowance	All families which contribute to social security benefit with children aged 6-21	0.2% of GDP	Large leakage : no link between income and eligibility	Not well studied
Healthcare	Universal	2.6% of GDP	Large leakage : no link between income and eligibility	Not well studied
Consumer subsidies	Universal covering basic food-stuffs (self targeting through quality), some energy products, and public services	2% of GDP	Large leakage and absence of under-coverage	Food subsidies are studied by the World Bank (1999)
Workfare and direct transfers	Compensations to those in poverty and able to work and transfers to the needy unable to work	0.8% of GDP	Some people receive multiple benefits while some needy are excluded	Not well studied
Unemployment insurance	Retrenched workers	Unknown	Not extensively studied	Not well studied
			Egypt	
Food subsidies	Universal for coarse and refined flour and bread (inferior goods) and ration cards for other commodities	1.3% of GDP	Important leakages. 7 to 8% of poor households have not ration cards	Relatively well studied
Education subsidy	Universal	4.9% of GDP	Higher income persons benefit proportionally more	Not well studied
Electricity subsidy	Universal	1.7% of GDP	Large leakage	Not well studied
Water subsidy	Universal but lower prices are applied on a restricted volume.		Large leakage	Not well studied
Casual workers scheme	771 000 persons	0.16% GDP	Large leakage	Not well studied
Social assistance	2.7 million of beneficiaries	0,15% GDP	Small leakage as payment is 5% of absolute poverty line	
			Jordan	
Cash transfers to food	Targeted to poor population through means-tests	0.73% GDP	Large leakage	Not well studied
Cash transfers	Unemployed poor	0.25% GDP	Not well studied	Not well studied
Education	Universal	5.4% of GDP	Benefit proportionally more the no-poor	Not well studied
Health care	Military personnel are main users; poor pay lower fees	3.7% of GDP		Not well studied

Table A-4.

Social safety nets in the AW (continued)

Program	Population Target	Budgetary cost	Leakage and under-coverage	Overall impact
		Morocco		
Food subsidies	Universal covering sugar, cooking oil, and self-targeting on low-grade flour	1,8% of GDP	Relatively small leakage	Relatively well studied
Food – nutrition support	2.5 million including 875 poor children at school	0.5% of GDP	Large under-coverage of rural children	Not well studied
Health care	Universal component and targeted component through certificates for health care	1.2% of GDP (universal)	Regional imbalances for the universal component and bad targeting for the second	Regressive but need to be more studied
Other programs	Targeted to regional development and women through public works, vocational training of women, etc	Unknown	Unknown	Not well studied
		Tunisia		
Food subsidies	Universal covering cereals, cooking oil, sugar and milk	1.7% of GDP	Large leakage without under-coverage	Largely studied
Direct transfers	Targeted to needy families, handicapped and Elderly	0.4% of GDP	Some people receive multi-benefits.	Not well studied
Public works	Poor unemployed in urban and rural areas	0.12% GDP	Leakage should be low	Not well studied
Health care	Almost universal	5.2% of GDP	Leakage should be high	Not well studied
		Yemen		
Food subsidies	Universal covering wheat and wheat flour	4.9% of GDP	Small leakage due to smuggling	Not well studied

Sources: Cornia and Stewart (1995), Tuck and Lindert (1996), van Eeghen and Soman (1998), World Bank (1999), Coady et al. (2002), and Radwan et al. (2005).

Annex 2: Robustness Analysis and Partial Orderings

Several alternative aggregation procedures enable a mapping from a distribution of income (or any alternative proxy of welfare/capability/opportunity/asset) to an overall measure of inequality, poverty or social welfare. Since measuring anyone of these three dimensions of well-being is a normative task, it would be appropriate to be aware of the desirable properties fulfilled or ignored by the measures used for the characterization of the pertinent dimension of welfare. Although the axiomatic approach to inequality, poverty and welfare measurement enables to structuring the relevant concept, it distances from any universal agreement on the judgments made. Thus, a complementary approach is to use stochastic dominance to curb arbitrariness in inequality, poverty and social welfare comparisons.

Ethical principles

Ideally, the functional form of an inequality, poverty or social welfare metric should directly depend upon what we want to know about the specified aspect of income distribution. One has first to set the purpose of the analysis and then find a suitable measure within the framework. The axiomatic approach, which has been largely developed in the literature, seeks to fit this framework. To evaluate different aspects of welfare, it is necessary to examine various axioms, with regard to the purpose of the analysis, and, then, to select the basic axioms for a pertinent yardstick. For expositional simplicity, and in view of our interest in this paper, we present most of them in terms of inequality as they can be easily translated in terms of poverty or welfare comparisons.

1. *Principle of Population:* the pooling of several identical income distributions does not affect the level of income inequality. Hence, for any integer $k > 1$, $I(\mathbf{x}[k]) = I(\mathbf{x})$ whenever $\mathbf{x}[k]$ is obtained from x by any k replications.

2. *Anonymity or Symmetry:* any characteristic other than the individuals' income does not matter for measuring inequality. Hence, $I(\mathbf{y}) = I(\mathbf{x})$ whenever $\mathbf{y}$ is obtained from $\mathbf{x}$ by a permutation. These two axioms are the common core axioms for poverty, inequality, and social welfare comparisons.[153] In the context of disparity judgments, the core axioms also include the *Pigou-Dalton transfer* principle and the *scale invariance*:

3. *The Pigou – Dalton Transfer*: a mean preserving transfer from a given person to a less well-off one (i.e., a progressive (an equalizing) transfer, should not increase the inequality level); while a disequalizing (a regressive) transfer should not decrease the inequality measure. Hence, $I(\mathbf{y}) \leq I(\mathbf{x})$ ($I(\mathbf{y}) \geq I(\mathbf{x})$) whenever $\mathbf{y}$ is obtained from $\mathbf{x}$ by a progressive (regressive) transfer.

4. *Scale Invariance*: inequality level is invariant to any uniform proportional change of individuals' income (or the welfare indicator whose distribution is being characterized). Hence, for any scalar $\alpha > 0$, $I(\alpha\mathbf{x}) = I(\mathbf{x})$ for any inequality index $I(.)$ in line with this principle.

We now turn to the other core axioms of absolute poverty and social welfare. It is important that a rise in any person's income does entail neither a fall in the social welfare metric nor an increase in the poverty index; in accordance to the Pareto principle. This principle belongs to the core axioms of absolute poverty measures and social welfare functions. It is summed up in the monotonicity axiom:

5. *Monotonicity*: $P(\mathbf{y}, z) \leq P(\mathbf{x}, z)$ $(f(\mathbf{y}) \geq I(\mathbf{x}))$ whenever $\mathbf{y}$ is obtained from $\mathbf{x}$ by a simple increment of income to any (poor) person. Finally, if poverty is deemed as an absolute (in contrast to relative) deprivation of the poor, the rise in the income of any non-poor person should not change the poverty measure. The focus axiom, which belongs to the core axioms of absolute poverty measurement, expresses this requirement:

6. *Focus*: $P(\mathbf{y}, z) = P(\mathbf{x}, z)$ whenever $\mathbf{y}$ is obtained from x by a simple increment of income to any non-poor person.

The literature offers three other desirable principles, which do not belong to the core axioms of any of the three dimensions of well-being.

7. *The Transfer - Sensitivity*: Inequality measure should be more sensitive to a regressive transfer, the poorer the loser is. Hence, $(I(\mathbf{y}) - I(\mathbf{x})) > (I(\mathbf{w}) - I(\mathbf{x}))$ whenever $\mathbf{y}$ and $\mathbf{w}$ are obtained from $\mathbf{x}$ by the same regressive transfer in detriment of i and j, respectively, where $x_i < x_j$.

8. *Subgroup Consistency*: Overall inequality measure should rise whenever inequality within a subgroup of the population increases, ceteris paribus.

9. *Subgroup – Decomposability*: overall inequality is a weighted sum of inequality levels within each group and inequality level between groups.

The desirability of each of these axioms is a matter of debates. For instance, scholars who believe that inequality is an absolute (and not a relative) concept prefer the *translation invariance* to the *scalar invariance* principle.[154] However, *scalar invariance* and the population principle are needed for inequality comparisons between populations with different size and mean income. The *anonymity* criterion is conventional in the inequality literature as it does not impose any real restriction on inequality measures. It commands that the inequality measure does not change when two persons switch places in the income order. However, it becomes controversial in the context of dynamic analysis of inequality and welfare mobility.[155]

The *focus* principle is desirable for absolute poverty analysis. Recall that absolute poverty is based upon absolute poverty line, which is unchanged in real terms over time and spaces, even in the presence of a sustainable economic growth. Relative poverty however, depends on the distribution of well-being. The poverty threshold is then fixed as a proportion of the mean or the median income. In this context, the *focus* axiom becomes questionable as a rise in the non-poor person's income, *ceteris paribus*, increase the relative poverty line and hence poverty.[156]

The idea of both transfer axioms is that an equalizing transfer that leaves the mean income unchanged should reduce inequality and poverty statistics, leading then to social welfare improvements. By definition, the *transfer – sensitivity* requirement is the strongest among these two transfer axioms. When it is respected, the Pigou-Dalton principle will be too, but the converse does not necessarily hold. Some statistical measures do fulfill neither of these principles. These are for instance, (i) the inter-quintile ratio to measuring inequality, (ii) the mean income to measuring social welfare, and (iii) the headcount ratio to measuring poverty. The *Gini* inequality measure obeys, however, to the *Pigou-Dalton transfer* principle, but not to the *transfer-sensitivity* axiom.

Subgroup consistency requires that inequality rankings of alternative distributions in the population as a whole should match the inequality rankings of the corresponding distributions within any subgroups of which the population is composed. This principle is weaker than that of *decomposability* whose basic idea is to express overall inequality as a function of inequality within the constituent subgroups, and inequality between the subgroups. The use of decomposable measure meets the need of decentralization strategies to promote equality and reduce poverty. It allows policy-makers to identify the profile of subgroups who have a large contribution to overall inequality/poverty and facilitates the design of effective, consistent national and specific inequality-fighting programs.

The functional forms of poverty, inequality or social welfare measures depend largely upon what we want to know about the specific dimension of well-being. They have then strong implica-

tions on the pertinence of the selected measure for the purpose of the analysis. To show this is precisely the goal of the next subsection.

Robustness analysis or partial orderings

At a number of points in the discussion so far, we have seen that there is pervasive uncertainty about possibly crucial aspect of distributional judgments. There is likely uncertainty and arbitrariness in the choice of social welfare function, poverty measure, or inequality index. Quoting from Kolm (1976).

> "I can take any country and prove that in some period (whatever it is) inequality has increased or decreased in it, or any two countries and prove that inequality is higher in the one or in the other, by choosing different inequality measures, all of which would probably seem good and valuable at first sight".
> (p. 416)

Arguably then, definitive distributional judgments should not be based upon some particular statistics (or complete orderings), as this may lead not only to incorrect appreciation of the extent of inequality but also to misleading economic policies aimed to improve distributional equity. They require, however, that all members of a wide class of (inequality, poverty, or social welfare) indices lead to the same ordinal ranking.

