

UNDERSTANDING POVERTY AND INEQUALITY IN EGYPT

JUNE 2019

Background Papers



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ACRONYMS

CAPMAS	Central Agency for Public Mobilization and Statistics
CBE	Central Bank of Egypt
CBN	cost of basic needs
CEQ	Commitment to Equity
DCGE	dynamic computable general equilibrium model
EGP	Egyptian pound
ELMPS	Egypt Labor Market Panel Survey
FDI	foreign direct investment
FY	fiscal year
GDP	gross domestic product
GoE	government of Egypt
GST	general sales tax
HH	household
HIECS	Household Income, Expenditure, and Consumption Survey
ICT	information and communication technology
IMF	International Monetary Fund
LE	Egyptian pound (currency symbol)
LFS	Labor Force Survey
LPG	liquified petroleum gas
MENA	Middle East and North Africa
MoEE	Ministry of Electricity and Energy
MoF	Ministry of Finance
PIT	personal income tax
PPP	purchasing power parity
SAM	social accounting matrix
STEM	science, technology, engineering, and mathematics
STEP	Skills Towards Employability and Productivity
VAT	value-added tax

CHAPTER 1

POVERTY PROFILE AND TRENDS: EVIDENCE FROM RECENT HOUSEHOLD SURVEYS

Gabriel Lara Ibarra, *The World Bank*

Introduction

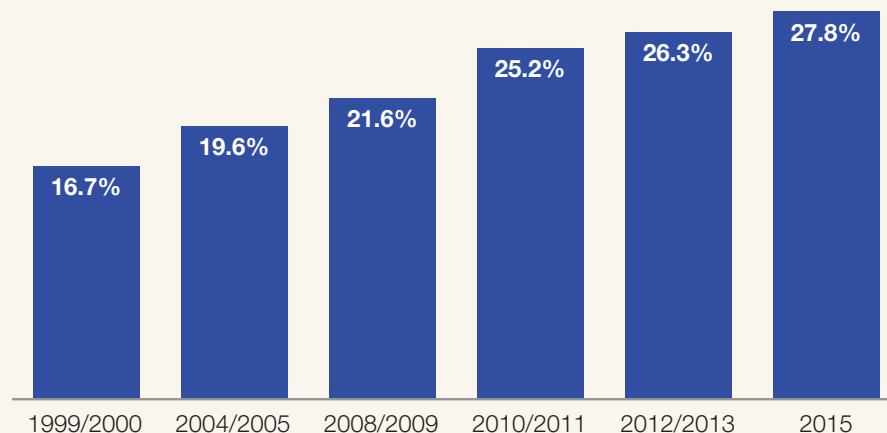
The previous decade in Egypt was marked by major internal and external shocks that have surely had severe implications for the evolution of the population's welfare. In recent years, social, political, and economic changes have transformed the landscape of the Egyptian society. On January 2011, the revolution started. Led by wide protests and social discontent, the movement ended with the ousting then president Hosni Mubarak. His toppling was followed by two presidential elections in two years. In May 2014, President Abdel Fattah El-Sisi was elected. Given the structural constraints to macroeconomic stability and fiscal pressures, the government engaged in a series of economic reforms to reel in spending and set the country in a sustainable path. The reforms included changes to the tax system, freezes to public sector hiring, and subsidy reduction. These reforms were accompanied by a pledge to boost spending on social sectors. It is critical to understand how the welfare of Egyptian households evolved during this period. Analyzing who were affected the most is key to assessing what the future conditions hold for their welfare and how policies can be better designed to protect them.

Monitoring of welfare and poverty in Egypt has relied on the efforts of the Central Agency for Public Mobilization and Statistics (CAPMAS), the national statistics office. CAPMAS has historically collected detailed information on households' expenditures through its Household Income, Expenditure, and Consumption Survey (HIECS), and consistently produced monetary poverty rates in Egypt with each survey round. In fact, official estimates suggest an increasing trend over the period 2000 – 2015, going from 16.7 percent to 27.8 percent (figure 1.1).

According to official estimates, poverty has increased slightly from 25.2 percent in 2010/11 to 27.8 percent in 2015. While these figures appear to be in line with a sense of uncertainty of economic policies due to the changing political landscape, they seem to be at odds with other economic indicators. For example, after the slowdown following the revolution, the economy quickly picked up and the real gross domestic product (GDP) growth averaged 2.9 percent between FY2012 and FY2015 (figure 1.2). The real GDP per capita growth averaged 0.7 percent in the same period. Meanwhile, between 2012 and 2015, the final consumption expenditure increase at a pace of 4.4 percent annually, and 2.2 percent in per capita terms.¹

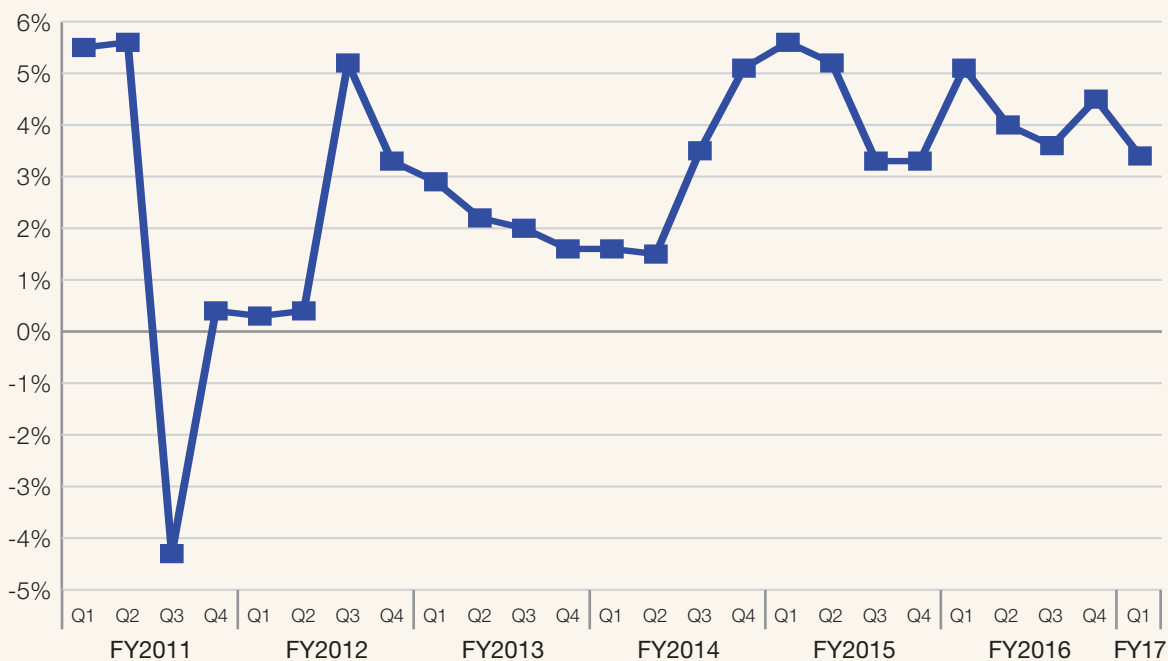
The objectives of this chapter are twofold. The first is to provide a detailed description of the methodology that has been applied in Egypt in estimating poverty, including the decisions taken to build the consumption-based welfare aggregate. Despite the long list of publications on welfare and poverty, this is the first time that a systematic analysis was conducted to understand the application of the cost-of-basic-needs (CBN) approach to the Egyptian case. By describing each step of the methodology, the chapter also points to potential areas of improvement to help bring current best

Figure 1.1. Poverty Rates in Egypt



Source: CAPMAS.

Figure 1.2. Real GDP Growth in Egypt



Source: Based on Ministry own calculations using Ministry of Finance estimates.

practices to the estimation of poverty rates in the country. The methodology described uses as a basis the different modules collected in the HIECS 2015 and concludes by presenting a compendium of poverty diagnostics: the distribution and incidence of poverty are presented for several profiles based on location, education, employment, and access to services, as well as inequality indexes.

The second objective of this note is to understand how the events from recent years have affected households' living conditions. This requires a consistent poverty trend, and, as described in this chapter, the official series of poverty estimates do not report a comparable trend of poverty over time. The reason is that estimates for the last three rounds of HIECS are neither strictly comparable to estimates from earlier years nor between themselves. The current methodology to estimate poverty in Egypt is based in a CBN approach. The main assumptions were defined in 2005, with a comparable series produced for 2008/09 based on changes in the cost of living (see World Bank 2010).² However, the reference food poverty basket used in the calculations was updated in 2010/11, in 2012/13, and in 2015. Updating the food basket is appropriate when consumption patterns of poor households change substantially. Thus, revising the basket over a short period (say, every two to three years) runs the risk of moving the reference standard of living associated with the poverty line. By moving this threshold, that is, moving the goalposts, the definition of what defines an unacceptable level of consumption changes, leading to inconsistent poverty estimates over time.³

There are two additional concerns in using the official estimates to track poverty over time. First, the caloric tables that were used to estimate the cost per calorie associated with the food poverty line were updated with the last three rounds of the HIECS. Second, there were substantial changes in the way the welfare aggregate was calculated in 2015 that make it noncomparable with the aggregates obtained in previous years. The welfare aggregate in 2015 contained an adjustment for housing services that increased the comparability of households that were under different rental schemes. It also included a correction in the valuation of food items that were available for households with a smartcard to be purchased at a fixed (lower) price. While these changes surely improve the consistency of the money-metric welfare measure to reliably rank households' living conditions, they were not applied to any of the previous rounds of the HIECS. Unfortunately, this raises the concern of how to compare living conditions when the actual measure used is not kept constant.

These findings provide the background for the analytical exercise presented in the second part of this chapter that seeks to answer the following question: What is the trend in poverty in Egypt between 2010 and 2015 if the estimations are anchored on the most recent households' consumption patterns?⁴ Our diagnostics apply the current (that is, recently revised) official measure of welfare to the last three rounds of household surveys available. Comparable poverty lines and poverty rates in Egypt are obtained by fixing the threshold of minimum consumption in the most recent data (2015).

As is noted below, applying comparable poverty lines led to different conclusions on the evolution of poverty than that presented in official publications. Results in this chapter show that 36.4 percent of the population was poor in 2010–11 a period marked by considerable uncertainty and upheavals. Subsequently, as Egypt moved to greater stability, poverty incidence declined to close to 30.4 percent in 2012–13 and 29.2 percent in 2015. This trend was accompanied by an increase in the share of the “near poor,” that is, those living between the lower and upper poverty lines. Moreover, poverty appears to have declined partly due to increases in social protection spending, especially the expansion of the food subsidy program that was introduced in the aftermath of the food price crisis. It is important to note that under this consistent methodology, the levels of poverty are estimated to be higher than official poverty estimates for 2010/11 and 2012/13.

A series of broad diagnostics that help present a more detailed picture of the characteristics of the poor and vulnerable in Egypt complement the analysis. We find that regional disparities in welfare are an enduring feature of the country landscape. We also note that the observed decreases in poverty in the country are mainly driven by changes in poverty in Upper Egypt. In turn, these decreases appear to be linked to a strong expansion of the food smartcard program, especially among the poor; increased transfers; and remittances received from abroad.

The findings presented in the second half of the chapter are not intended to replace the official poverty estimates for each year. They are intended to fill an important knowledge gap that was first identified in World Bank (2015) regarding a comparable poverty series for Egypt that uses a fixed poverty line to measure poverty over time.

Welfare and Poverty Measurement Using the HIECS 2015

In conducting the analyses below, we have used as a basis the CAPMAS approach to measure welfare and poverty, but throughout we describe and include a few adjustments to incorporate current best practices and ensure greater comparability across the households included in the analysis. We begin by describing the different components included in the welfare aggregate, both for the food and nonfood items. Next, we describe the CBN approach used to estimate the food and lower poverty lines. The findings use the HIECS 2015 as it is the most recent household survey available in Egypt at time of the writing.⁵

Welfare measurement

The approach uses a consumption expenditure–based welfare aggregate as a straightforward addition food and nonfood expenditures.⁶ The source data on expenditures are the different modules from the HIECS 2015, with the welfare aggregate calculated in annualized terms. Food purchases are recorded based on a two-week recall period. Thus, for food items, the expenditures recorded in the survey are

multiplied by a factor of 26 to get annual estimates. Food expenditures include all purchases of food to consume at home, as well as food purchased outside in places like restaurants, cafés, or canteens. Meanwhile, nonfood expenditures include, among other things, clothing, services, furniture, vehicles, medicines, transportation services, and education. The recall period varies across nonfood items, but it is mostly 1 month or 12 months. Thus, nonfood items are annualized using adjustment factors that vary according to the reference period of the relevant section.

There are two important adjustments that the methodology of measuring welfare should consider in the calculations of households' (consumption) expenditure: the valuation of subsidized food items and the housing services.⁷ We describe each of these next.

FOOD SUBSIDIES

The proper estimation of a money-metric value of household welfare requires an accurate valuation of the benefits a household derives from the goods and services it consumes. Typically, this valuation can be directly obtained from the expenditures of the household in several items. A household that spends 100 Egyptian pounds (LE) on foodstuffs in the market and consumes them, the welfare of its members is assumed to have increased by exactly LE 100.

The proper measurement of welfare becomes more complex as many of the goods consumed by the household are affected by regulation that changes the prices faced by some households. The provision of subsidies for certain goods is a common example. Two consequences emerge when certain foods are subsidized to a specific group of the population. First, there is a segment of the population (the subsidized-food beneficiaries) whose out-of-pocket expenses to purchase a certain good are less than the market reference price of that good. Second, the valuation of welfare across households becomes less straightforward. As households pay different prices for the same good, using the expenditure approach to measure welfare would incorrectly imply that two households consuming the same good enjoy different welfare levels. In such cases, adjustments to the evaluation of welfare derived from subsidized items is recommended.

In Egypt, there is a long history of food subsidies, starting at the end of World War II. Traditionally, households in Egypt that satisfy certain criteria were given a ration card that allowed them to purchase specified items, up to a certain quantity, at a much lower price than the ongoing market price. The quantities allowed are defined on a per capita basis. While several changes have been made to the food subsidies system, by 2012/13 there were still several items that certain households could enjoy at a subsidized price. The list of subsidized food items include rice, wheat flour, pasta, edible oil, sugar, and tea. In 2014, a major overhaul of the subsidy system took place. As a result, in short, starting in 2015 ration card holders were assigned LE 15 per person per month and could use this transfer to purchase from a list of approved items at government-regulated prices. The list of items included all the food items from the quota system and many others. Beneficiaries could purchase any of the items

in the list, and for each item purchased a deduction would be taken from their card, and they had to pay a corresponding fee (see annex table 1A.1). Special grocery stores, called “family stores”, carried the items available for purchase with the card and had special machines to make the deductions of the beneficiaries’ cards. Crucially, the items in these stores were available for all households purchasing at the stores. If a household who did not have a ration card, it could still purchase the items in the family stores by paying the appropriate price (equivalent to the addition of the smartcard deduction and the out-of-pocket expense). Anecdotal evidence hinted that some households did purchase them, but the items were considered to be of lesser quality than other available brands in the market.

The HIECS 2015 recorded all the items that were obtained with the card among all ration card holders. To get at an appropriate valuation of these items, we use the combination of the reported deduction and out of pocket expenses as the “welfare value.” The sum of these two amounts represents the total value of the items being consumed by the household. Since these items are available to other households, they also represent a valuation that is comparable across households for all the foodstuffs listed in the ration list. Any quantities that were purchased using bread points were also valued at this amount (adding the deduction and out of pocket expense).⁸ Finally, if the same type of items were purchased in the market (without using the ration card) they were treated as nonsubsidized items, and their market price was used to estimate the associated welfare value.

HOUSING SERVICES

Housing services is a key component in the calculation of the welfare aggregate. While the value of housing services as a share of households’ total consumption expenditures varies across countries, numerous studies show that it is nonnegligible and can be anywhere from 13.7 percent to over 23 percent.⁹ Housing services reflect, in monetary terms, the flow of services that the household receives from occupying its dwelling. These services are not equivalent to the purchase value of the dwelling, but the dwelling characteristics influence the value of such services.

Typically, the rental value of the dwelling can be used as a proxy for the flow of services the household is obtaining from the dwelling. This approach, however, presents two problems. First, households who own the dwellings they inhabit, or that are received as a gift (or employee benefit), cannot provide information on the rental paid. The second problem is that housing regulations can severely affect the observed values as recorded in households’ surveys. For instance, rent controls or other type of regulations can artificially depress the rental value of a dwelling, making it a poor measure of the actual value of the services its inhabitants obtain. These measures can then bias the estimates of welfare when they are added to the households’ consumption expenditure.

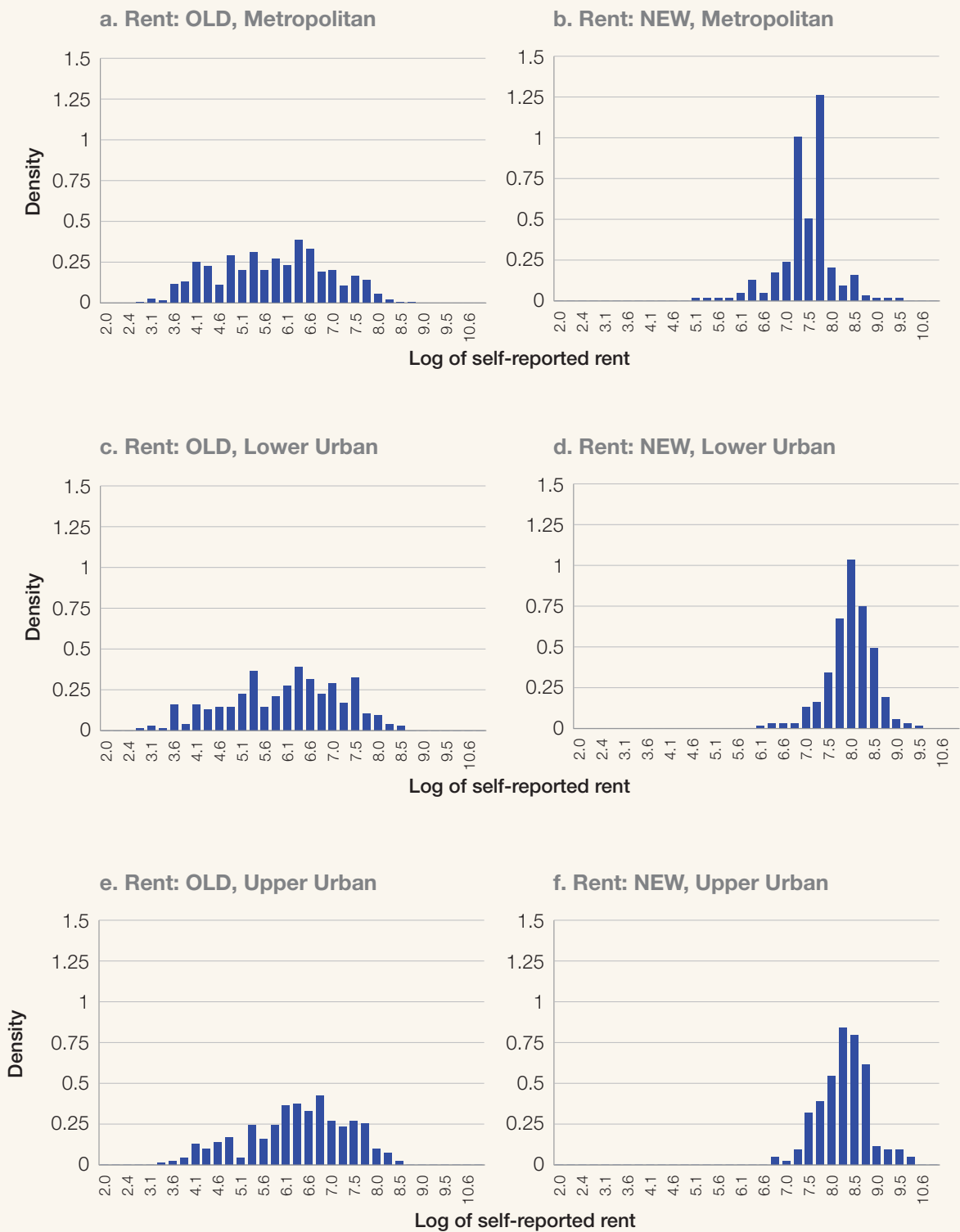
The HIECS 2015 provides very detailed information on dwelling ownership status and associated values. The survey allows us to differentiate across ownership status (owner, tenants, and in-kind recipients) and registers the amount of rent paid by tenants. Owners and in-kind recipients are asked

to self-report an estimate of the rental value of the property if they would actually renting the dwelling. The HIECS also collects information on several dwelling characteristics including size, number of rooms, materials of the floor and walls, and so forth.

In regard to the first issue of the typical approach to measure housing services, the information collected in the HIECS provides a possible solution. The information collected on a “hypothetical” value of rent for owners and in-kind tenants allows us to adapt the approach to measure housing services. The recorded self-reported value can be used as a proxy of what the rental value of the property would be if the household living in it paid rent. Thus, in the case of owners and in-kind tenants, the welfare from housing services can be approximated using the self-reported hypothetical rent.

As highlighted in Lara Ibarra et al. (2017), rental regulation in Egypt presents a particular difficulty for evaluating the housing services of a group of the tenant population. In Egypt, tenants in the present day are found to belong to either of two rent systems: the old law or new law. The old rent system is based on the law no. 49/1977. Similar to rent control in other parts of the world, this law is highly restrictive in the amount that can be charged in rents to tenants and how much the rent amount can increase over time. The new rent system is more market oriented, with rents being much higher than the old system and changing more often. Using the self-reported rental data collected in the HIECS 2015, it becomes evident that households under the old rent law pay substantially less than households renting under the new law in all the regions in Egypt. As shown in figure 1.3, the distribution of reported rents for renters under the old law (top panel) is shifted to the left vis-à-vis the distribution of those under the new law (bottom panel).

Figure 1.3. Distribution of Log of Self-Reported Rent across Regions and Living Situations in Selected Regions, Egypt 2012/13



Source: Lara Ibarra, Mendiratta, and Vishwanath (2017).

Notes: Rent-OLD refers to subsidized tenants and Rent-NEW refers to tenants under the new rent law. X-axis presents the logarithm of the monthly rent as reported by the households in HIECS 2012/13. Y-axis presents the density function of log of rents within each region.

Poverty measurement

The methodology to measure poverty uses the CBN approach. This approach defined a poverty line for each household, taking into account each household's location, size, and age and gender composition. The implementation of this approach followed two steps:¹⁰

Step 1. Create a household- and region-specific food poverty line

- Using tables from the World Health Organization (WHO), caloric needs were separately specified for urban and rural individuals, by gender and 13 age categories. For example, for men over 18 years of age an average weight of 70 kilograms and for women 60 kilograms were assumed.¹¹ Urban individuals were assumed to need 1.8 times the average basal metabolic rate (BMR) and rural individuals were assumed to need twice the average BMR. By adding the caloric requirements of all individuals in the household, a household-specific caloric requirement was obtained (called k_h).
- Using the nominal consumption expenditure per capita distribution, households in the bottom 40 percent were identified and labeled as the reference group. For households in the reference group, total quantities consumed of all food items (vector Z_r) were calculated to define the reference poverty food bundle. Next, using calories-per-food-item information,¹² the associated total calories of the reference bundle Z_r were calculated (called k_r).
- The value of the reference bundle Z_r was determined by the cost of purchasing the items belonging to the bundle in each region. That is, for each region, unit values were calculated for each food item and each household. The regional average unit value would then be applied to each item to obtain its representative value in the region. Adding the representative value of each item in the bundle within each region provided the value of the reference bundle.
- The region-specific cost per calorie of the consumption bundle Z_r is obtained by dividing the region-specific value of the reference bundle by the total calories in the bundle (k_r).
- The final household-specific food poverty line (*Foodline*) is obtained by multiplying each household's caloric requirements by the region-specific per-calorie cost.

Step 2. Estimate the nonfood poverty line using an application of Engel's law

- A region-specific Engel regression is run with all households in the region as observations. The dependent variable of the regression is the households' food share of expenditures,¹³ while the independent variables included the logarithm of the ratio of total household expenditures and the food poverty line, the square of this logarithm, the logarithm of household size and its square, the share of children, adult males and adult females.

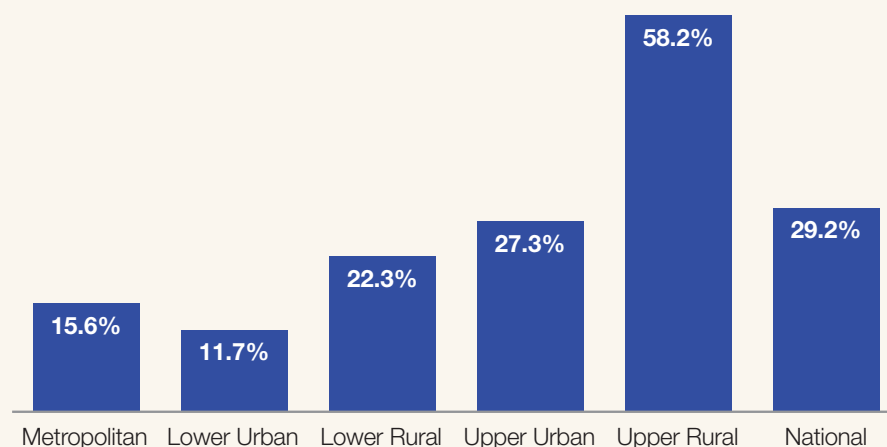
- For each household, the share of food expenditure for households whose total expenditure is equivalent to the food poverty line was estimated. That is, using the Engel regression's estimates (coefficients), a prediction was obtained (\hat{f}_s) for each household under the assumption that total expenditure was equal to the food poverty line.
- Finally, the total poverty line associated with each household was obtained by applying the following formula: $Povline = (2 - \hat{f}_h) Foodline$.

This approach yields household- and region-specific poverty lines,¹⁴ also called *lower* poverty lines. Households were classified as poor whenever the household's total consumption expenditure was below the estimated poverty line. Finally, the national poverty rates were estimated as the share of the population living in households whose total consumption expenditure was below its corresponding poverty line.

Poverty profiles in Egypt 2015

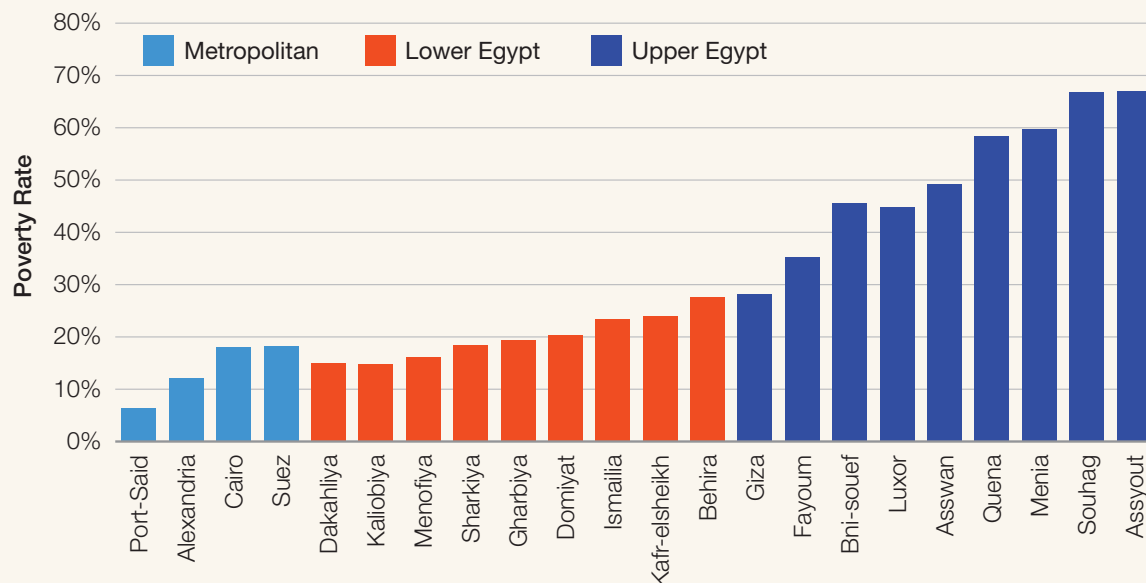
Using the welfare and poverty measurement methodologies just described, we find that regional disparities continue to be a feature of the welfare landscape in the country. In the Metropolitan area, average per capita consumption per annum was estimated at LE 12,370, which is about 20 percent higher than the average of households in the Urban Lower region (LE 10,068), and more than twice that of the residents in Rural Upper Egypt (LE 5,819). These differences, translate to varying degrees in the incidence of poverty. As shown in figure 1.4, the Metropolitan area and the Urban Lower regions register the lowest poverty rates at 15.6 and 11.7 percent, respectively. Meanwhile, Rural Upper Egypt showed a rate close to 58 percent, which is practically twice the national rate of 29.2 percent. When looking at the estimates at the governorate level, we find that they replicate closely the patterns shown in the greater regions (figure 1.5).

Figure 1.4. Poverty Rate in Egypt 2015, by Region



Source: Based on HIECS 2015 data.

Figure 1.5. Poverty Rates in Egypt 2015, by Governorates

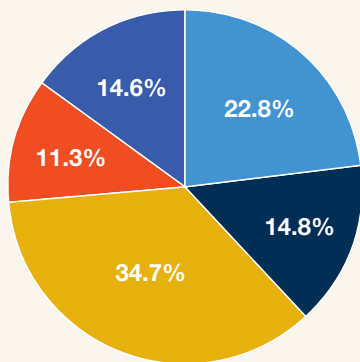


Source: Based on HIECS 2015 data.

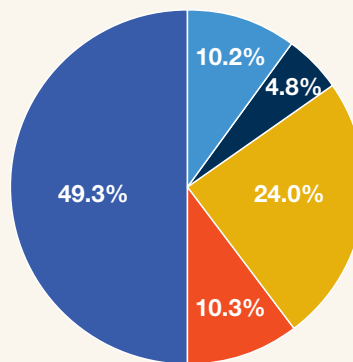
In line with these results, the poor population is highly concentrated in the Rural Upper region, with almost half of poor individuals living there. The region hosted only a quarter of the population in 2015 (figure 1.6). In contrast, the nonpoor population is somewhat evenly divided across all regions in Egypt, although they are slightly overrepresented in the Rural Lower region (34.7 percent) where about 31 percent of the population resides.

Figure 1.6. Distribution of the Population, by Poverty Status and Region

a. Distribution of nonpoor population



b. Distribution of poor population



Metropolitan Urban Lower Rural Lower Urban Upper Rural Upper

Source: Based on HIECS 2015 data.

Note: Border regions with less than 1 percent of population not shown.

Besides the levels of poverty, there is evidence of a certain degree of vulnerability among Egyptian households in terms of falling into poverty. As shown in table 1.1, an increase in the estimated poverty line of 5 percent would have yielded a national rate of 33.38 percent (a 4.1 percentage point increase). In Rural Upper Egypt, a similar increase in the poverty line would have led to a regional poverty rate of 63.86 percent, or a 5.8 percentage point increase. Notably, poverty rates are also sensible to hypothetical decreases in the poverty line. These results point to the fact that an important share of households are situated very close to the threshold needed to satisfy their needs, and they may at a high risk of falling into poverty when faced a single negative shock (such as losing a job or falling ill).

Table 1.1. Sensitivity of Poverty Rates when Varying the Poverty Line, by Region

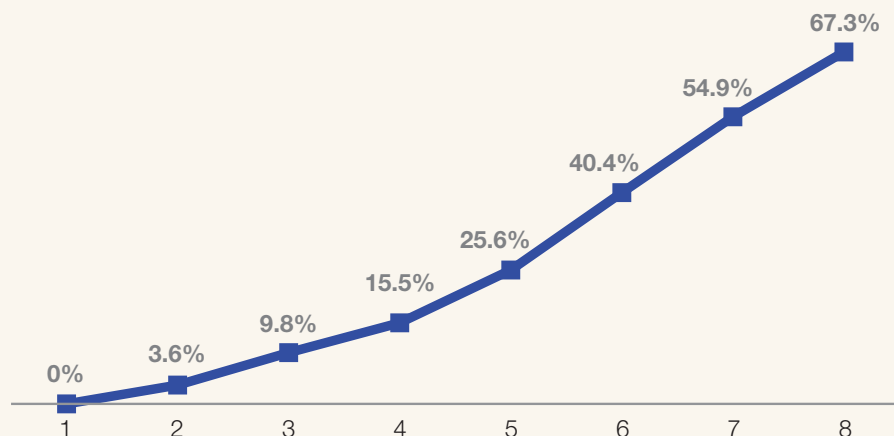
	Poverty line -10%	Poverty line -5%	Poverty line	Poverty line +5%	Poverty line +10%
Metropolitan	9.76	12.87	15.59	18.62	22.76
Urban Lower	7.01	8.45	11.71	13.98	18.13
Rural Lower	13.06	17.73	22.27	26.54	32.17
Urban Upper	19.50	23.18	27.31	31.78	35.71
Rural Upper	47.04	53.02	58.20	63.86	68.16
TOTAL	20.92	25.10	29.24	33.38	38.03

Source: Based on HIECS 2015 data.