Since the publication of Atkinson's (1970) and Kolm's (1973) pioneering papers, considerable effort has been devoted to make ethically more robust inequality and social welfare comparisons through partial orderings.[157] Drawing on results from the theory of stochastic dominance, it is henceforth often possible to reach this goal by making distributional judgments ethically robust for a class of "acceptable" welfare indices. The acceptability of the welfare indices will depend on whether they meet normative criteria of some ethical order. Each order of normative criteria defines a class of welfare measures. As the ethical order increases, the criteria put increasingly strong constraints on how welfare indices should rank distributions of living standards. Thus, lower degree dominance entails higher degree dominance; but the converse does not necessarily hold.

Clearly then, there exist many orders of partial orderings or stochastic dominance. Each order can be given an ethical interpretation when used in the context of inequality, poverty, and welfare analysis. When two stochastic dominance curves of a given order do not intersect, all indices that obey the ethical principles associated to this order of dominance then rank identically (or unambiguously) the two distributions. However, when they do, the distributional judgments become ambiguous in the sense that the members of the ethical class under concern will not lead to the same judgments. To solve this ambiguity, one may check for dominance over a higher class of indices of ethical order s.

To see how these can be done, let $\mathbf{x}^*$ be:

$$\mathbf{x}^* = (\frac{x_1}{\bar{x}}, ..., \frac{x_n}{\bar{x}}) = (x_1^*, ... x_n^*) \tag{30}$$

and defining $F_x(x) = F_x(x^*) = p$ as the cumulative distribution function (*cdf*) of both $\mathbf{x}$ and $\mathbf{x}^*$; giving the proportion of population with income less than x or, equivalently, normalized income less than x^*. Inverting the *cdf* with respect to p gives the quantile function $x(p) = F_x^{-1}(x)$ and $x^*(p) = F_x^{-1}(x^*)$. These yield for $\mathbf{x}$, for example, the income level of the individuals whose rank or percentile in $\mathbf{x}$ is p. For the purpose of absolute [relative] poverty dominance, we need also the concept of censored distribution as defined in subsection 2.2. Censored distribution, $\mathbf{x}(z)$ [$\mathbf{x}^*(\gamma)$], sets all income above the absolute [relative] poverty line, z [γ], to the poverty standard itself. Thus, for absolute poverty, we have

$$x(p; z) = \min\left(x(p); z\right) \tag{31}$$

and, alternatively, for relative poverty we have:

$$x^*(p; \mathsf{g}) = \min\left(x^*(p); \mathsf{g}\right) \tag{32}$$

A simple way to draw the dominance curves of order s is to calculate, for different poverty lines, the FGT class of poverty measures (for $s = \alpha$-1, as we will see below) of Foster et al. (1984) given, for absolute poverty measures, by:

$$P_x(\mathsf{a}, z) = \int_0^z (z - x)^{\mathsf{a}} \, dF_x(x) \tag{33}$$

and, for relative poverty measures, by

$$P_{x*}(a, g) = \int_0^z (g - x^*)^a \, dF_x(x^*)$$

(34)

As it is well known, $P(0, z) = F(z)$ is the head-count poverty, $P(1, .)$ is the poverty gap, and $P(2, .)$ is often described as the severity of poverty. We turn now to the presentation of how the use of these peculiar poverty indices is also useful for predicting how other indices of poverty, inequality and social welfare will react to distributional changes.

First-order dominance

Indices of social welfare and absolute poverty that are of ethical order 1 (so-called first-order indices) have to be such that they fulfill their respective core axioms (i.e., *population principle, anonymity, and monotonicity* for the former along with the *focus* for the latter). These indices are also named Pen-indices. For indices of relative inequality (or relative poverty), the same properties are also needed along with the *scale invariance* principle. This simply requires that distributions under concern should be normalized by their respective mean income prior to tests for any-order inequality dominance.

To see how this can be done, consider now two income distributions, $\mathbf{x}$ and $\mathbf{y}$, and defining $F_y(\mathbf{y})$, $\mathbf{y}(z)$, $y(p)$, $y(p; z)$, $\mathbf{y}^*(\gamma)$, $y^*(p)$, $y^*(p; \gamma)$, $P_y(\alpha, z)$ and $P_y^*(\alpha, \gamma)$ accordingly. For the purpose of social welfare dominance, a necessary and sufficient condition for the distribution $\mathbf{y}$ to *first-order* dominate the distribution $\mathbf{x}$ is that $F_y(\mathbf{y})$ lies nowhere above and at least somewhere below $F_x(\mathbf{x})$. Hence, for populations size normalized to 1, there are no more individuals with income less than a given threshold in the distribution $\mathbf{y}$ than in the distribution $\mathbf{x}$, for all levels of income in $[0, +\infty[$. Formally:

$$F_y(z) \le F_x(z), \quad \forall z \in [0, +\infty[$$

(35)

First-order dominance can be alternatively expressed in terms of quantile functions $y(p)$ and $x(p)$ as follows:

$$y(p) \ge x(p), \quad \forall p \in [0, 1]$$

(36)

Condition (36) is known as the Pen (1971)'s Parade. It simply plots incomes (ordered in increasing values) against the percentiles p of the population. The dominant distribution is that whose parade lies nowhere below and at least somewhere above the other. If the primal condition (35), or its dual (36), holds, (i.e., $F_x(\mathbf{x})$ and $F_y(\mathbf{y})$ -- or, equivalently $x(p)$ and $y(p)$-- do never intersect, then any social welfare statistic, which satisfies the core axioms to social welfare measurement will show higher levels of welfare in y than in x. This includes basically all of the social welfare functions that have been proposed and that are in use.

Using indirect access to LSMS micro-data through the World Bank website (http://www.worldbank.org/povcalnet), one can obtain information about the mean income of several countries expressed in 2005 purchasing power parity (PPP) US dollars along with the country-specific estimates of the parameterized Lorenz curve $L(p)$, namely the Beta specification of Kakwani (1980), given by: [158]

$$L(p) = p - q \, p^g (1 - p)^d$$

(37)

The country-specific parameters of (37) are estimated by Chen and Ravallion (2008) using unit record data. The Beta model for the ACs tracked the data extremely well; with very low standard errors and R-squares that are always higher than 0.998.[159] Having the country specific estimates of θ, γ, and δ, the income level at any percentile in the country c at date t is calculable as

$$x_{c,t}(p) = \frac{dL_{c,t}(p)}{d(p)} \int_0^1 x_{c,t}(p) dp$$

$$= \left(1 - q_{c,t} p^{g_{c,t}} (1 - p)^{d_{c,t}} \left(\frac{g_{c,t}}{p} - \frac{d_{c,t}}{1 - p}\right)\right) \overline{x}_{c,t}.$$

(38)

Given the irregular spacing of surveys and in order to test the robustness of the results reported in Table 4, which brings out a snapshot about the social welfare ranking using a common baseline year over some ACs, we also run robust comparisons of social welfare for the baseline year 1999. In absence of a household survey related to the baseline year, interpolation method using two household surveys is executed to yield $\hat{x}_{c,1999}(p)$. With the exception of Egypt, where it is directly given by $x_{1999}(p)$, $\hat{x}_{1999}(p)$ is interpolated using 1997 and 2002 household surveys (HS) in Jordan, 1995 and

2000 HS in Mauritania, 1998 and 2000 HS in Morocco, 1995 and 2000 HS in Tunisia, and 1998 and 2005 HS in Yemen. For Algeria, however, the more recent estimates of the parameters of equation (37) related to 1995 household survey. Then, $\hat{x}_{1999}(p)$ is estimated by applying the growth rate in real household expenditure per person from national accounts of the World Bank databases to $x_{1995}(p)$; assuming that the Algerian Lorenz curve has not shifted between 1995 and 1999.

Figure 1 displays the estimates of the estimated $\hat{x}_{c,1999}(p)$ and the closer $x_{c,t}(p)$ to the 1999 in order to search for first-order welfare dominance over these seven ACs. As mentioned above, this exercise enables contrasting the results summarized by Tables 4 and 5; and discussed in subsection 4.2. The Pen curves displayed in the left side of this figure is based on the estimated 1999 expenditure ($\hat{x}_{1999}(p)$), while those in the right side are based upon the closer household survey ($x_t(p)$) to the 1999 date available from the World Bank website.

Several of the $\hat{x}_{1999}(p)$ and $x_t(p)$ curves do intersect preventing then first-order dominance. Nonetheless, three groups of countries stand out in Figure 1. The better-off group includes Tunisia and Jordan. These two countries first-order dominate four among the five remaining countries both in terms of $\hat{x}_{1999}(p)$ and $x_t(p)$. The less well-off includes Yemen and Mauritania, which are dominated by all the other five countries. Finally, Algeria and Morocco seem to unambiguously belong to the middle group. They first-order dominate the poorest country but they are unambiguously dominated by Jordan and Tunisia. Thus, one can make robust social welfare comparisons between any two countries from different groups. However, robust comparisons within the same group of countries, that is, between countries whose curves intersect, will critically depend on the choice of the social welfare yardstick. The only exception is the countries of the middle group in 1999. Indeed, the interpolated 1999 Moroccan curve lies nowhere below the Algerian curve; meaning that there is first-order dominance of the former country. However, the small vertical distance between these two curves at any value of p may reveal that the income difference between Moroccan and Algerian citizens across the different percentiles is not statistically significant.

Turning now to Egypt, it is not obvious from Figure 1 whether it should be in the first or in the second group. On the first hand, Egypt is First-order dominated by Jordan. While this should at first glance exclude Egypt from the first group, this is not quite clear as Egypt's curve crosses that of Tunisia at roughly the 10th percentile of the distribution. Therefore, any social welfare comparison between Egypt on the one hand, and Tunisia, Algeria, or Morocco on the other, will also depend arbitrarily on the choice of the social welfare function.

Social welfare dominance over p ranging from 0 to 1 for the different groups also holds for absolute poverty dominance over the same range; and *vice versa*. Thus, any poverty measure, which obeys the core axioms to poverty measurement will show lower levels of deprivation in the countries belonging to the better-off group and higher poverty for Mauritania and Yemen, irrespective of the choice of the real poverty line and the poverty indices that are in use.

Of course, a certain amount of arbitrariness underlines the ordinal rankings of these three groups in terms of social welfare (and poverty). Indeed, robust comparisons of social welfare could be subjected to sampling errors (as discussed in section 3). Unfortunately, it is not possible to address these issues without direct access to unit record household data. Finally, it is not sure that 2005 PPP are appropriate for comparing national consumption or for considering consistent real income differences between the ACs.

Nevertheless, the right side of Figure 1, for example, reveals that countries like Tunisia and Jordan, Morocco and Algeria, and Egypt and Yemen could not be unambiguously ranked in terms of current social welfare, $x_{c,t}(p)$. Some social welfare metrics (like that used for Table 5) may reveal that Moroccan citizens in 1999 are better-off than their Egyptian counterparts, while some others may indicate an opposite result. Since the $x_t(p)$ curves of each one of these three couples of countries intersect, their ranking is ambiguous in terms of both welfare and absolute poverty. For social welfare analysis, the only route available is to search for welfare dominance over a higher-order class of indices. But, for poverty dominance, a second route may be followed by reducing the size of the set of the potentially poor individuals. This can be achieved by looking for *restricted* Pen-dominance over a $[0, z^+]$ range of living standards:

$$F_y(z) \le F_x(z), \quad \forall z \in [0, z^+] \tag{39}$$

or, alternatively,

$$y(p; z^+) \ge x(p; z^+), \quad \forall p \in [0,1] \tag{40}$$

Looking once again to the right side of Figure 1, one can note the $x(p)$ curves of Egypt and Algeria or Morocco cross at $p = 30$. This means that for any poverty line, which is not greater than $x(30)$, (i.e., $z^+ = x(30)$), one can unambiguously conclude that there is less poverty in Egypt than in Algeria or Morocco. However, if this upper limit z^+ is judged low enough, the outcome becomes equivocal and the only way to follow is the use of normative criteria that are of "higher" ethical order than the *restricted* Pen criterion.

We now turn to inequality dominance. We have stated in subsection 5.1 that the *Pigou-Dalton-transfer principle* is among the core axioms of distributional judgments. It is well known, however, that this principle corresponds to the indices of the second-order principle. This explains why the empirical literature does not offer first-order test in terms of inequality dominance. In reality, since we deal with normalized distributions of income (**x*** and **y*** instead of **x** and **y**) for any-order inequality dominance tests, it is impossible to record first-order dominance over $[0, +\infty[$. However, restricted relative poverty dominance can be checked using either the primal approach to first-order dominance

$$F_y(\text{g}) \le F_x(\text{g}), \quad \forall \text{g} \in [0, \text{g}^+] \tag{41}$$

or the dual one:

$$y^*(p; \text{g}^+) \ge x^*(p; \text{g}^+), \quad \forall p \in [0,1] \tag{42}$$

It should be apparent at this stage that social welfare Pen dominance of **y** over **x** does not ensure less inequality or relative poverty in **y**. It would be the case that everybody's income goes up (condition (36) is met) but the rich gain more in absolute and relative terms than the poor. According to Fields (2006), inequality is not inherently wrong as long as three conditions are met:

1.   The society as a whole is getting richer, that is, the condition (36) is met;

2.   There is a safety net for the poor;

3.   Every person, regardless of class, race, origin, and gender, has an opportunity to climb up through the system.

Second- and higher-order dominance

Maintaining the earlier first-order ethical conditions, the *Pigou-Dalton transfer* principle leads to the second-order indices, which are usually referred to as Pigou-Dalton class. To see how second order conditions could be checked, it is easy to show (using integration by parts) that the poverty gap is

$$P_x(1, z) = \int_0^z F_x(x)dx = \int_0^z (z-x)dF_x(x) \tag{43}$$

For dual approach, let $GL_x(p)$ be the generalized Lorenz curve defined as the cumulative Pen's parade:

$$GL_x(p) = \int_0^p x(q)dq = \bar{x}L_x(p) \tag{44}$$

and defining $GL_x(p, z^+)$, $GL_x(p)$, $GL_y(p)$, $GL_y(p, z^+)$ and $GL_{y^*}(p)$ accordingly. A necessary and sufficient condition for the distribution **y** to display second-order dominance in terms of social welfare over **x** is given either by this primal condition

$$P_y(1, z) \le P_x(1, z), \quad \forall z \in [0, +\infty[\tag{45}$$

or, alternatively, by this dual test

$$GL_y(p) \ge GL_x(p), \quad \forall p \in [0,1] \tag{46}$$

Clearly then, unrestricted second-order dominance made by comparisons of the deficit curves (equation (45) for uncensored distributions implies and is implied by generalized Lorenz curves (equation (46). Whenever either of these two conditions holds, then social welfare (poverty) functions that weakly increase (decrease) following a mean preserving progressive transfer will show higher (lower) levels of welfare (poverty) in **y** than in **x**. This includes basically all of the social welfare functions and poverty measures that are in use with the notable exception of the headcount poverty ratio.

If second-order tests are not conclusive, *re-stricted* Pigou-Dalton absolute poverty dominance could be checked using censored distributions:

$$P_y(1, z) \leq P_x(1, z), \quad \forall z \in [0, z^+]$$
$$GL_y(p, z^+) \geq GL_x(p, z^+), \quad \forall p \in [0, 1] \qquad (47)$$

Figure 2 displays the generalized Lorenz curve defined for the same countries as with Figure 1. For instance, one can note that Yemen second-order dominate Mauritania in terms of social welfare and poverty; no matter when the poverty line is set. This means that with the exception of the incidence of poverty, any poverty measure respecting the Pigou-Dalton principle will count less poverty in Yemen than in Mauritania between 1998 and 2000. This is in contrast with the results of the first order dominance displayed by Figure 1. Further, generalized Lorenz curves enable to confidently exclude the un-restricted dominance of one country among Algeria, Egypt and morocco over the other in terms of poverty and social welfare. Similar exclusions hold between Tunisia and Jordan, and between Tunisia and Egypt; in contrast with the results reported in Table 5.

Relative poverty second-order dominance over the censored distributions can be simply checked as:

$$P_{y*}(1, \mathsf{g}) \leq P_{x*}(1, \mathsf{g}), \quad \forall \mathsf{g} \in [0, \mathsf{g}^+]$$
$$GL_{y*}(p, \mathsf{g}^+) \geq GL_{x*}(p, \mathsf{g}^+), \quad \forall p \in [0, 1] \qquad (48)$$

Whenever conditions (48) hold for all the range variation of the relative poverty line, i.e., $\mathsf{g}^+ \in [0, +\infty[$, *unrestricted* relative poverty and inequality second-order dominance follow. It is perhaps interesting to note that the generalized Lorenz curves defined over the normalized distributions are simply Lorenz curves defined over the non-normalized distributions:

$$GL_{x*}(p) = L_x(p), \quad \forall p \in [0, 1] \qquad (49)$$

Figure 3 compares the restricted Lorenz curves of the same ACs in terms of the interpolated $\hat{x}_{1999}(p)$ and the closer $x_t(p)$ to the 1999 in order to search for restricted second-order inequality dominance over these seven ACs. Both of the two sides of this figure show that Egyptian Lorenz curve is

the closer one to the line of perfect equality for roughly any p in terms of $\hat{x}_{1999}(p)$ (the left side of Figure 3) and $x_t(p)$ (the right side of Figure 3). For the other countries, the curves intersect more than once. These mean that only Egypt would have unambiguously less inequality and relative poverty than the other countries when comparing censored distribution of income. However, the vertical difference between the Egyptian Lorenz curve and the other curves are small at each percentile, and can hardly be considered statistically significant. For the other countries, inequality and relative poverty comparisons will critically depend on the choice of the inequality measure, the relative poverty threshold, and the poverty index.

Third-order indices should, in addition, fulfill the *transfer – sensitivity* principle and higher order classes of indices can be analogously defined by putting more structure on the indices that belong to a class of order *s*. This class reduces to a Rawlsian one as s tends to infinity (see equation (11). While dual conditions for higher poverty dominance are not as straightforward as those presented above for first- and second-order dominance, we can repeat the primal process by putting appropriate restrictions on the indices that are member of a class of order *s*. Thus, we can extend the Bibi and Duclos's (2007b) framework to show that a necessary and sufficient condition for a distribution y to s-order dominates a distribution **x** is for social welfare dominance:

$$P_y(s-1, z) \leq P_x(s-1, z), \quad \forall z \in [0, +\infty[\qquad (50)$$

and, for inequality dominance:[160]

$$P_{y*}(s-1, \mathsf{g}) \leq P_{x*}(s-1, \mathsf{g}), \quad \forall \mathsf{g} \in [0, +\infty[\qquad (51)$$

To illustrate how the assessment of first-order tests differ from those of second-order ones, assume that there are only two levels at which incomes are grouped, (x_1, x_2) and (y_1, y_2), with $x_1 < x_2$ and $y_1 < y_2$. A first-order improving welfare or decreasing poverty requires that $y_1 > x_1$ and $y_2 > x_2$. This is, in a sense, equivalent to giving a veto to each income equals group taken as an average. By contrast, second-order conditions will need to improve the poorest group's living standard ($y_1 > x_1$), as well as the overall mean living standard ($\bar{y} > \bar{x}$) – but not necessarily the living standard

of the second group. This eliminates the second group's veto power. The distribution **y** could thus be second-order dominant even if the richest group were to be poorer than in **x**, providing that the gains of the poorest group were high enough. Finally, Rawlsian-order conditions only require that $y_1 > x_1$, no matter what happens elsewhere in both distributions; as equation (11) illustrates.[161]

Among the few studies that have used partial orderings to undertake inter-temporal robust comparisons of poverty, one can note that of Kheir-El-Din and El-Laithy (2006) on Egypt. Based on four successive household's income, expenditure and consumption surveys for the years starting 1990/91 to 2004/05, the authors have begun their poverty monitoring using different poverty measures and specific poverty line calculated on the basis of the cost-of-basic-needs. This absolute poverty line ensures consistency in temporal comparisons of poverty because the standard is unchanged in real terms. Complete poverty orderings reveal that during the second half of the 1990s, poverty in Egypt fell for the first time since the early 1980s. This fall was observed across various FGT poverty measures (for α equal to 0, 1, and 2 in equation (33). Starting 2001/02, Egypt's poverty reduction broken and poverty level slightly exceeded that of 1995/96.

Dominance analysis was then carried out to assess the robustness of these results to the absolute poverty lines applied. Quoting from by Kheir-El-Din and El-Laithy (2006),

> Curves for the three poverty measures were plotted using a wide range of values for the poverty line (40 percent to 100 percent of average per capita expenditure for the four survey years. (p. 8)

Clearly then, Kheir-El-Din and El-Laithy (2006) fall short to take the appropriate route for testing the robustness of their results based upon absolute poverty. Instead of making robust comparisons of absolute poverty on the basis of equation (50), they make use of equation (51), which is linked to relative poverty and inequality as explained above. In reality, absolute and relative poverty approaches are perfect substitute in the unique case when the average per capita expenditure in real terms is unchanged over the periods under consideration. Otherwise, 50 percent of the mean income, say, does not provide the same

purchasing power over time to the poor. From the absolute view of poverty, keeping unchanged the poverty line in real terms enables to avoid such a situation where changes in poverty could come from variants in methods rather than from genuine economic evolutions. Finally, the relative poverty curves are not plotted from lowest limit of γ as equation (51) stipulates, but from γ equals to 40 percent of average per capita expenditure. These even prevent robust inequality and relative poverty comparisons as one cannot know whether the plotted curves intersect before 40 percent of the mean expenditure *per capita*

An example: Complete and partial orderings of the effects of CS on inequality, poverty and social welfare

Another commonly used approach to evaluate redistributive effectiveness of CS can be viewed as an attempt to incorporate the size of transfers and the budget explicitly into the analysis, as well as how transfer levels are differentiated across households in different parts of the income distribution. Rather than asking how effective the program is at identifying the targeted group (for instance the poor), it asks how effective it is at improving social well-being by means of complete and/or partial rankings. Recall from Section 5 that changes in inequality, poverty, and social welfare indices yield complete orderings because they enable to rank pre- and post-policy distributions. Partial orderings, which are linked to robustness analysis presented in sub-section 5.2, require unanimous welfare ranking for a set of inequality, poverty, and social welfare class of pertinent measures.