Note: Border regions not shown.

As expected, poverty rates were found to be correlated with several demographic and economic characteristics. For instance, larger households tend to have higher levels of poverty (figure 1.7), and households with more educated heads or spouses tend to have lower rates (table 1.2). In terms of economic characteristics, there is evidence that the employment status and sector of the household head is also linked to the incidence of poverty (table 1.3). Households whose head is working in the government and public enterprises show levels of poverty much lower than the national average: 16.3 percent and 9.9 percent, respectively. Households where the head is unemployed register a poverty rate of 21 percent. However, one of the highest rates is found among households whose head works outside the formal sector: 38.6 percent. This rate is particularly important as it may hint at high levels of destitution that force individuals to take very-low paying jobs, while some share of those who are unemployed are able to weather better the wait for another job.

Figure 1.7. Poverty Rate by Household Size



Source: Based on HIECS 2015 data.

Notes: Category 8 contains households that have eight members or more.

Table 1.2. Poverty Rates by Education of Head or Spouse in Household, 2015

Maximum education of head or spouse	%
Less than primary	33.07
Primary certificate	24.89
Preparatory/secondary	21.89
Post-secondary	10.06
Technical studies	18.14
University or higher	4.8

Source: Based on HIECS 2015 data.

Table 1.3. Poverty Rates by Sector of Employment of the Household Head, 2015

Sector	%
Government	16.3
Public enterprise	9.9
Private sector	19.4
Outside formal	38.6
Unemployed	21.0

Source: Based on HIECS 2015 data.

Note: Other sectors of employment (not shown) with low shares of the labor force include private investments, NGOs, joint ventures, and cooperatives.

Incidentally, the HIECS 2015 confirmed information from other sources in regard to the labor market. A few points are worth noting. First, female labor force participation severely lags behind that of males. Among individuals who are 18–65 years old, 72 percent of females are out of the labor force and only 23 percent are employed. The corresponding figures for males are 18.2 percent and 78.7 percent. Second, the gender imbalances are present across all regions of Egypt. While females represent half of the population, they account for only between a fifth and a quarter of the employed population (among those 18 years old or older) in each region. Finally, at least 15 percent of the employed individuals work by themselves, and almost a third of the workforce is employed in microenterprises of 2–4 people. Firms with 5–9 people account for another 10 percent of the workforce.

Nonmonetary Dimensions of Poverty

In terms of access to services, the HIECS 2015 improved substantially with respect to previous rounds. Going further than capturing answers to basic access-to-services questions, the HIECS also captured information along the quality of services margin. We present here results for water, sanitation, and electricity services.

More than 90 percent of Egyptian households have water services through a tap inside the house, 3.5 percent of households have access to a tap outside of the dwelling, and about 2.6 percent of households have no access at all. There is a positive correlation between access to water and poverty incidence. Poverty rates among those with a tap inside the dwelling were 27.9 percent, while those with a tap outside and no access showed higher rates: 53.5 percent and 28.8 percent, respectively. Along the quality margin, it is notable that many households (within those who have a tap inside the dwelling) reported issues with the service. As shown in table 1.4, close to 10 percent of households declare having daily cutoffs of the water, and about 50 percent of households have issues at least once a week. Connectivity issues seem to be correlated with location as well. A higher proportion of households reporting frequent cutouts are more likely to be found in rural regions than in urban areas.

Table 1.4. Distribution of Households with Tap Water inside the Dwelling, by Frequency of Cutoff and Region of Residence

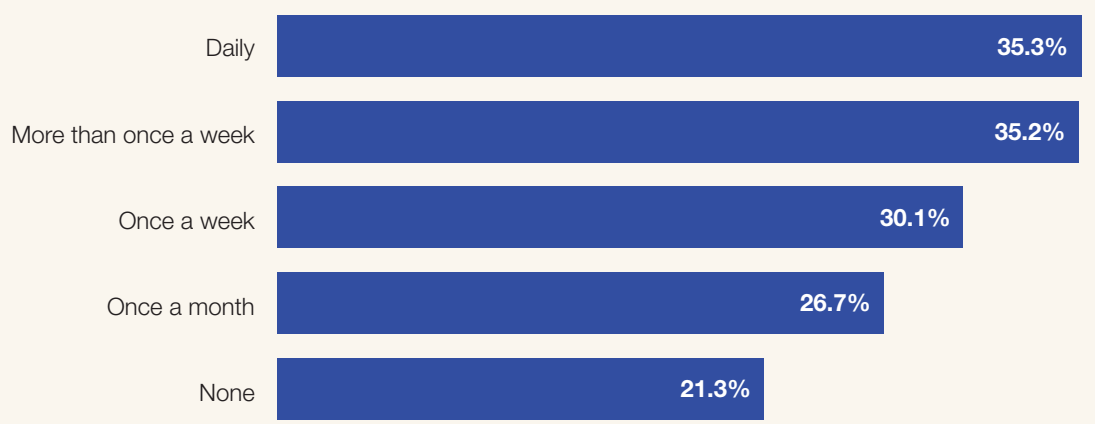
	Metropolitan	Urban Lower	Rural Lower	Urban Upper	Rural Upper	TOTAL
None	12.7	4.1	5.1	3.9	3.1	29.0
Once a month	5.4	2.7	5.1	2.4	3.0	18.6
Once a week	1.7	3.3	9.0	2.3	4.4	20.8
More than once a week	1.3	2.0	9.2	1.9	6.4	21.7
Daily	0.9	1.0	2.7	1.3	3.7	9.9
TOTAL	21.9	13.2	31.1	11.8	20.7	100

Source: Based on HIECS 2015 data.

Notes: The total column includes the distribution of border regions (not shown).

Similarly, poverty rates vary across households with different qualities of water services. Figure 1.8 shows that households that do not report issues with their water connection have a 21.3 percent poverty rate, almost half of the rate found among households that report having daily water cutoffs.

Figure 1.8. Poverty Rate by Quality of Access to Water, among Households with Tap inside the Dwelling



Source: Based on HIECS 2015 data.

In terms of sanitation, the HIECS 2015 also collected information on the frequency of seepage of the network to which the dwelling had access. Around 57 percent of the population is connected to the public network, 20 percent is connected to a trench, 11 percent of households have a cesspool, and another 10 percent is connected to the civil network (table 1.5). Among those with a public network connection, the majority reports not having any seepage, but around 18 percent of them still presents problems of seepage at least once a month. The issue of quality is relatively more frequent among those connected to other forms of sanitation services. For instance, about a third of all households connected to a trench declared having experienced a seepage at least once a month in 2015.

Table 1.5. Distribution of Households by Access to the Sanitation Network and Frequency of Seepage

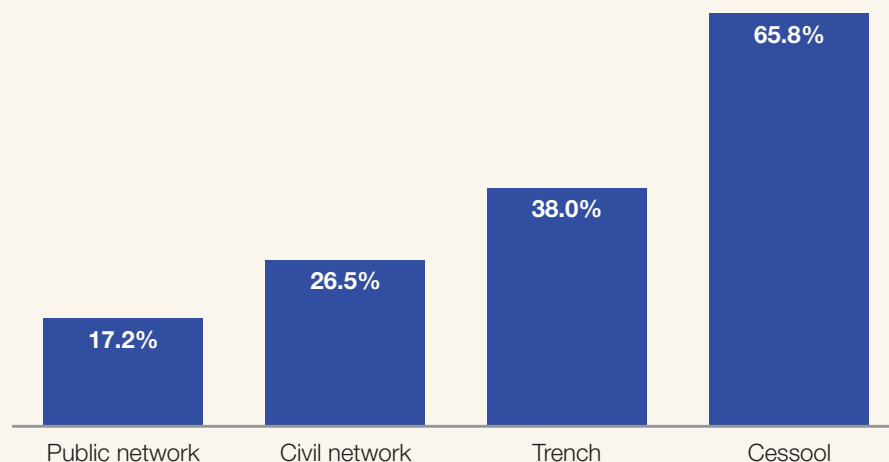
	Public network	Civil network	Trench	Cesspool	Other	TOTAL
No seepage	46.8	4.8	14.3	8.7	1.1	75.8
Once a month	6.9	3.1	4.4	1.9	0.2	16.6
Once a week	2.3	1.2	0.8	0.2	0.1	4.5
Daily	1.2	0.9	0.4	0.1	0.1	2.6
TOTAL	57.4	10.1	20.1	11.0	1.5	100.0

Source: Based on HIECS 2015 data.

Note: Totals may be off due to rounding, a small fraction of households with no access to sanitation, and nonresponse.

Poverty rates among households that use cesspools are the highest, with almost two-thirds of individuals being considered poor (figure 1.9). Households that are connected to trenches (38.0 percent) and to the civil network (26.5 percent) show lower rates. Finally, households that received sanitation services through the public network show the lowest incidence of poverty at 17.2 percent.

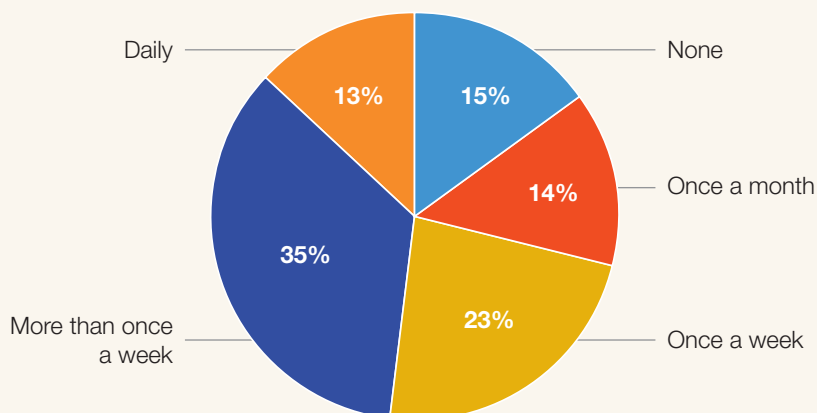
Figure 1.9. Poverty Rates by Access to Sanitation Services



Source: Based on HIECS 2015 data.

For access to electricity, the HIECS 2015 collects information on the primary means of lighting. More than 99 percent of the population receives electricity in their homes. There are, however, important differences in the quality of the service received. As shown in figure 1.10, about a third of households experienced an electricity cutoff more than once a week and about 13 percent experienced cuts daily. Moreover, higher quality of electricity service is negatively correlated with the incidence of poverty (table 1.6). For instance, households that experience daily cutoffs show poverty rates of 35.3 percent.

Figure 1.10. Distribution of Households by Frequency of Electricity Cutoffs



Source: Based on HIECS 2015 data.

Table 1.6. Poverty Rates among Households with Access to Electricity, by Frequency of Cutoffs

Frequency	Poverty rate (%)
None	21.33
Once a month	23.19
Once a week	29.54
More than once a week	32.4
Daily	35.34
TOTAL	29.24

Source: Based on HIECS 2015 data.

An interesting finding emerges when we look at the distribution of households and their experience with different qualities of electricity service and their place of residence. Households that experience blackouts more than once a week are very likely to be in rural areas (table 1.7). In fact, rural households represent about 70 percent of all households that experienced the lowest quality of electricity of service (with cutoffs of more than once a week or daily). As a comparison, these regions account for 56 percent of the country's population.

Table 1.7. Distribution of Households by Frequency of Electricity Cutoffs and Region of Residence

	Metropolitan	Urban Lower	Rural Lower	Urban Upper	Rural Upper	TOTAL
None	6.05	2.07	2.74	2.11	1.98	15.24
Once a month	4.65	2.17	2.5	2.24	2.03	14.16
Once a week	5.08	3.46	6.83	2.56	4.37	22.52
More than once a week	3.56	3.93	14.99	2.92	9.19	34.88
Daily	1.37	1.09	4.79	1.47	4.42	13.2
TOTAL	20.71	12.72	31.85	11.30	22.01	100

Source: Based on HIECS 2015 data.

Notes: The includes the distribution of border regions (not shown).

Education Profile

Before moving into the inequality profile, there are a few additional points worth highlighting with respect to poverty and the level of education in Egypt. As noted, the education level in the household is negatively correlated with the incidence of poverty. Thus, households whose head (or spouse) have achieved a university degree or higher are much less likely to be poor (4.8 percent) than those households where the maximum level of education of the head (or spouse) is less than primary (33 percent). This important relationship can be further explored thanks to new information collected in the HIECS 2015. Here we use information on the educational attainment of fathers and mothers for all members of the household as collected in the survey.

There has been an increase in the average educational attainment of Egyptian individuals. This is evident when we compare the distribution of only household heads (that is, an older generation) with the distribution of the overall population for which this information is collected. While 41 percent of household heads attained less than primary, the share in the overall population over 18 years old is 35 percent. There are also higher concentrations on the share of the adult population attaining at least a secondary or upper intermediate education (13.8 percent) than among household heads (6.6 percent), and the rate of those obtaining at least a university degree is the same across both groups (table 1.8).

Table 1.8. Distribution of the Population by Educational Attainment, all Adults and Only Household Heads, by Percent

Frequency	All adults >18yo	Only heads
Less than primary	35.44	41.37
Primary, no intermediate	7.86	9.07
Secondary/upper intermediate	13.78	6.64
Postsecondary	3.49	4.39
Technical	26.11	25.03
University or higher	13.33	13.50
TOTAL	100	100

Source: Based on HIECS 2015 data.

Egypt experienced a leap in education between the previous and the current generation, but the poor population seems to not have fully reaped the benefits from it. Table 1.9 shows the distribution of individuals at least 25 years old based on the education of their father. The share of those individuals without a primary level diploma was half of that of their fathers. Those with a university degree reached 14.5 percent compared to 3.9 percent among their fathers. The transitions within the poor population were less impressive. Among the poor, more than 90 percent of the father's generation did not have a primary diploma, whereas for the current generation the rate is still 60 percent.¹⁵

Among all groups, the educational level that observed the largest increases was secondary level technical certificate. HIECS data show that the share of the population that achieved this level of education increased almost fivefold between the current generation and their fathers' generation. Among the poor, attainment at this level increased more than 11 times, whereas in rural Upper Egypt the increase was about 7.5 times. This increase in the educational attainment is a remarkable achievement and consistent with the government's policy. It is worrisome, however, that multiple studies have found that either due to the surge in the number of workers with these degrees and/or the poor quality of technical training provided, the labor market returns tend to be very low for these graduates.

As has been found in many other contexts, there is a strong correlation between the education of the parents and the education of their children. For instance, about 80 percent of individuals 25 years or older reported a father with less than a primary school education. Among this group, 50 percent attained the same level of education and only 7.9 percent were able to achieve at least a university education. In contrast, among the individuals whose father had attained a university degree, a full 74 percent attained the same education.¹⁶ Unfortunately, the poor population and those residing in Upper Egypt appear to show stronger intergenerational correlations. Half of the individuals 25 years or older attained a higher level of education than their parents, but for the poor and those living in rural Upper Egypt, this rate was only 36.4 and 38.9 percent.¹⁷ Looking at the extremes of the educational distribution provide more evidence of the lack of mobility among the poorest.

Almost two-thirds (64.2 percent) of poor individuals in this generation whose father didn't graduate from primary had the same level of educational attainment, and only 4 percent were able to reach a university degree.¹⁸ This implies that the current generation of poor Egyptians have the same percentage of university degrees among Egyptians in the previous generation. At the top of the distribution, it is also evident that the offspring of highly educated individuals in rural Upper Egypt (and among the poor population) face barriers to achieve their parents' educational attainment. In Egypt, 74.4 percent of individuals whose fathers had a university degree also received one. In contrast, this rate is only 46.7 percent among the poor and 55.7 percent among individuals living in rural Upper Egypt.

Finally, poor women in Egypt are one of the groups with the lowest human capital accumulation (table 1.10) and thus are at a disadvantage to be able to become active participants in the labor market and have a sustainable path out of poverty. About 70 percent of the female poor population (among those 25 years old and older) do not have a primary level diploma, and less than 3 percent have a university degree or more. Moreover, this group shows low educational mobility; only around 28 percent of this population reached an educational level higher than that of their fathers; around three quarters of those whose father did not complete primary also did not attain this level, while only 3 percent of this group was able to achieve postsecondary education or more; and only a quarter of the women whose father had a university degree also attained this level of education. This rate, among the poor population as a whole was over 46 percent.

Table 1.9. Distribution of the Population 25 Years Old and Older Relative to the Education of Their Fathers

a. OVERALL POPULATION								
Individual's education	Father's education							TOTAL
	No primary	Primary	Preparatory	Secondary	Secondary tech.	Post-secondary	University	
No primary	40.48	0.43	0.26	0.08	0.2	0.03	0.05	41.53
Primary	6.68	0.39	0.21	0.06	0.19	0.03	0.06	7.61
Preparatory	4.01	0.29	0.21	0.03	0.11	0.05	0.05	4.75
Secondary	1.14	0.17	0.1	0.04	0.17	0.02	0.14	1.78
Secondary tech.	19.77	1.88	1.43	0.31	1.87	0.22	0.46	25.94
Postsecondary	2.29	0.4	0.3	0.1	0.45	0.09	0.26	3.89
Univ. or higher	6.38	0.93	0.81	0.54	2.35	0.56	2.93	14.5
TOTAL	80.76	4.49	3.31	1.16	5.33	1	3.94	100

b. POOR POPULATION								
Individual's education	Father's education							TOTAL
	No primary	Primary	Preparatory	Secondary	Secondary tech.	Post-secondary	University	
No primary	59.7	0.5	0.32	0.04	0.16	0.01	0.02	60.74
Primary	7.03	0.21	0.17	0.05	0.12	0.01	0.02	7.62
Preparatory	3.82	0.17	0.2	0.04	0.09	0	0.07	4.38
Secondary	1.19	0.07	0.02	0.01	0.02	0.04	0.04	1.39
Secondary tech.	17.34	1.01	0.69	0.18	0.88	0.19	0.12	20.41
Postsecondary	1.13	0.09	0.04	0.01	0.1	0.01	0.05	1.44
Univ. or higher	2.76	0.17	0.08	0.06	0.49	0.18	0.28	4.02
TOTAL	92.97	2.23	1.51	0.4	1.85	0.44	0.6	100

c. RURAL UPPER EGYPT								
Individual's education	Father's education							TOTAL
	No primary	Primary	Preparatory	Secondary	Secondary tech.	Post-secondary	University	
No primary	56.76	0.29	0.17	0.05	0.19	0.06	0.04	57.56
Primary	6.2	0.12	0.08	0.01	0.12	0.03	0.03	6.6
Preparatory	3.75	0.1	0.08	0.05	0.11	0	0.03	4.13
Secondary	1.22	0.11	0.06	0	0.1	0.04	0.04	1.58
Secondary tech.	18.08	1.01	0.74	0.15	1.21	0.27	0.22	21.67
Postsecondary	1.74	0.09	0.08	0	0.31	0.04	0.13	2.39
Univ. or higher	3.95	0.2	0.2	0.09	0.8	0.24	0.59	6.07
TOTAL	91.71	1.93	1.41	0.35	2.85	0.68	1.06	100

Source: Based on HIECS 2015.

Table 1.10. Distribution of the Female Poor Population 25 Years Old and Older Relative to the Education of Their Fathers

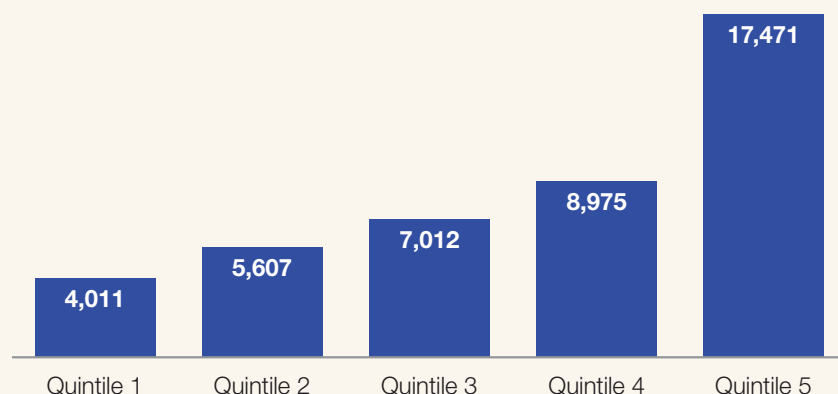
Individual's Education	Father's education							TOTAL
	No primary	Primary	Preparatory	Secondary	Secondary tech.	Post-secondary	University	
No primary	68.77	0.6	0.36	0.05	0.25	0.02	0	70.06
Primary	5.31	0.24	0.24	0.05	0.08	0.02	0	5.95
Preparatory	3.07	0.21	0.03	0.05	0.15	0	0.11	3.62
Secondary	0.71	0.1	0.02	0.02	0.03	0.03	0.03	0.94
Secondary tech.	12.8	1.01	0.5	0.19	1.02	0.14	0.19	15.86
Postsecondary	0.58	0.06	0	0	0.12	0.02	0.02	0.8
Univ. or higher	1.86	0.17	0.13	0.03	0.36	0.12	0.11	2.78
TOTAL	93.1	2.39	1.29	0.39	2.02	0.35	0.45	100

Source: Based on HIECS 2015.

Inequality

Besides poverty, we also use the HIECS 2015 to estimate inequality measures. To study this, we define the population in quintiles based on the distribution of the consumption per capita. As shown in figure 1.11, there is substantial variation in terms of the consumption of households across Egypt. The poorest households, located in the first quintile, show an average consumption per capita of just above LE 4,000 per year. Households in the second quintile registered an average consumption per capita of just over LE 5,600. Meanwhile, the richest quintile had an average consumption per capita of 17,471 which is 4.3 times higher than the average of households located in the first quintile. This ratio is 3.12 for the second quintile. It is interesting to note, however, that the overall inequality as measured by the Gini index is 0.307. This level has been considered low when compared to other countries within the MENA region, as well as compared to others with similar levels of development.¹⁹

Figure 1.11. Average Consumption per Capita (Annualized) by Consumption Quintile



Source: Based on HIECS 2015 data.

Finally, table 1.11 presents some of the characteristics of households by quintile. In line with previous studies, richer households are typically smaller and have lower dependency rates. By looking at the ownership rates of assets, we also find important differences across households at different levels of consumption. For instance, the vast majority of households have a satellite dish (93 percent) in their home, about a third have a personal computer, 10 percent of households have an air conditioning unit, and just under 8 percent of households own a car. It is evident that ownership of uncommon assets is much more concentrated among the richest households (figure 1.12). For instance, satellite dish ownership is balanced across the consumption distribution. In contrast, about half of all AC units in Egypt are owned by the richest quintile—with the first decile owning 7 percent. Moreover, almost three-quarters of all cars owned in Egypt belong to the richest quintile. As a comparison, the bottom 40 percent of households own around 4 percent of cars in the country.

We now turn to the findings on the comparable poverty trends in Egypt for the period 2010–15. The methodology described in this section has the added benefit of being able to be closely reproduced in previous rounds of the HIECS, and thus allows for a clean comparison of welfare and poverty in recent years.

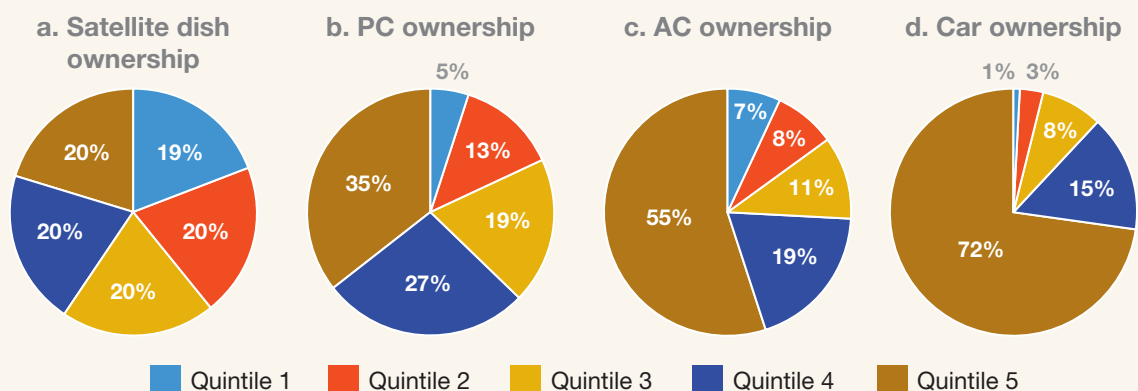
Table 1.11. Characteristics of Households in 2015, by Consumption per Capita Quintile

Quintile	Household size	Dependency rate	Ownership rate of					
			Car	Smartphone	AC	Heater	Dish	PC
1	6.6	0.49	0.47	6.7	3.82	2.24	89.9	9.23
2	5.49	0.43	1.36	11.43	4.12	4.67	93.6	22.41
3	5.05	0.38	3.02	20.63	6.2	7.19	94.57	33.08
4	4.47	0.32	6.11	28.07	10.07	9.8	95.06	46.09
5	3.72	0.26	28.77	47.75	29.84	17.74	95.42	59.3
TOTAL	5.07	0.38	7.94	22.91	10.81	8.33	93.71	34.02

Source: Based on HIECS 2015 data.

Note: Ownership rates shows the percentages of households that own the stated asset (label in column) within the group listed in the row. PC stands for personal computer. AC represents an air conditioner unit.

Figure 1.12. Distribution of Asset Ownership across Consumption per Capita Quintiles, among Households Who Own the Article



Source: Based on HIECS 2015 data.

Note: PC stands for personal computer. AC represents an air conditioner unit.

Building Comparable Poverty Trends

The events that occurred in the past decade in Egypt have potentially had major effects on the welfare of households. To understand the extent of the impact of these shocks on the evolution of poverty, it is necessary to analyze a consistent time-comparable trend. As already explained, the full reestimation of poverty measurement methodology for each round of HIECS limits the comparability of official poverty rates over time. Thus, we apply a revised version of the approach originally implemented in World Bank (2015) to create comparable trends. Using the latest rounds of the HIECS, this section provides comparable poverty lines and poverty rates in Egypt for the years 2010/11, 2012/13, and 2015.

Poverty trends

Poverty trends rest on the definition of a poverty line that stays constant in real value: any adjustments made reflect only changes in the cost of living. This implementation ensures that the threshold of what is considered a minimum standard of living (that is, the poverty line) is constant across time and does not change. Unfortunately, official estimates allow the analysis of poverty only at a specific point in time.²⁰

To overcome the recognized limitations on comparability over time of official estimates, this study produced comparable poverty lines and poverty rates for the three most recent rounds available of the HIECS: 2010/11, 2012/13, and 2015. The methodology applied follows the approach described earlier in the chapter, thus incorporating several elements of the official approach (El-Laithy, Lokshin, and Banerji 2003) used by CAPMAS, but incorporating two key aspects to ensure comparability across time. First, we create a comparable welfare measure for all the HIECS rounds. In 2015, calculations of welfare included a specific approach to account for housing services (that is, the welfare that results from the flow of services the household receives from living in a dwelling) and an adjustment for subsidized items. In earlier rounds of the HIECS, CAPMAS welfare estimates had taken at face value the reported rent from all types of occupants as the money-metric housing services component of the welfare aggregate. However, this created an issue of noncomparability between tenants that were renting under different regulations. In Egypt, strong rental market regulation lead to a dual rental market, where a nonnegligible share of tenants pay very low rents for dwellings that are, across many characteristics, similar to the dwellings of other tenants that are not covered by this law. A hedonic model is used to correct for this difference. A second feature that was incorporated was the adjustment for subsidized food items. In 2014, there was an overhaul of the smartcard program in Egypt. This implied that households were no longer entitled to a quota of certain food items, but would now have LE 15 per person per month to purchased items at a “family store” at subsidized prices determined by a ministerial decree. To appropriately account for the value of these items, their welfare value took

into account both the smartcard deduction from the purchased items as well as the out-of-pocket expenditures required at the time of purchase. Unfortunately, the publication of the 2015 estimates were not accompanied by a revision of the official poverty estimations of previous years. As these corrections were incorporated only in 2015, the welfare measure used in the poverty estimations was effectively noncomparable across years.

We address this issue of noncomparability in the following way (box 1.1). We first apply a hedonic model that allows for the correction of the valuation of housing services for tenants under the rental regulations. This step basically implies developing a prediction model for the rent that a household would pay based on the characteristics of the dwelling in which it resides. We use this predictive model to correct for the rent-control tenants, as well as for some outliers.²¹ For the case of subsidized items, we first define the set of goods that were available at a subsidized price. These items included rice, wheat flour, pasta, edible oil, sugar, and tea. Previous to the 2014 reform, households that owned a smartcard were able to purchase these items at a discounted price. Once their quota was depleted, they would be able to purchase them at the ongoing market price. All households that did not have a smartcard would purchase these items at the market price. Thus, to create a comparable measure of the welfare obtained from these items, we adjusted upward the welfare value assigned to each of these items when they were purchased using the smartcard. The adjustment would be enough to account for the same value as if the item would have been purchased in the market.²²

The second aspect in which the methodology used here differs from the official one is that a comparable poverty line is used to estimate poverty rates. The methodology is an updated version of the approach used in World Bank (2015).²³ To do this, we rely on the estimations that anchor the poverty line estimations obtained in the 2015 round (that is the region-specific cost per calorie for the food component and the Engel regression estimates for the nonfood as described earlier in the chapter) and calculate what would be the corresponding food poverty line for all households in each HIECS round. This can be done as all the necessary information on demographics, caloric needs, and food share in expenditures is available for all households in our data. Finally, we reevaluate each household's welfare aggregate by using a region-specific consumer price index (CPI) as an inflation factor. For instance, the welfare of a household observed in 2012/13 is "inflated" to get an estimate of its value in 2015 prices using the region CPI of where that household resided in the HIECS.²⁴ By comparing households' welfare valued in 2015 prices to the poverty line (obtained with 2015 as anchor) provides a comparable poverty rate estimate and a consistent poverty trend for all rounds in the HIECS.²⁵

Box 1.1. Adjustments Incorporated into the Welfare Measure for HIECS 2010/11 and 2012/13

Given the changes incorporated in the official welfare measure in the 2015 estimates, the team produced a comparable welfare measure for the previous HIECS. First, the distribution of rent values declared by tenants under and out of the rental regulation of 1977 are quite different than other types of tenants. Tenants under the old rent law typically pay much lower rents than those under the new, although the dwellings where they reside have many similar characteristics and are located in the same areas as dwellings that fall outside the purview of this law (Lara Ibarra, Mendiratta, and Vishwanath 2017). To correct for this, a predictive model for rental values (a hedonic model) was estimated for each round of the HIECS. The model uses the dwelling characteristics, such as access to water, material of floors and walls, and so forth as a way to predict what would be the rental value of a certain dwelling. By using this model, we correct the housing services estimate for households under the old rent law. Other corrections included the correction for outliers (reported rents that substantially deviate from the rental value distribution) and a correction for owner's pride (where respondents typically overestimate the potential value of the dwelling they inhabit due to a strong attachment).

The second correction applied in earlier HIECS include the adjustment of the welfare valuation of subsidized food items. Data from 2012/13 showed that households were purchasing the same food item at two different prices (table B1.1). For instance, households with a smartcard could purchase 1 kilogram of rice at LE 1.5, while households without the card would purchase the same amount at LE 3.5 in the market. Thus, a potential comparability issue may arise if the welfare obtained from the same kilogram of rice is valued at the price they pay. To prevent this, the team obtained a market reference price for all food items that were available for smartcard holders. To account for regional variation, a region-specific reference price was calculated for each of the seven regions in Egypt. To address potential issues of differences in quality, the reference price was obtained from median of the lowest 40 percent implicit prices (unit value) paid by all households that purchased the item in that region. This reference price was then applied to all the quantities purchased of the six food items using the smartcard. This approach then ensured comparability in the welfare measure used to rank households.

Table B1.1.1. Comparison of Subsidized and Market Prices in 2012/13, Selected Food Items

Unit value	Rice	Wheat flour	Pasta (macaroni)	Edible oil	Sugar	Tea
Subsidized	1.5	0.6	1.5	3	1.25	16
Market purchased	3.5	3.5	4	10	5	37.5

Source: Based on HIECS 2012/13.

Note: Only households with a smartcard had access to items at the subsidized price. Market purchased shows a national average.

Data

The calculation of the poverty trends builds on various rounds of the HIECS, namely the 2010/11 (50 percent sample), 2012/13 (100 percent sample), and 2015 (50 percent sample) rounds. A few details of each of these rounds are presented in this section and in table 1.12.