Complete orderings

Complete orderings route have been used, for instance, by El Edel (1982) to evaluate the redistributive effects of taxes and subsidies in Egypt, by Bibi and Duclos (1997) to assess the redistributive effects of indirect taxes and CS, and by Bibi (2003) to estimate the CS poverty effects.

El Edel (1982) has attempted to gauge the impact of different taxes and subsidies in Egypt on inequality, measured by the *Gini* index, with a distinction between indirect taxes, direct taxes, and price subsidies to food consumption.[162] Overall, he found that the tax system would be progressive in Egypt. The *Gini* index before taxes and subsidies would be equal to 40.4 percent in 1974-1975.

This level would be decreased by 0.6 percentage points through the indirect taxes, 3.26 percentage points through the price subsidies, and increased by 1.33 percent through the direct taxes. These results reveal then that food subsidies are the main device for redistributing income. However, direct taxes, unexpectedly, would lead to increased inequity. According to Hansen (1991), the reason must be that direct taxes, as defined in El Edel's study, include and are dominated by employee contributions to social security, a typically regressive form of direct taxation in Egypt. As these results are policy relevant, it would be interesting to see this study extended to Egyptian 1999 and 2004 household surveys and to other ACs.

In Bibi and Duclos (1997), equations (2) to (4) are applied to the Atkinson's (1970) social welfare function (given by equation (10)) to estimate the efficiency losses and the distributional effects of the Tunisian indirect tax-subsidy system. For this purpose, the outcome of this system is compared to that of a counterfactual one based upon simple lump-sum tax – involving the same overall net tax revenue for the government. This means that the households are deemed to face different price systems. To address this issue, they have estimated a complete demand system using a large sample from 1990 household survey. The estimation strategy follows Deaton's (1997) procedure, which relies on the spatial variability of prices to estimate the price parameters. The estimated price parameters enable to calculate the equivalent tax and the size of the deadweight losses from the tax-subsidy system in force. To achieve these, they have assumed producer prices invariant to changes in consumption tax-subsidy rates and they set their average values as the benchmark price system. Then, each observed income in the survey, xi, is converted into a real income evaluated at the benchmark system, $x_{e,i}$:

$$v(\mathbf{p}_i^{cp}, x_i) = v(\mathbf{p}^r, x_{e,i}) \Rightarrow$$
$$x_{e,i} = f(\mathbf{p}^r, \mathbf{p}_i^{cp}, x_i) = f(\mathbf{p}^r, \mathbf{p}_i^{pp}, x_i) - EL_i \qquad (52)$$

where $v(.)$ is the individual indirect utility function derived from the estimated demand system, $\mathbf{p}^r$ is the benchmark system fixed at the mean of producer price system, $\mathbf{p}_i^{cp}$ is the consumer price system (including indirect taxes and subsidies) –which varies across households living in different region–, $\mathbf{p}_i^{pp}$ is the producer price system, and

EL_i is the equivalent lose (or tax); which is positive for the net tax payers and negative for the net subsidy receivers. Equation (52) yields the post-tax-subsidy *equivalent income* ($x_{e,i}$), (i.e., the level of income) which, at the benchmark prices, affords the same utility level as can be attained under the observed income and the post-tax-subsidy prices. Substituting the tax-subsidy system to a lump-sum tax ρ –involving the same overall net tax revenue for the government– yields the counterfactual distribution:

$$x_{e,i}^r = f(\mathbf{p}^r, \mathbf{p}_i^{pp}, x_i - \mathsf{r}) = f(\mathbf{p}^r, \mathbf{p}_i^{pp}, x_i) - \mathsf{r} \qquad (53)$$

When the distributional gains from the tax-subsidy system do not matter, substituting ($x_{e,i}$) then ($x_{e,i}^r$) in equation (10) for $\epsilon = 0$ simply yields the social loss from the distortionary tax-subsidy system:

$$\Delta x_e(\mathsf{e} = 0) = \mathsf{r} - \frac{1}{n}\sum_{i=1}^{n} EL_i < 0 \qquad (54)$$

Clearly then, equation (54) yields an estimate of the inefficiency effect of the distortionary tax-subsidy system. According to Bibi and Duclos's (1997) estimations, the efficiency loss from the tax-subsidy system as measured by the excess burden would not exceed 0.17 percent of the mean income per capita and 2.65 percent of the government tax revenue per capita.

Form $\epsilon = 0.3$ however, efficiency losses are more than compensated by the distributional gains. More precisely, the fall in inequality index given by equation (5) is roughly equal to 17.8 percent while the equally distributed equivalent (EDE) income grows by approximately 1.86 percent. Finally, for Rawlsian judgments given by $\epsilon = 5$, inequality index is lowered by 26.6 percent and the EDE income is increased by 357 percent.

Subsequently, the authors simulate a reform of the current system. The food prices are increased by removing the food subsidies. The additional revenue generated is handed back to households in the form of lump-sum transfers. The average lump-sum transfer, which can be financed by eliminating food subsidy, is roughly equal to 5.34 percent of the mean income. The estimation results show that both the efficiency and the distributional effects of the simulated reform are im-

portant. The deadweight loss is by far weaker, the inequality falls by 5.2 percent form the level given by food subsidy and the EDE income grows further by 2.5 percent for $\epsilon = 0.3$ and 6.5 percent for $\epsilon = 0.7$. All these results prove that while the current food subsidy system benefits more the worse-off in relative terms, it benefits more the rich than the poor in absolute terms.

Bibi (2003) has followed similar methodology by focusing only on CS and their effects on poverty. For this purpose, they have estimated the poverty changes as

$$\Delta P(a, z) = \frac{1}{n} \sum_{i=1}^{n} \left(\frac{z - f(\mathbf{p}^r, \mathbf{p}_i^{pp}, x_i + j_i)}{z} \right)_+^a$$

$$- \frac{1}{n} \sum_{i=1}^{n} \left(\frac{z - f(\mathbf{p}^r, \mathbf{p}_i^{cp}, x_i)}{z} \right)_+^a$$

(55)

where $\mathbf{p}_i^{cp}$ is here the consumer price system including *only* the subsidy rates and φ_i can be either equal to zero or to the amount that could be transferred to the individual i under an alternative redistributive design using the CS public funds.

Setting firstly $\varphi i = 0$, Bibi (2003) has found that the initial headcount ratio would be, according to the level of the poverty line, ranged between 17.3 percent and 31.2 percent of the population. The CS would have enabled to bring them to 14.4 percent and 27.8 percent, respectively. These poverty improvements would have been even more important for distribution sensitive poverty measures ($\alpha \geq 1$).

Performances of CS in reducing poverty do not indicate, however, that it is an optimal transfer design. In reality, CS benefited the rich more than the poor in absolute terms. Thus, if φ_i is set on the basis of lump-sum transfer, poverty would have been reduced more and better.

Alternative performance measures of CS could be given by applying the theory of optimal taxation developed by Newbery and Stern (1987), which was extensively applied in the AW. To see how this can be done, let $\mathbf{p}$ and $\mathbf{t}$ be *K*-vectors of consumer prices and tax rates, respectively. For simplicity, producer prices are often assumed to be invariant to changes in t and normalized to 1. We therefore have $p_k = 1 + t_k$ and $dp_k = dt_k$, where p_k and t_k are respectively commodity *k*'s consumer price and indirect tax rate. A good *k* is subsidized

when $t_k < 0$. Let $x_{i,k}(x_i, \mathbf{p})$ be the quantity of commodity k purchased by the consumer *i* who faces prices $\mathbf{p}$ and has an exogenous income x_i. Let government revenue per capita from indirect taxation be denoted by

$$R(\mathbf{t}) = \frac{1}{n} \sum_{i=1}^{n} \sum_{k=1}^{K} t_k x_{i,k}(x_i, \mathbf{p})$$

(56)

In Section 5, social welfare and poverty measures were defined over the living standards x_i of each member of the population. Here, because we are interested in the effects of changes in prices implied by CS or indirect taxes, we need to be more explicit about the link between prices and poverty or social welfare. For this purpose, let $W(.)$ be any social accounting device (social welfare function, poverty measure, or inequality index) defined as a function of the equivalent incomes

$$W\left(f(\mathbf{p}^r, \mathbf{p}, x_1), ..., f(\mathbf{p}^r, \mathbf{p}, x_n)\right)$$

(57)

where $f(\mathbf{p}_r, \mathbf{p}, x)$ is the equivalent income as defined by equation (52). [163]

The theory of optimal taxation plays a useful role in identifying redistributive improving tax reforms, which are revenue-neutral ($dR(\mathbf{t}) = 0$). To see this, let $\bar{x}_k$ be the *per capita* consumption of good *k*, E_k be the marginal efficiency cost of funds (MECF) from taxing good k,[164] and D_k be the social cost (benefit) of raising (lowering) t_k expressed as a proportion of $\bar{x}_k$. E_k and D_k are formally defined as

$$E_k = \frac{\bar{x}_k}{\partial R(\mathbf{t}) / \partial t_k}$$

(58)

and

$$D_k = \frac{\partial W / \partial t_k}{\bar{x}_k} = \frac{\sum_{i=1}^{n} b_i(x_i) x_{i,k}}{\bar{x}_k} \quad \text{with} \quad \frac{\partial b_i(x_i)}{\partial x_i} \leq 0$$

(59)

where β_i is the social marginal utility of income, i.e., the marginal social valuation of income transferred to individual *i*.

Note that D_k can be interpreted as an index of Feldstein's (1972) distributional characteristic of commodity *k*. The product of these two quantities gives λ_k, the overall social cost per marginal dollar

of the government revenue raised from increasing t_k

$$I_k = \frac{\partial W / \partial t_k}{\partial R(\mathbf{t}) / \partial t_k} \qquad (60)$$

The larger the value of D_k, the greater the redistributive benefit of a tax rate t_k decrease. Said differently, the higher the distributional characteristic of commodity k, the higher the effect of a tax rise on low income groups – or, in the case of increasing a subsidy, the higher the benefit for the poor. The larger the value of E_k, the lower the revenue effectiveness of the tax change; since the lower its impact on government revenue. Therefore, the larger the value of E_k, the larger the economic efficiency cost of a tax increase. λ_k is an intuitive product of the distributive and of the efficiency costs of the tax change: it is the social cost of raising a marginal dollar of government revenue through an increase in t_k. It involves the trade-off faced by the social policymaker between economic efficiency considerations and distributional value judgments. Note that if E_k is negative, we are in a downward-sloping area of the Laffer curve and it is then always necessarily desirable to reduce t_k.

Given this interpretation, it is not surprising that λ_k plays a useful role in identifying social-improving tax reforms. Indeed, what matters for designing redistributive revenue-neutral policy reforms are the comparative values of the λ_k for different k. When $\lambda_k < \lambda_l$, the social accounting target (inequality, poverty or social welfare) can be improved by raising one more dollar from t_k and one less dollar from t_l (thus keeping overall government revenue constant).

Implementing the methodology presented above requires information on the joint distribution of incomes and commodity consumption. This is readily obtained from household budget surveys. To search for social-improving tax or CS reforms, one further needs estimates of β_i. In MENA region, the most commonly used approach is to set $W(.)$ as the Atkinson's (1970) social welfare function –in the line of Newbery and Stern (1987). This gives β_i equals $(yi)^{-\epsilon}$ (normalized for expositional clarity by the sum of $(yi)^{-\epsilon}$ over i in order to equalizing the sum of β_i over i to 1).

Implementation of the above methodology finally requires estimates of how aggregate commodity demands change in response to price variations in order to assess the expected impact of tax reforms on government revenue and then E_k.

Laraki (1989) has followed the Deaton's (1997) procedure, which relies on the spatial variability of prices to estimate the price parameters of an almost ideal demand system in Morocco. Simulations of various price policy reforms have revealed that low-income households can be partially compensated for the negative effects of food price increases by subsidies on *barley* (in the rural sector) and *hard wheat* (in the urban sector). However, the two sectors are not totally isolated from one another. Because *hard wheat* is a luxury item in the rural sector, a subsidy on the commodity in urban areas can benefit high-income groups in rural areas. To avoid this problem, it might be more appropriate to subsidize a *flour* (but not the grain) composed of *hard wheat, barley* and any other grains giving the *flour* a dark color (dark baked products are inferior in Morocco). Import prices of *grain* and *vegetable oil* are now low. The time is ripe to move toward removal of current subsidies and development of a low-priced "inferior" *flour*. This would decrease the cost of the subsidies without hurting the poor.

Adams (2000) has implicitly focused on the distributive characteristics of goods, i.e., D_k (ignoring then E_k), to measure the targeting performance of the Egyptian CS schedule. Using the 1997 household survey, he has found that the Egyptian food subsidy system is self-targeted in the sense that the poor tend to participate more than the rich. These results are driven by those for *baladi bread* as the per capita expenditure on this item declines sharply with income (thus leading to relatively high value of D_k). By contrast, expenditure levels for the other three subsidized foods show little variation across income group (this should yield lower values of D_k than *baladi* bread). All of this suggests that for urban areas, *baladi* bread is a good target for increasing subsidies. The other three subsidized foods – *baladi wheat flour*, edible oil and sugar– are not the appropriate goods to channel more transfers to the low-income urban population. In the rural areas, however, *baladi wheat flour* is the better target to improve the purchasing power of the poor.

Similar analyses for the Tunisian case con-

ducted by Newbery (1995), and Tuck and Lindert (1996), and based –explicitly for the former and implicitly for the latter– exclusively upon the distributional characteristics of commodities D_k, have advocated reductions in the subsidy rates on *tender wheat* and on *other subsidized goods* in order to increase subsidy rates on *hard wheat* and *cooking oil*. Tuck and Lindert (1996), and the World Bank (1999) reported that by adopting these reforms direction in 1993, Tunisia has successfully transformed its CS program from one in which more absolute subsidies are transferred to the rich to one in which the poor benefited the more even in absolute terms.

Unfortunately, these redistributive gains are not estimated from a representative household survey, which covers all Tunisian regions. They were rather estimated on the basis of a small-scale household expenditure survey conducted in 1993, which covers only the District of Tunis region. Its representativeness is then clearly insufficient to capture the redistributive effects of the Tunisian CS reforms engaged since 1993. Further, these studies, likewise that of Adams (2000) for Egypt and of the World Bank (1999) for several MENA countries, fail to take into account probable differences in the marginal efficiency costs of funds across commodities, i.e., E_k. This is because consumption elasticities were neither estimated nor used in those studies. They could not therefore address simultaneously the efficiency and the distributive criteria. All these issues are important and should be scheduled in the AW research agenda.

Partial orderings

Most of the analyses conducted in the AW are based upon the specification of a social welfare function. Since such a choice is typically somewhat arbitrary, so could be the reform directions identified using them. Quoting from Mayshar and Yitzhaki (1995),

> Two basic schemes have been utilized to tackle the value-judgment requirement. Some researchers seek to avoid the need for welfare comparisons altogether by searching only for Pareto-improving tax reforms. In practice, however, this approach yields no results. For this reason, most researchers have opted

to impose a particular, albeit arbitrary, structure of social welfare that enables inter-household comparisons.

Fortunately, it is often possible to curb such degrees of arbitrariness by searching for tax reforms that are necessarily equalizing for a class of "acceptable" inequality, poverty and social welfare indices. Such reforms may then be called *social welfare improving*, in analogy to the references to Pareto-improving tax reforms in welfare economics. The acceptability of social accounting indices will depend on whether they meet normative criteria of some ethical order. Each order of normative criteria defines a class of social accounting measures. As the ethical order increases, the criteria put increasingly strong constraints on how these indices should rank distributions of living standards. Hence, the goal is to seek fiscal reforms that are *social welfare improving* for various orders of ethical criteria. Quoting from Mayshar and Yitzhaki (1995),

> In this paper, we seek to demonstrate the empirical applicability of an intermediate approach that imposes only a minimal structure on social norms. (...) This approach is based on the principle of transfers introduced by 'Hugh Dalton (1920)'.

Bibi and Duclos (2007b) have extended the Mayshar and Yitzhaki's (1995) approach in four important ways:

1. Their methodological framework is general enough to encompass Mayshar and Yitzhaki's *Dalton-improving* tax reforms as a special case of a general search for *poverty-improving* tax reforms. Mayshar and Yitzhaki's problem is obtained by focusing on second-order dominance and by setting the upper poverty line (denoted by z+ in subsection 5.2) to infinity.

2. They have introduced a new concept of *Pen-improving* tax reforms, which are tax reforms that generate first-order stochastic dominance of the post-reform distribution over the pre-reform one. As is well-known, first-order dominance imposes fewer constraints on the allowable set of social welfare functions than second-order dominance, and is, therefore in that sense more general than higher-order dominance.

3. Their methodological framework further enables the policy analyst to censor welfare at

some upper-bound poverty line so that the ethical focus be put (if considered desirable) solely on poverty reduction rather than on Mayshar and Yitzhaki's more traditional concept of social welfare improvement.

4. To achieve this greater degree of ethical freedom, they have relied on what are called "primal stochastic dominance curves" (or "poverty dominance curves" as defined in subsection 5.2) instead of the dual concentration curves used by Mayshar and Yitzhaki (1995). [156]

To describe how poverty and social welfare are affected by changes in **t**, they have started with the popular Foster-Greer-Thorbecke (1984) (FGT) family of poverty indices as the target of the social welfare maker in (57)

$$W\left(f(\mathbf{p}^r,\mathbf{p},y_1),...,f(\mathbf{p}^r,\mathbf{p},y_1)\right) = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{z - f(\mathbf{p}^r,\mathbf{p},y_i)}{z}\right)_+^a$$

(61)

Then, they have followed similar approach of that presented in the subsection 5.2 to show how the use of these peculiar indices is also useful for predicting how many other poverty and social welfare indices will react to tax and CS changes. Using equation (59), Roy's identity, and setting reference prices to current consumption prices, $\mathbf{p}_r = \mathbf{p}$, they have showed

$$D_k(a,z) = \begin{cases} x_{i,k}^*(z,\mathbf{p}) & \text{if } a = 0 \\ \frac{a}{nz}\sum_{i=1}^{n} x_{i,k}^*(y_i,\mathbf{p})\left(\frac{z - f(\mathbf{p}^r,\mathbf{p},y_i)}{z}\right)_+^{a-1} & \text{if } a > 0 \end{cases}$$

(62)

where $x_{i,k}^*(y_i,\mathbf{p})\left(x_{i,k}^*(z,\mathbf{p})\right)$ is the consumption of k relative to average consumption for that individual i whose income is equal to y_i (the poverty line z). For complete orderings, the interpretation of (62) depends on whether α is equal to or greater than zero.

• With $\alpha = 0$, the poverty objective of a tax reform is to reduce the proportion of the population in poverty. Because the tax reforms we consider are marginal, it is only those at the margin or just around z that matters in identifying headcount-reducing directions for marginal tax reforms. Seeking to reduce $P_0(z)$ could then lead to a reform that benefits more the richest of the poor but penalizes the poorest of them. This could

occur if the consumption profile of those close to z differs significantly from the consumption profile of poorer individuals and can thus raise important ethical issues.

• With $\alpha > 0$, every poor person's consumption counts, but not necessarily equally. The weights on the consumption $x_{i,k}(y_i, \mathbf{p})$ are proportional to the normalized poverty gaps in $P_{\alpha-1}(z)$. *Ceteris paribus*, the larger the value of α, the more socially costly it is to increase the tax rate on a commodity consumed mainly by the poorer. When a commodity is not consumed by the poor, there is no distributive cost in increasing its tax rate. Note that $D_k(\alpha=1, z)$ gives the share of total consumption of k that is consumed by those below z, and is therefore an intuitive indicator of the efficiency of using commodity k for targeting purposes.[166]

Exploring the possibility of tax and CS reforms that are necessarily social welfare or poverty-improving becomes then straightforward. Likewise in subsection 5.2, the acceptability of a social accounting index will depend on whether it meets normative criteria of some ethical order. Recall from subsection 5.2 that the *focus*, the *anonymity*, and the *monotonicity* principles characterize the poverty measures of the first-order class. Maintaining these principles, the poverty and social welfare measures of the second-order class must obey to the Pigou-Dalton criterion. This procedure can iteratively be continued up to any desired ethical order *s* by putting appropriate restrictions on the poverty and social welfare measures. Thus, substituting the results given by equation (62) in (60). Then, using condition (35) for the first-order, expression (45) for the second-order, and equation (50) for any higher ethical order, Bibi and Duclos (2007b) have showed that a necessary and sufficient condition for a marginal tax-subsidy reform to be revenue neutral and s-order poverty improving –that is, to decrease poverty weakly for all poverty measures that are member of the *s*-order class– is that

$$\mathsf{I}_k(a = s-1, z) \leq \mathsf{I}_l(a = s-1, z) \quad \forall z \in [0, z^+]$$

(63)

and *s*-order social welfare improving if condition (63) holds for $z_+ = \infty$.

One way to check the existence of *restricted* or *unrestricted* improving tax reforms is simply to plot the different $\lambda_k(\alpha, z)$ over the range of poverty

lines starting from 0 to z_+ for the former (poverty-improving) and from 0 to infinity for the latter (social-welfare improving). If the $\lambda_k(\alpha, z)$ curves do never intersect for a couple of commodities k and l, then a marginal tax reform involving them can easily be constructed such as to decrease all of the poverty and social welfare measures that belong to the s-order class. If, however, these curves intersect, one can either lowering z^+ or looking for tax reforms that are welfare improving over a higher-order class of poverty and social welfare indices.