The HIECS is the key instrument to monitor households' income, consumption, and living conditions. Collected for more than 20 years, the HIECS has consistently captured information on households' composition, dwelling characteristics, ownership of assets indicators, heads' and spouses' characteristics, and household expenditure and income. Expenditures on food are calculated using a 15-day diary, while nonfood item expenditures are collected through recall. The HIECS also collected information on individual-level characteristics related to migration, education, labor, and health.²⁶ The most recent HIECS rounds have used data from the 2006 population census as the sampling frame. The survey has produced indicators that are representative at the national, urban/rural, and regional level. Seven regions have always been included in the HIECS: Metropolitan, Urban Lower, Rural Lower, Urban Upper, Rural Upper, Border Urban, and Border Rural.

The HIECS 2010/11 was conducted between July 2010 and June 2011 and was planned to be the first HIECS representative at the governorate level. This round also included in the sampling strategy two governorates that had not been included in the previous rounds: Hewlan and 6th October. Hewlan, a governorate previously belonging to the Cairo governorate, was designated by presidential decree to Lower Egypt. The 6th October governorate was designated as part of the Upper Egypt region.²⁷ Due to the country's situation during this period, the total sample collected was roughly half of what was collected in the previous round. The survey was carried out for a sample of approximately 26,500 households. This round contained around 10,000 households that were considered "panel households"²⁸ and 16,000 households that were interviewed for the first time. The analysis presented here uses a 50 percent random sample of the nonpanel households, with randomization applied at the Primary Sampling Unit level.

The HIECS 2012/13 was conducted between July 2012 and June 2013. It collected information on 24,863 households. From this total, 16,094 households were interviewed for the first time ("new households") and 8,769 belong to the panel. The analysis includes data from the full sample of households who had valid information (approximately 15,000 households).

The HIECS 2015 is the latest round available of the survey. The data collection was done for the first time within the annual calendar; households were interviewed between January and December 2015. About 24,000 households were interviewed in this round, of which about 2,000 households belonged to the panel component. The data collection in the HIECS 2015 differed from previous rounds in the following way: data on food consumption was collected for 15 days in two separate weeks in the year. Previously, a diary of 15 consecutive days was used to estimate food consumption. In this round, one 7-day diary was used during the first week of data collection. The household was then visited a second time approximately six months later. During this second visit another 7-day diary was collected to complement the information on food expenditures.

Table 1.12. HIECS Data Used for Calculating Poverty Trends

HIECS round	Available sample size	Coverage/representativeness
2010/11	7,719*	National, regional, and governorate level
2012/13	15,057	National, regional, and governorate level
2015	11,988*	National, regional, and governorate level

Source: Compiled from official documentation and literature review.

* Refers to the 50 percent sample of the household survey data that was made available to the team.

The microdata from different rounds was made available in response to specific requests of the team through the technical assistance program and thanks to CAPMAS's evolution in recent years to make their data accessible to selected researchers. For instance, the partnership between CAPMAS and the Economic Research Forum is a commendable effort, but has only been able to put a harmonized version of a 50 percent sample of the HIECS rounds online.²⁹ CAPMAS has also developed its microdata catalog site, but the dissemination strategy seems to be limited for non-Arabic users and is also limited to a 50 percent sample of the survey. CAPMAS should do more to move its open-data agenda forward. The richness of the information collected in the HIECS can make the most impact and help the policy dialogue when it is shared with a larger community of researchers, academics, and development partners.

Results

Using the data from HIECS and the methodology just described, we calculated poverty lines with the same real value in the period 2010/11–2015, as well as the corresponding poverty rates of the Egyptian population. Table 1.13 shows the estimated per capita poverty line by region and for the entire country. Figure 1.13 shows the estimated poverty rate trend for the period 2010/11 through 2015. In 2010/11, it is estimated that about 36.4 percent of the population was in poverty. The national poverty rate decreased between 2010/11 and 2012/13, dropping to 30.4 percent. After this period, a further slight decrease in poverty is observed, with poverty falling 1.2 percentage points and estimated to be 29.2 percent in the most recent survey period.

Other poverty measures describe a similar outcome (table 1.14): the poverty gap fell from 7.8 percent to 6.1 percent between 2010/11 and 2012/13, whereas the severity of poverty dropped from 2.5 percent to 1.8 percent. It is notable that, in the latter period, the fall in the headcount rate were not accompanied by drops in the other poverty measures. This may reflect the fact that only households that were very close to the poverty line experienced an increase in living standards. Those further away from the threshold did not experienced any improvements.

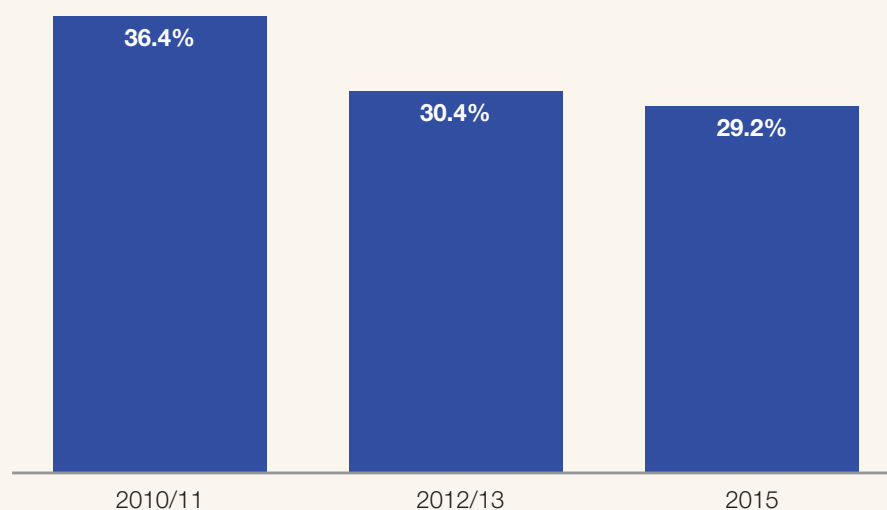
The trends shown in figure 1.13 contrast with the findings based on official measures. To better understand this decreasing trend, especially in a period where economic and political shocks were happening, we now look into the diagnostics section.

Table 1.13. Poverty Lines per Capita Holding the Real Value Constant across Time

	Total poverty line per capita		
	2010/11	2012/13	2015
Metropolitan	6,068	6,076	6,080
Urban Lower	5,608	5,588	5,630
Rural Lower	5,686	5,662	5,636
Urban Upper	5,746	5,700	5,728
Rural Upper	5,685	5,665	5,677
TOTAL	5,763	5,735	5,748

Source: Own calculations using HIECS data.

Figure 1.13. National Poverty Rates, Egypt 2010/11–2015



Source: Based on HIECS data.

Table 1.14. Poverty Measures for Egypt, 2010/11–2015

	2010/11	2012/13	2015
Poverty headcount	36.4% (0.65)	30.4% (0.44)	29.2% (0.53)
Poverty gap	7.8%	6.1%	6.0%
Poverty gap squared (severity of poverty)	2.5%	1.8%	1.8%

Source: Based on HIECS data.

Note: Standard errors, based on simple sampling weights, for the poverty headcount are shown in parenthesis.

Diagnostics

This section presents a series of diagnostics of Egyptian households. Using data from the HIECS rounds, we show the evolution of consumption, profiles, and descriptive statistics for several groups of the population. Special emphasis is placed in understanding the evolution of welfare during these years, with an angle on the regional disparities, the vulnerability of households to fall back into poverty, and a hint of what can be explaining the drop in poverty.

In line with the poverty decreases already presented, Egyptian households appeared to have experienced increases in their real consumption during the period 2010/11–2015. The estimated growth incidence curves (GIC) for 2010–15 shows an increase across all households along the consumption distribution (figure 1.14, panel c).³⁰ The GIC is positively sloped, indicating that relatively richer households had higher growth rates than poorer households. Notably, there seems to be an important difference in the evolution of welfare between the 2010/11 through 2012/13 period and afterward. During the first period, the negatively-sloped GIC indicates that households in the bottom of the distribution fared well and better than those at the top of the distribution. In fact, the bottom 40 percent experienced an annual growth rate of 3.05 percent while the overall population's growth was only 1.37 percent (table 1.15). Poorer households fared worse in the period that followed: the bottom 20 percent of the households experienced a slight drop (-0.28 percent) in their consumption in real terms, whereas the bottom 40 percent average growth rate was 0.07 percent.

Table 1.15. Annual Growth Rates, Household per Capita Consumption by HIECS Round and Population Group

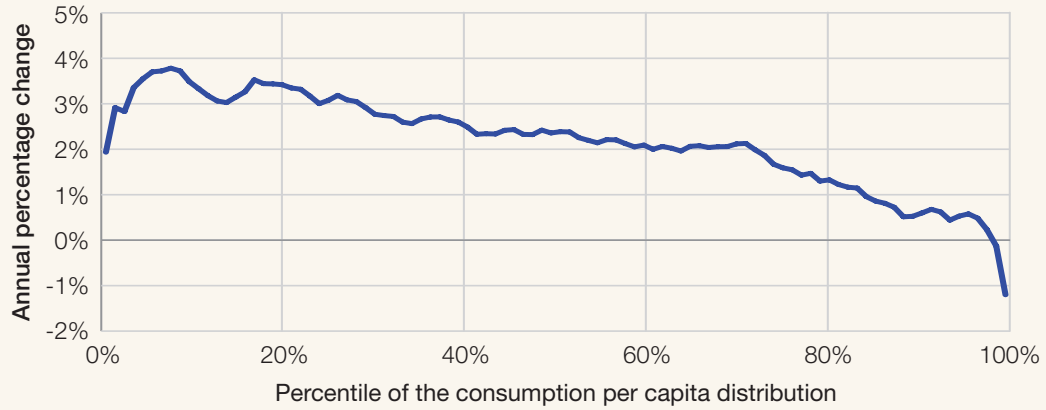
	2010/11–2012/13	2012/13–2015	2010/11–2015
Bottom 40%	3.05%	0.07%	1.38%
Overall population	1.37%	2.3%	1.89%

Source: Based on HIECS data.

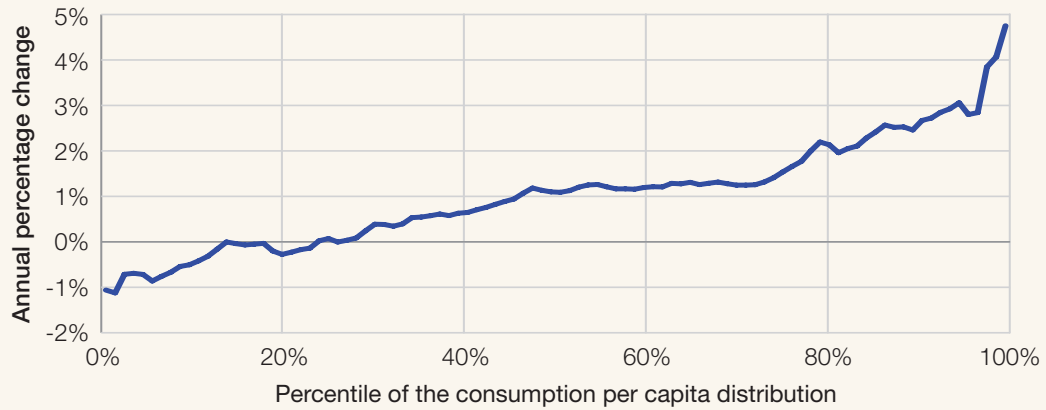
In line with these results, inequality measures showed a slight increase when we look at the overall period of 2010/11–2015 (table 1.16). In 2010/11, the consumption per capita of a household in the 90th (50th) percentile of the distribution was 1.97 (1.67) times that of a household located in the 50th (10th) percentile of the distribution. These ratios had barely changed in 2015. The Gini index also experienced a slight increase in the period.

Figure 1.14. Growth Incidence Curves, Egypt 2010/11–2015

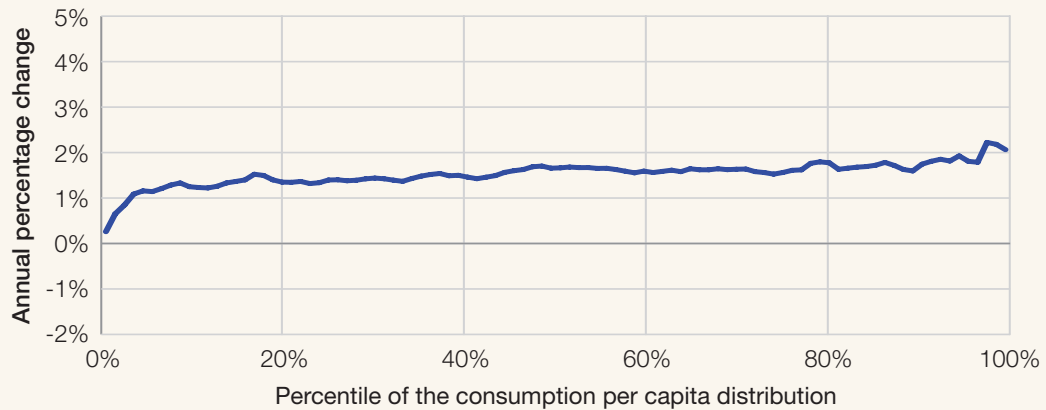
a. 2010/11–2012/13



b. 2012/13–2015



c. 2010/11–2015



Source: Based on HIECS.

Table 1.16. Inequality Estimate for Egypt, by HIECS Round

	2010/11	2012/13	2015
Ratio of the 90th / 50th percentile	1.97	1.9	1.98
Ratio of the 50th / 10th percentile	1.67	1.63	1.69
Gini index	29.6 (0.42)	28 (0.27)	30.8 (0.61)

Source: Based HIECS data.

Note: Percentiles refer to the distribution of consumption per capita. Jackknife standard errors in parenthesis for the Gini index.

Performing a Datt-Ravallion decomposition (Datt and Ravallion 1992) allows us to see the relationship between the evolution of poverty and inequality more clearly. As shown in table 1.17, redistribution played a significant role in the decrease in poverty after 2010, with growth in the economy playing a much smaller role. After 2012/13, growth is actually poverty reducing, but the redistribution actually acted as a counterweight, leading to an increase in poverty.

Table 1.17. Datt-Ravallion Decomposition for Headcount Index

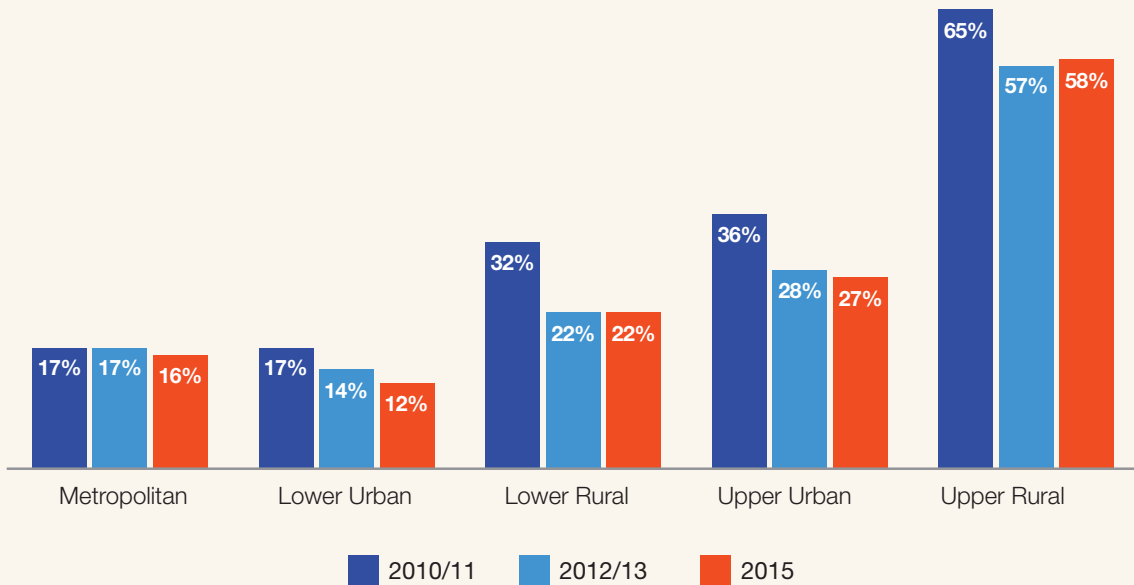
Period	Growth component	Redistribution component	Residual	Total change in poverty
2010/11–2012/13	-0.728	-5.335	0.056	-6.007
2012/13–2015	-2.698	1.173	0.357	-1.168
2010/11–2015	-3.539	-4.273	0.638	-7.174

Source: Calculations based HIECS 2010–2015 and on the methodology of Datt and Ravallion 1992.

The improvements in overall poverty were accompanied by high improvements in the most destitute regions. However, large regional disparities remain. In 2010/11, Upper Egypt showed the two highest poverty rates, with 36.1 percent in the urban areas and 65.5 percent in the rural areas. Thus, Upper Rural Egypt had a poverty rate more than 3.88 times that of the Metropolitan area (16.9 percent). By 2015, the poverty rates in Upper Egypt had gone down, as in other regions in the country, but remain worryingly high (figure 1.15). In Urban Upper Egypt, the poverty was 27.3 percent. In Rural Upper Egypt, more than half of the population was still considered poor. According to data from HIECS 2015, 58.2 percent of households were poor—a rate that is 3.73 times higher than that in the Metropolitan area.

It is not surprising that the poor population is overrepresented in Rural Upper Egypt. As shown in figure 1.16, the region has been and still is home to about a quarter of the Egyptian population. In contrast, about half of the poor population live in the region. In 2010/11, 47 percent of the poor lived in Rural Upper Egypt, and by 2015 the percentage was still estimated at 50 percent. These results hint at the importance for any poverty reduction strategy to prioritize improving living conditions in this part of the country.

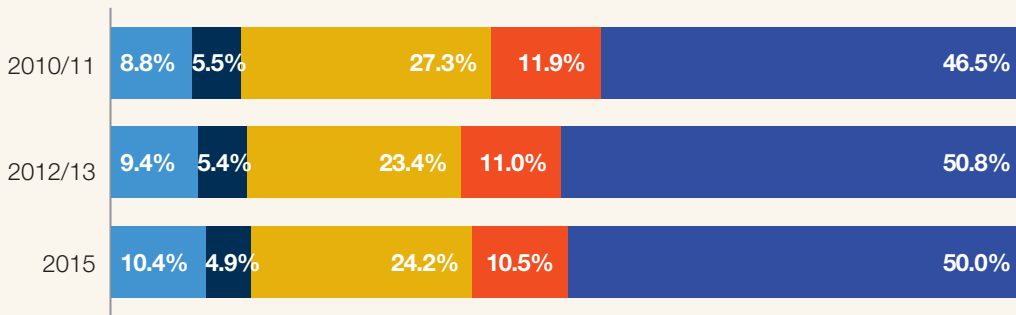
Figure 1.15. Regional Poverty Rates, Egypt 2010/11–2015



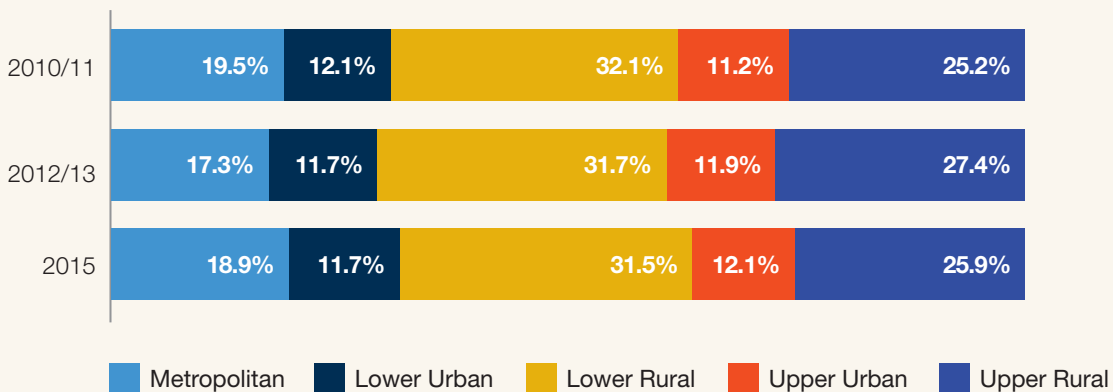
Source: Authors' calculations using HIECS data.

Figure 1.16. Distribution of the Population by Region

a. Poor population



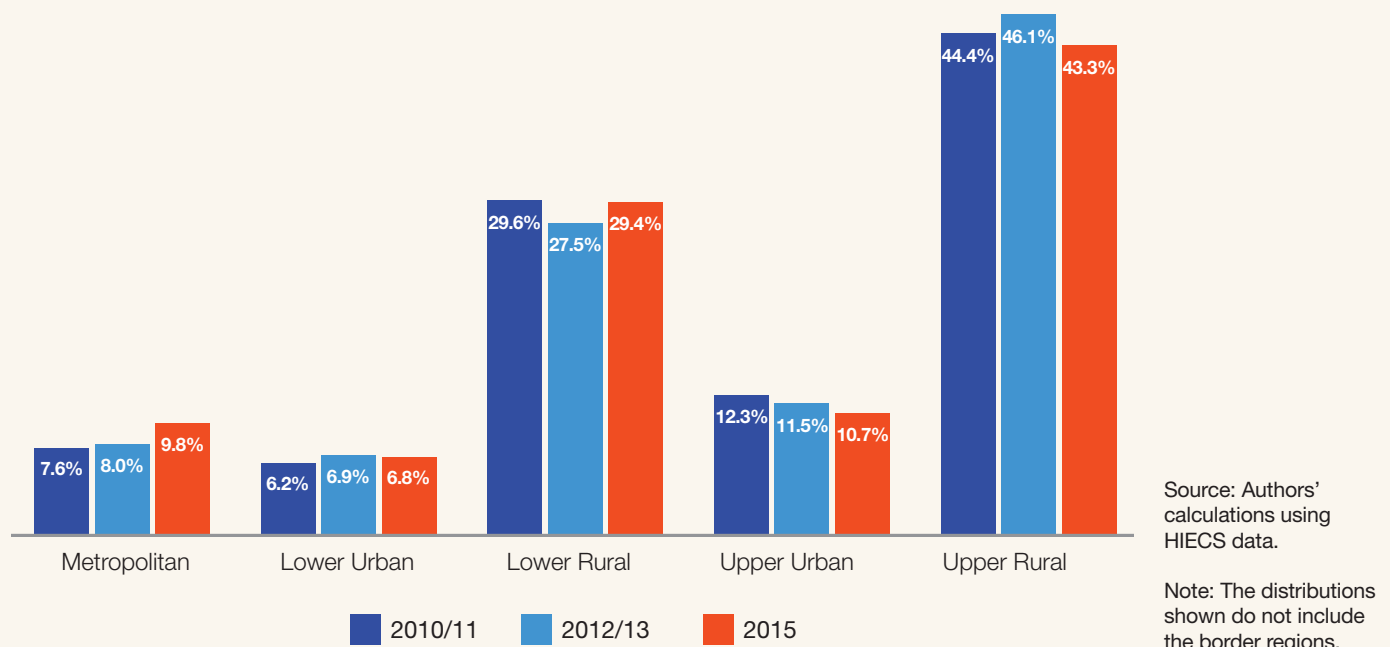
b. Overall population



Source: Based on HIECS data. The distributions shown do not include the border regions.

Similarly, the bottom 40 percent of the consumption per capita distribution appears to show little change over time (figure 1.17). The bottom of the population is highly concentrated in the rural areas of Egypt. In 2010/11, the rural areas hosted around 57 percent of the population, but more than 70 percent of the households belonging to the bottom 40 percent (30 percent in Rural Lower and 44 percent in Rural Upper Egypt). By 2015, these shares were practically unmoved: 72 percent of the households in the bottom 40 percent were living in rural Egypt. By far, the region with the highest concentration of households in the bottom of the distribution is Rural Upper Egypt (44 percent).

Figure 1.17. Distribution of the Bottom 40 Percent across Regions in Egypt



Accompanying these lingering regional disparities, the vulnerability faced by households of falling back into poverty is a recurring phenomenon. To see this, we calculate how the poverty rate would change due to small changes in the value of the poverty line. We repeat this exercise for all HIECS rounds of the analysis (table 1.18). In 2010/11, an increase of the estimated poverty line of 5 percent would have led to a national poverty rate of 40.9 percent (4.5 percentage points higher than the actual rate). A similar increase of the poverty line in the year 2012/13 would have led to an increase of 4.8 percentage points (going from 30.4 to 35.2 percent). In 2015, a similar increase in the poverty line would have yielded an increase in poverty of 4.2 percentage points. Higher hypothetical increases in the poverty would lead to even higher changes in the estimated poverty rates. A similar exercise where the value of the poverty line is *decreased* provides evidence that the poverty rate is also sensitive in this direction. Finally, poverty rates using an “upper poverty line” showed that the share of households not considered poor but that sacrifice some of their food needs for nonfood spending has gone up.³¹

This group, labeled the *near-poor* in World Bank (2010), represented 46 percent of households in 2010/11, increasing to 50 percent in 2012/13, and staying at 49.1 percent in 2015. These results point to the fact that a nonnegligible section of the population is very close to the poverty line. Thus, many households live close to what is considered the minimum living standard not be considered poor. Transitory shocks, even if small, make them likely to fall back into poverty very fast.

Table 1.18. Sensitivity of National Poverty Rates When Varying the Estimated Poverty Line

	2010/11	2012/13	2015
Rates at poverty line -10%	26.7	21.3	20.9
Rates at poverty line -5%	31.4	25.7	25.1
Poverty rate at poverty line	36.4	30.4	29.2
Rates at poverty line +5%	40.9	35.2	33.4
Rates at poverty line +10%	45.9	40.1	38.0

Source: Based on HIECS data.

Note: Benchmark shown in the middle in italics.

What Happened to Poverty in Rural Egypt?

As noted, social, economic, and political shocks all hit Egyptian households in recent years. These phenomena would have led to the intuitive finding in official estimates that poverty had been increasing during the period. However, applying a comparable methodology resulted in a decreasing poverty trend, and a large share of this decrease was the result of the poverty reduction observed in rural Egypt (figure 1.15). In this section we investigate further the potential explanations behind the observed drop in poverty.

Several factors appear to have contributed to the observed drop in poverty in rural Egypt. These factors seemed to have more than counterweighted the economic shocks that the country was experiencing after 2011. The availability of smartcards, remittances, and transfers seem to have helped households in rural Egypt. There is also some evidence that public employment continued increasing during the period, further helping increase the resilience of households in this part of the country.

Table 1.19 presents a series of summary statistics for 2010/11 and 2012/13 for households in Rural Egypt. The largest change is that of the percentage of households with a food smartcard: in 2010/11, 72 percent of households had a card, while over 91 percent of households did by 2012/13.³² The share of households receiving remittances increased between the two periods, as did the percentage of households receiving monetary transfers. Regarding the latter, the average monetary transfers received by these households also went up. In 2010/11 the average annual transfer was just over LE 6,248 (in 2015 prices). By 2012/13 this transfer was LE 8,013 (in 2015 prices). This means that, in real terms, these households' transfers increased an average 28 percent. As a comparison, the

average consumption per capita in rural Egypt was LE 7,230 in 2010/11 and LE 7,638 in 2015. Other indicators also present some evidence of resilience in this region that may help explain in part the decrease in poverty. Compared to 2010/11, in 2012/13 a higher percentage of the employed population worked in the public sector, the average schooling among heads is slightly higher, and a slightly higher percentage of heads benefit from pensions and/or social insurance.

Table 1.19. Characteristics of Households Residing in Rural Egypt, by HIECS Round

Characteristic	2012/13	2015
Percentage of heads employed in public sector*	18.8%	19.3%
Percentage of heads with less than primary	53.9%	53.2%
Percentage of head with at least a university degree	6.9%	7.9%
Food share in household expenditures	53.9%	50.7%
Percentage of heads benefitting from pension/social insurance	21.6%	22.5%
Percentage of households with a smartcard	72.4%	91.8%
Percentage of households receiving remittances	5.7%	6.6%
Percentage of households receiving monetary transfers**	48.4%	50.1%
Average monetary transfer (among those receiving, 2015 prices)	LE 6,248	LE 8,013

Source: Based on HIECS and Rural Lower and Rural Upper regions.

* Only among those employed.

** Includes government pensions, social insurance, social security pension, pensions from unions, transfers from abroad and within the country, religiously decreed support, and other transfers.

Table 1.20 produces characteristics similar to those in table 1.19, but only for poor households residing in rural Egypt. It is evident that the mitigation measures found for the population in rural Egypt are reproduced when we look at the poor population. Ownership of smartcards is almost universal among this population, while over 46 percent of the households receive some kind of monetary transfer. The average transfer also increased by 24 percent in real terms (from LE 4,836 to LE 5,999). These average transfers are particularly high if we consider that the average per capita consumption among these households was LE 4,577 in 2010/11 and LE 4,680 in 2012/13.

Table 1.20. Selected Characteristics of Poor Households Residing in Rural Egypt, by HIECS Round

Characteristic	2012/13	2015
Percentage of heads benefitting from pension/social insurance*	17.8%	18.0%
Percentage of households with a smartcard	78.4%	93%
Percentage of households receiving remittances	3.9%	4.4%
Percentage of households receiving monetary transfers**	44.9%	46.4%
Average monetary transfer (among those receiving, 2015 prices)	LE 4,836	LE 5,998

Source: Based on HIECS and Rural Lower and Rural Upper regions.

*Only among those employed.

**Includes government pensions, social insurance, social security pension, pensions from unions, transfers from abroad and within the country, religiously decreed support and other transfers.

Conclusions

This chapter contributes to the understanding of what has happened to poverty and its monitoring in Egypt in two major ways. First, it provides the first comprehensive description of the methodology that was used in official publications of welfare and poverty, while complementing it in ways that incorporate current good practices for better measurement of these indicators. Adjusting the methodology leads to small qualitative changes in the estimates of poverty (when compared to official rates) and replicate very well the regional disparities that are an enduring feature of the Egyptian landscape. Thus, the chapter provides a detailed profile of the poor in Egypt as of 2015, highlighting the correlation of poverty with other nonmonetary indicators such as access to basic services. The poor tend to live in dwellings of lower quality—they live in smaller dwellings and have higher overcrowding rates. More than 99 percent of the poor and nonpoor population have electricity, but among the former group 89.2 percent had cuts to their electricity service; a lower share (83.6) of nonpoor households had cuts to their service. In terms of water access, 4.5 percent of poor households do not have access to water (either inside or outside their dwelling) in contrast to 2.1 percent among the nonpoor. On sanitation, 41 percent of poor households are connected to a public or civic network, while 73 percent of nonpoor are, while 27 (24) percent of the poor (nonpoor) suffered from seepage of sewage water. Finally, an analysis of intergenerational mobility in education shows that the poor have been lagging in human capital accumulation and have benefitted disproportionately less than others from Egypt's recent investments in education.

As a second contribution, the chapter aims to answer the question of what has happened to the well-being of Egyptians in recent years, as measured by their poverty rates. To do this, we performed an analytical exercise to create comparable welfare aggregates and poverty lines across three rounds of HIECS data. This results in an absolute poverty line that is constant in real terms across time and allows the tracking of poverty in a way that allows to answer the question, What has happened to poverty in recent years? The answer is that poverty has decreased. The largest drop occurred between 2010/11 and 2012/13, apparently aided by a large increase in the share of households that received smartcards and, coupled with a slight increase in the share of households receiving monetary transfers, a substantial increase in the average transfers received by households.

ANNEX A: ITEMS AVAILABLE TO PURCHASE WITH THE RATION CARD

Table 1A.1 shows the list of items that per ministerial decree are available for purchase in “family stores” through the use of the households’ smartcard. The deduction from the family’s allotment as well as the out-of-pocket (OOP) payment are described for each item. The OOP is a co-pay that the household must pay to obtain the good.