For $s=1$, and similar to condition (36), condition (63) reproduces the Pen (1971)'s Parade in the space of commodities, weighted by their specific MECF, against a wide range of poverty lines starting from 0 to z^+. Bibi and Duclos (2007b) described such a design as *restricted* Pen-improving tax reform and *unrestricted* Pen-improving if condition (63) holds also for $z^+ = \infty$.

For $s=2$, Bibi and Duclos (2007b) have described any tax-subsidy reform satisfying condition (63) as *restricted* or *unrestricted* Dalton-improving reform according to whether $\lambda_k(1, z)$ curves intersect from a certain threshold z^+ or do never intersect. Note that unrestricted 'primal' second-order dominance made by comparisons of the $\lambda_k(1, z)$ curves (for z starting from 0 to infinity) implies and is implied by the dual second-order dominance made by comparisons of the concentration curves weighted by the MECF as suggested by Mayshar and Yitzhaki (1995).

Recall from the previous subsection that Newbery (1995), and Tuck and Lindert (1996) have advocated the Tunisian CS reforms, initiated since 1993, which consist in reducing the subsidy rates on *tender wheat* and on *other subsidized goods* in order to increase subsidy rates on *hard wheat* and *cooking oil*. Using 1990 household survey, Bibi and Duclos (2007b) have tested in retrospect the desirability of these reforms. Their findings suggest, for instance, that reducing subsidies on *tender wheat* to finance a subsidy increase on *cooking oil* would reduce poverty at 150 percent of the reference poverty line but would not do so at higher poverty lines.[167] A similar conclusion would be valid for a reform involving other subsidized goods and cooking oil. Further, they have estimated the upper poverty line, z^+, until which the ordinal rank of each of the $\lambda_k(\alpha, z)$ remains unchanged. The results show that increasing the rate of subsidy on

cooking oil would be *restricted* Pen-poverty reducing as long as the poverty lines do not exceed 130 percent of the reference poverty line, and would be *restricted* Dalton-poverty reducing for all poverty lines until 200 percent of the reference poverty line. However, since it is difficult to rule out all poverty lines above 85 percent of the reference poverty line, decreasing subsidies on *tender wheat* in order to increase them on *hard wheat* would not be safely declared first-order poverty improving. All these results show that taking account for the MECF, the robustness of welfare judgments, and the representativeness of the household survey seriously can have important implications for the design and the understanding of the initiated reforms.

Audet et al. (2007) have used a similar approach to study the effects of the Egyptian CS program expansion. Indeed, to offset some of the adverse effects of falls in tariffs and custom duties, Egypt has recently expanded its CS program to include *rice, pasta, tea, macaroni, beans, margarine and lentils*, while removing subsidies on *tamwin* bread, thereby almost doubling Egypt's total subsidy bill.[168] Instead of estimating a complete demand system to deduce for each commodity its MECF, Audet et al. (2007) plot the different $D_k(\alpha, z)$ curves over the range of poverty line $[0, z^+]$, and then calculate for each couple of commodities, k and l say, the critical value of the ratio $g_{l,k}^+ = \dfrac{E_l}{E_k}$ such that

$$D_k(s-1, z) \leq g_{l,k}^+ D_l(s-1, z) \qquad \forall z \in [0, z^+]$$

(64)

Thus, if the condition is satisfied for a certain order of dominance s and up to the critical value of $g_{l,k}^+$, this will clearly hold for any value of $g_{l,k}$ lower than $g_{l,k}^+$.

Comparing the distributional characteristic, $D_k(\alpha, z)$, of *macaroni and tamwin bread*, Audet et al. (2007) have found that decreasing subsidies on the former in order to increase them on the latter would not be desirable even though the efficiency cost of taxing *macaroni* is set 23 percent higher than that of *tamwin bread*. However, increasing indirect taxes on *macaroni* to finance a subsidy rise on *tamwin bread* would result in a reduction of all poverty indices belonging to the second-order class for any cut-off income below the official poverty line.

This result would also hold for any poverty line inferior or equal to two times the official poverty line if the efficiency cost of taxing macaroni is 4 percent greater than that of taxing *tamwin bread*. Similar results are found for beans and *tamwin bread* and other couple of commodities, which led the authors to conclude that the changes brought to the list of subsidized food items have not always been relevant for reducing inequality and poverty.

It is perhaps interesting to add at this stage that 'dual' *unrestricted* first- and second-order tests, which completely ignore the MECF, are implicit in many other studies, which have explored the CS structure in the MENA region. For instance, Coady et al. (2004) have noted that the benefits of Egypt's CS program are uniformly distributed across all income levels (that is, a Pen's (1970) Parade test based only on $D_k(.)$). Further, the World Bank (1999) reports that:

> With inadequate targeting [...], higher income groups benefit more in absolute terms than the poor because the rich tend to consume greater quantities of subsidized goods. In Morocco, for example, those in the top quintile consume twice the value of subsidized foods as do those in the lowest quintile. In Yemen, the top decile spends 10 times more than the lowest on subsidized wheat and flour. On average, 60 percent to 80 percent of public CS expenditures in MENA go to higher income groups. (p. ii).

Likewise some of the studies mentioned in subsection 10.1.2.1, these ones also fail to take into account probable differences in MECF across commodities, E_k. In the light of Audet et al. (2007) and Bibi and Duclos (2007b), they could be misleading in assessing the effectiveness of these social programs.

A word of caution is warranted at this point. One of the main concerns with these theoretical frameworks is that they are very short-term in nature. In particular, they take the nominal income of the population as given. Government revenue and thus the supplies of public goods are also taken as given. A long-run solution to the basic problem of inequality, poverty and social welfare in ACs will almost certainly involve significant changes in both of these variables. In particular, provision of good education and health care are arguably key ingredients to a long-run solution. This implies, *inter alia*, that the empirical structure of consumption on which the analysis of indirect taxes CS are based can theoretically be incompatible with a structure that is best for long-run equalization of opportunities.

Notes

1. Kanbur and Lusting (1999) provide several arguments that may explain why inequality is back on the agenda.
2. See for instance Ravallion (2004) for more elaborate discussion about this.
3. In this respect, Chen and Ravallion (2000) affirm that differences in the growth elasticities of absolute poverty appear to arise in large part from initial inequalities in incomes, education attainments and other dimensions (including geographic differences within countries). Using panel data of 58 developing countries for the period 1980–1998, Kalwij and Verschoor (2007) provide econometric evidence that the large cross-regional variation in the capacity of income growth to reduce poverty is largely explained by differences in the initial income inequality.
4. From Kuznets (1955) inverted U assumption, inequality would rise with growth at early stages of development and fall at higher levels of per capita income. In this respect, empirical literature is not unanimous. For instance, while Perotti (1996) (among many others) finds that initial inequality is negatively associated with subsequent growth, Li and Zou (1998) find an opposite result.
5. The countries included in the Arab region are those which are members of the League of Arab Sates: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen.
6. For example Acemoglu and Robinson (2006).
7. Restricted access to primary data has led several analysts to adopt ad-hoc macroeconometric approach to study these issues. For instance, Daymon and Gimet (2007) have used macroeconomic data for 19 ACs to estimate a simple relationship equation between the Gini index and social public expenditures while Benar (2007) have used a similar approach to capture the effects of globalization on inequality in 10 countries from the MENA region.
8. This section draws on Nabli (2007)
9. See Iqbal (2006)
10. See World Bank (2004a).

11. Computed from Barro-Lee (2001) Educational attainment database, including Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Syria and Tunisia.
12. Such analysis was conducted in other regions and was effective in helping improve data quality, and provided arguments for better access to data. See Atkinson and Micklewright (1992) for their analysis of data for transition economies, and Székely and Hilgert (1999) for Latin America.
13. http://www.measuredhs.com/accesssurveys/.
14. In reality, WIID (2008) reports the existence of a household survey in Sudan conducted in 1968 while Deininger and Squire (1996) talk about a Sudan's household survey conducted in 1971.
15. There is a paper on poverty by N. Kakwani based on the HIES 2005-2006 which was not published.
16. Ali (2003) cites some measures of inequality for Kuwait in 1987 and 1999, but the data is not available.
17. The only information published on Saudi Arabia survey is that the latest Consumption survey was conducted during the year 1999 – see the web site of the Statistical Office (http://www.cdsi.gov.sa/). There are stand-alone surveys in large cities in Saudi Arabia.
18. Qatar statistical office in 2007 published results of 2001 Consumption expenditure survey as part of its annual publication (statistical abstract). It is unclear whether it was one-off survey, and results were presented only as part of the CPI weights derivation.
19. Even though some of these countries participated in other surveys – e.g. Kuwait in 1998 DHS; Qatar has labor force surveys. World Bank has supported some surveys through the LSMS project (Morocco). A very sobering picture of surveys whose existence is officially reported to the international statistical community can be found at http://laborsta.ilo.org/, or at the household survey network central catalogue (http://www.internationalsurveynetwork.org).
20. For instance, we know from Central Statistical Office (1989, 2003) concerning the 1987 and 2000 household surveys of Kuwait and Bibi and El-Lahga (2009) concerning the re-

cent 2007/08 household survey of the United Arab Emirates that these surveys cover both the nationals and the immigrants.

21. See Lachaud (2005) who computed several poverty and inequality indices using 1995 and 2004 household surveys.

22. Household survey of the LSMS type conducted by stat office with the support of the World Bank (TF financed) is on going and is the first since 1990s. But results have not been announced yet.

23. For Lebanon, some distributional indices are in El-Laithy et al. (2008). Lebanon also participated in the pan-Arab project for Family health (DHS type survey)

24. There is a paper in Arabic on 2003 survey results authored by the head of the statistical office. Its copy is not available on the web, or has been disseminated in any form. Libya also participated in the pan-Arab project for Family health (DHS type survey), and collects LFS-type data.

25. The existence of a household survey for Oman is mentioned in Ali (2003).

26. Some information is available for Sudan in the 1960s, see Cromwell (1977) or Jain (1975). WIID (2008) reports the existence of a household survey in Sudan conducted in 1968 while Deininger and Squire (1996) talk about a Sudan's household survey conducted in 1971. But according to our investigations such surveys were not household surveys, but partial and sectoral (health, agriculture) surveys.

27. Bibi and El-Lahga (2009) provides in an unpublished paper in Arabic different measures of inequality for United Arab Emirates.

28. For Syria, UNDP (2005) includes analysis of 1996/7 and 2003/4 household expenditure surveys, but has only limited circulation. Syria also participated in the pan-Arab project for Family health (DHS type survey)

29. According to the World Bank (2001b, 2003b), household surveys have been carried out for West Bank in Gaza, but no measures of inequality are available. Palestine also participated in the pan-Arab project for Family health (DHS type survey)

30. See, among many others, Deininger and Squire (1996), WIID (2008), and the World Bank (2002) except for the Syrian case, see El-Laithy and Abu-Ismail (2005).