Table 1A.1. List of Items Available for Purchase with the Ration Card

Item	Unit	Deduction from	2015
Rationed rice	1Kg	2.25	0.15
Sugar (sugarcane)	1Kg	4.5	0.25
Rice (premium)	1Kg	3.75	0.25
Flour	1Kg	3.6	0.15
Margarine	800g	7	0.25
Margarine	700g	30	1.5
Margarine	450g	4	0.25
Pasta/macaroni	350g	1.32	0.03
Pasta/macaroni	800g	2.9	0.1
Lentil	500g	3.35	0.15
Oil (sunflower)	1L (920g)	9.75	0.25
Oil (mix)	1L (920g)	8.45	0.25
Beans (foul canned)	1Kg	4.6	0.4
Tea (bond)	40g	1.3	0.05
Tea (arousa)	40g	1.3	0.05
Tea (alsafwa/captain tea)	40g	1.2	0.05
Tea (Lipton)	20g	0.72	0.03
Tomato paste/salsa (alrashidi/royal/Heinz/Qeha/Edfina)	320g	2.8	0.2
Tomato paste/sauce (alrashidi/royal/Heinz/Qeha/Edfina)	50g	0.72	0.02
Fish (tilapia)	1Kg	6.75	0.25
Meat (frozen)	1Kg	29	1
Poultry (frozen)	1Kg	14.25	0.75
Chicken breast	1Kg	17.5	0.5
Laundry detergent (automatic)	1Kg	6.9	0.35
Laundry detergent (regular)	1Kg	5.15	0.27
Chicken broth/stock (48 pieces)	1 pack	6	0.15
Soap 125g	1 piece	1.6	0.15
White cheese (plastic box)	1Kg	14.75	0.25

Item	Unit	Deduction from	2015
White cheese-double cream (plastic box)	1Kg	14.75	0.25
White cheese-baramli (plastic box)	1Kg	14.75	0.25
White cheese-Feta (plastic box)	1Kg	14.75	0.25
Cheese—Istanbuli (plastic box)	1Kg	14.75	0.25
Cheese (slightly salted) (paper carton box)	1Kg	11.6	0.4
Cheese—feta (paper carton box)	1Kg	11.6	0.4
Cheese—Istanbuli (paper carton box)	1Kg	11.6	0.4
White cheese—feta (Domty) (paper carton box)	500g	6.22	0.2
Cheese—Istanbuli (Domty) (paper carton box)	500g	6.22	0.2
White cheese (Domty) (paper carton box)	500g	6.22	0.2
White cheese—feta (Domty) (paper carton box)	250g	3.22	0.15
Cheese—Istanbuli (paper carton box)	250g	3.22	0.15
White cheese (Domty) (paper carton box)	250g	3.22	0.15
Cheese—Feta (Obourland) (paper carton box)	500g	6.8	0.2
Cheese—Istanbuli (Obourland) (paper carton box)	500g	6.8	0.2
White cheese (Obourland) (paper carton box)	500g	6.8	0.2
Cheese—Feta (Obourland) (paper carton box)	250g	3.5	0.15
Cheese—Istanbuli (Domety)(paper carton box)	250g	3.5	0.15
White cheese (Domty) (paper carton box)	250g	3.5	0.15
Tuna (Americana) (canned)	140gm	5.85	0.15
Milk (Almaraei)	1L	7.45	0.25
Milk (pouder) (Nido)	63g	3.85	0.15
Nescafé 3*1	1sachet	0.56	0.04
Clothes bleach (Clorox)	1L	2	0.1
Prepared meal	800g	11.5	0.25
Prepared meal (spicy)	800g	11.5	0.25

Note: OOP payment refers to the per unit out-of-pocket expense that the household needs to make for the purchase of an item in the list.

ANNEX B: POVERTY TRENDS USING AS ANCHOR THE 2005 ESTIMATION

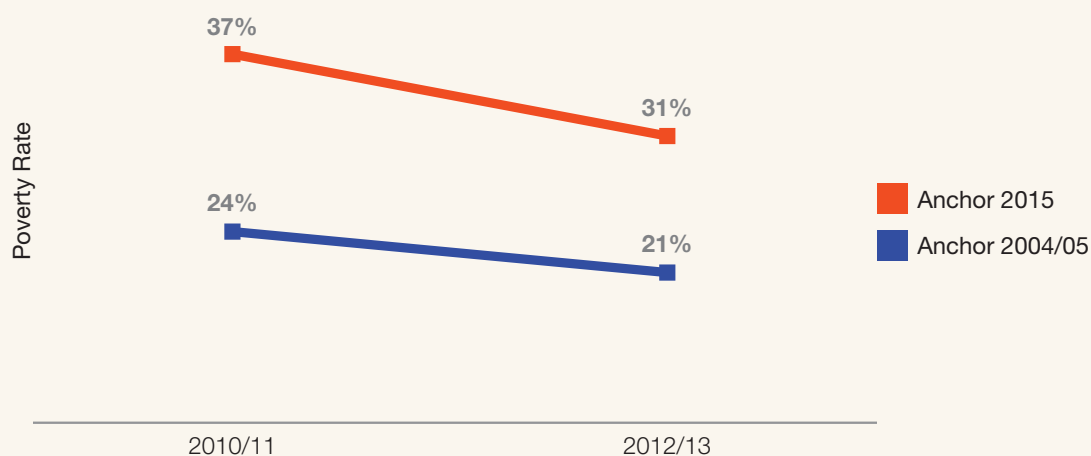
In World Bank (2015), the Egypt Systematic Country Diagnostic used as basis the 2005 HIECS round to calculate a comparable poverty line and poverty rate and estimate a trend in poverty rate for Egypt. In this type of exercise, the analysis needs to anchor the estimations in the results of a particular year (or round of a household survey) so that the real value of the threshold of minimum living standard is held constant. World Bank (2015) anchored the calculations in the then available data for the HIECS 2005, as well as the official welfare aggregate. This aggregate did not make any adjustments for housing services or subsidized food items, leading to potential issues of noncomparability across households.

The results presented here follow a similar approach to that in World Bank (2015) for the calculation of a poverty line whose value is held constant across time, but further make the necessary corrections for housing services and subsidized food items. It is important to compare the trends presented before and those presented now, when the anchor is 2015.

Figure 1B.1 shows the results of this comparison. It is evident that, regardless of the anchor used, a drop in poverty is observed. The most striking difference is that the levels of the poverty estimates differ, with those anchored in 2015 being much higher. The key reason underlying this difference is that the definition of the poverty threshold (i.e. the value that differentiates who is considered poor or not) varies depending of the level of development and the country context at the reference time period. In 2004/05, the anchor year used in World Bank (2015), the reference group that was used for the definition of the reference bundle is likely to be a relatively poorer group than the reference group that will be used when the anchor is the year 2015. This difference in the reference group has clear consequences for the associated cost per calorie and food poverty line used for the calculations of poverty.

Typically, as countries develop, households' incomes and consumption levels increase. Thus, the reference households observed in the 2015 HIECS are expected to be richer, to spend a lower share of their expenditures on food (due to the Engel law), buy more expensive calories, and spend relatively more in nonfood items. In turn, as the reference group used in the 2015 anchor is relatively richer, the threshold of what is considered poor will mechanically be higher than in the case where the reference is a (relatively poorer) group of households as those found in 2005. *Ceteris paribus*, a higher threshold that defines who is poor will lead to a higher poverty rate when we look at the same group of households. It should not be surprising then to find higher poverty rates when the anchor is 2015 than when it is 2004/05 as shown in figure 1B.1.

Figure 1B.1. Poverty Trends Anchored in Results from HIECS 2004/05 and 2015



Source: Based on HIECS.

Note: World Bank 2015 did not produce estimates for 2015.

To provide some evidence of the point made in figure 1B.1, table 1B.1 presents a comparison of the characteristics of both reference groups. As expected, the reference group for the 2004/05 calculations shows different characteristics from those of the group of 2015. The results from the anchor 2004/05 suggest a reference group that has lower standards of living: higher share of expenditures devoted to food, lower share of food expenditures devoted to more expensive calories (purchasing cereals instead of meats or vegetables), and less educated household heads (typically reflected in lower incomes).

Table 1B.1. Reference Group Characteristics, by Survey Year, Used as Anchor for Estimations

	Anchor 2004/05	Anchor 2015
Food share in household expenditures	54.5%	41.3%
Share of bread and cereals in food expenditures	17.7%	9.2%
Share of meat and fish in food expenditures	33.6%	36.5%
Share of vegetables in food expenditures	13.5%	17.3%
Age of household head	44.5	45.4
Illiteracy rate among household heads	44.16%	35%
Percentage of household heads with at least university degree	4.99%	4.98%

Source: Based on HIECS and sampling weights at the household level.

CHAPTER 2

THE MIDDLE CLASS IN EGYPT: SIZE, TRENDS, AND PROFILE

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Introduction

Within any society, the middle class is an important category of interest, not only because it is considered to be a driver of economic activity and thus vital to the economic development of a country, but also because it is an interest group influencing political and social life. Traditionally and compared to other groups, members of the middle class constitute a very broad stratum of the population, comprising people of varying professional, political, economic, social, and cultural backgrounds. Often, politicians count on the middle class as their main constituent and draw substantial support for policy positions from its members (Prasad et al. 2014).

According to the *Human Development Report 2016* (HDR), the middle class is expected to expand to 3.2 billion people in Asia and the Pacific and to 1.7 billion people elsewhere by 2030 (UNDP 2017). The HDR adopts a definition of the middle class as people earning or spending US\$10–100 a day in 2005 purchasing power parity (PPP) terms. Not only is the middle class growing in numbers, it is also growing in terms of median income. The HDR argues that the size and expansion of the middle class will have a significant impact on world growth path as well as the development of individual economies.

The literature points to the importance of assessing the size and profile of the middle class. First, middle-class citizens tend to value human capital accumulation and increased savings, which are critical for economic development, as they have the capacity to pay for a relatively high quality of education. Second, the middle class can also be a potent force for better governance and accountability, as its members are the main tax-payers (Birdsall, Graham, and Pettinato 2000). For Egypt, Kandil (2012) notes that the role of the middle class in the Egyptian uprising is crucial, because it was this group that overwhelmingly mobilized against Hosni Mubarak, with workers and peasants remaining, at least initially, on the sidelines.

This chapter is organized as follows. The following section investigates the size of the middle class in Egypt. The section provides some definitions of *middle class*, discusses the definition adopted for this report, and presents the size of middle class in 2015. The third section then presents the changes in the size of middle class during 2011–15 in Egypt. Finally, the fourth section describes the profile of the middle class in 2015, in terms of the members' demographic, education, and employment characteristics. It illustrates characteristics that distinguish the middle class from the poor and vulnerable.

Who Are in the Middle Class?

Throughout this chapter, households whose consumption expenditure lies within a certain range are called middle class. Definitions of middle class vary in their approaches to identifying thresholds that distinguish it from the affluent and the poor. However, there is no universally accepted definition of middle class nor is there a standard way to measure the middle class.

Successive Household Income, Expenditure, and Consumption Surveys (HIECSs) conducted by Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS) for 2010/11, 2012/13, and 2015 were used to calculate actual household consumption. The consumption measure we use is comprehensive in that it includes household expenditures on food and non-food items, as well as imputed values for consumption from own production valued at local market prices, imputed food subsidies, and an imputed value of the consumption streams from housing.

Definition of middle class

Much attention in the economics and sociology literature is given to the importance of a middle class for stability, social cohesion, and economic growth. This chapter focuses on the economic definition of middle class. However, even among economists, there is no consensus on the definition. For example, some researchers use relative measures, such as second, third, and fourth quintiles, to define middle class (Easterly 2001), while others use individuals earning between 75 and 125 percent of a society's median per capita income (Birdsall, Graham, and Pettinato 2000). Others use absolute terms, such as individuals with daily per capita expenditures of US\$2–4 or US\$6–10 PPP, which is widely used in developing countries (Banerjee and Duflo 2008). Others have combined relative and absolute measures.

Birdsall (2007) used a hybrid definition that combines the absolute and the relative approaches. According to Birdsall, the middle class includes individuals who consume the equivalent of US\$10 or more per day but who fall below the 90th percentile in the income distribution. Her rationale for using the absolute global threshold for the lower bound is that people with consumption below this level are just too poor to be middle class in any society, while her rationale for using the relative and local threshold is to exclude people who are rich in their own society.

Abo-Ismael and Sarangi (2013) adopted a definition that is closer to the heart of the concept of development as freedom and views the economic middle class in terms of the degrees of freedom or choices its members have in terms of consumption. More specifically, it defines the middle class of any society as a group of individuals whose level of consumption expenditure lies above an appropriately determined poverty line but whose level of consumption of nonessential goods and services is less than the value of that line. The more affluent members of society, on the other hand, can afford to spend a more generous portion of their income on items that are deemed luxurious or unnecessary relative to the basket of goods and services consumed by the neediest lower classes. Thus, the

middle class can be distinguished from three other economic categories; the poor, or those whose expenditure lies below an appropriately defined lower poverty line; the vulnerable (near poor), or those whose expenditure places them between the lower poverty line and the upper poverty line; and a third group of more affluent consumers, whose expenditure on nonessential goods exceeds the value of the lower poverty line. In contrast to the affluent class, the middle class does not adopt frivolous consumption habits and, in relation to the poor and vulnerable classes, the members have a higher degree of authority over their consumption choices and enjoy a higher economic status.

Abo-Ismael and Sarangi (2013) applied this approach to Egyptian household expenditure surveys from 1995 to 2011. They estimated that 49.8 percent of the Egyptian population was poor and vulnerable, 44.7 percent was in the middle class, and 7.1 percent in affluent class. The size of the middle class reached its peak in 2005 (51.8 percent) and declined afterward, to 44.7 percent in 2011.

For the purpose of this chapter, three approaches were explored to identify the middle class. The first approach is based on the vulnerability-to-poverty approach. It derives thresholds that distinguish the middle class from poor and rich classes by estimating the probability of transitions of households into and out of poverty, using the transitions estimated from a panel data analysis. The second approach explored is to define middle class using multiples of the poverty line. It is this approach that the chapter adopts. The third approach identifies the poor as those with daily per capita consumption less than US\$3 (adjusted by PPP), the vulnerable are those between US\$3 and US\$4, the lower-middle class as those with daily per capita consumption of between US\$4 and US\$6, and an upper-middle class with daily consumption of between US\$6 and US\$8. Those with consumption above US\$8 are considered affluent class (adjusted at purchasing power parity). Annex A provides more details and presents a comparison of these approaches.

This chapter adopts a multiples of poverty line approach to defining middle class in Egypt based on the absolute definition.³³ This approach defines people in the middle class as those with consumption between 1.3 times and 2.0 times the national poverty line. Accordingly, people can be classified into five groups as shown in table 2.1: poor, vulnerable, lower-middle class, upper-middle class, and affluent. Thresholds and size of each group are summarized in table 2.2.

Table 2.1. Definition of Economic Classes

CLASS 1	Poor people: whose consumption is less than the national poverty line
CLASS 2	Vulnerable people: whose consumption is between the poverty line and less than 1.3 times national poverty line
CLASS 3	Lower-middle class: whose consumption is between 1.33 and 1.67 of the national poverty line
CLASS 4	Upper-middle class: whose consumption is between 1.67 and twice the value of the national poverty line
CLASS 5	Affluent class: whose consumption is higher than twice the national poverty line

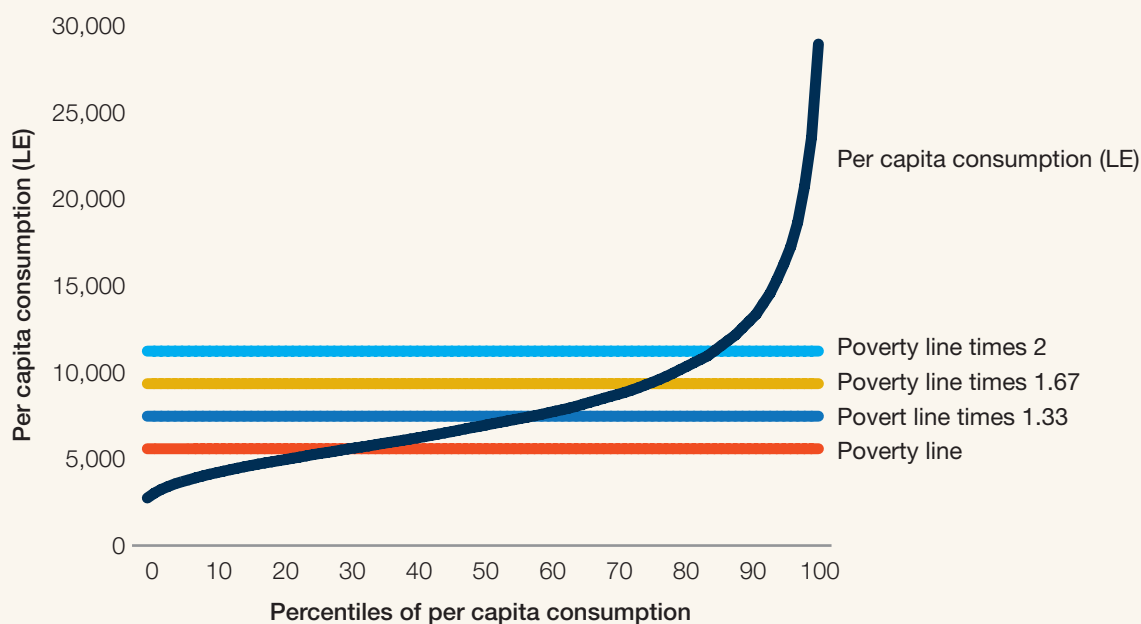
Table 2.2. Economic Classifications Based on Multiples of the National Poverty Line

	Thresholds used for classification (annual per capita consumption)	Percent
Poor	5636.4	27.8
Vulnerable	7515.1	28.7
Lower middle	9393.9	18.0
Upper middle	11272.7	10.0
Affluent class	more than 11272.7	15.5
TOTAL		100.0

Source: Based on HIECS 2015 and Rural Lower and Rural Upper regions.

Figure 2.1 shows the distribution of mean consumption per capita per year for percentiles, in 2015. The poverty line as well as the thresholds for vulnerable, the middle class, and the affluent class are drawn at respective points of the distribution. The Egyptian inequality is quite low (the Gini index is approximately 0.3), which is reflected in a relatively flat distribution curve; therefore, small change in consumption may yield large movements between classes.

Figure 2.1. Average per Capita Consumption by Percentiles

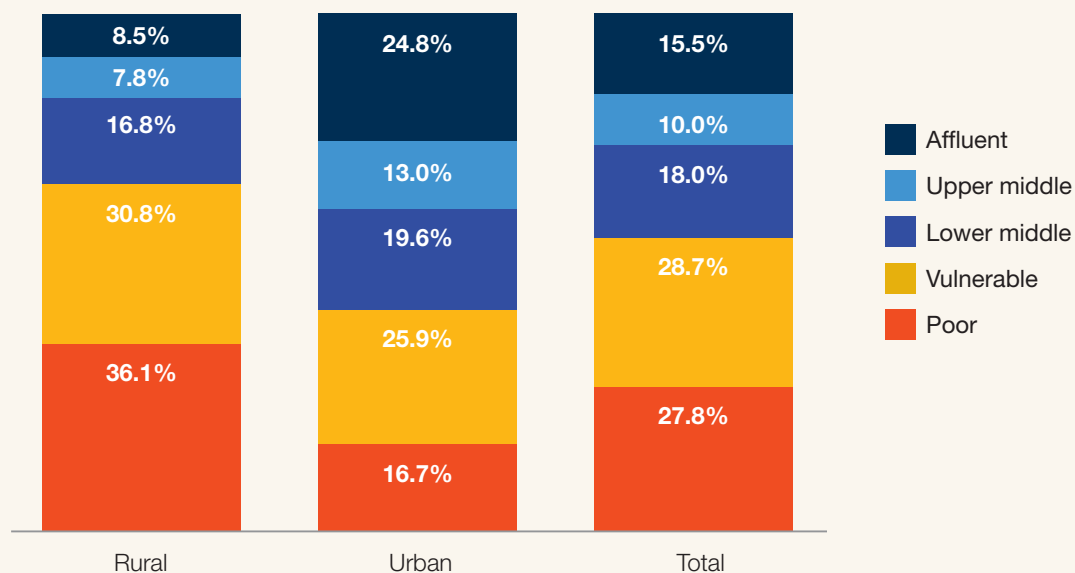


Note: Horizontal lines show the value of the poverty line, as well as the value of multiples of the line. The 1st and 100th percentiles of the distribution not shown for presentation purposes.

How large is the middle class?

Data presented in figure 2.2 show that the share of middle class in Egypt's population reached 28 percent in 2015 (almost 25.6 million people), whereas 18 percent are identified as the lower-middle group and 10 percent belong to upper-middle group. Vulnerable individuals represent 29 percent of the population, and almost 16 percent of the population is among the affluent group. These classes are not equally distributed by urban and rural areas. It is clear from figure 2.2 that the poor disproportionately reside in rural areas and the middle classes disproportionately reside in urban areas. The rural population is divided almost equally into three categories: poor, vulnerable and "middle," and "affluent class." Thirty-six percent of those residing in rural areas are poor, 31 percent are vulnerable, while 25 percent are in the middle class (lower and upper). On the other hand, 33 percent of urban population is in the middle class (20 percent in the lower middle and 13 percent in the upper middle) and one quarter of the urban population is classified as in the affluent class. This is a common trend, as rural areas have higher shares of people employed in low-income agricultural occupations.

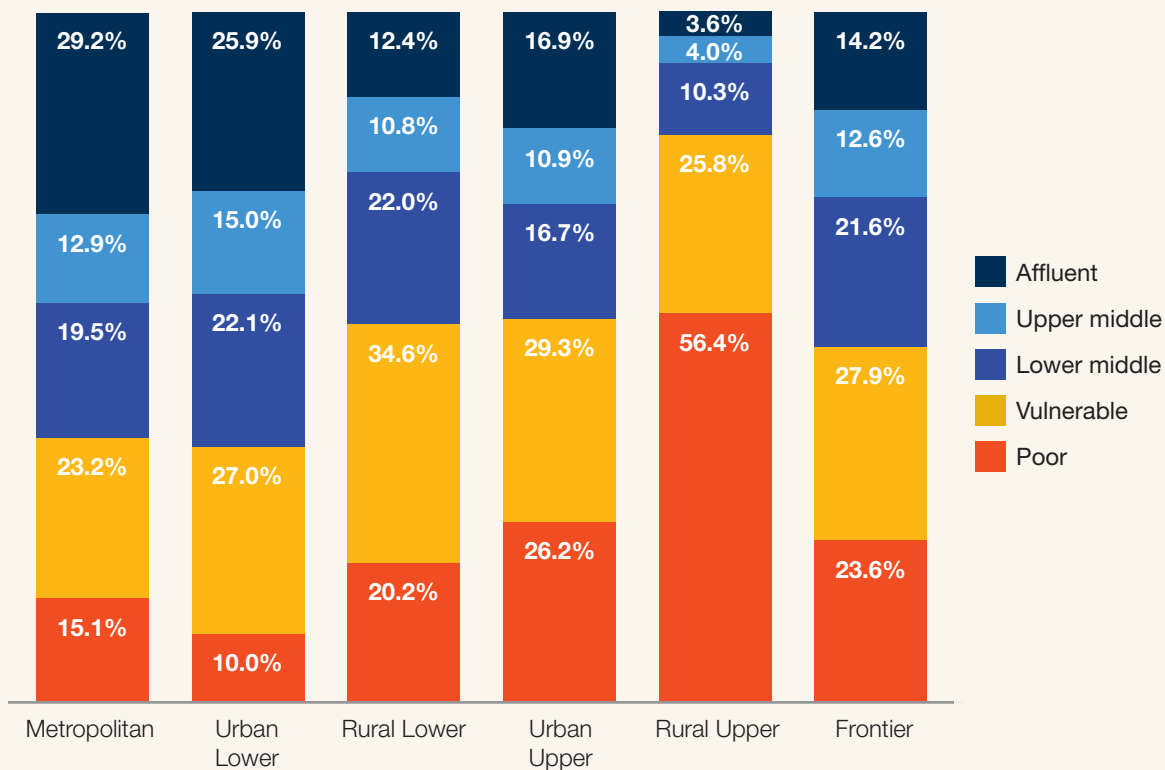
Figure 2.2. Economic Classes by Urban-Rural Status, 2015



Source: HIECS 2015.

There are sharp differences between geographic regions in poverty and middle class classifications as shown in figure 2.3. The highest share of the middle class was found in urban Lower Egypt, where 37 percent of the population is categorized as middle class, 10 percent are considered poor, and 27 percent are vulnerable. Rural Upper Egypt has the smallest share of its population in the middle class, where only 14 percent of people are classified as middle class, while more than half of people (56 percent) are poor. Although the metropolitan region does not have the lowest poverty rate, it has the lowest vulnerable share and the highest Affluent share.

Figure 2.3. Economic Classes by Regions, 2015

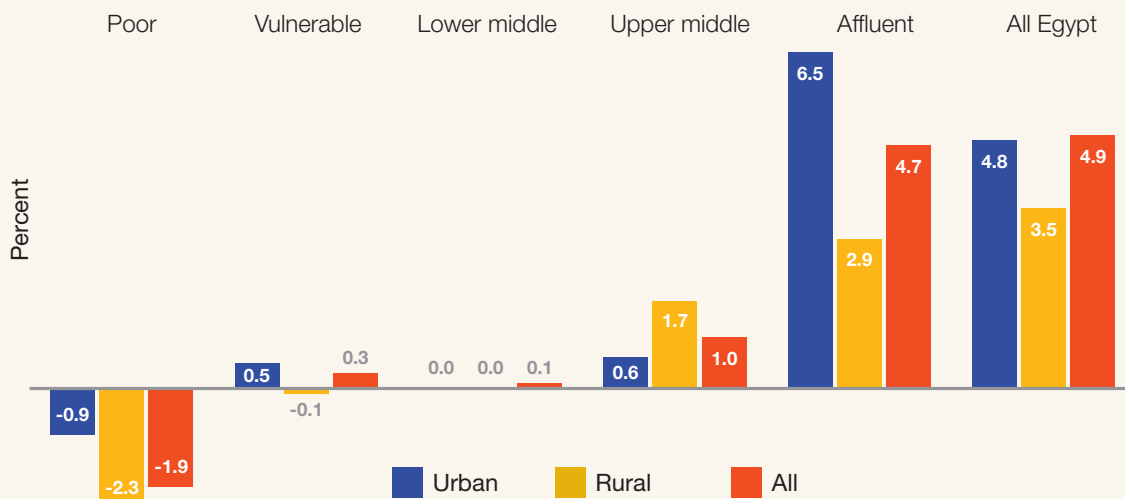


Source: HIECS 2015.
 Note: LPG = liquefied petroleum gas; PIT = personal income tax.

Changes in Economic Classes over Time (2011–15)

Constant thresholds for classifying economic classes are used for different years. These require evaluating household consumption from 2010/11 and 2012/13 HIECS rounds at 2015 prices. Regional consumer price indexes are used to inflate consumption of 2011 and 2013 to 2015 price levels. The corresponding income categories including the poor, vulnerable and others were estimated using the corresponding prices. Overall, figure 2.4 shows that the percentage of people classified as the middle class (lower and upper) increased during 2011–15. The percentage of population in middle class increased from 25 percent in 2011 to 28 percent in both 2013 and 2015. It seems that some of poor and vulnerable were moved to the middle class and some of households in the middle class moved to affluent class. Based on this classification, poverty rates appear to have dropped during this period (see box 2.1).

Figure 2.4. Changes in per Capita Consumption by Economic Classes during 2013–15, by Place of Residence

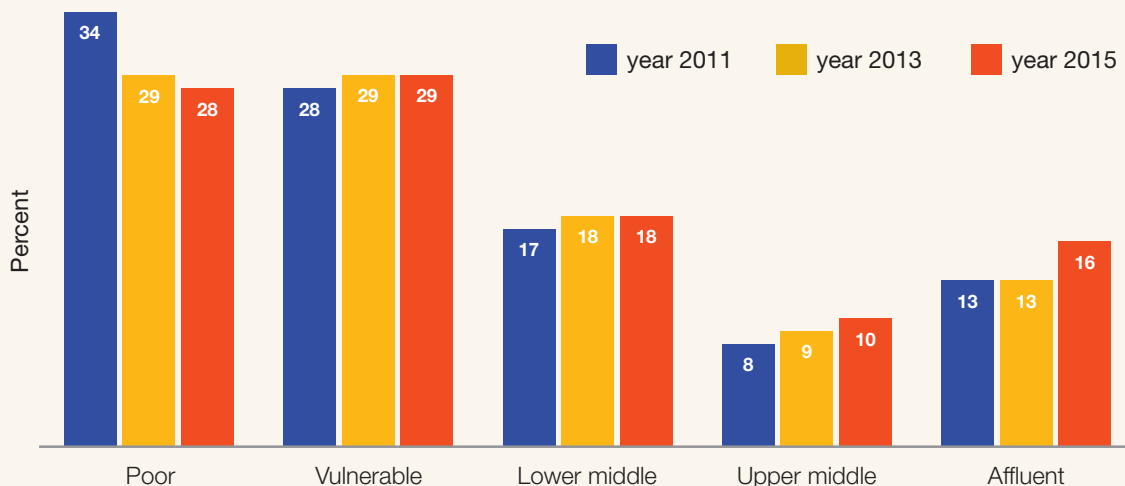


Source: HIECS 2012/13 and 2015.

As figure 2.4 shows, poor households witnessed a decline in average real expenditure per capita, as did the vulnerable group in rural areas. The middle classes experienced almost stagnant changes. The affluent classes gained all benefits from growth, especially in urban areas.

Differences of changes in the sizes of economic classes are observed among urban and rural areas. Most of changes in the middle class occurred in rural areas, where the percentage of population in middle class increased from 21 percent (both lower- and upper-middle groups) in 2011 to 25 percent in 2015. These figures in urban areas reached 31 and 33 percent, respectively (see figure 2.5 and tables 2.3 and 2.4.)

Figure 2.5. Distribution of Population by Economic Classes in 2011, 2013, and 2015



Source: HIECS 2010/11, 2012/13, and 2015.

Table 2.3. Distribution of Urban-Rural Population by Economic Classes in 2011, 2013, and 2015

	Urban			Rural		
	2011	2013	2015	2011	2013	2015
Poor	21.5	18.4	16.7	43.8	37.2	36.1
Vulnerable	24.8	25.2	25.9	29.7	32.3	30.8
Lower middle	19.2	20.0	19.6	15.3	17.2	16.8
Upper middle	11.5	12.7	13.0	6.0	7.0	7.8
Affluent	22.9	23.7	24.8	5.2	6.3	8.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source: HIECS 2010/11, 2012/13, and 2015.

Regions also experienced different change patterns. Most of changes in middle class occurred in Lower Egypt in both urban and rural areas, while almost no changes occurred in Upper Egypt.

Table 2.4. Distribution of Regions' Population by Economic Classes in 2011, 2013, and 2015

	Metropolitan	Urban lower	Rural lower	Urban upper	Rural upper	Frontier	Total
2015							
Poor	15.1	10	20.2	26.2	56.4	23.6	27.8
Vulnerable	23.2	27	34.6	29.3	25.8	27.9	28.7
Lower middle	19.5	22.1	22	16.7	10.3	21.6	18
Upper middle	12.9	15	10.8	10.9	4	12.6	10
Affluent	29.2	25.9	12.4	16.9	3.6	14.2	15.5
2013							
Poor	15.6	13.1	22	27.5	54.7	28.1	29.4
Vulnerable	21.3	26.7	35.7	28.7	28.5	31.2	29.4
Lower middle	19.6	22.2	22.9	18.5	10.4	19.8	18.3
Upper middle	13	15.7	10.2	9.2	3.4	11.5	9.4
Affluent	30.4	22.4	9.2	16.1	3.1	9.4	13.5
2011							
Poor	15.3	16.4	29.3	35.6	60.7	29.5	34.4
Vulnerable	21.3	29	34.6	25.3	24.1	31.4	27.7
Lower middle	17.9	22	20.1	18.5	9.8	16.7	17
Upper middle	12.4	13.4	8	8.7	3.4	9.6	8.3
Affluent	33.1	19.1	7.8	11.9	2.1	12.9	12.6
TOTAL	100	100	100	100	100	100	100

Source: HIECS 2010/11, 2012/13, and 2015.

Box 2.1. Poverty Trends 2011–15

While official government and World Bank estimates are very close in 2015, the evolution of poverty for the period 2011 to 2015 is completely different and trends take different directions. The poverty line used in this report was estimated by the World Bank, using the same approach used by CAPMAS to derive the official poverty line in 2015. There is one difference in the derivation process: the CAPMAS food basket (the core component in estimating food poverty line) is based on the consumption pattern of the second per capita consumption quintile, while the World Bank used the poorest two quintiles as the reference group. In 2015, the average per capita poverty line estimated by CAPMAS reached LE 5788, while it was LE 5635 per person per year according to the methodology used in the current report.

In estimating poverty lines and measures in 2011 and 2013, this report used the well-known consistent approach in which actual consumption (welfare aggregate) was inflated to reflect prices of 2015, and the poverty lines of 2015 were used to measure poverty levels. Regional consumer price indexes were used to evaluate consumption of 2011 and 2013 at 2015 prices. Thus, the poverty line can be defined as fixed, absolute line. Poverty lines have the same real value at different dates and places. However, as Ravallion and Chen (2016) argued, this approach ignores the latent heterogeneity across years in the “social norms” that define the critical welfare level to not be considered poor.

In contrast, CAPMAS admitted that poverty lines should allow for differences in the cost of social inclusion, which can be defined as the expenditure needed to cover certain commodities that accord with social norms in each specific year. Thus, for each survey year, CAPMAS used a food basket that accords with the consumption pattern of the second quintile to derive a food poverty line of the corresponding year. The food poverty line was then augmented to estimate a total poverty line using Engel’s curve. Estimating the poverty line in this approach can be interpreted as following the argument to include costs of social inclusion in defining the “weakly relative poverty line,” as defined by Ravallion and Chen (2016).

As Ravallion and Chen note, “Welfare depends on both ‘own-income’ in absolute terms, and relative income, defined as the ratio of own-income to a country-/year-specific comparison income. Therefore, welfare-consistent measures are shown to be bounded by a fixed absolute line and above by weakly relative lines derived from a theoretical model of relative-income comparisons calibrated to data on national poverty lines.” Poverty trends using both bounds did not follow the same direction; while world poverty declined using the absolute poverty line, world poverty saw the aggregate incidence of weakly relative poverty rise slightly in both the late 1980s and late 1990s. The trend rate of decline over the period as a whole is -0.56 percentage points per year”.

Similar results were observed for Egypt, where poverty declined using the absolute poverty line (as used in this report) and increased when a type of weakly-relative poverty line (as CAPMAS used) was used, taking into account changing in social norms.

Profile of the Middle Class

In this section, we identify the main factors that distinguish the middle class from other groups in 2015, keeping in mind that, by definition, the middle class lies between the poor and vulnerable classes, on one side, and the affluent class, on the other. Therefore, most of its characteristics resemble those on either side. Factors used for comparisons include demographic characteristics, place of residence, education, health, and employment characteristics. However, we do not assume a causal relationship due to the endogenous nature of household characteristics and the economic classes. Moreover, we investigate shocks that the middle class was exposed to and the coping strategies of its members and highlight how shocks and coping strategies may differ among various economic classes. Finally, consumption patterns of economic classes are examined.

Location

The lower- and upper-middle class are more represented in metropolitan areas and in Lower Egypt than elsewhere. As expected, most poor people are located in rural areas and particularly in rural Upper Egypt (51 percent); they are least represented in other regions, as shown in table 2.5. The lower- and upper-middle classes as well as the affluent class are more represented in metropolitan areas and in Lower Egypt (both urban and rural areas) compared to other population shares. Metropolitan areas have 19 percent of the total population but nearly 25 percent of those in upper-middle class. Similar results are observed in urban Lower Egypt, where the corresponding figures reached 18 percent and 12 percent, respectively.

Table 2.5. Distribution of Population in Different Economic Classes by Location, 2015 (percent)

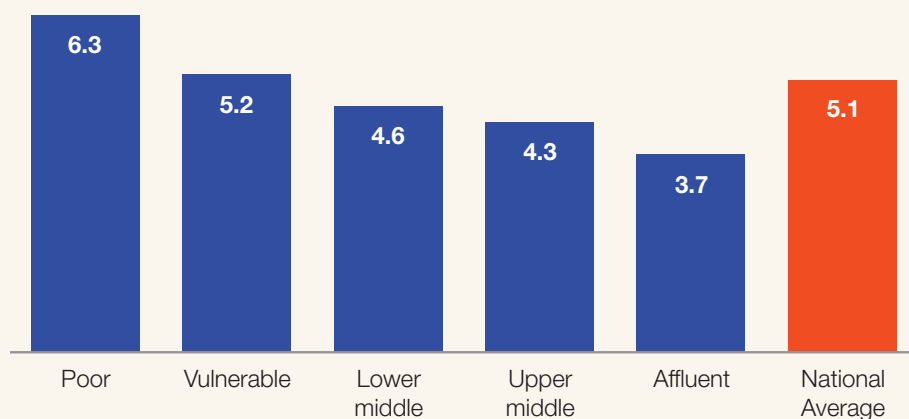
	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Residence						
Rural	74.2	61.2	53.3	44.3	31.3	57.0
Urban	25.8	38.8	46.7	55.7	68.7	43.0
Regions						
Metropolitan	10.3	15.2	20.4	24.3	35.4	18.8
Urban Lower	4.3	11.2	14.6	17.8	19.9	11.9
Rural Lower	23.0	38.2	38.5	33.9	25.2	31.6
Urban Upper	10.5	11.4	10.3	12.1	12.1	11.1
Rural Upper	50.5	22.4	14.2	9.9	5.9	24.9
Frontier	1.4	1.6	2.0	2.1	1.5	1.6
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source: HIECS 2015.

Household composition

Household size is strongly correlated with economic classes; household size decreases with higher income groups. Figure 2.6 shows that average household size reached 6.3 members among the poor group, while it decreased to 4.6 members among lower-middle class and to only 4.3 members among upper-middle class compared to the national average (5.1 members).

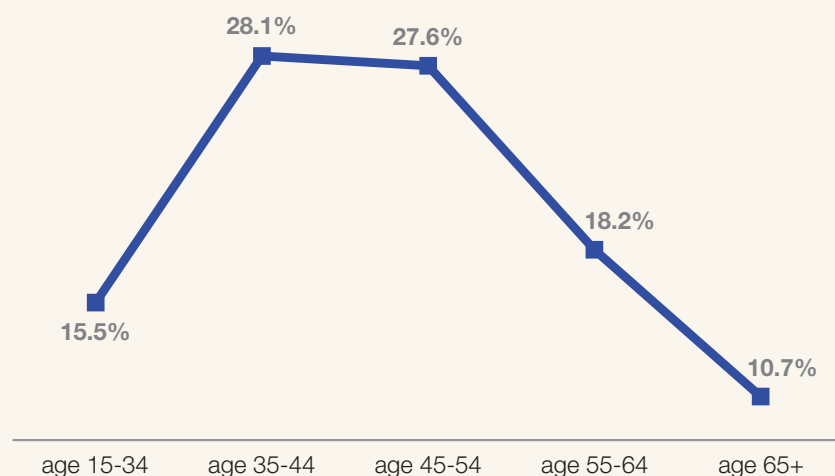
Figure 2.6. Economic Classes and Household Size (members in household), 2015



Source: HIECS 2015.

There is a bell curve to the distribution of the middle class by age of head of household. Almost 16 percent of people in the middle class (lower and upper) have household heads younger than 35 years of age (figure 2.7). The majority of the middle class have household heads aged 35–54 years. Only a small share of the middle class has household heads older than 54 years. Only 11 percent of the middle class live in households where the head is older than 65 years.

Figure 2.7. Distribution of Middle Class by Age of Heads of Household, 2015



Source: HIECS 2015.

Compared to the poor, the middle class includes more working-age members, as shown in table 2.6. Almost 60 percent of household members of the upper-middle group are in the working-age group (18–65 years), and 35 percent of household members are children. In contrast, 53 percent of household members in the poor group are of working age, and 44 percent of household members are children. Differences between economic groups are more obvious when it comes to the dependency ratio, which is 1.23 for the poor, 1.02 for lower-middle class, and 0.89 among upper-middle class.

Table 2.6. Average Share of Household Groups and Dependency Ratio by Economic Classes, 2015

	Children (age≤17)	Youth (age 18–29)	Elderly (age >65)	Working age (age 18–65)	Dependency ratio
Poor	0.442	0.199	0.030	0.528	1.230
Vulnerable	0.425	0.183	0.031	0.543	1.108
Lower middle	0.394	0.184	0.040	0.566	1.022
Upper middle	0.349	0.182	0.054	0.597	0.888
Affluent	0.272	0.174	0.116	0.612	0.726
TOTAL	0.393	0.186	0.048	0.559	1.045

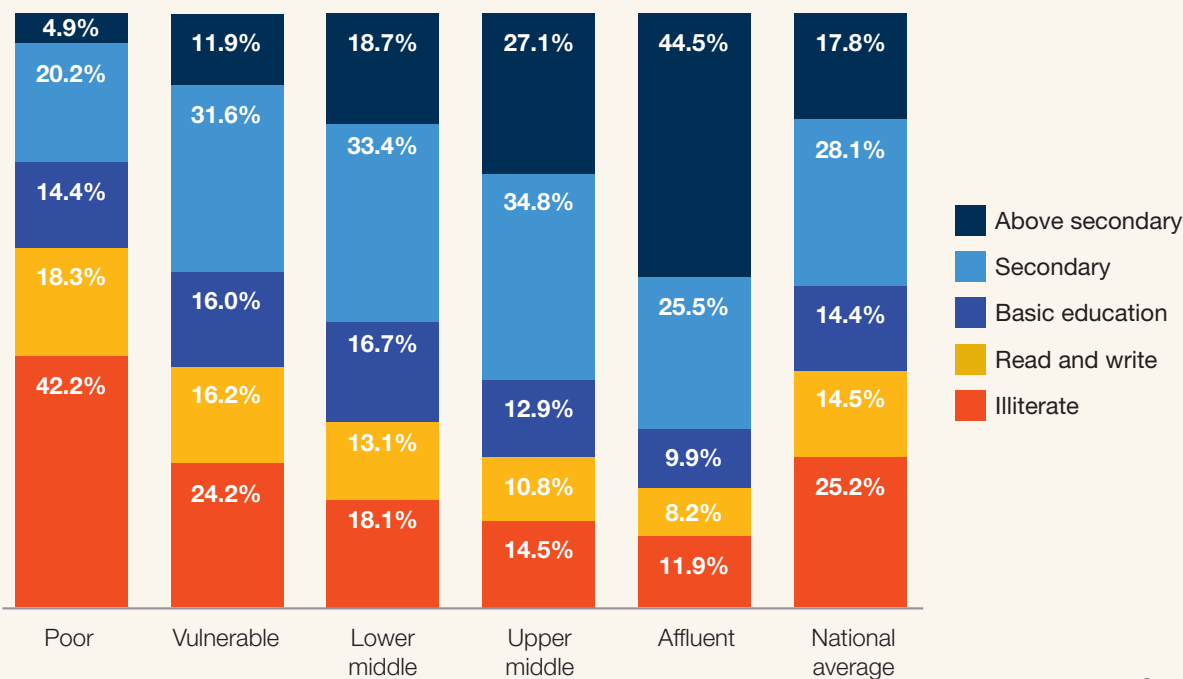
Source: HIECS 2015.

Household head characteristics

Compared to the poor, household heads in the middle class are much more likely to be better educated and hold permanent jobs, are less likely to work in agriculture, or in public sector jobs, and are likely to benefit from social and health insurance. The profile of the middle class differs from that of the poor and affluent groups because our definition of economic classes is based on household consumption levels, which are in turn highly correlated with certain household characteristics.

The educational level of head of household seemed to have the greatest impact on economic group classifications. Only 18 percent of population in lower-middle class and 15 percent of the population in upper-middle class have an illiterate household head; in contrast, 42 percent of the poor population lives in a household with illiterate head. Regarding heads with secondary education, figure 2.8 shows that more than one-third of population in lower- and upper-middle class (33 percent and 35 percent, respectively) has a head of household with secondary education, which is higher than the 20 percent of the poor who have household heads with secondary education.

Figure 2.8. Distribution of Population in Different Economic Classes According to the Education of Household Head, 2015



Source: HIECS 2015.

Most people with illiterate household heads are poor or vulnerable. Among households with illiterate heads, 74 percent are poor or vulnerable, while only about 13 percent and 6 percent are in the lower- and upper-middle class, respectively (table 2.7).

Table 2.7. Distribution of Population According to Education of Household Heads and Economic Classes, 2015 (percent)

	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Illiterate	46.5	27.5	12.9	5.7	7.3	100
Read and write without certificate	35.2	32.2	16.3	7.5	8.8	100
Basic education	27.7	31.8	20.9	8.9	10.7	100
Secondary	20.0	32.2	21.4	12.4	14.0	100
Above secondary	7.6	19.2	19.0	15.3	38.9	100
TOTAL	27.8	28.7	18.0	10.0	15.5	100

Source: HIECS 2015.

Social and health insurance benefits are highly correlated with presence in middle class. Table 2.8 shows that, compared to the poor and vulnerable, a higher share of the middle class has heads participating in or benefitting from social or health insurance. More than 60 percent of people in middle class has heads participating or benefitting from social insurance, compared to only 40 percent among poor group. Similar result was observed regarding the participation in health insurance. Employment status of the heads (whether wage earner, employer, self-employed, and so forth) does not have a very strong correlation with middle class status.

Table 2.8. Distribution of Population in Different Economic Classes According to Characteristics of Heads of Household, 2015

	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Sex of heads						
Male	89.9	89.9	87.8	85.7	79.4	87.5
Female	10.1	10.1	12.2	14.3	20.6	12.5
Employment status of heads						
Wage earner	48.3	52.9	52.9	49.8	42.5	49.7
Employer	20.6	17.3	16.6	16.1	17.2	18.0
Self-employed	12.2	12.0	10.9	9.7	7.0	10.9
Unpaid worker	0.3	0.2	0.1	0.1	0.1	0.2
Out of labor force*	18.6	17.6	19.5	24.3	33.2	21.3
Heads participated or benefitting from social insurance						
Not insured	59.9	48.2	39.9	31.3	23.8	44.5
Insured	40.1	51.8	60.1	68.7	76.2	55.5
Heads participated or benefitting from health insurance						
Not insured	76.6	63.8	55.9	47.8	41.2	60.8
Insured	23.4	36.2	44.1	52.2	58.8	39.2
TOTAL	100	100	100	100	100	100

Source: HIECS 2015.

* includes people not working nor looking for work, the elderly, and the disabled.

People in the middle class are much more likely to have household heads with permanent jobs and nonagricultural formal work. Table 2.9 presents the distribution of the population with working household heads according to economic classes. The table shows that 92 percent of people with working household heads in the upper-middle class have heads with permanent jobs, compared to only 74 percent among the poor population. Additionally, there were some large differences by sector of employment of household head in determining middle class status. People with household heads who work in government administration or public sector enterprises or private sector, (with specified work place) are overrepresented in middle or affluent classes compared by the national distribution. A similar result is observed for those with heads working in nonagricultural work.

Table 2.9. Distribution of Population with Working Heads According to Economic Classes and Characteristics of Household Heads, 2015 (percent)

	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Employment status of household heads						
Wage earner	59.3	64.2	65.7	65.8	63.5	63.1
Employer	25.3	21.0	20.6	21.2	25.7	22.8
Self-employed	15.0	14.5	13.5	12.9	10.5	13.8
Unpaid worker	0.4	0.2	0.2	0.1	0.2	0.2
Job stability of household heads						
Permanent	73.8	83.0	87.0	91.5	94.0	83.4
Temporary	26.2	17.0	13.0	8.5	6.0	16.6
Sector of employment of household heads						
Government administration or Public enterprises	19.2	27.8	35.0	39.5	43.7	29.9
Private sector	28.7	38.2	40.7	38.8	43.1	36.6
Outside establishment*	51.4	33.6	23.7	21.3	12.6	33.0
Other	0.6	0.4	0.6	0.4	0.6	0.5
Type of work of household head						
Agricultural work	34.1	18.5	12.9	11.1	9.2	20.0
Nonagricultural work	65.9	81.5	87.1	88.9	90.8	80.0
TOTAL	100	100	100	100	100	100

Source: HIECS 2015.

Note: Includes all workers without a fixed address, such as street vendors or taxi drivers.

Three quarters of the population with household heads who work in temporary jobs are poor or vulnerable, 20 percent are in the middle class, while only 5 percent are in the affluent class. Job stability of working heads is highly correlated with economic classification. Table 2.10 shows that 75 percent of people with household heads working in temporary jobs are poor or vulnerable; only 5 percent belong to the upper-middle class, and another 5 percent belong to the affluent class. A similar result is observed regarding the type of work of heads, where 77 percent of people with heads working in agriculture are poor or vulnerable and only 17 percent are in the middle class.

Table 2.10. Distribution of Population with Working Household Heads According to Economic Classes and Characteristics of Heads, 2015 (percent)

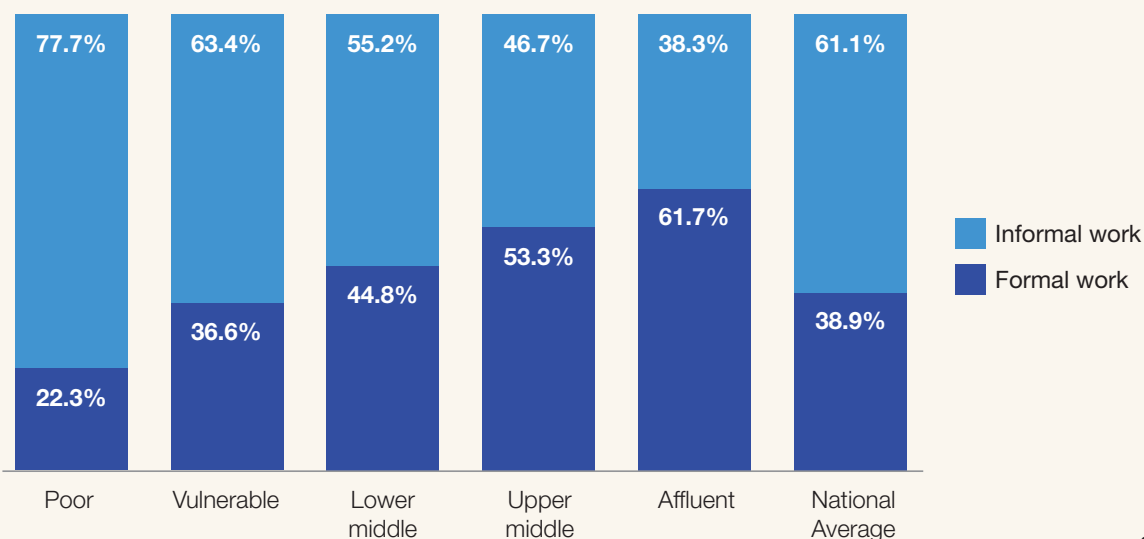
	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Employment status of household head						
Wage earner	27.0	30.5	19.2	10.0	13.3	100
Employer	31.9	27.7	16.6	8.9	14.9	100
Self-employed	31.3	31.6	18.1	9.0	10.0	100
Unpaid worker	42.4	27.2	13.1	5.2	12.0	100
TOTAL	28.7	30.0	18.4	9.6	13.2	100
Job stability of household head						
Permanent	25.4	29.9	19.2	10.6	14.9	100
Temporary	45.3	30.6	14.4	4.9	4.7	100
TOTAL	28.7	30.0	18.4	9.6	13.2	100
Sector of employment of household head						
Government-public	18.5	27.9	21.6	12.7	19.3	100
Private	22.6	31.3	20.5	10.2	15.5	100
Outside establishment*	44.9	30.6	13.3	6.2	5.0	100
Other	32.9	22.5	22.1	7.2	15.3	100
TOTAL	28.8	30.0	18.4	9.6	13.2	100
Type of work of household head						
Agricultural work	49.0	27.7	11.9	5.3	6.1	100
Nonagricultural work	23.7	30.6	20.1	10.7	14.9	100
TOTAL	28.8	30.0	18.4	9.6	13.2	100

Source: HIECS 2015.

* Includes all workers without a fixed address such as street vendors or taxi drivers.

Heads with formal work are overrepresented in the middle and affluent classes. Informal jobs are defined as temporary jobs or work without a fixed location or address and also include people who do not participate in social insurance.³⁴ Accordingly, household heads in formal work are those who work in permanent, with specified work place and participate in social insurance. Overall, data presented in figure 2.9 show that for the 39 percent of people with working household heads, those heads work in formal jobs. People with heads working in formal jobs are overrepresented in the middle and affluent classes (45 percent, 53 percent, and 62 percent in lower, upper and affluent classes, respectively), but this declined to only 22 percent among the poor.

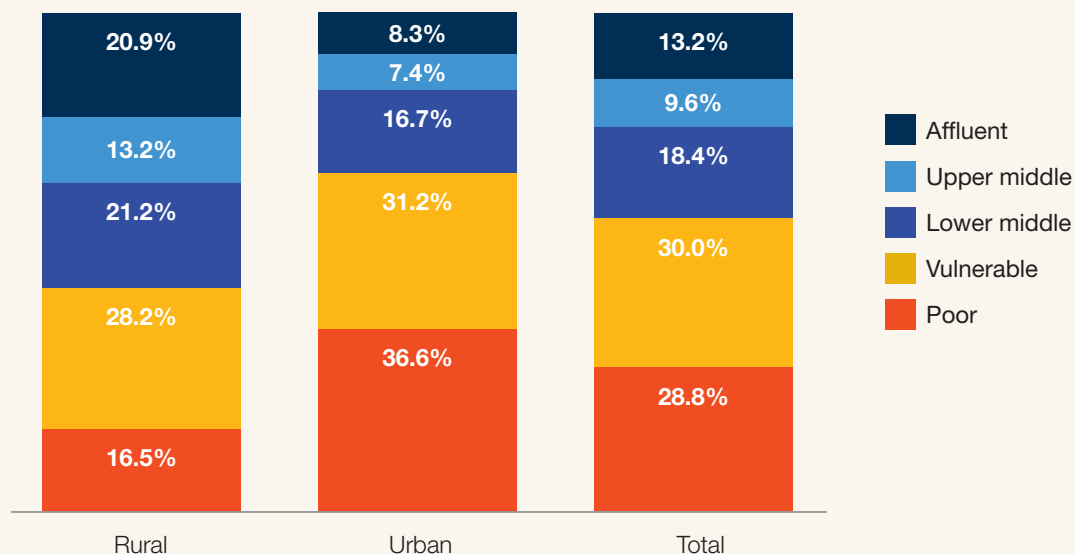
Figure 2.9. Distribution of Population with Working Household Heads According to Economic Classes and Formal Work of Heads, 2015



Source: HIECS 2015.

Looking at the population with household heads working in formal jobs, the data presented in figure 2.10 shows that only 17 percent are considered poor, while 34 percent are in the middle class. These figures reached 37 percent and 24 percent, respectively, among the population with household heads working in informal jobs.

Figure 2.10. Distribution of Population with Working Household Heads According to Economic Classes and Formal Work of Heads, 2015



Source: HIECS 2015.

Ultimately, household head characteristics that drive the creation and sustenance of a middle class are the higher education, stability of job, security (benefit of social and health insurance), and nonagricultural formal work.

Household member characteristics

Compared to the poor, household members in the middle class are more likely to be better educated. Although the educational level of the head of household has marked impact on economic classification of households, the education of household members also seemed to have great impact on middle class status. Table 2.11 shows the shares of different education levels of household members by economic classes. There are noticeable differences in education by income class. Among the poor group, almost one-quarter of household members are illiterate and only 15 percent have a secondary education. The situation is reversed among the upper-middle group, where only 13 percent of household members are illiterate, while 24 percent have a secondary education and another 16 percent have more than secondary education.

Table 2.11. Education of Household Members and Economic Classes, 2015

	Share of illiterate	Share of read and write (no certificate)	Share of basic education	Share of secondary education	Share of above secondary
Poor	0.237	0.148	0.221	0.148	0.028
Vulnerable	0.154	0.137	0.210	0.205	0.064
Lower middle	0.128	0.119	0.198	0.227	0.101
Upper middle	0.125	0.104	0.187	0.236	0.160
Affluent	0.114	0.092	0.159	0.220	0.271
TOTAL	0.163	0.126	0.201	0.198	0.103

Source: HIECS 2015.

Children in the middle and affluent classes are more likely to enroll in schools than those in the poor class. Poor children are most likely to enroll in public Arabic schools, while children in upper-middle class are most likely to enroll in experimental public and private Arabic schools. Marked differences are observed between children in different economic classes regarding the enrollment rates. Table 2.12 shows that almost all (99 percent and above) children ages 7–15 years in the upper and affluent classes are currently enrolled in school, while this percentage is only 90 percent among the poor group. A similar result is observed regarding the enrollment rate among children of 16–18 years. More than 90 percent of these children in the upper-middle and affluent classes are currently enrolled in school, while this percentage decreased significantly to 63 percent among children in the poor group. The percentage of dropout children ages 7–15 years reached 6 percent among poor children, while it was less than 1 percent among children in upper-middle and affluent groups.

Additionally, differences are observed between different economic classes regarding type of schools of enrolled children 7–15 years. Table 2.13 shows that poor children are most likely to be enrolled in public Arabic schools, while children in the upper-middle class are most likely to be enrolled in experimental public or private Arabic schools. Arabic and foreign private schools are the choice of most children in the affluent class.

Table 2.12. Distribution of Children (7–15 and 16–18 years) According to School Enrollment by Economic Classes, 2015 (percent)

	Row %					Column %				
	Never enrolled	Dropout	Currently enrolled	Finished	Total	Never enrolled	Dropout	Currently enrolled	Finished	Total
Enrollment rate among population 7–15 years										
Poor	3.7	6.1	90.1	0.0	100	74.6	63.0	31.0	20.0	32.8
Vulnerable	0.8	2.7	96.4	0.1	100	16.0	26.2	31.5	40.0	31.1
Lower middle	0.5	1.6	97.8	0.1	100.	4.8	9.0	17.8	40.0	17.4
Upper middle	0.6	0.5	99.0		100	3.0	1.2	9.0		8.7
Affluent	0.2	0.2	99.6		100	1.5	0.6	10.6		10.1
TOTAL	1.6	3.2	95.1	0.0	100	100	100	100	100	100
Enrollment rate among population 16–18 years										
Poor	6.2	25.9	62.7	5.3	100	77.0	59.1	27.6	35.8	34.0
Vulnerable	1.3	13.8	78.6	6.4	100	13.2	26.2	28.8	36.2	28.4
Lower middle	0.5	8.6	86.5	4.4	100	2.9	8.8	17.1	13.5	15.3
Upper middle	0.5	4.3	90.1	5.1	100	1.7	2.6	10.7	9.4	9.2
Affluent	1.1	3.7	93.3	1.9	100	5.2	3.3	15.8	5.0	13.1
TOTAL	2.7	14.9	77.3	5.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: HIECS 2015.

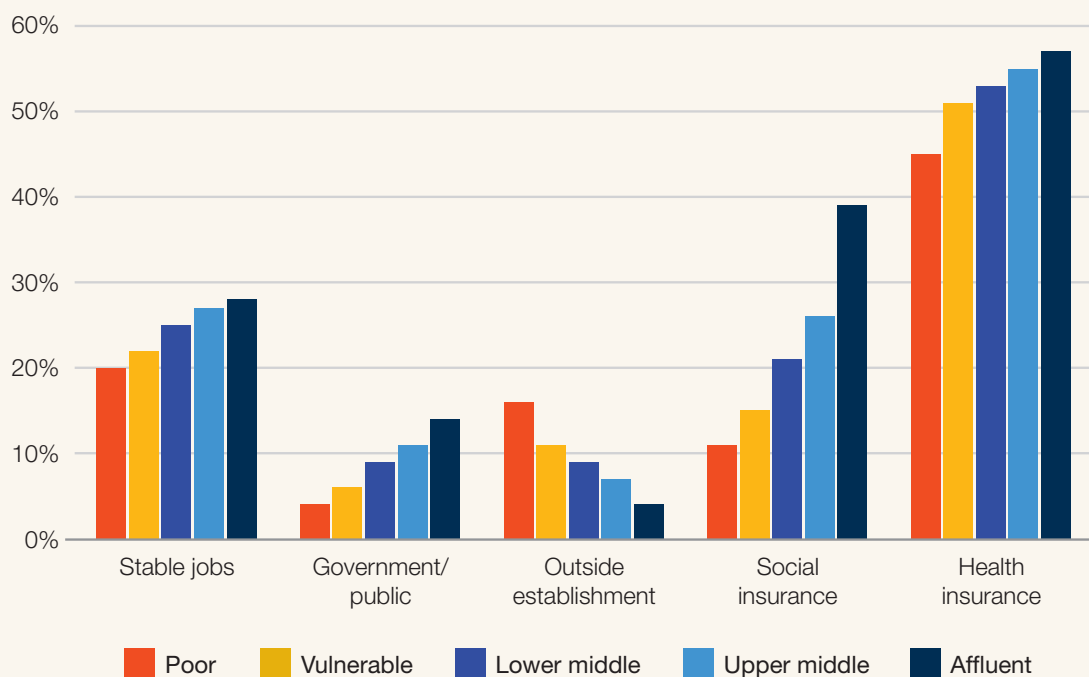
Table 2.13. Distribution of Children by Type of School for Currently Enrolled Children (7–15 years) by Economic Classes, 2015 (percent)

	Arabic public	Experimental public	Azhary public	Azhary foreign	Private Arabic	Foreign Private	TOTAL
	Row %						
Poor	91.1	0.4	7.7	0.1	0.7	0.0	100
Vulnerable	90.7	1.3	6.3	0.1	1.2	0.4	100
Lower middle	88.1	3.0	5.4	0.2	2.8	0.4	100
Upper middle	79.9	6.3	5.2	0.0	7.3	1.3	100
Affluent	57.3	9.6	3.8	0.6	17.1	11.6	100
TOTAL	85.9	2.7	6.2	0.2	3.5	1.5	100
Column %							
Poor	32.9	5.3	38.3	16.1	5.8	0.0	31.0
Vulnerable	33.3	15.0	32.0	22.6	10.3	7.4	31.5
Lower middle	18.3	20.0	15.6	22.6	14.3	4.7	17.8
Upper middle	8.4	21.4	7.6	0.0	18.5	7.7	9.0
Affluent	7.1	38.3	6.6	38.7	51.1	80.1	10.6
TOTAL	100	100	100	100	100	100	100

Source: HIECS 2015.

Household members in the middle class are more likely to have stable jobs, work in government or other public sector settings, and benefit or participate in social and health insurance. There were some large differences by stability and sector of employment of household members in determining middle class status (figure 2.11). On average, 27 percent of members in any household in the upper-middle class are working in stable permanent jobs, compared to only 20 percent among the poor group. The factor that is strongly correlated with middle class status is the participation in (or benefitting from) social insurance. Among the poor, the share of participation in social insurance among household members reached 11 percent, while this share increased to 26 percent among upper-middle class (the national level is 0.2).

Figure 2.11. Shares of Different Characteristics of Household Members by Economic Classes, 2015



Source: HIECS 2015.

Sources of income

There is clear distinction in the relative importance of income sources between the poor as a group; the vulnerable, lower-middle, and upper-middle classes as second group; and the affluent as a third group. Generally, wages contribute, on average, about 42 percent of total income (tables 2.14 and 2.15). This is compared to about 17 percent from nonfarm business and 8 percent farm income sources. Therefore, 67 percent of household income is derived from labor activities. Contributory pension is also an important source of income (representing 10 percent). The share of nonfarm as well as contributory pension in sources of income to total income increases as per capita income

increases; accordingly, income shares of nonfarm and contributory pensions of the middle class are higher than the corresponding shares of the poor and vulnerable and lower than the affluent class. In this respect, the gap between the affluent class and the middle classes is wider than the gap between the poor and middle class. For instance, nonfarm income represents 12 percent of total income of the poor; about 15 percent for the vulnerable, lower-middle and upper-middle class; but it is 20 percent for the affluent. The opposite is true for the share of wages, farm income, and government assistance transfers. The contribution of wages in total income is 47 percent and 44 percent for the lower- and upper-middles class and 32 percent for the affluent class. Wages from agricultural activities represent a negligible share for the affluent class, but represent 9 percent of income of the poor. Nonfarm wages have a higher share for the vulnerable, lower-middle and upper-middle classes compared to the poor and affluent. Therefore, nonfarm income (from wages and business activities) represents 60 percent of total income for the middle classes, compared to only 52 percent for the poor and affluent. Farm income is more important for the poor, less important for the middle classes, and it is the fifth most important source for the affluent.

Table 2.14. Average Household Income by Source, 2015 (LE per year)

	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Wages	15,575	17,494	18,927	20,165	21,533	18,611
Agricultural wages	2,845	1,366	858	459	294	1,277
Nonagricultural wages	12,730	16,128	18,069	19,707	21,239	17,334
Farm income	4,031	3,765	3,478	3,196	2,932	3,507
Nonfarm income	3,909	5,575	6,398	7,202	13,963	7,523
Total asset income	240	468	866	1,313	3,686	1,341
Total contributory transfers	1,669	2,456	3,368	5,059	10,908	4,730
Government transfers	822	537	505	460	595	595
remittances	440	527	674	748	1,322	747
Other cash transfers	821	955	1,115	1,621	2,069	1,293
In-kind transfers	195	274	350	508	1,303	538
Food subsidy	1,145	1,086	1,083	1,057	1,316	1,148
Imputed rent	2,807	3,288	3,518	4,093	6,884	4,161
TOTAL household income	31,654	36,426	40,280	45,422	66,510	44,194

Source: HIECS 2015.