31. Ethnicity is another possible candidate for stratification.

32. Egypt uses illiteracy rate from Census data in ordering PSUS before the random selection, which is not equivalent to dividing population into strata and drawing samples independently from each.

33. e.g., in Egypt not individual households, but "clusters" of 5 households are sampled.

34. See EUROSTAT assessment of Poland HBS, where it is criticized for using this method to achieve inflated response rate statistics.

35. Paradoxically, it is in less accessible survey data in MENA where one sees more realistic picture, perhaps reflecting more accurate sampling: e.g .in Bahrain the actual sample is slightly above 3,000 as opposed 5,000 sampled households – a response rate that one can expect elsewhere.

36. The permanent income hypothesis (PIH) of Friedman (1957) provides the theoretical rationale for why consumption is preferred to income as a measure of welfare

37. Consumption has lower levels of inequality because it smoothes out temporary fluctuations. See Townsend (1995) for details. For example, Rogers and Gray (1994) show that in the U.S. Consumer Expenditure Survey (CEX), the ratio of expenditures to income is over two for the poorest income quintile and only 0.66 for the richest quintile. In a developing country context, Deaton (1997) reports deciles of household total income for Thailand, which show the same pattern; consumption-to-income ratios decline monotonically from 2.0 in the poorest income decile to 0.8 in the richest decile (although a measurement error interpretation is placed on this pattern).

38. One of the rare applications to an Arab country which addresses these issues with some detail prior to calculating poverty and inequality indices is done by Jolliffe et al. (2004).

39. Using data from Russia Teliuc and Ovcharova (2007) demonstrate that this factor alone increases Russia Gini for per capita expenditure by 11 percentage points - from 0.26 to 0.37 – a large distortion.

40. Practices recommended by a best practice paper "'HBS and EU-SILC Imputed Rent" Eurostat 2005.

41. As noted in Deaton and Zaidi (2002), expen-

ditures on taxes and levies are not part of consumption, but a deduction from income. Gifts, charitable contributions, and remittances to other households represent double-counting if, as one would expect, the transfers show up in the consumption of other households. Making an analogy with the system of national accounts, these items belong to the capital account of the household, not to its current account: repayment of loans, interest payments, loans given to others, and purchases of financial assets. Infrequent or lumpy expenditures, like marriages, dowries, births, and funerals, should be excluded because they represent transitory spending, while the consumption aggregate we want to construct attempts to approximate permanent income.

42. The rate of survey to corresponding SNA aggregate was 52% in 1996 and fell to 47% in 2005. See World Bank (2007a).

43. World Bank (2001).

44. e.g. by Price Waterhouse or other international companies which provide assessment of local labor costs.

45. Székely and Hilgert (1999).

46. World Bank (2005).

47. Piketty T. and E. Saez (2006).

48. Facundo Alvaredo. 2008.

49. Piketty, T. and N. Qian (2006).

50. Guriev S. and A. Rachinsky (2006).

51. Leigh, A. and P. van der Eng (2007).

52. Ersado, Lire (2006).

53. In fact, in the research for developed countries it is common to top and bottom code incomes or expenditures because extreme observations are regarded as less reliable, but in MENA this is not done.

54. UNU/WIDER-UNDP World Income Inequality Database, Beta 3, 8 November, 1999, which builds on DS and offers an expanded version of this data set.

55. To correct for variation in price levels across Egyptian regions, Jolliffe et al. (2004) used the ratio of regional poverty lines as spatial-price indices. Unfortunately, they did not estimate the poverty variation related to this correction.

56. http://www.measuredhs.com/accesssurveys/. From the Arab counties having DHS, only Jordan and Mauritania restrict access to micro-data records.

57. Ayadi et al. (2007) have applied the MCA approach to Tunisian DHS. Their findings, based upon an absolute Gini index, show a clear downward trend between 1988 and 2001.

58. Either from: the WIDER website (http://www.wider.unu.edu/research/Database/en_GB/database/) or the World Bank website (http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp). Milanovic (2005) has also combined Gini data from Deininger and Squire (1996) and World Income Distribution databases. The combined database is downloadable from http://go.worldbank.org/807GA6YX80.

59. See Anand and Segal (2008) for a critical survey on how to measure inequality at a global (or regional) level and how to decompose it into between- and within-country components.

60. The last version of the Distributive Analysis Stata Package (DASP) of \citeN{Araar and Duclos (2007) enables to readily apply this procedure.

61. Ravallion (2004) provides more arguments against this choice and advocates a weighting system proportional to the population share of each country.

62. The definition of the MENA countries varies from one study to another. Ali (2003) provides several examples about this.

63. Ideally, the mean expenditure consumption *per capita* computed from household surveys should be used at this stage to avoid combining two inconsistent sources of data (household surveys and national accounts). Unfortunately, none of the references used to produce Table 4 provide reliable estimates of the mean consumption,

64. This method is advocated by Sen (1976), who used it to rank the Indian states.

65. See Rawls (1973).

66. For instance, Marku and Salehi-Isfahani (2005) have put the focus only on the evolution of mean income for different cohorts to assess how their welfare has changed from 1985 to 2002.

67. Although discussion will be made in terms of income among individuals, any alternative measure of socioeconomic position (consumption, expenditure, earnings, wages, as-

sets, land, education, health, occupational status index) among any well-defined recipient unit (households, workers, generations, per capita, per equivalent adult) would do.

68. Bibi and Duclos (2005, 2007a) have followed this route for poverty analysis. We shall present their methodology with more details in subsection 6.1.

69. Using Jordanian 1997 and 2002 household surveys, Shahateet (2006) has computed an Atkinson's (1970) inequality index along with the *Gini* coefficient. The results provide empirical evidence that there was a rising income inequality over the period 1997-2002 in Jordan and at least nine of its 12 governorates.

70. These data are downloadable from http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp. The countries are listed in Table A-5, which provides their specific *Gini* indices.

71. In reality, Atkinson (2003a) take such a 3-percentage points as a minimum for an economically significant distributional shift while recognizing that this threshold is essentially arbitrary.

72. Averaging the *Gini* indices published by PovCal, our own calculations reveal that the MENA Gini falls from 39.7 in 1980s to 38 percent in 1990s. These findings are close to those of Deininger and Squire (1996) (see Table 4) and Milanovic's calculations (see table 3) but far from those of Adams and Page (2003).

73. See also Robinson (2009) for more elaborated discussion on this.

74. Absolute poverty and inequality measures violate one of the ethical principles in distributional analysis: the "principle of the population" which states that distributive statistics should not be affected by the pooling of several identical distributions. The absolute number of the poor or malnourished may increase even though the incidence of poverty or malnutrition or inequality, which are relative measures, do not change or even decrease.

75. De Ferranti et al. (2003) confirmed that the inequality levels in Ecuador, Jamaica, Nicaragua, Mexico, and Peru are much lower when computed over the distribution of expenditures rather than that of incomes. However, the changes over time are very similar.

76. Using the ratio of the income share of the

richest to the poorest quintile of the population and the *Gini* coefficient in seven ACs for which data were obtained, the UNDP's (2001) report confirms this picture of relatively low inequality in the AW. Similar findings are also in Page (2007).

77. Based upon panel data from 58 developing countries over the period 1980-1998, Kalwij and Verschoor (2007) found that the income growth capacity to reduce poverty in the mid-1990s ranges from minus 2.27 in the MENA region to minus 0.71 in Sub-Saharan Africa. The weak initial inequality level in MENA region is the main driver of its highest growth elasticity of absolute poverty.

78. There are a large number of recent papers that explain how these issues can be addressed. See, among many others, Kakwani (1993), Cowell (2000), Davidson and Duclos (2000). For an application to an Arab country, see Jolliffe et al. (2004). Further, Araar and Duclos (2007) have developed a distributive analysis Stata Package that enables to calculate the standard errors of the most inequality and poverty indices while taking into account of the sampling process.

79. Among the twenty odd countries that form the MENA region, only Algeria, Egypt, Iran, Jordan, Morocco, Tunisia and Yemen are included.

80. See World Bank (2002b, 2004b), ESCWA (1999), and UNDP (2001, 2002).

81. ESCWA (1999) reported that the *Gini* coefficient for Iraq rose from 37 percent in 1993 to roughly 51 percent in 1998 and Lachaud (2005) showed that the *Gini* coefficient for Comoros increased from 44.3 percent in 1995 to 55.7 percent in 2004. The former values are not reported in Table A2 as we are unsure whether they are based on representative household surveys and they are not reported elsewhere. Those of Comoros are calculated over households as the unit measure and not over individuals.

82. Kandeel and Nugent (2000) attribute the Egyptian fall in inequality to the decreasing income gap between household heads with primary education and those with higher education; while the increasing urbanization has slowed down this decline.

83. The standard error of the former result is 1.05

points of percentage while it is 0.83 for the latter.

84. The World Bank (2004b) reports a standard error for the 2003 *Gini* index of Jordan equal to 0.57 percentage points while Jolliffe et al. (2004) find in the case of Egypt that the standard error of the 1997 Gini coefficient ranges from 1 percentage point in rural region to 3 percentage points in metropolitan strata.

85. Cardiff (1997) uses data from the household surveys in Egypt for 1990/1991 and 1995/1996 and calculates Gini indexes based on income measures. He finds that the Gini index declined from 38.5 to 35.1, which is consistent with the decline in measures of inequality using expenditures data shown in Table A-2.

86. See also Zouari-Bouattour and Jallouli (2001) for the characterization of the Tunisian inequality trend from 1975 to 1990.

87. Said and El-Hamidi (2005) provide quantitative estimates of the hourly wage gap between men and women that can be attributed to pure discrimination effect. See also Chishti and Khalaf (2000) for a similar application using data from Kuwait which only covers public sector employees.

88. See for instance Haddad and Kanbur (1990).

89. See for instance Auerbach and Hasset (2002).

90. See Esteban and Ray (1994). Ostbi (2008) has explored whether various forms of polarization and horizontal inequalities affect the probability of civil conflict onset across 36 developing countries in the period 1986-2004. The estimation results derived from panel of cross-developing-countries show that social polarization and horizontal social inequality are positively related to conflict outbreak.

91. The former principle suggests that the pooling of several identical income distributions does not affect the welfare statistics while the latter states that the inequality level are invariant to any uniform proportional change of individual's income.

92. See Thurow (1987) and Pressman (2007).

93. See Birdsall et.al. (2000), Milanovic and Yitzhaki (2002), and Banerjee and Duflo (2008).

94. See, for instance, Roemer (1998), Peragine (1999), and the World Bank (2006a).

95. The decomposability principle states that "overall inequality is a weighted sum of inequality levels within each group and inequality level between groups". Examples of decomposable inequality indices are those of Generalized Entropy (GE) class. More details on the GE class of inequality indices are in Box 5.

96. See for instance Checchi and Peragine (2005), Bourguignon et al. (2007), and Ferreira and Gignoux (2008)

97. See Assaad (2009).

98. See, among many others, Peragine (1999).

99. In Tunisia for example, Lahouel (2007) notes that in 1991, more than two-thirds of the farmers owned about 10 percent of total land, while the 1.2 percent richest farmers held more than 22 percent. The state still holds large farms expropriated from the French. Some of these farms have been leased to private farmers on a long-term basis, but the poor have been excluded.