The results just noted agree to a great extent with Lanjouw (2000), who emphasized that the “nonfarm sector is a heterogeneous collection of activities which includes both productive and nonproductive occupations. The former contribute to growth, [and] raise living standards. And in general are associated with a dynamic process of inter-sectoral transfer out of agriculture into manufacturing and services, with specialization, and with technological changes. The latter are more in the nature of residual activities into which people are pushed when other sources of income (cultivation income, rents, transfers, etc.) are not sufficient to make ends meet. For the poor, these activities contribute significantly to total incomes, but they do not actually generate significant returns.”

Table 2.15. Income Sources as a share of Households' Total Income, 2015 (percent)

	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Wages	49.20	48.03	46.99	44.40	32.38	42.11
Agricultural	8.99	3.75	2.13	1.01	0.44	2.89
Nonagricultural	40.22	44.28	44.86	43.39	31.93	39.22
Farm income	12.74	10.34	8.64	7.04	4.41	7.94
Nonfarm income	12.35	15.31	15.88	15.86	20.99	17.02
Total asset income	0.76	1.29	2.15	2.89	5.54	3.03
Total contributory transfers	5.27	6.74	8.36	11.14	16.40	10.70
Government transfers	2.60	1.47	1.25	1.01	0.89	1.35
Remittances	1.39	1.45	1.67	1.65	1.99	1.69
Other cash transfers	2.59	2.62	2.77	3.57	3.11	2.93
In-kind transfers	0.62	0.75	0.87	1.12	1.96	1.22
Food subsidy	3.62	2.98	2.69	2.33	1.98	2.60
Imputed rent	8.87	9.03	8.73	9.01	10.35	9.41
Total household income	100	100	100	100	100	100

Source: HIECS 2015.

As table 2.16 shows, more than three-fourths of poor households have income from wages as opposed to one-half for affluent class. The percentage of households receiving farm income and government cash transfers follow the same decreasing direction, while among households receiving income from financial assets or real estate, the affluent have the largest share. Households in the middle classes receive the largest share of nonfarm, with reduced shares for the poor and the affluent.

Slightly more than one-third of poor and vulnerable persons have income, and this percentage increases as we move to the lower- and upper-middle classes and increases again for affluent class, 53 percent. Individuals receiving income from labor represents about 30 percent fairly evenly across groups, with a slight higher ratio for upper-middle class. At 22 percent, the affluent class receives a substantially larger share of nonlabor income than the others.

Table 2.16. Percentage of Households by Income Source

	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Percentages of households who have income from:						
Wages	80.98	75.91	72.41	65.91	50.52	69.25
Farm	37.03	29.26	24.69	20.82	12.44	25.13
Nonfarm	30.20	33.08	32.07	30.25	24.83	30.05
Financial and real estate assets	4.52	7.12	9.38	12.04	18.90	10.31
Contributory pension	21.78	23.01	26.90	33.77	49.38	30.86
Government transfers	22.99	14.51	12.91	12.09	12.10	15.13
Percentages of household members who:						
Have income	37.75	37.68	40.47	44.15	53.41	41.31
Have labor income	29.24	29.28	30.66	31.35	30.69	29.94
Have nonlabor income	8.51	8.41	9.81	12.81	22.72	11.37

Source: HIECS 2015.

Financial shocks and coping strategies

Despite being classified as a middle-income country, Egypt faces a set of long-standing development challenges and ranks 108 on the Human Development Index. About 30 percent of its population falls below the income poverty line. The unstable circumstances during the most recent period after the 2011 revolution had a significant negative impact on the economy. This was associated with a drop in private investments and deterioration in economic activity that was not clearly improved by social protection programs that help in protection of the poorest and most vulnerable from further socioeconomic challenges.

Real gross domestic product growth slipped from 5.1 percent in 2010, before the 2011 revolution, to 1.8 percent in 2011; rising to 2.1 percent in 2013 and to 4.4 percent in FY 2015.³⁵ Investment growth dropped from 8 percent in 2010, to -2.2 percent in 2011, with a further drop to -9.6 percent in 2013, due to the rapid deterioration in the investment and business climate; this translated into a 40 percent increase in the unemployment rate after the 2011 revolution (WFP 2013).

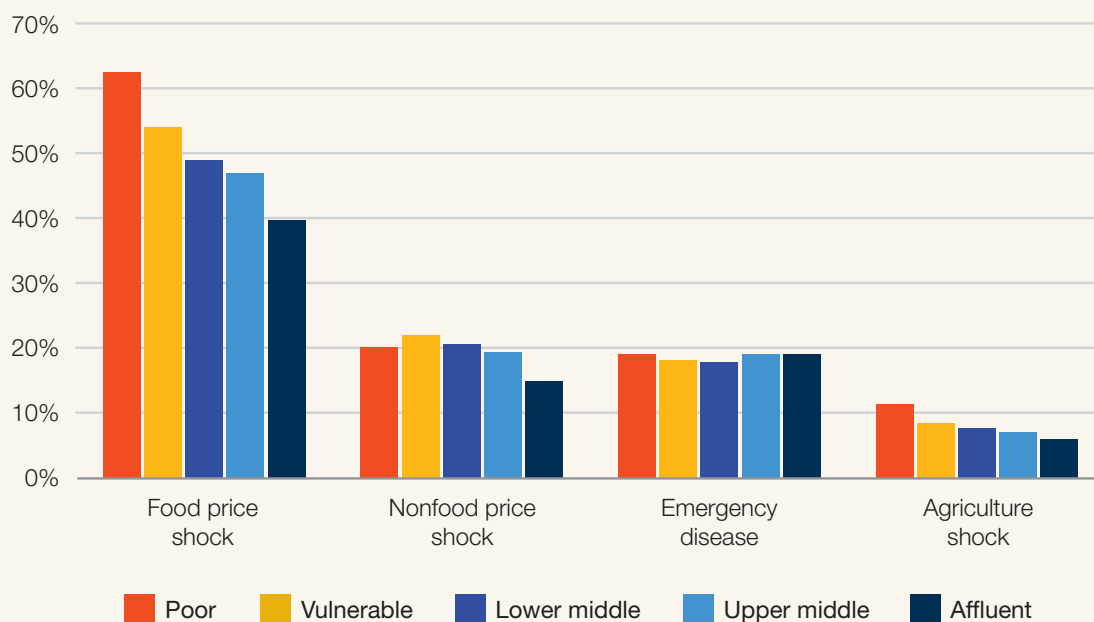
FINANCIAL SHOCKS

It could be assumed that household perceptions regarding the key shocks that affected their real incomes would most likely revolve around the deterioration in the security situation or even the loss of livelihoods associated with the previous circumstances. However, Inflation in food prices is the key shock that affected the financial status of households, with marked differences among the poor, middle, and affluent classes, followed by rise in nonfood prices and health emergencies facing household members. When households in HIECS 2015 were asked about the key shocks they faced that affected their incomes and financial status, the majority of households pinpointed domestic inflation in food prices. About 51 percent identified the rise in food prices, while 19.4 percent identified the rise in nonfood prices as the key shock, and 18.6 percent identified health emergencies and infection with diseases. These shocks were followed by price hikes of agricultural inputs (seeds, fertilizers, chemicals) in rural areas, where 9 percent of households in mention this as the key shock. This confirms earlier conclusions that household vulnerability to food insecurity is in essence an economic one that revolves around the increasing cost of living and the inability to cope with it. This perception is linked, not only to the actual increase in market prices, but to the deterioration in the purchasing power of households associated with stagnant incomes, deteriorating quality of jobs, and the overall increase in unemployment rates in the presence of targeting gaps in social protection schemes.

Figure 2.12 presents households' perceptions of the most frequent shocks affecting their financial status in 2015, for different economic classes. The figure shows that the largest difference between the poor, middle and affluent classes was in inflation of food prices. The figure shows that 63 percent of poor households reported the rise in food prices as the main shock, compared to 49 percent and 47 percent among the lower- and upper-middle class, respectively, and 40 percent among the affluent class.

The second most frequently reported shock by households is the rise in nonfood prices (reported by 19.4 percent of households). However, no marked differences were observed among the economic classes. This is followed by a disease-related emergency facing one of the members (18.6 percent of households), as well as agriculture-related shocks among households in rural areas (8.6 percent of households in rural areas).

Figure 2.12. Reported Shocks Affecting Household Financial Status, 2015 (percent)



Source: HIECS 2015.

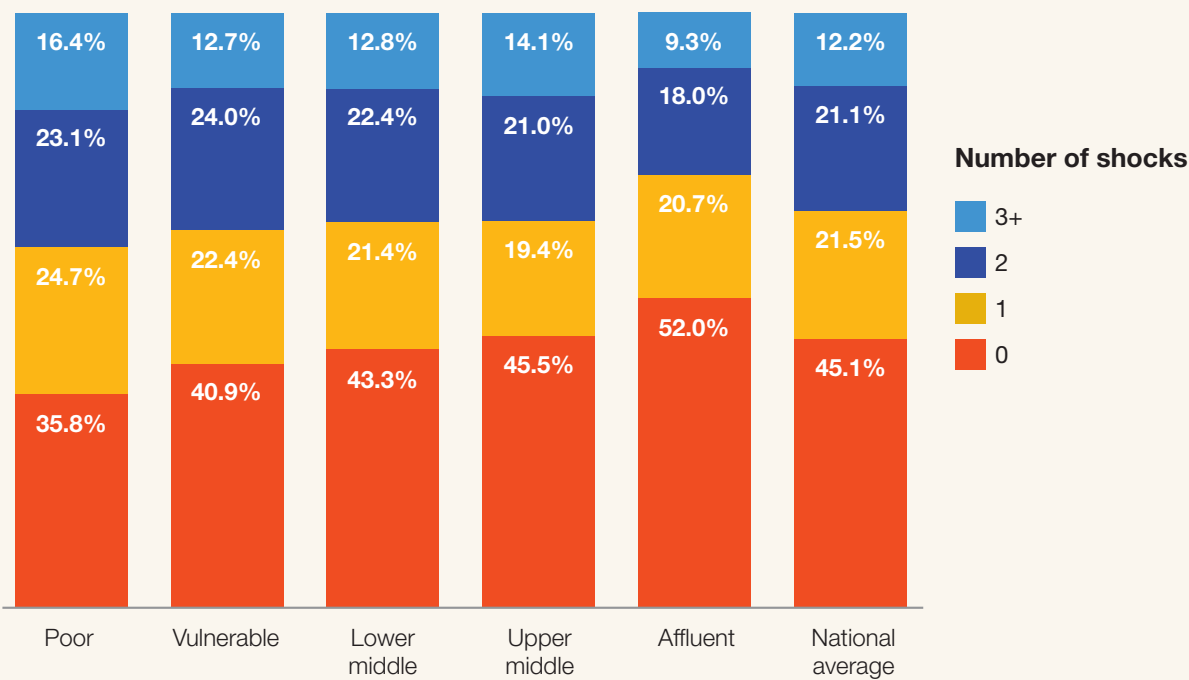
HOUSEHOLD COPING STRATEGIES

The ability of households to cope with shocks was hampered, not only by the exposure to successive economic shocks since the 2011 revolution, but also by the compounded effect of being exposed to numerous shocks at the same time. Overall, data from HIECS 2015 indicate that 33 percent and 39 percent of households in urban and rural areas, respectively, were exposed to two or more different types of shocks at the same time that affected their financial status during the years preceding 2015, as opposed to almost one-fourth exposed to one single shock and 45 percent and 37 percent that were unaffected in urban and rural areas, respectively, as shown in figure 2.13.

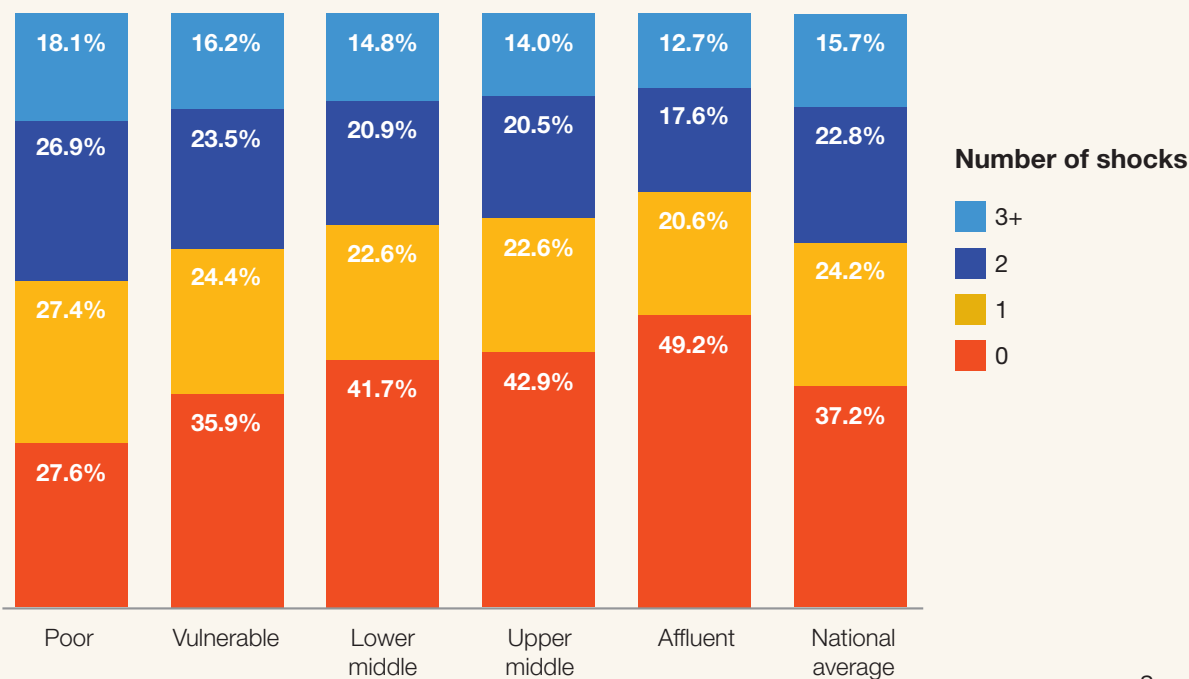
Differences are observed between economic classes. Almost 64 percent of poor households in urban areas are exposed to at least one key shock that affects their financial status, but this percentage among households in upper-middle class is 10 points lower. In rural areas, 72 percent of poor households are exposed to one key shock, but the percentage was only 58 percent among households in the middle class.

Figure 2.13. Number of Shocks Faced by Households According to Economic Classes and Residence, 2015

a. Urban



b. Rural



Source: HIECS 2015.

Households adopted various consumption and stress strategies to cope with the increase in food and nonfood prices and other shocks. Households were asked to report three strategies to cope with the financial shock, in order from the most important strategy to the least). Coping strategies adopted by households can be grouped into five main categories: consumption, stress, crises, emergencies, and employment rationing. These are outlined in table 2.17.

Table 2.17. Household Coping Strategies

Consumption coping	Sending children to live with relatives Reducing food consumption Consuming less-preferred kinds of cheaper food items
Stress coping	Spending cash savings Borrowing money from relatives Borrowing money from other lenders Taking credit from institutions
Crisis coping	Sale of assets Renting agricultural land Leasing part of the household house Taking children out of school to reduce expenses Sending children to work Consuming food stocks that were saved for the next season Reducing nonfood expenses
Emergency coping	Moving to another place in search of a job One of the family members moves to another place to seek a job Receiving financial support from local nongovernmental organizations Receiving financial support from government agencies Receiving financial support from family and friends
Change employment coping	Working for longer hours Sending nonworking family members to work (not children) Changing type of work

Source: World Food Program, “Technical Guidance for WFP’s Consolidated Approach for Reporting Indicators of Food Security (CARI),” Rome: WFP. <https://resources.vam.wfp.org/CARI>.

There is a clear pattern of association between types of shocks experienced and the coping strategies adopted. Households tend to cope with the increase in food prices primarily through consumption-rationing strategies, including the reduction of food consumption and increasing reliance on cheaper foods. They rely more on both consumption and crisis-coping strategies (like selling assets and reducing nonfood expenses) in the case of nonfood inflation, and on stress-coping strategies for health emergencies. Finally, households in rural areas rely on stress-coping strategies for dealing with the rise in prices of agriculture inputs. The increasing reliance on consumption and stress strategies indicates that households compensated for the increase in prices by spending less on food, which in most cases translates into greater spending on cheap calories and less on those micronutrients needed for a healthy balanced diet. It also indicates that households are becoming more vulnerable to future shocks.

For inflation of food prices, after employing a consumption-coping strategy, poor households reduce nonfood expenses, while households in middle and affluent classes spend cash savings to cope with this shock. Table 2.18 shows the distribution of households according to coping strategies adopted for each type of most common shock. For inflation in food prices, stress and crisis are the second coping strategies after the consumption strategy (adopted equally by 16 percent of households). Spending cash savings is the most adopted method for stress, and it is adopted by 12 percent of poor households, 17 percent in middle-income households, and 21 percent in affluent households. Crisis strategy, which consists mainly in reducing nonfood expenses, is adopted by 18 percent of poor households and 14 percent among the affluent class.

Table 2.18. Distribution of Households According to Coping Strategies by Type of Shock and Economic Class, 2015 (percent)

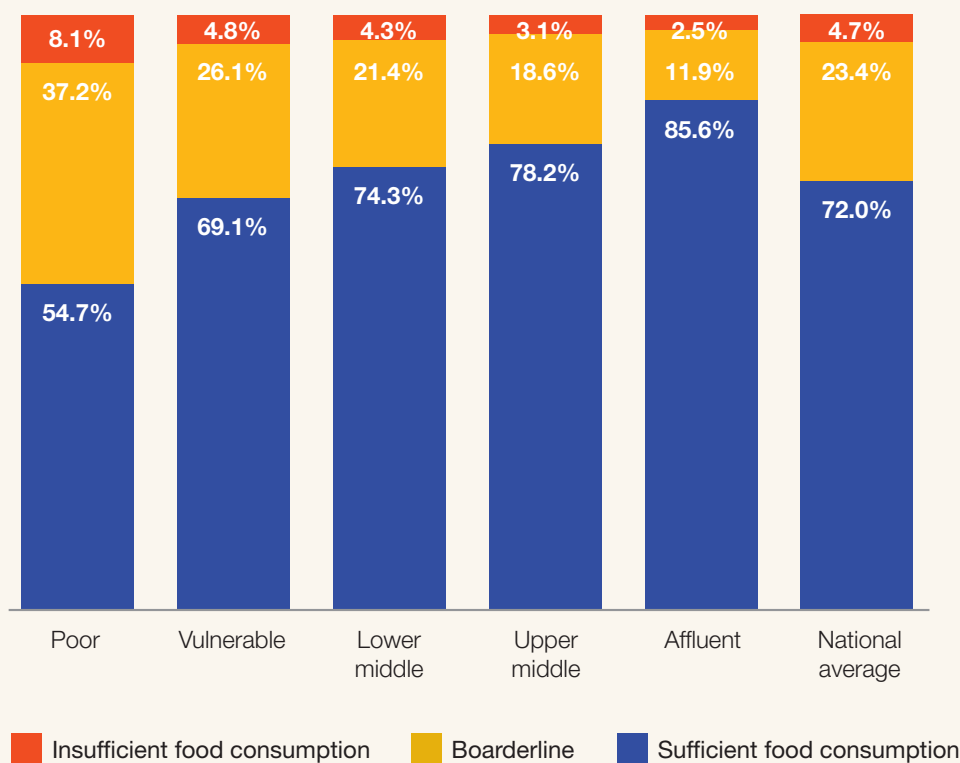
Coping strategies	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Inflation in food prices shock:						
Consumption coping	59.1	58.6	57.3	56.7	53.9	57.4
Stress coping	12.1	15.0	17.0	17.0	21.2	16.0
Crisis coping	18.0	15.7	15.5	16.8	14.2	16.1
Emergency coping	4.9	4.7	4.7	4.2	5.4	4.8
Change employment	5.9	6.0	5.6	5.3	5.3	5.7
TOTAL	100	100	100	100	100	100
Inflation in nonfood prices shock:						
Consumption coping	30.1	28.6	24.1	24.6	24.1	26.8
Stress coping	17.1	19.8	20.5	27.9	25.6	21.3
Crisis coping	30.6	27.8	31.1	26.8	30.8	29.5
Emergency coping	9.0	8.0	8.1	8.3	8.3	8.3
Change employment coping	13.2	15.9	16.2	12.4	11.2	14.1
TOTAL	100	100	100	100	100	100
Any emergency disease facing one of the members:						
Consumption coping	20.9	19.6	18.0	16.9	15.8	18.3
Stress coping	33.3	35.2	36.5	38.5	39.5	36.5
Crisis coping	14.5	14.0	13.9	12.9	15.5	14.3
Emergency coping	18.8	20.4	21.0	21.6	22.7	20.9
Change employment coping	12.5	10.8	10.6	10.1	6.5	10.0
TOTAL	100	100	100	100	100	100
Price hikes of agricultural inputs (seeds, fertilizers, chemicals):						
Consumption coping	10.8	13.7	12.4	5.9	7.3	11.2
Stress coping	47.3	48.9	57.0	42.5	54.6	49.7
Crisis coping	21.4	18.9	16.4	26.8	15.6	19.7
Emergency coping	4.6	5.7	3.4	6.5	9.8	5.4
Change employment coping	15.9	12.9	10.8	18.3	12.7	14.1
TOTAL	100	100	100	100	100	100

Source: HIECS 2015.

Adequacy of household food consumption

Only 55 percent of poor households have sufficient access to food, compared to about 75 percent of households in the middle class and 86 percent in the affluent class. As part of the 2015 HIECS questionnaire, households were asked about the adequacy of food consumption during the 30 days prior to survey. Overall, slightly less than three-fourths (72 percent) of households reported that their food consumption was sufficient during that time, 23 percent of households reported that they could barely meet their basic food needs, and 5 percent reported insufficient access to food. Marked differences are observed among economic classes. As shown in figure 2.14, only 55 percent of poor households reported sufficient access to food, compared to 74 percent and 78 percent among the lower- and upper-middle class (increases of 19 and 23 percentage points, respectively) and 86 percent among the affluent class.

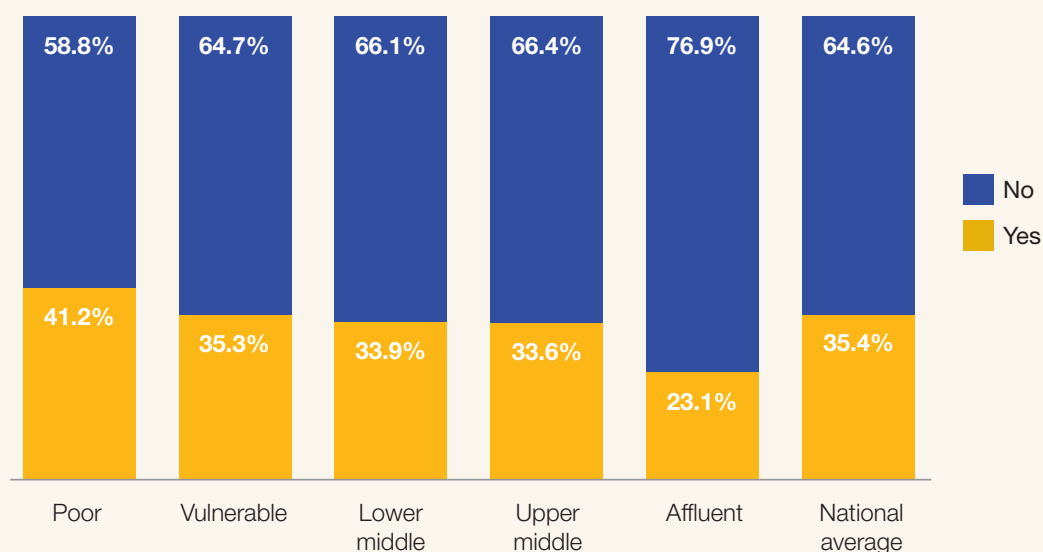
Figure 2.14. Reported Household Perceptions on Sufficiency of Food Consumption, by Economic Classes, 2015



Source: HIECS 2015.

Events and seasons are highly affecting poor households than those in middle and affluent class (figure 2.15). Households who reported that they are barely satisfied with their basic food needs or those who have insufficient food were asked to mention whether this problem is aggravated in special seasons. Overall, 35 percent reported that this problem is aggravated in special seasons, mainly in Ramadan or before beginning of schools. As is the case with other stressors and conditions, the poor were most strongly affected.

Figure 2.15. Share of Households Reporting Insufficient Food During Some Seasons, by Economic Classes, 2015 (percent)



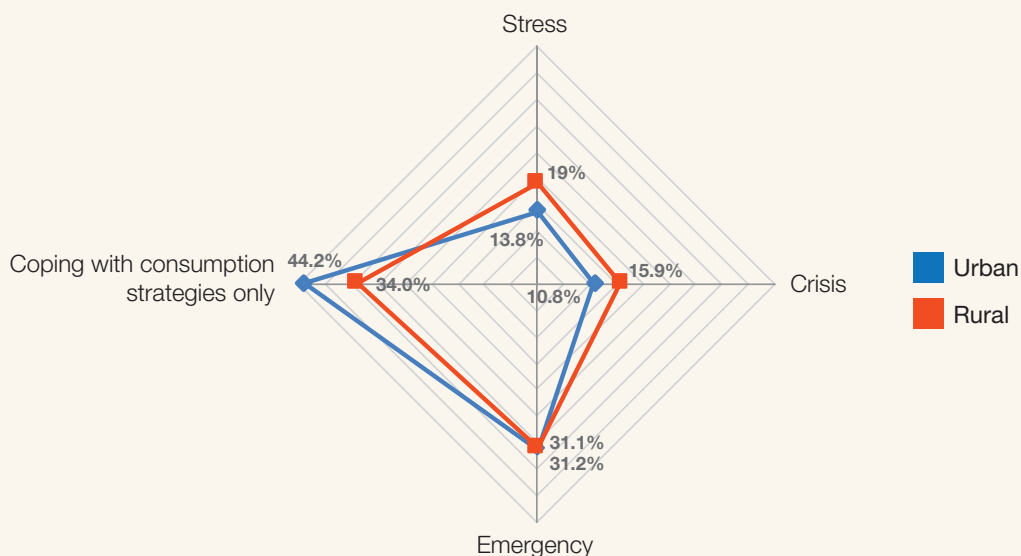
Source: HIECS 2015.

Households with insufficient food or in the borderline were forced to rely on various coping strategies to satisfy their basic food consumption needs. Overall, 28 percent of households could barely meet their food consumption needs and had to resort to various coping strategies, making them highly vulnerable to the risks of food insecurity. Overall, these households relied mainly on consumption rationing (39 percent) and emergency strategies (31 percent), while 16 percent of Egyptian households relied on selling productive assets as a main coping strategy for food insufficiency. Differences are observed between urban and rural residences, as shown in figure 2.16. Households in urban areas rely on consumption strategies more than those in rural areas, while households in rural areas rely on stress and crisis strategies more than those in urban areas.

Disaggregating by economic classes, differences are observed between poor households and other households mainly in adopting crisis-coping strategies and consumption-coping strategies. About 16 percent of poor households rely on crisis strategies, including the reduction spending on health

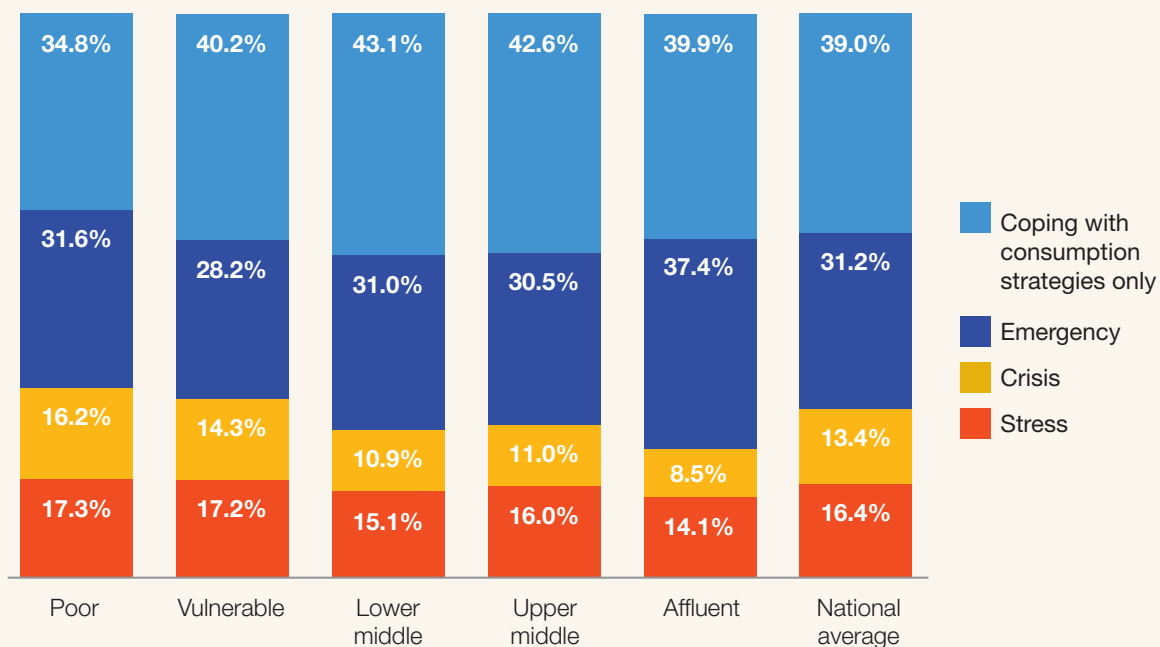
and education to save money for food and use stored grains kept for the coming season, compared to 11 percent among households in middle class. And about 35 percent of poor households rely on consumption-coping strategies, increased to 43 percent among those in middle class (figure 2.17).

Figure 2.16. Coping Strategies for Food Insecurity of Vulnerable Households by Urban/Rural Residence, 2015



Source: HIECS 2015.

Figure 2.17. Reported Household Perceptions on Sufficiency of Food Consumption, by Economic Classes, 2015 (percent)

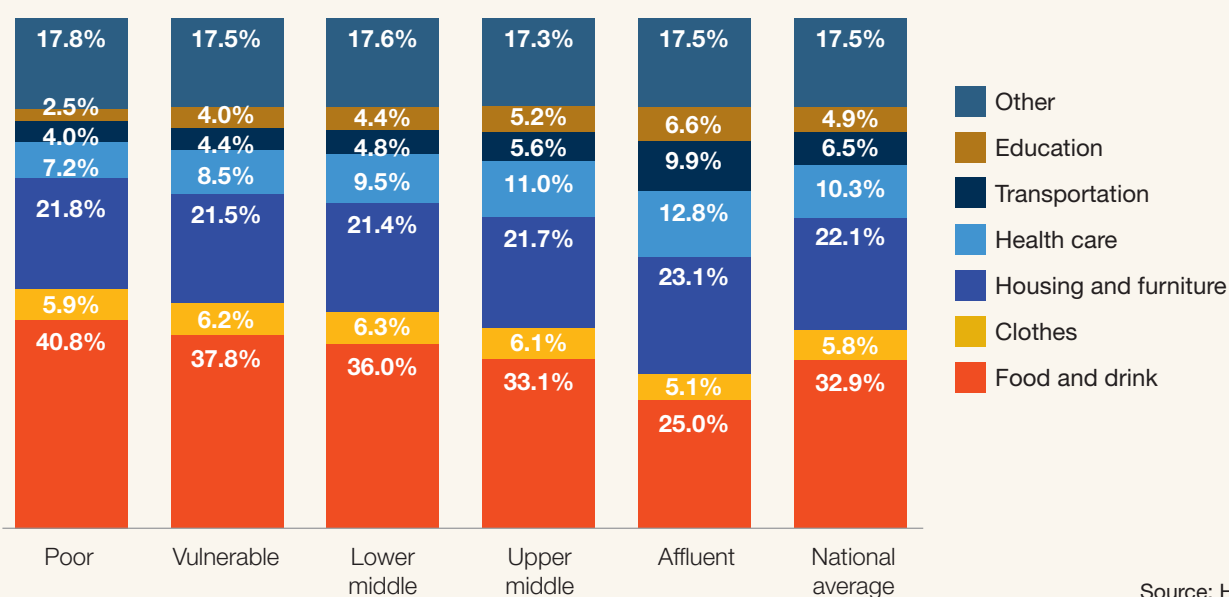


Source: HIECS 2015.

Consumption patterns

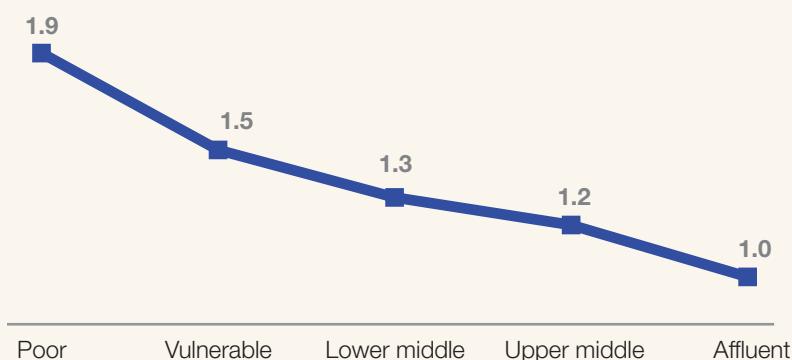
In this section we examine the underlying budget shares for different groups of consumption, across the economic classes. Overall, figure 2.18 shows that food consumption accounts for 33 percent of total consumption, with marked differences among economic classes. Food consumption constitutes nearly 41 percent of total consumption of poor households, but it decreases to 36 percent and 33 percent among households in lower- and upper-middle group, respectively, and it declines to only 25 percent among households in the affluent group. Strong differences are observed in consumption patterns among different economic classes particularly in education and health care consumption. Households in the middle class spend on education a larger share of their consumption (almost twice) compared to those in poor group.

Figure 2.18. Consumption Patterns by Different Economic Groups, 2015



Source: HIECS 2015.

Figure 2.19. Average Number of Persons per Room, by Economic Class



Source: HIECS 2015.

Housing characteristics

The middle classes (lower and upper) have much better quality facilities in their homes than do the poor, especially for floor material, toilets, sanitation network and availability of private kitchen. Table 2.19 shows how the middle class differs from the poor as most housing characteristics are strongly correlated with living standards.

Table 2.19. Economic Classes and Housing Characteristics

Coping strategies	Poor	Vulnerable	Lower middle	Upper middle	Affluent	TOTAL
Water network:						
Public network	92.3	92.5	92.7	92.8	94.8	92.9
Other	7.7	7.5	7.3	7.2	5.2	7.1
Electricity:						
Electricity	99.3	99.2	99.1	99.5	99.0	99.2
Other	0.7	0.8	0.9	0.5	1.0	0.8
Cooking fuel:						
Butagas	92.1	81.9	76.2	67.5	52.3	77.7
Natural gas	7.4	17.7	23.5	32.0	47.0	21.8
Other	0.6	0.5	0.4	0.5	0.6	0.5
Floor material:						
Tiles	36.7	50.9	51.8	47.3	37.1	44.6
Ceramic/parquet	11.1	22.8	32.3	41.5	56.9	28.4
Concrete	32.9	20.6	13.3	9.0	4.7	19.1
Natural floor	19.3	5.7	2.5	2.2	1.2	7.9
Type of toilet:						
Modern toilet	24.7	52.2	66.3	75.6	87.3	54.9
Tradition toilet	74.4	47.5	33.5	24.2	12.6	44.7
No toilet	0.9	0.4	0.3	0.1	0.1	0.4
Sanitation network:						
Public network	31.9	52.9	60.1	67.2	78.9	53.9
Private network	8.2	11.9	13.0	10.9	7.2	10.3
Septic Tank	28.4	24.0	19.5	16.4	10.9	21.6
Byara	29.3	9.6	6.1	4.4	2.4	12.8
Other	2.1	1.6	1.2	1.1	0.5	1.5
Availability of kitchen:						
Private	78.5	91.4	94.3	96.1	97.5	89.8
Shared	5.4	2.6	1.9	1.1	0.7	2.8
No kitchen	16.2	6.0	3.8	2.8	1.8	7.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source: HIECS 2015.

The degree to which children grow up in crowded housing is an important factor affecting children's well-being and health. Figure 2.19 shows the strong correlation between crowdedness and economic classes. In general, the average number of persons per room in 2015 is 1.5 members. The crowdedness level decreases with higher economic classes. The average number of persons per room decreases from 2.0 members per room among the poor to 1.2 members per room among the upper-middle class.

Conclusions

The middle class as a large group within any society is an important category of interest, as it is the main driver of economic activity and an interest group that influences political and social life. The Egyptian middle class's share of the country's population reached 28 percent in 2015 (almost 25.6 million people). Both the lower- and upper-middle class is more represented in metropolitan areas and in Lower Egypt than elsewhere.

Middle class households are likely to have heads with high education, permanent jobs, nonagricultural formal work, work in the government, other public, or private sector, and benefit more from social and health insurance compared to lower income households. Coverage of social and health insurance should be expanded all population specially the middle class. They need insurance or income stabilization interventions so that no newly poor are generated. On the other hand, the poor need structural changes in terms of their education, employment, health status, and assets. Cash transfers may alleviate their situation in the short-run, but the impact will be temporary unless they can build their human capacities to be able to maintain sustainable income, and hence get and stay out of poverty.

Compared to those in poor groups, they spend a larger share of their consumption on education, and accordingly children in the middle and affluent classes are more likely to enroll in schools than those among the poor class.

Food consumption constitutes nearly two-fifths of total consumption of poor households, while it is 36 percent and 33 percent among households in the lower- and upper-middle group, respectively. The number declines more to 25 percent among households in the affluent group. Subsidized food received via ration cards is considered a significant part of food consumption for the poor group (8.4 percent), and 6 percent for middle group.

Pensions received from the contributory system support the affluent class. Recipients include retired workers, pensioners from early-retirement, as well as survivors of the original beneficiary (i.e. widows, daughters). Households in this class receive government pension at a rate more than six times higher than that for the poor, and three and two times higher than that for the lower- and upper-middle class, respectively. Moreover, the percentage of households receiving government transfers (government cash assistance) is progressive where the poor receive more benefits. However, there is scope for improved efficiency in this type of spending, as one out every eight individuals in the affluent class receives cash transfers from the government.

ANNEX A. METHODOLOGIES TO IDENTIFY THE MIDDLE CLASS

We tried three approaches to classify the population into poor, vulnerable, middle class (lower and upper), and affluent class:

1. Absolute definition, using a vulnerability approach (probability of being poor)
2. Multiplicity of national poverty line
3. Absolute definition of classification (using the values of US dollars adjusted at PPP)

Vulnerability Approach (Probability of Being Poor)

In this method, the middle class is defined using the vulnerability-to-poverty approach based on a panel data analysis. This method of estimating the threshold and size of the middle class depends on the actual transitions of households into and out of poverty, rather than using arbitrary consumption or percentile levels.

The framework for defining the middle class according to a household's vulnerability to poverty follows a regression-based approach to estimate a consumption threshold associated with a low probability of falling into poverty. According to the methodology for estimating the middle class, defining the middle class is done in three stages.

In the first stage, actual characteristics are identified of those moving into and out of poverty by constructing a poverty transition matrix for those in both the 2010/11 and 2012/13 HIECS surveys (panel data)³⁶ using the official poverty lines of consumption levels.

The second stage constructs probabilities of falling into poverty by constructing a logistic model in order to analyze the correlates of the probability of falling into poverty over the analyzed period. The dependent variable in the logistic regression taking the value of 1 if households are identified as always poor in both periods or entering poverty in the final period and 0 otherwise.

In the third stage, the independent variables of the logistic regression are used to estimate a consumption equation. The resulting coefficients from the linear regression are used and the averages of the independent variables are used to solve the consumption equation and to obtain the amount of consumption associated with each probability level.

First stage: Transition matrix using the panel data of 2011–13

Table 2A.1. Transition Matrix, 2011–13 (percent of total)

		Poverty in 2013		TOTAL
		Nonpoor	Poor	
Poverty in 2011	Non poor	61.5%	12.2%	73.7%
	Poor	10.8%	15.5%	26.3%
TOTAL		72.3%	27.7%	100.0%

Second stage: Estimating the probability of being poor from the logistic regression using the panel data of 2011–13

Mean of predicted probabilities = 0.2821407.

Median of predicted probabilities = 0.1788124.

Table 2A.2. Distribution of Population (panel data 2011–13) According to the Predicted Probability of Being Poor

Predicted probability of being poor	Percent	Cumulative percent	Lower middle
Less than 0.01 (affluent class)	3,380	9.1	9.1
0.01 and less than 0.05	6,063	16.3	25.5
0.05 and less than 0.1	4,525	12.2	37.7
0.1 and less than 0.2	5,517	14.9	52.5
0.2 and less than 0.3	3,942	10.6	63.2
0.3 and less than 0.4	2,985	8.0	71.2
0.4 and less than 0.5	2,390	6.4	77.6
0.5 and less than 0.6	2,065	5.6	83.2
0.6 and less than 0.7	1,755	4.7	87.9
0.7 and less than 0.8	1,458	3.9	91.9
0.8 and less than 0.9	1,704	4.6	96.5
More than 0.9 (extreme poor)	1,311	3.5	100.0
TOTAL	37,095	100.0	

According to table 2A.2, it was decided to classify the population into the following:

- **Poor group:** those with consumption level less than the national poverty line
- **Vulnerable group:** defined as those people with predicted probabilities of being poor more than 0.2 but after excluding those defined as poor by the national poverty line
- **Lower-middle group:** those with predicted probabilities between 0.05 and 0.2
- **Upper-middle group:** those with probabilities between 0.01 and 0.05
- **Affluent group:** those with probabilities less than 0.01

Third stage: Estimating the amount of consumption (using the estimated linear regression) associated with each probability level

Table 2A.3. Economic Classifications Based on the Vulnerability Approach, 2015

	Thresholds used for classification (annual per capita consumption)	Percent
Poor	5636.4	27.8
Vulnerable	7098.4	21.1
Lower middle	8968.9	21.1
Upper middle	13079.1	19.2
Affluent	more than 13079.1	10.9
TOTAL		100.0

Multiplicity of National Poverty Line Approach

Another approach to defining the middle class is the multiplicity of the national poverty line. This approach classifies people as poor if they have a consumption level less than the national poverty line, while the vulnerable group is defined as those people with consumption level above the poverty line and less than 1.33 of the poverty line. The lower-middle class is defined as those people with consumption level 1.33 times the poverty line and less than 1.66 times the poverty line. The upper-middle group includes people with an estimated consumption level equal or above 1.66 times the poverty line and less than twice the national poverty line. Finally, people with consumption twice the poverty line and more are considered the affluent class group.

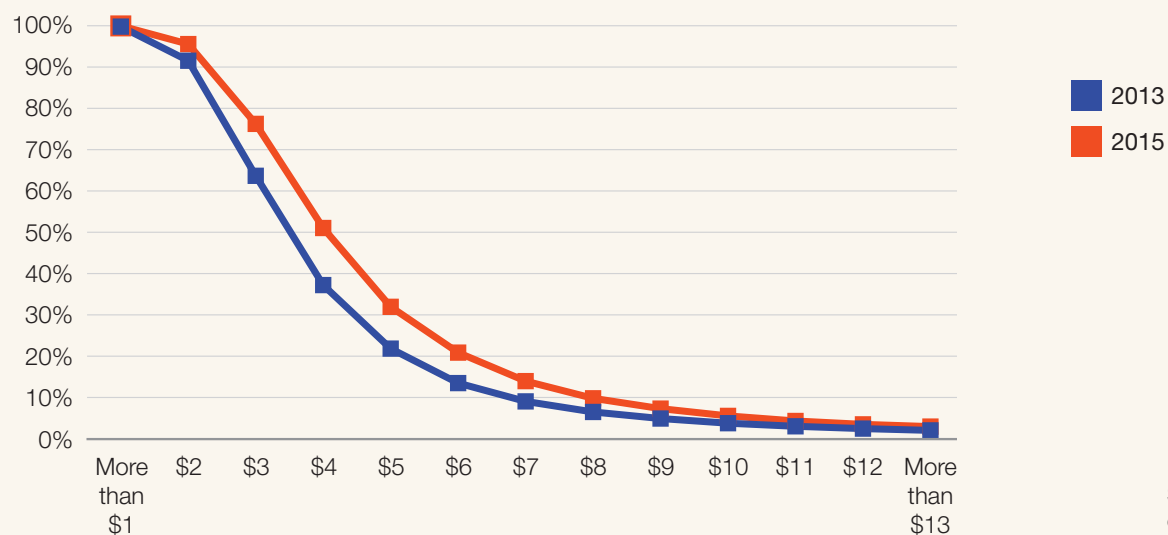
Absolute Definition Using the US Dollars Adjusted at 2005-PPP Poverty Line Approach

According to this definition, poor people are defined as those with daily per capita consumption less than US\$3 (adjusted by PPP), the vulnerable are those between US\$3 and US\$4, the lower-middle class is defined as those with daily per capita consumption of between US\$4 and US\$6, an upper-middle class has daily consumption of between US\$6 and US\$8, and those above US\$8 are considered to be in the affluent class (table 2A.5). This choice was guided by figure 2A.1, which illustrates the percentage of individuals whose per-capita consumption is below different values of US\$ PPP (US\$1 PPP at 2015 = 4.72³⁷).

Table 2A.4. Economic Classifications Based on US Dollars Adjusted at PPP

	Thresholds used for classification (daily per capita consumption, adjusted by PPP)	Percent
Poor	less than US\$3	23.8
Vulnerable	US\$3 and less than US\$4	25.2
Lower middle	US\$4 and less than US\$6	30.2
Upper middle	US\$6 and less than US\$8	11.1
Affluent	US\$8 and more	9.8
TOTAL		100.0

Figure 2A.1. Percentage of Population with Consumption More Than US\$1–13



Source: Authors' calculations using HIECS data.

Relationship Among the Three Methodologies, 2015

Table 2A.5. Relationship between the Classifications Based on Probability of Being Poor and Multiplicity of Poverty Line (PLI)

		Multiplicity of PL (1.33, 1.67, 2)					TOTAL
		Poor	Vulnerable	Lower middle	Upper	Poor	
Poverty using probability of being poor	Poor	27.8%					27.8%
	Vulnerable		21.1%				21.1%
	Lower middle		7.6%	13.5%			21.1%
	Upper middle			4.5%	10.0%	4.7%	19.2%
	Affluent					10.9%	10.9%
TOTAL		27.8%	28.7%	18.0%	10.0%	15.5%	100.0%

Table 2A.6. Relationship between the Classifications Based on US Dollars and Multiplicity of Poverty Line

		Multiplicity of PL (1.33, 1.67, 2)					TOTAL
		Poor	Vulnerable	Lower middle	Upper	Poor	
Poverty using US\$3-8	Poor	20.9%	2.8%	.0%	.0%		23.8%
	Vulnerable	6.6%	16.0%	2.5%	.0%	.0%	25.2%
	Lower middle	.3%	9.8%	14.0%	5.1%	1.0%	30.2%
	Upper middle			1.5%	4.8%	4.8%	11.1%
	Affluent				.1%	9.7%	9.8%
TOTAL		27.8%	28.7%	18.0%	10.0%	15.5%	100.0%

Table 2A.7. Relationship between the Classifications Based on US Dollars and Probability of Being Poor

		Poverty using US dollars					TOTAL
		Poor	Vulnerable	Lower middle	Upper	Poor	
Poverty using probability of being poor	Poor	20.9%	6.6%	.3%			27.8%
	Vulnerable	2.8%	12.8%	5.5%			21.1%
	Lower middle	.1%	5.7%	14.9%	.5%		21.1%
	Upper middle	.0%	.1%	9.4%	8.8%	.9%	19.2%
	Affluent			.1%	1.8%	8.9%	10.9%
TOTAL		23.8%	25.2%	30.2%	11.1%	9.8%	100.0%

CHAPTER 3

IMPROVING LABOR MARKET MATCHING IN EGYPT

Natalie Chun, *Consultant*

Introduction

When 42 million people of working age—nearly three out of every four—are out of the labor force, unemployed, informally employed, or underqualified for their job, the productivity losses for a country are enormous.³⁸ Getting these people into work and better employment opportunities is a social imperative.³⁹ With the scale of the problems and limited economic base for generating public finances, it is essential to set priorities for education and labor market investments that are cost-effective and can make an impact.

What recent history and economic performance in Egypt conveys is that continuing with the same model and approaches will not suffice. The highlight of the decade between 2000 and 2010 was rising levels of education accompanied by positive increases in gross domestic product (GDP) per capita growth. However, increases in the employment rate and working-age population were small relative to the increases in output per worker. In the six years that followed, a large part of the gains were wiped out, with total employment contracting because of smaller increases in the working-age population, but also weak growth in labor market demand (table 3.1). The result has been increasing unemployment and rising informality (World Bank 2014, 47; Assaad and Krafft 2015).

Table 3.1. Employment and Productivity Growth Decompositions

	1990	2000	2010	2016
GDP per capita (PPP \$ 2011)	5,909.2	7,388.4	10,536.8	10,848.2
Population (millions)	57.4	69.9	78.7	91.0
Output per worker	22,888	28,286	34,793	38,981
Employment, age 15+ (millions)	14.8	18.3	23.8	25.3
Working-age population (millions)	33.9	44.4	53.9	62.6
Employment agriculture (%)	29.6	29.6	29.1	25.6
Employment industry (%)	21.3	21.3	24.0	25.5
Employment services (%)	49.1	49.1	46.9	48.9

Changes	1990 to 2000	2000 to 2010	2010 to 2016
Growth in GDP per capita (PPP \$ 2011)	1,479	3,148	311
Contribution to growth in GDP per capita			
Output per worker	1,403	1,833	1,217
Employment rate	-407	629	-937
Working-age population	483	686	31
Contribution of sectoral employment to growth in GDP per capita			
Agriculture	-0.08	0.04	-2.02
Industry	-0.06	0.12	-0.23
Services	-0.14	0.04	-0.75
TOTAL	-0.28	0.20	-3.01

Source: World Development Indicators; Egypt National Statistical Yearbook 2016.

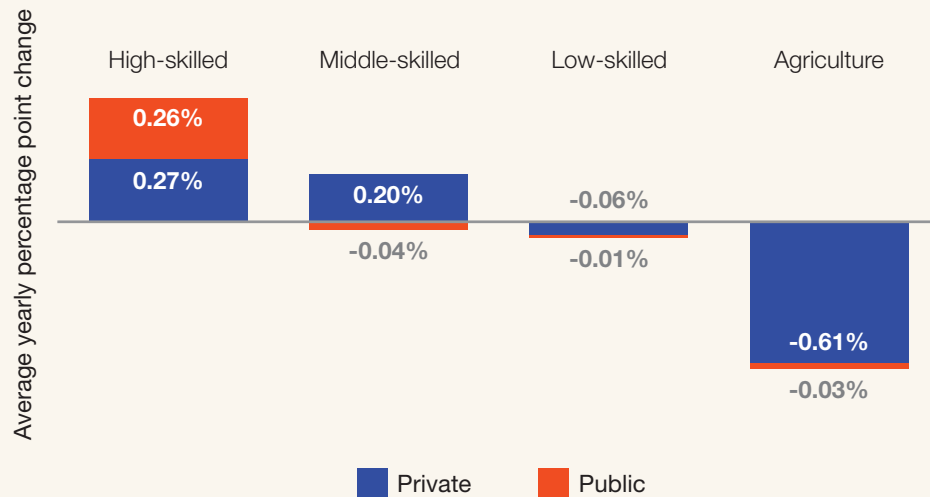
Note: Output per worker is GDP divided by working age population 15+. Working-age population is 15+. Employment rate is based on actual employment numbers for those age 15+. Years 2010 and 2016 use numbers from the national statistical yearbook's national population and employment estimates for total population, population age 15+ and total employment. Based on computations described in: World Bank Job Generation and Growth Decomposition Tool: Reference Manual and User's Guide v1.0: http://siteresources.worldbank.org/INTEMPSHAGRO/Resources/JoGGs_Decomposition_Tool_UsersGuide.pdf

There is an urgency to act. Solving the problem of the labor market will only become more difficult with technological change and automation (Frey and Osborne 2017; Nedelkoska and Quintini 2018).⁴⁰ Structural change has continued to provide benefits by shifting employment from agriculture into industry and services. However, automation is increasingly making it difficult to create opportunities for employment in middle-skilled, tradable jobs such as manufacturing, where there is greater potential to employ people with more limited skills in high-quality, formal jobs. While in much of the developed world technological change has resulted in rising polarization, the story in Egypt is different, where there is greater balance between the set of winners and losers in the labor market. In Egypt, the demand for high-skilled labor has weakened and a disproportionately high share of labor is ending up in middle-skilled and low-skilled jobs (figure 3.1). However, the middle-skilled, private sector jobs created are primarily in the nontradable construction and transportation sectors that are unlikely to exist as a long-term source of viable labor demand and quality jobs that can drive economic growth.

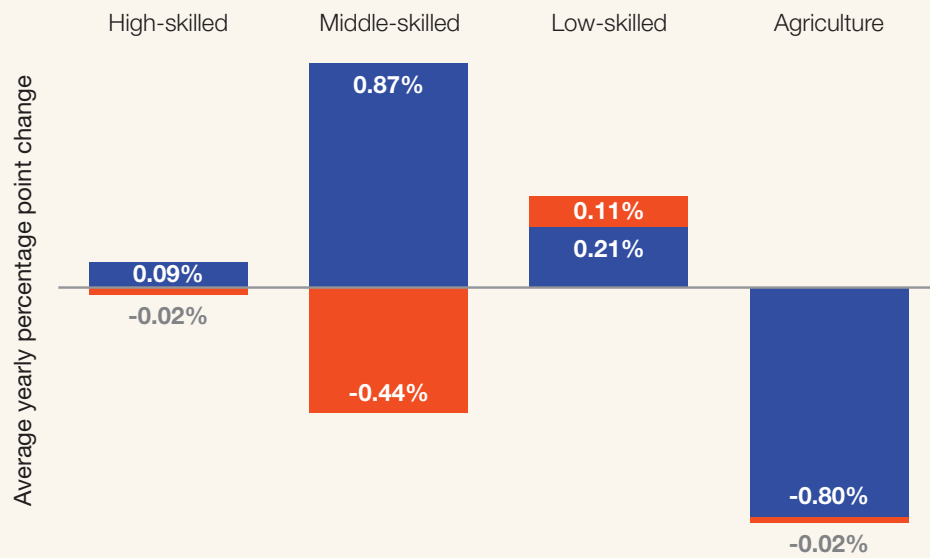
While the public sector in Egypt has acted to artificially boost employment numbers and serve as the primary source for better employment opportunities in high-skilled occupations, this strategy is impossible to sustain fiscally. The public sector has aggravated the problem of labor market matching as well as unemployment that has resulted in an emphasis on qualifications as opposed to skills (Assaad 2014; Rizk 2016).⁴¹ Transforming Egypt's fortunes will require developing a competitive private sector that has a strong demand for a variety of skilled labor. This must be complemented with an education system that is focused on producing quality skills that enhance *productivity* in the private sector labor market rather than educational qualifications.

Figure 3.1. Employment Shifts in Occupations, 1988 to 2016

a. 1988 to 1998



b. 1998 to 2016



Source: Egypt Labor Market Panel Surveys ELMPS 1988 2012 (OAMDI 2013, 2016a, 2016b, 2018).

Note: High-skilled = managerial, professional, and technical and associate professionals; middle-skilled = clerks, craft-related trade workers, plant and machine operators and assemblers, service workers; low-skilled = elementary occupations. Agriculture = all workers in agriculture industry independent of occupation level.

Average yearly percentage point change is defined as (percent of labor in [skill type] in year t minus percent of labor in [skill type] at year t-1)/(year t minus year t-1).

Prioritizing policies that can enhance job outcomes and reduce inefficient public expenditures on education investments should start with a systematic documentation of the problems and an understanding of how labor market supply matches demand. It is found that many workers are without a primary education, while a large percentage of secondary and university educated are unemployed or out of the labor force. This suggests that the greatest benefits can be had by prioritizing that all people reach a basic level of education, upping the quality of education at all levels to focus on building critical labor market skills, and developing private sector labor market demand.⁴² These types of initiatives will likely reap greater rewards in improving labor market matching than expansions in university education, where there is limited domestic demand for university-educated labor or programs that try to solve labor market frictions to help match workers to jobs.

Labor market problems are magnified at the governorate level due to the low mobility of the population. Some governorates have a relative dearth of skills, while others have an oversupply relative to demand. More worrisome, however, is that the public sector employment plays a significant role at the governorate level in improving job match outcomes by absorbing most of the university-educated labor and reducing unemployment. This is a strong sign that private sector demand has a limited role in employing more skilled labor. Setting regional policy priorities are essential to helping ensure that education is more in line with local labor market needs. Local industrial development can focus on policies that develop private industries that will better capitalize on the skills that are available. Policy can then build on agglomeration effects.

It is important to help people build skills that will allow them to be productive and effective in the global market, as opposed to skills that will not be utilized. Building communication, problem-solving, computer, digital, and English skills and an aptitude for learning will improve prospects for entry into productive, higher quality jobs.

Diagnosing the problems and identifying possible solutions are the easy parts. Far more difficult is implementing projects and investments that are cost-effective and make an impact. While recent investment laws and bankruptcy law initiatives have the potential to improve the competitiveness of the private sector and generate labor market demand, these laws could also be stretching current resources too thin over programs that will have little impact.

More fully embracing the opportunities and scalability of digital technologies is one possibility for solving the job situation and ensuring impact. This requires investment and improving the affordability of digital tools so the 66 percent of the population that is unconnected can access the Internet. It requires fully committing to the development of core digital, reading, and writing skills that are needed to allow the population to sell skills to the global labor market through the cloud. Even better outcomes may follow if there is strong government commitment to rules-based legislation that streamlines government process through digital automation and greater investments in monitoring and evaluation of policies and programs.

This chapter is organized as follows: The next section 2 discusses approaches to measuring labor market matching, focusing on qualification mismatches that can be documented using standard labor force surveys. After that, the chapter presents some exploratory work that leverages data from online job postings to start documenting the types of occupations and skills that are in demand. The chapter then discusses policy and programs that can address some of the major issues in labor market matching that have been identified in Egypt. The final section offers conclusions.

Measuring Labor Market Matching

Quality, detailed information on skill shortages, gaps, and mismatches helps to pinpoint major areas that need investment in order to improve labor market outcomes. Despite many labor market studies and evaluations on labor market returns to education in Egypt, there are relatively few attempts to systematically document and measure the quality of labor market outcomes in order to provide insight into how the government should invest to improve labor market matching. The research presented in this chapter is an initial step in creating a policy diagnostic tool that can relate to actionable strategies and priorities at a broader level.⁴³

Data

The primary analysis of this chapter relies on the Egypt Labor Force Survey of 2016. Only one cross-section of data is used, due to difficulties in obtaining data from earlier years.⁴⁴ The Egypt Labor Force Survey (LFS) covers a large geographic region and has a sample size of about 220,000 observations that can be used to understand labor market matching at the governorate level. As the labor force survey is run on an annual basis, the data can be used to understand broad trends in employment outcomes over time.

The labor market in Egypt is characterized by low rates of labor force participation, with only 49 percent of the population participating in the labor force and only a quarter of all females of working age participating. Unemployment stands at 13 percent and is high both among females, youth ages 15–29, and those with a secondary education. However, in developing countries poverty and absence of a formal safety net often means that informality may be a better measure of job match outcomes. *Informality* in Egypt, defined as workers in the labor market surveys that do not have formal contracts and are not employers, is high, with 60 percent of the population in informal jobs. Youth and those with a primary education have disproportionately higher shares of the informality (table 3.2). However, for jobs with a fixed location and where the company has at least 25 employees or more, rates of informality are less than 5 percent, indicating that larger formal firms could have a role in improving employment outcomes. These standard labor force statistics, nevertheless are more limited in conveying information about the matching process.

Table 3.2. Statistics of the Labor Market, 2016

	All	Male	Female	Urban	Rural	Age 15 to 29	Age 30 to 49	Age 50 to 65
Labor force participation	49	73	24	47	50	40	61	48
Labor force participation, female	24	0	100	25	24	29	22	19
Education of labor force								
No Education	27	28	23	19	33	17	26	51
Primary	8	9	6	7	9	10	8	6
Preparatory/secondary	8	8	7	7	8	11	6	4
Secondary/vocational	33	33	31	31	34	36	35	20
Postsecondary	5	5	5	6	4	4	6	4
University or higher	19	16	29	29	12	21	18	14
STEM technical training	18	21	11	20	17	23	19	8
Medical/Nursing training	2	1	4	3	1	2	2	2
Teaching	3	2	7	4	3	3	4	3
Business	15	13	22	19	13	16	16	14
Unemployed	13	10	24	15	11	27	5	1
Employed	87	90	76	85	89	73	95	99
Underemployed	1	2	1	1	1	2	1	1
Employment status								
Wage	70	71	66	77	65	78	68	61
Employer	10	12	2	7	12	3	11	20
Own account	12	13	8	13	11	7	15	13
Unpaid family worker	8	4	23	2	12	12	6	6
Informal worker	60	61	60	54	65	82	55	38
Has health insurance	32	29	41	40	26	18	36	44
Has social insurance	38	37	43	49	31	22	45	50
Mobility								
Work outside governorate	13	15	8	10	16	15	14	8
Mobile worker								
Type of wage employee								
Unlimited contract (including officially hired)	24	22	30	30	20	8	28	39
Written contract (limited)	9	8	12	12	7	13	8	4
No contract	37	40	24	35	38	56	31	18
Not stated	31	30	34	24	35	23	32	39
Monthly wage	2,132	2,224	1,817	2,271	1,966	1,596	2,258	2,631

Source: Egypt Labor Force Survey 2016 (OAMDI 2018). Definitions follow conventions described on the ERF data portal website.

Standard labor force surveys have more limited means to provide information about the actual tasks and skills required for jobs and the skills that workers possess. However, the first, best approach to collecting this type of data costs significant time and money. Standard labor force surveys and information culled from the web are an alternative and lower-cost approach to documenting problems in labor market matching. To provide additional insights into the labor market, the labor force surveys are used to undertake an initial analysis of the tasks used by jobs in Egypt and to document qualification and

technical mismatches. While this analysis tends to simplify the skill mismatch problem, it can provide important insights for setting priorities for education and labor market demands investments that can better capitalize on available skills. Complementing standard data with data collected from online job websites is examined in the section “Policy Approaches to Improving Labor Market Matching.”

The task framework for labor market analysis

The decomposition of occupations into a series of tasks can help one understand the skills and education that are needed for the occupation. It provides a way to describe how technologies and automation are changing the relative importance of the tasks that will drive labor demand. The task framework provides a broad breakdown of tasks that are categorized along different dimensions (Autor, Levy, and Murnane 2003; Acemoglu and Autor 2011). *Routine* tasks are repetitive in nature and have clear rules that are codifiable. For example, basic bookkeeping and assembly jobs are highly routine and require minimal interaction with others. These tasks are increasingly being automated as the relative cost of technologies to labor declines. *Nonroutine* tasks require adjusting to different environmental conditions and are more difficult to codify. These tasks differ along manual, physical, interactive, and abstract dimensions. *Manual* tasks require movement in operating machinery and tools, but some areas such as driving and livestock raising are increasingly being taken over by robots. *Physical* tasks require heavy lifting and are largely in the realm of occupations such as logging, mining, and construction. Interactive tasks require interfacing with customers and clients and responding to queries and are commonly found in sales and customer service. *Abstract* tasks require higher order thinking and innovation and include occupations such as engineering and research services. Both interactive and abstract tasks are more difficult to automate, are highly complementary to technology, and are better supplied by human labor.

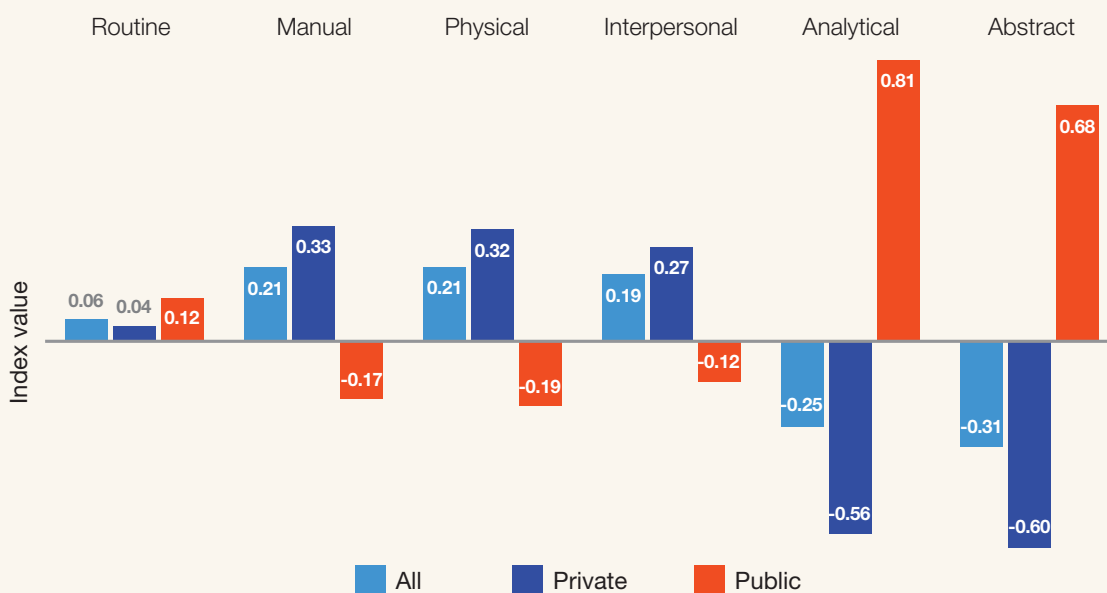
Workers come with different skills that are essential to efficiently executing different tasks. Individuals with strong *motor skills* have an advantage in performing manual tasks. Males, who are typically endowed with greater physical strength than females, have an advantage in conducting highly, manual and physical tasks. Individuals that have strong *soft skills* involving communication, empathy, client orientation, leadership, and attention to details have an advantage in conducting interactive tasks. Those with *hard skills*, which include problem solving, numerical, and analytical skills, have advantages in conducting more complex, abstract tasks. *Technical skills* focused on occupation-specific skills, such as programming or diagnosing diseases, provide advantages in very specific and specialized occupations. The education system plays a significant role in developing soft, hard, and technical skills that improve an individual's capabilities to perform interactive, abstract, and occupational-specific tasks.