100. http://www.measuredhs.com/accesssurveys/. From the ACs having DHS, only Jordan and Mauritania restrict access to microdata records.

101. For instance, Ayadi et al. (2007) have pooled the different surveys.

102. It is perhaps useful to be precise at this stage that the results of Duclos et al. (2006) are valid only under the assumption that multidimensional poverty and welfare indices of ethical order (s1, s2) fulfill a particular form of *substitutability* between the different attributes. *Substitutability* means in this context that the more affluent is the individual i in terms of xi,1, the less is overall welfare deemed to be enhanced if her provision of xi,2 is increased. This leads to policy recommendations such as an improvement in access to health services for those who are poorer in income is socially more desirable than for those who are better off. But, it is not excluded to advocate an alternative assumption in other cases. For instance, one may think that education should be given first to well-nourished. In such a case, the literature offers alternative appropriate tools for robust multidimensional poverty comparisons, which are surveyed in Bibi (2005).

103. The official absolute poverty lines are excluded because they are not estimated on the same basis.

104. Notwithstanding, the World Bank (2002b) ar-

gue that 3 percent of the 1998 overall inequality as measured by the *Gini* index in Yemen is due to between urban-rural inequality and 97 percent is due to within each area inequality. Lerman and Yitzhaki (1984), among many others, have suggested a methodology, which enables to decompose the overall *Gini* index into a *within* groups component, a *between* groups inequality, and an *overlapping* component.

105. The *Pigou-Dalton transfer* principle suggests that an appropriate inequality measure should decrease following a progressive transfer from a rich to a poorer person.

106. Theil's index is defined as:

$$I^{GE}(1) = \frac{1}{n}\sum_{i=1}^{n}\frac{x_i}{\bar{x}}\ln\frac{x_i}{\bar{x}}, \forall x_i > 0$$

107. Notwithstanding, the World Bank (2002b) argue that 3 percent of the 1998 overall inequality as measured by the *Gini* index in Yemen is due to between urban-rural inequality and 97 percent is due to within each area inequality. Lerman and Yitzhaki (1984), among many others, have suggested a methodology, which enables to decompose the overall *Gini* index into a *within* groups component, a *between* groups inequality, and an *overlapping* component.

108. *The Pigou-Dalton transfer* principle suggests that an appropriate inequality measure should decrease following a progressive transfer from a rich to a poorer person. We shall discuss with more detail the core principles an inequality index should fulfill in section 5.

109. However, one may normalize $I^{GE}(\theta)$ by its hypothetic maximum value, obtained when only one person owns all available resources, to make these indices ranging between 0 and 1. This is important for the purpose of an integrated analysis of inequality and social welfare (or poverty) as illustrated by equation (5).

110. The idea of exploring other routes to estimate the between-groups inequality dates back to Blackorby et al. (1981) but has recently been investigated by Dagum (1997) and Foster and Schneyerov (2000).

111. The concentration index, $I^C(\mathbf{x}_j)$ may be alternatively given by the product of the *Gini* index in $\mathbf{x}_j$, $I^{Gini}(\mathbf{x}_j)$, and the *Gini* correlation between $\mathbf{x}_j$ and $\mathbf{x}$. More details on this alternative formula are in Adams (2001) and Zouari-Bouattour and Jallouli (2001).

112. We can also add the study of Siber and Ozmucur (2000), who have followed a similar approach to decompose the income-based *Gini* index by income sources from primary job and income for other sources. They have found, inter alia, that income for other sources in urban area have disequalizing effects. However, as entrepreneurial income represents 38 percent of total income, taxing these income sources in urban area may impact negatively on economic growth.

113. This is in reality the so-called Mincer (1974) equation, which relates at the origin the natural logarithm of earnings as a function of years of education and years of potential labor market experience.

114. For decomposition by factors, the value of β_0 does not matter as it is constant across households. Further, one may run ordinary least square regressions without constant.

115. The authors do not provide detailed information on the data used.

116. For instance, if the average number of years of schooling for women is lower than that of men is the result of unequal opportunity access to education for male and female, then the endowment effect related to education becomes unambiguously uneven.

117. See for instance Sen (1984), Harris (1986), Deaton (1989), Haddad and Kanbur (1990) among many others, who provide evidences on intra-household inequality on various outcomes.

118. See Browning and Chiappori (1998) and Dauphin et al. (2008).

119. See Manser and Brown (1980) and Chiappori et al. (2002).

120. For targeting purpose, Haddad and Kanbur (1990) have found that rankings of different socio-demographic groups according to their inequality or poverty status do not significantly change when based on socio-demographic characteristics such as region of residence. However, the relative rankings of groups according to the gender of the household head is sensitive to what type of data is used, indicating that intra-household inequality has a strong gender dimension.

121. See Kanbur (1996) for more details on this.

122. Note that this approach parallels the well-known Kuznets' (1955) theory.

123. This argument is not very strong as one may test first-order dominance with the same information.

124. Similar approach was implicitly used for s-order relative pro-poor judgments (see equations to (7) and (9)).

125. In reality, Bibi (2006) compare the outcome yielded by equation (28) to that of a counterfactual situation when the growth rates are unchanged over the entire distribution. These developments are avoided here for expositional simplicity.

126. Approximately the same pattern of economic growth is observed in Jordan between 1997 and 2002. See the World Bank (2004b).

127. Recall from Table A-2 that Algeria has experienced a small fall in its mean income between 1988 and 1995, while Egypt has experienced a small growth during 1990s.

128. See Babiker (2007).

129. See also the earliest study of Morrisson (1991) about the effects of structural adjustments on poverty in Morocco.

130. The issue of CS restructuration was also addressed by Lofgren and El-Said (1999).

131. Recall that only the integrated models enable to capture the full variations of the intra-group inequality.

132. These poverty measures are the headcount ration, the deficit of poverty, and the severity of poverty.

133. This is the central simulation of Chemingui and Thabet (2008). Similar results are drawn from the other simulations.

134. See Demery (2001).

135. Benefit incidence analysis cannot be applied to publicly-provided goods and services that are not readily assignable. Investments in infrastructure are typical examples.

136. A *concentration curve* plots the cumulative percentage the income-related variable(s) (y-axis) against the cumulative percentage of the population, where the income-related variable(s) are ordered in increasing values of income.

137. See for example World Bank (1995, 2007b).

138. Each household observation would be weighted by its sample weight, which stands for the inverse of the probability that the observation is included in the survey due to the sampling design.

139. Household observations would be weighted in this case by the sample weights times the number of persons in the household.

140. Similar findings are in Abdelkhalek (2005) and Radwan et al. (2005) for Morocco.

141. See, for instance, De Ferranti et al. (2003) for more elaborate discussion on the effectiveness of conditional cash transfers in Latin America.

142. Using similar data, Ali and El-Badawi (2001) have estimated a single inequality equation when the logarithm of the average income of the poor is regressed on the logarithm average income of the population, the squared logarithm average income, and some measures of openness as proxy for globalization. Their results suggest the existence of a Kuznets process in the sense that at early stages of development, the average income of the poor seems to decline before it increases. As for the effects of the various measures of openness, none of them is significantly related to the living standards of the poor.

143. See, for instance, World Bank (1991) for Algeria, Adams (2000) for Egypt, Laraki (1989) for Morocco, Tuck and Lindert (1996) for Tunisia.

144. Hansen (1991) has noted that the methodology used is not entirely transparent and the assumptions about shifting of taxes and the saving functions used to transform the expenditure distribution into a distribution of income are questionable.

145. The estimation strategy follows Deaton's (1997) procedure, which relies on the spatial variability of prices to estimate the price parameters.

146. Saying differently, each dollar gained by the government from the current distortionary tax-subsidy system is equivalent for the households to 1.025 dollars paid under non-distortionary lump-sum tax.

147. This is in fact reminiscent of the difficulties faced by the (small) existing socio-demographic targeting programs in Tunisia, alluded to in World Bank (1995): "(Their) coverage is still inadequate. As a result, many of the truly needy do not benefit from the program, while others receive multiple benefits from

148. The reference poverty line is that estimated by the World Bank (1995).

149. Recent reviews of the historical experience and importance of migration from ACs include World Bank (2007b, Chapter 7) and World Bank (2009).

150. Adams (2007) provides an excellent survey on how some of these issues are addressed in the literature.

151. In the same vein, Adams (1991) found that in rural Egypt the number of poor household declines by 9.8 percent when household income includes remittances, and that remittances account for 14.7 percent of their income.

152. We are grateful to Djavad Salehi-Isfahani for suggestions and input on this theme.

153. More details are in Atkinson (1970), Kolm (1976) and Cowell (2000). See also the excellent survey of Zheng (1997) for an extensive discussion about the axiomatic approach to poverty measurement.

154. *Translation principle* requires that inequality measure is invariant to a constant absolute changes of incomes: $I(x + t) = I(x)$ whenever $t \neq 0$. More details are in Kolm (1976).

155. Friedman (1962) argues for instance that a society with a rigid income distribution where everyone remains in the same position year after year can almost certainly be declared ``worst'' than a mobile society with identical cross-sectional inequality.

156. Fields (1980) argues that relative poverty measures are rather more inequality measures as they obey to the *scale invariance* principle; which is one of the core axioms of relative inequality measures.

157. See, among many others, Atkinson (1987), Davidson and Duclos (2000), Duclos and Makdissi (2004), Duclos and Araar (2006), Bibi (2006), and Bibi and Duclos (2007b).

158. The *povcalnet* website provides also the estimates of the general quadratic model of Villasenor and Arnold (1989). However, the choice of the *beta* specification is made because it gave a better fit of the data.

159. Such values of R-square are common for the parameterized Lorenz curves.

160. See Duclos and Makdissi (2003) and Duclos and Araar (2006) for more on this.

161. For instance, Figure 1 shows that the Egyptian income level of the poorest was higher than their Tunisian counterparts in 1999. Thus, Egypt would Rawlsian-order dominates Tunisia in 1999.

162. Hansen (1991) has noted that the methodology used is not entirely transparent and the assumptions about shifting of taxes and the saving functions used to transform the expenditure distribution into a distribution of income are questionable.

163. The common approach was to select a social welfare function as the social accounting target of policymakers. Bibi and Duclos (2007b) have suggested specifying a poverty measure as the social accounting target to facilitate robustness analysis of tax reforms.

164. See Mayshar and Yitzhaki (1995) for a discussion of this.

165. Recall from subsection 5.2 that dual conditions for third and higher welfare dominance are not as straightforward as those for first- and second-order dominance.

166. Reducing the leakage ratio (as advocated by Cornia and Stewart (1995)) could then be justified when the social accounting target of the policymaker is to minimize $P_1(z)$ while $E_k = 1$ for all $k = 1, \ldots, K$.

167. The reference poverty line is that estimated by the World Bank (1995).

168. See Ahmed and Bouis (2002), Oteify (2004) and Fan et al. (2007).

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