The U.S. Department of Labor's Occupational Information Network (O*NET) lists the skills, knowledge, and education needed to be effective and successful in detailed occupations that are at the technological frontier. Forward-looking economies often set up their technical education system to deliver the skills and competencies for occupations that are outlined on these webpages. The reality is that differences in technologies used by firms, the capabilities of managers, and the skills of workers

result in tasks varying substantially even within narrowly defined occupations. In developing countries, these factors can cause the task content to be more basic and require far fewer skills than most developed countries. The work on measurement of tasks is still evolving, but Autor and Handel (2013) and the World Bank's Skills Towards Employability and Productivity (STEP) measurement program (Pierre et al. 2014) have been paving the way for better measuring skills and actual tasks on the job.

The average occupation in Egypt is highly manual and physical compared to analytical and abstract when applying the STEP skill measures to the labor force survey data.⁴⁵ While there have been declines in the physical nature of tasks and increases in analytical and abstracts tasks, due to shifts in occupations and industries, most jobs in Egypt do not require a high level of skill or education (figure 3.2). Examining changes between 2006 and 2016, a significant drop in occupations requiring interpersonal tasks is observed arising from shifts in private sector demand. This is concerning as interactive tasks typically are complementary tasks in economies that are transforming and capitalizing on digital technologies.

Figure 3.2. Task Content of Occupation, 2016, by Sector



Source: Egypt LFS 2016 (OAMDI 2018); World Bank STEP (Pierre et al. 2014).

Note: Mean task content from the STEP surveys for six Asian economies at the one-digit occupation, one-digit industry level is merged with the Egypt Labor Market Panel Surveys (ELMPS) and LFS data. Task content measures are designed to have a mean of 0 and standard deviation of 1 in the original data.

Qualification mismatches

Qualification mismatches represent an inefficiency in matching education supply to labor market demand. *Underqualification* and *overqualification* mismatches arise when a person has a lower or higher level of education relative to what is needed for his or her job or occupation. At a microlevel, information, mobility, and skill constraints can result in people ending up in jobs for which they are over- or underqualified, even while there are jobs available that are better matched to their education level. Underqualification typically results in lower wages compared to individuals that are similarly educated but higher wages

compared to others in the occupation for which they are overeducated. Overqualification is related to higher wages for those that are underqualified compared to individuals that are similarly educated but lower wages compared to other people in that occupation (Sattinger and Hartog 2013; Leuven and Oosterbeek 2011). At an aggregate level, too much underqualification implies significant losses to productivity and constraints on growth (Kampelmann and Rycx 2012). Too much overqualification can indicate overinvestment in education compared to labor market demand or a weak education system that is failing to efficiently produce the critical skills. See Sattinger (2012) for a detailed review.

To document qualification mismatches, criteria on the level of quality education necessary to be productive in executing tasks associated with an occupation is applied (table 3.3). The mapping assumes that even for elementary occupations a person needs basic numeracy, literacy, computing, and communication skills that are delivered through a quality primary education. In countries faced with a large informal sector, a basic level of education is seen as critical basis for developing numerical, reading, and communication skills for workers to enhance their opportunities for employment and income. Most middle-skilled jobs and technical associate occupations require basic technical, problem-solving and communication skills. These skills can be delivered through a quality secondary education that develops more advanced problem-solving, writing, and oral communication skills in addition to basic technical or occupational-specific skills. For professional and managerial occupations, there is a need for higher order problem-solving, communication, and writing skills in addition to specific technical skills that can be delivered through a postsecondary or university education. The exception to this rule is for managers of agriculture and low-skilled services, where only a quality secondary education that emphasizes general skills in addition to basic business and market oriented skills is needed.

Table 3.3. Mapping Occupations to Tasks and Maximum Education Needed

Occupation	ISCO (2-digit)	Tasks	Skills	Maximum education needed	Wage to low skilled
High-skilled managerial (CEOs)	11, 12 (nonagriculture), 13, 14	Problem solving, interpersonal, industry specific	Cognitive, social, technical	Tertiary	2.17
High-skilled professional (for example, engineers, doctors, lawyers)	21/6	Problem solving, industry specific	Cognitive, technical	Tertiary	1.51
Technical associates	31/35	Problem solving, industry specific	Cognitive, technical	Secondary vocational/postsecondary	1.43
Middle-skilled routine (for example, assembly, construction, machine operation)	41/44, 71/75, 81/82	Repetitive, some industry specific	Basic technical, basic cognitive	Preparatory/secondary	1.24
Middle-skilled nonroutine (for example, service or sales); administrative managerial (agriculture, low-skilled services)	51/54, 12 (agriculture), 83	Interpersonal, basic problem solving	Basic cognitive, social, basic technical	Secondary vocational/general	1.19
Low-skilled (for example, agriculture, maids, street workers)	91/96, 63	Physical, repetitive	Basic cognitive	Primary	1.00

Note: In Egypt, workers categorized as high-skilled agriculture workers are grouped with low-skilled agriculture workers. Relative wages are based on Egypt's Labor Force Survey (OAMDI 2018). ISCO = international standard classification of occupations. Wage to low skilled is simply a ratio of how wages in Egyptian pounds of one group compares to another.

A more detailed outline of this mapping is provided in table 3.4. The absolute mapping that was used to determine match quality is believed to provide the best approach from the perspective of evaluating the efficacy of public investments in education and labor market demand. This mapping sets a baseline but does not take into account the efficacy of public investments that could result in improvements in social welfare from a forward-looking economy that is looking to upskill labor to employ more advanced technologies. Moreover, because individuals have private returns to education, they still may choose to invest in education even though it may not make sense from the perspective of the government to invest. As a result, the primary mapping is compared to various alternative mappings and the returns to education within each two-digit occupation. The primary mapping provides a reasonable minimum standard on the level of quality education that is needed to be productive in an occupation in a modernized economy that is focused on skills. It is observed that the mapping is similar to educational requirements reported in World Bank's STEP skills surveys for six Asian economies and is below the level of education reported to be required for occupations in the United States.⁴⁶ In contrast, using a measure based on the median level of education of formal sector workers observed in an occupation in 2016, the occupation level of the median person tends to be lower than the standard that has been set. The results show that there are returns to education in many occupations, but that for construction, drivers, and metal workers and for professional workers the returns are relatively minimal.⁴⁷ The estimated share of the employed population that comes out matched versus mismatched using the various mappings is shown in table 3.5. The values of the primary mapping are reasonable compared to other hard standards that are possible to utilize, but they overestimate levels of underqualification and possibly underestimate levels of overqualification using a relative standard that simply takes an average of the education observed with the formally employed population in Egypt. These relative standards on education should be viewed with greater skepticism for economies aiming to modernize and upgrade their technologies to compete in the global market, as they are reflective only of local supply and demand relationships.

Underqualification using the mapping in table 3.4 occurs in many different occupations, but it is most severe in middle- and low-skilled occupations. Underqualification in low-skilled occupations arises because 35 percent of all labor force participants in 2016 had at most a primary education (figure 3.3, annex table 3A.1). Despite rising average years of education, 17 percent among those 15 to 29 still do not have even a primary education, with a disproportionate share of the low-skilled underqualified population occurring in rural areas (table 3.2). Many of the technical associate positions have high rates of underqualification, but they account for a relatively small share of all occupations. Although there are some occupations such as customer service and keyboard that have high levels of overqualification, these account for a minimal share of overall employment. The high degree of underqualification among administrative managerial positions and elementary occupations (agriculture, drivers, and cleaners) that comprise a significant proportion of all labor at 13 percent and 33 percent, respectively, are of more critical concern (annex table 3A.2).

Table 3.4. Comparison of Occupation to Education Mapping with Other Standards

Occupation (two-digit ISCO)	Occupation needs			Egypt education (2016)			Returns to education (2016)		
	Egypt	U.S. O*Net	STEP Asia	Median	Mean	SD	Primary	Secondary	University
CEOs	Tertiary	Bachelor's degree	Tertiary	University	13.6	4.9			
Administrative managers	Secondary	Bachelor's degree	Tertiary	Primary	6.9	6.4	0.00	0.15	0.34
Production managers	Tertiary	Bachelor's degree	Tertiary	University	15.0	2.2	-0.68	-0.98	-0.96
Science and engineering professionals	Tertiary	Bachelor's degree	Tertiary	University	16.0	0.5	-0.93	-1.12	-0.84
Health professionals	Tertiary	Doctoral degree	Tertiary	University	15.9	1.3	-1.14	-1.47	-1.25
Teaching professionals	Tertiary	Master's degree	Tertiary	University	15.2	1.7	-0.34	-0.22	0.13
Business administration professionals	Tertiary	Bachelor's degree	Some college	University	15.5	1.3	0.03	0.15	0.28
Science and engineering associates	Secondary	Associate degree	Secondary	Secondary vocational	12.3	1.9	-0.06	0.07	0.27
Health associates	Secondary	Associate degree	Secondary	Secondary vocational	13.1	1.8	0.31	0.54	0.64
Business administration associates	Secondary	Associate degree	Some college	Postsecondary	13.8	2.1			
Legal associates	Secondary	Associate degree	Secondary	Secondary vocational	12.7	2.4	0.27	0.52	0.69
Keyboard	Secondary	High school diploma	Secondary	Secondary vocational	12.7	2.4	0.01	0.18	0.37
Customer service	Secondary	High school diploma	Secondary	Secondary vocational	12.9	2.4	0.37	0.91	1.36
Service and sales	Secondary	Postsecondary certificate	Lower secondary	Secondary vocational	8.9	5.5	-0.03	0.14	0.38
Sales	Secondary	High school diploma	Lower secondary	Secondary vocational	11.3	4.7	-0.05	0.08	0.25
Building and construction	Secondary	High school diploma	Secondary	Preparatory/secondary	8.2	5.0	0.00	0.10	0.22
Metal	Secondary	High school diploma	Lower secondary	Secondary vocational	8.3	5.1	0.23	0.49	0.69
Handicraft and printing	Secondary	High school diploma	Lower secondary	Secondary vocational	9.4	4.5	-0.04	-0.13	-0.22
Electronic and trade	Secondary	Postsecondary certificate	Lower secondary	Preparatory/secondary	8.9	4.8	0.11	0.21	0.28
Machine operator	Secondary	High school diploma	Primary	Secondary vocational	9.8	4.4	0.05	0.28	0.54
Assembly	Secondary	High school diploma	Primary	Preparatory/secondary	7.7	5.1	0.03	0.08	0.12
Drivers	Secondary	High school diploma	Lower secondary	Preparatory/secondary	7.7	4.8	0.17	0.22	0.20
Cleaners and helpers	Primary	High school diploma	Primary	Primary	5.8	5.0	0.09	0.22	0.32
Agriculture laborer	Primary	High school diploma	Primary	Preparatory/secondary	6.9	5.4	0.04	0.05	0.04
Mining and manufacturing laborer	Primary	High school diploma	Lower secondary	Primary	7.0	6.4	20	42	16

Notes: 1. Egypt's educational requirements comes from stance of what is needed for the occupation. 2. U.S. data come from O*NET Online (2018) on the education level that at least 50 percent of the population or greater has for a given occupation. 3. STEP data come from the cited level of education needed for the given occupation by all workers in six Asian countries that are not considered informal workers. 4. Median and mean education levels in Egypt are based only on workers that are considered formal. 5. Simulations of estimated returns to education (not causal) comes from Mincerian wage regression of log real wages on education years-squared, education years-squared, experience, experience-squared, industry controls, regional controls, and control for females. Values are not reported for those where there were less than 100 data observations

Table 3.5. Reported Mismatch Based on Different Definitions

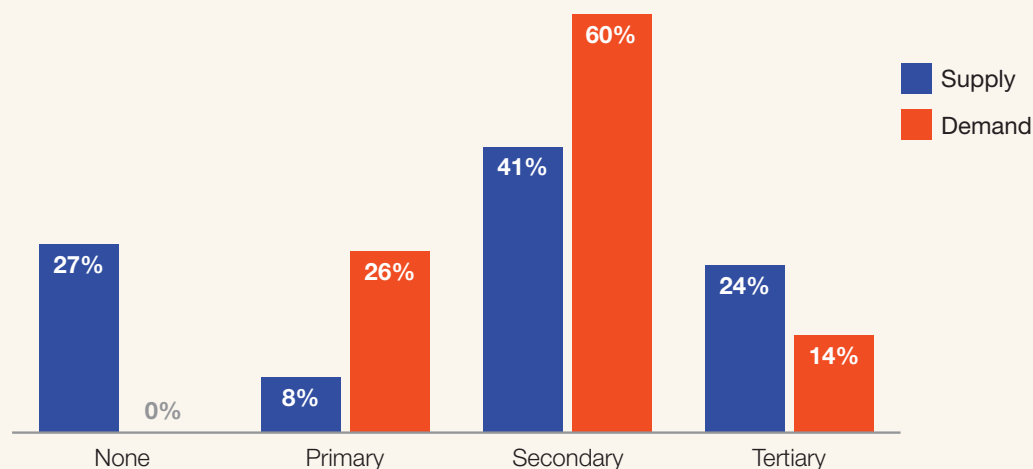
Definition	Qualification (%)		
	Match	Over	Under
Occupation needs are based on mapping in column 2 of table 3.4. Specific definition for Egypt.	41	21	38
Occupation needs are based on mapping in column 3 of table 3.4. Data are based on defined education requirements based on the US O*NET database.	43	5	52
Occupation needs are based on mapping in column 4 of table 3.4. Data are based on World Bank STEP Skills database for six Asian countries on self-reported education needed for workers in formal jobs.	39	21	40
Needed education based on median education level that people are observed to have in formal sector jobs in Egypt.	27	32	41
Needed education based on being within 1 standard deviation of the mean education level of people observed in formal sector jobs at the 2-digit occupation level.	59	13	28

Note: Based on values reported in table 3.4. Egypt Labor Force Survey 2016 (OAMDI 2018).

Figure 3.3. Labor Supply and Demand per Education Level, 2016

Source: See table 3.2.

Note: Demand is based on low-skilled jobs needing at most primary education; middle-skilled jobs needing at most a secondary education; and managerial, professional, and technical jobs needing a postsecondary education.



When 60 percent of administrative managers are underqualified, it can have wider detrimental effects on the productivity and learning potential of employees that they oversee. Administrative managers at their best play a strong role in motivating, monitoring, and incentivizing employees to be productive while bringing in new ideas that develop innovation and improve productivity and growth of the firm. Continuous learning of numeracy, communication, analytical, problem-solving, and managerial and business skills that are built through a quality secondary or university education is therefore critical and important for those that enter into management positions. Outside of the government, a majority of these managers own small businesses, are older, have more years of experience, and have become administrative managers due to an absence of better employment opportunities. Given evidence

that younger managerial ages and education are important factors in creating greater openness to technology and generating innovation within a firm, Acemoglu, Akcigit, and Celik (2017) suggest that the many older, underqualified managers could be contributing to significant losses in productivity.

Job match outcomes are quite dismal, but the picture is even worse when one considers that the public sector is the main driver of higher quality employment and better matched job outcomes: 68 percent of public sector jobs are defined as high-skilled compared to 34 percent in the overall labor market (annex table 3A.2). A large part of these occupations are administrative managerial, teaching professionals, and legal associates and therefore have limited value in helping to generate greater innovation and private sector growth. As most private sector employment outside of agriculture occurs in nontradable construction, transportation, and cleaning services, much of employment is highly susceptible to domestic downturns and does not provide a good base for generating public finances over the longer term.

Putting the labor market on a path toward long-term sustainability requires relying on stronger private sector growth in tradable sectors where there is significant room to expand employment from global demand. While demand-side interventions can help, this needs to be complemented by a shift in education priorities toward building marketable skills and ensuring the entire population is provided with at least a quality primary education.

Technical qualification mismatches

Technical skills that are built through a quality technical education or university degree play an important role in some occupations. In Egypt, science and engineering, health, and business qualifications (including legal associate) that come through university or secondary technical vocational education have particular importance, as these technical degrees account for over 50 percent of those employed (annex table 3A.2). These occupations are the main ones where insufficient numbers of workers with specific technical skills could limit growth and expansion of associated industries. In contrast, most other occupations have a mixture of people with different technical degrees or more generalized education. In the latter occupations, the technical skills are much easier to learn on the job or through short training courses, making it more important to have a strong set of transferrable soft and hard skills and an openness to learning.

In Egypt, insufficient technical qualifications do not appear to be a major problem. Over 40 percent of those trained in technical degrees are employed in other occupations. Unemployment among those with tertiary engineering and science degrees stands at 26 percent and over 36 percent of university graduates with engineering certifications are overqualified for their jobs (table 3.6). Somewhat similar numbers are observed for those with business training. Only the labor market for health and life science graduates is relatively tighter and comparatively well matched. However, much of the rates of unemployment and overqualification would be far higher if there was more limited public sector employment.

Table 3.6. Labor Force Participation and Employment Outcomes of Individuals with Technical Certifications (percent)

	Popu- lation share	LFP	Unem- ployment rate	Qualification			Technical	In public sector
				Match	Over	Under	Skill match	
Secondary vocational								
Other	3	75	14	62	25	13	0	27
Engineering/physical science	11	70	17	73	21	5	10	18
Health/life science	0.342	65	3	93	2	2	89	89
Business	11	50	19	69	24	6	17	27
Tertiary								
Other	7	79	21	60	39	0	0	54
Engineering/physical science	1	88	26	64	36	0	51	34
Health/life science	1	86	13	72	27	0	56	60
Business	3	78	21	54	46	0	48	40

Source: See table 3.2.

Note: LFP = Labor force participation.

That many are receiving specific training that is not translating into employment and better job matches is a concern representing lost productivity and wasted investments in education.⁴⁸ Probing deeper into the drivers of unemployment and overqualification should be a priority. Higher rates of unemployment among engineering graduates could be driven by failures in university education to provide a solid combination of technical and generalizable skills that are applicable to the labor market. As engineering skills are in high demand globally, there is great potential for individuals with these degrees to work remotely and sell their skills through the cloud. While some studies suggest the need to expand science, technology, engineering, or mathematics (STEM) degrees to reduce informality, this is not believed to be an effective strategy for solving the job situation, given that so many with STEM and business degrees remain unemployed or overqualified (Subrahmanyam and Castel 2016). The inability to translate this type of education into a viable labor market outcome more likely arises from an education system where a large majority of graduates do not have the right skills that ensure they are productive and competitive on a global scale. Given that public education from primary to university is free, it suggests that the government could reap substantial savings by reorienting the education system and constraining higher education investments to better ensure that skills are delivered that provide a better match with labor market demand.

Diagnosing problems of labor market matching

Documenting labor market matching problems related to informality, unemployment, underqualification, and overqualification can be translated into statistics for diagnosing the major constraints that link to potential solutions (table 3.7). The primary documentation focuses on labor market supply and demand problems. As job vacancy information is limited, documenting the contribution of information and search costs to labor market matching problems is a challenge.

Table 3.7. Policy Options

Problem	Statistic	Problem size from Labor Force Survey 2016	2010
Supply: Low educated	Less than Primary educated: underqualified and informally employed; unemployed	9.5 million (33% of LFP)	Invest in improving the share with a quality primary education.
Supply: Secondary educated and higher	Secondary educated: underqualified	0.6 million (2.5% of LFP)	Invest in raising the number with a quality higher education.
Supply: Technical educated (skill shortage)	Secondary educated and higher: low unemployment, informality, overqualification of those with technical degrees	Minimal? Except secondary medical. High unemployment otherwise	Provide incentives for people with valuable skills to join the labor market and improve the share that have a quality technical education.
Demand: Low educated	Primary educated: informally employed and not underqualified	0.6 (2% of LFP)	Develop demand-side policies that develop and foster creation and growth of formal firms in tradable sectors that can utilize lower-skilled labor (for example, manufacturing, agriculture, food-processing); complement activities with improving quality of education system that focuses more on marketable skills.
Demand: Secondary educated and higher	Secondary educated and higher: informally employed, unemployed, overqualified	11.2 million (39% of LFP)	Develop demand-side policies that develop and foster creation and growth of formal firms, particularly in high-skilled, tradable sectors; complement activities with improving quality of education system and number with marketable skills.
Labor market matching: information, search costs	Vacancies/unemployment and informal employment (by occupation/education type)	Minimal? High shares unemployed (13%), informally employed (52%)	Develop supply-side policies that provide incentives for skilled people to relocate for these jobs. Encourage and incentivize greater participation of skilled and educated workforce, particularly females. Invest in specialized training.

Note: LFP refers to labor force participation (employed and unemployed people of working age).

Labor market supply problems arise because workers have insufficient skills to be fully productive in jobs for which there is labor market demand that needs to be addressed through improvements in the level and quality of education. Factors such as informality and unemployment among those with low levels of education and underqualification can reflect labor market supply problems. Targeting the population where there are the highest levels of underqualification and aligning curricula to skills that are critical to occupations is essential to resolving these problems. Labor market demand-side problems arise when workers have a sufficient amount of quality skills but there is insufficient private sector demand for these skills. This requires improving the investment climate for firms that ensure that the most productive and innovative firms can thrive. Factors that could reflect demand-side problems are high levels of unemployment and overqualification among the population with at least a secondary education.

In Egypt there is limited evidence that skill shortages or constraints in high-skilled formal occupations are significantly constraining the economy. These shortages appear small compared to the problems of labor market demand for higher skilled labor and inadequate skills among administrative managers and workers in elementary occupations, pointing to significant inefficiencies in the matching process. While labor market search frictions that raise costs to easily finding a job are difficult to document, it is likely these issues are minimal compared to the size of both supply- and demand-side problems that are documented in Egypt.

Labor market matching in the governorates

Macrolevel problems of labor market matching are magnified at the governorate level, due to the low mobility of the population. Some governorates have an oversupply of educated labor relative to demand, while other governorates have shortages. The average worker in Egypt only travels 30 minutes to work, and only 6 percent state they work in a governorate outside of the one in which they live (OAMDI. 2017). In stark contrast to the United States, where in 2010 nearly 60 percent of the population was reported to live in a different state than the one they were born in, only 10 percent of the working population in Egypt has moved from the governorate where they were born, with the number slightly higher among more skilled workers, at 23 percent (OAMDI. 2016a). This points to the importance of a spatial perspective that treats different governorates as separate labor markets.

Understanding regional differences in labor market outcomes and matching by governorate are useful for prioritizing regional policies. This approach matches with the flexibility and scope that governorates have to propose budgetary allocations and set priorities for various policies and projects. Given that there are financial and time constraints to covering a full range of initiatives, it is important to figure out how to set priorities in the governorates for different types of education, training, and industrial development that can improve labor market outcomes.

Labor market supply and demand are problems in most governorates. Supply problems are driven by a large mass of the population with very little education that ends up in informal jobs or jobs that require a higher level of education than what they possess. Demand-side problems being driven by a large population with at least secondary education that are unemployed or overqualified. This portrait supports priorities for investments that expand the coverage and quality of basic education and improve labor market demand to better utilize both the unemployed and the overqualified university-educated populations.

Using match quality definition 1 (table 3.5), demand-side problems are found to be a greater issue than supply in 20 of the 27 governorates and are driven primarily by a large share of the population with very high education that ends up unemployed or in jobs for which the individuals are overqualified. Still the statistics suggest that labor market supply-side problems are sizable in many of the governorates. Annex table 3A.3 provides raw indicators on the key labor market statistics in the different governorates.

Low-skilled occupations account for the majority of underqualification and informality but also include overqualification. The main exception to this pattern is in administrative managerial positions, which consistently account for a large share of underqualification in many governorates (annex table 3A.4). In four governorates the share of workers with primary education or less that are underqualified and informally employed account for more than 40 percent of the population. In contrast, 11 governorates have demand-side problems where unemployment, overqualification, and informal employment among the highly educated account for more than 40 percent of the population (annex table 3.5).

When the best and most skilled labor is captured by the public sector, it is a strong indication that there is weak private sector labor demand. Public sector employment in the governorates ranges from 15 percent to 50 percent of all employment (annex table 3A.3). Public employment is a large determinant of job match outcomes, particularly in regions where there is limited industry. While for 1998 and 2006 there is some evidence that higher public sector employment contributed to higher unemployment among university-educated male and female youth in governorates with higher public sector employment, this relationship declined over time (Assaad 2014). Although queuing for public sector could be driving this unemployment, it is likely an unfortunate result of poor quality private sector employment prospects among the university educated.⁴⁹

The statistics at the governorate level suggest that ensuring everyone receives a quality primary education should be a priority, as a significant portion of the underqualified and informally employed is driven by the population without any education. Many governorates have high unemployment rates among university and secondary vocational graduates, indicating the need for greater restraint in upping the levels of education to ensure that the education investments do not go to waste.

Supply-side strategies can be complemented with demand-side strategies to ensure that greater productivity is extracted out of existing labor. In many of the regions, agriculture, building, and construction accounts for the majority of underqualification, informality, and often overqualification. Developing more viable and stable sectors that can absorb low-skilled labor is the main way to ensure better quality jobs for the majority of people. Agriculture is highly susceptible to climate change, while building and construction employment may be only temporarily boosted by the government's subsidized housing loan policies and other publicly funded housing programs. Agriculture value added therefore could play an important role in governorates where agriculture dominates. In others, where overqualification, informality, and unemployment is high among secondary and university graduates, there is a need to identify the skills that these graduates possess and the potential to develop tradable sectors such as manufacturing and business services that are competitive and can provide greater possibilities to employ this type of labor.

Assessing Labor Market Demand Using Online Job Postings

Typical survey data are limited in providing information on labor market demand and require significant time and costs to collect. They have trouble tracking trends in needed occupations and skills as well as the number of job vacancies, which might provide information on skill shortages or difficulties in labor market search, resulting in vacancies going unfilled over long periods. Timely and relevant data are essential to having a dynamic education system that can be responsive to labor market demands. Data culled from the web provides a significant opportunity to increase the timeliness of assessments and identify the key skills that are in demand, and this is important for informing policy makers and individuals on learning investments. Recent work by Nomura et al. (2017) using online job portal data from India has shown the potential power and value that big data methodologies can provide in understanding and informing labor market policies. This section presents some exploratory work using data obtained from key job websites in Egypt.⁵⁰

Online job-posting data

OLX.com is one of Egypt's largest online portals, with over 133,000 job ads as of the end of August 2017. Roughly two-thirds of these postings are advertisements for vacancies, with about one-third of advertisements comprising people looking for jobs. Ads on the website are typically posted in Arabic, but can be translated into English using Google translate, and are live for a maximum of 90 days. The data have breadth, as they cover almost all of the major cities and areas in Egypt. A typical advertisement from OLX.com is displayed in figure 3.4. Key statistics from the OLX.com data downloaded daily between January and March 2018 and covering over 200,000 job ad vacancies is displayed in table 3.8.⁵¹ Hospitality jobs account for a major portion of all job ad vacancies where the

Figure 3.4. Example of an OLX.com.eg Job Ad Page



Source: OLX.com (translated into English using Google translate).

Table 3.8. OLX Egypt Summary Statistics, January 1, 2018, through March 31, 2018

	Number		Mean			Percent of Ads									
	Ads	Days Posted	Views	Compensation	Has Valid Compensation	listed email	listed phone	Bachelor Degree Required	Full-Time	Experience: Managerial	Experience: Entry Level				
Accounting	4,950	43	722	6481	25	57	58	64	57	36	29				
Architecture - Engineering	3,607	44	676	330	4	60	57	70	58	46	21				
Art - Design	2,738	43	525	300	2	54	56	55	45	43	20				
Business Development	472	42	638	513	3	58	64	44	40	35	23				
Construction	3,475	44	465	296	10	60	71	27	33	50	13				
Consulting	1,042	47	611	857	9	54	63	71	37	31	39				
Education	5,089	50	532	434	9	57	67	61	29	41	19				
Executive	3,710	41	613	281	2	59	60	46	54	41	21				
HR - Recruiting	2,304	36	580	307	1	55	61	27	44	23	30				
Hospitality	20,788	40	343	295	1	54	66	10	47	16	38				
IT - Telecom	5,568	39	492	377	1	65	68	61	52	25	27				
Marketing - PR	13,037	41	408	445	3	58	68	41	37	24	36				
Medical - Health	5,036	45	529	361	5	54	66	58	37	38	32				
Other	101,761	38	340	423	2	54	62	9	42	9	45				
Retail	7,779	40	719	679	3	47	65	20	42	16	41				
Sales	12,778	45	495	326	2	56	66	50	57	26	40				
Secretarial	11,269	33	888	605	4	51	62	35	36	24	27				
TOTAL	205,403														

Source: Downloaded daily from OLX.com/eg: January 1, 2018-March 31, 2018

Note: Eliminates ads for job seekers and only focuses on employer ads. Compensation is the average for job postings where this data is available. However, a large majority of ads do not post data on compensation. Job ads are distinct with data from last job ad kept even though we have multiple entries in the dataset. Average views does not take into account time length that job ad is posted and should be altered for future work.

sector is known. However, these jobs receive fewer views than business development, secretarial, and retail jobs. Based on the job ads that report compensation; accounting, consulting, retail, and business development have higher average compensation than other industries such as construction and sales; but the large majority of ads typically do not report this type of information or do not have seemingly credible numbers for compensation (noting, for example, “greater than 100 Egyptian pounds”).

Wuzzuf.net is an online job portal representing approximately 5,000 job postings per month from January and March 2018. It serves as a platform to match workers to jobs. In contrast to OLX.com, individuals can apply for jobs directly through the website. As a result, the website displays tracking of job ads in terms of number of applicants, number of applicants reviewed, number rejected, and number shortlisted. Wuzzuf job ads are primarily tied to the export and tradeable services market and are largely limited to the Alexandria and Cairo labor markets. Most Wuzzuf job ads are listed in English and provide a very detailed breakdown of different skill demands and minimum requirements in tradable sectors and those catering to foreign clients. Figure 3.5 shows a typical advertisement from Wuzzuf.net. Key statistics from Wuzzuf.net data are displayed in table 3.9.

While there is variety in the jobs posted, they are likely to have demand for critical hard and soft skills. These jobs represent the more innovative and productive sectors of Egypt that are concerned with hiring skilled labor and are likely to pay a premium for a person with good skills.

Figure 3.5. Example of a Wuzzuf.net Job Ad Page

The screenshot shows a job advertisement on the Wuzzuf.net website. The job title is "Financial Controlling Specialist" at "Amreyah Cement - InterCement" in Alexandria, posted 1 day ago. There are 27 applicants for 1 open position. The job is full-time, entry level, and requires 1 to 3 years of experience. The salary is confidential, and the languages spoken are Arabic and English. The job involves handling CAPEX budget processes, supporting P&C teams, and analyzing competitor financial statements. The job roles are categorized as Accounting/Finance and Analyst/Research. The company is InterCement, one of the 10 largest cement producers in the world. The advertisement also includes a list of related jobs and a location tag for Alexandria.

Source: OLX.com (translated into English using Google translate).

Table 3.9. Statistics from Wuzzuf Job Advertisements, by Occupation, January 1, 2018, through March 31, 2018

	Number		Mean		Share of ads				
	Ads	Vacancies	Applicants	Job requirements	Fulltime	Bachelor degree required	Female only	Male only	English required
ALL	17,682	28,959	74.3	6.9	0.95	0.44	0.06	0.09	0.70
Repair services	732	1151	73.7	6.8	0.95	0.46	0.06	0.09	0.70
Tourism	225	365	76.0	6.9	0.96	0.39	0.04	0.07	0.70
Health	561	924	79.3	7.0	0.95	0.44	0.06	0.07	0.67
Engineering	6,262	10,349	73.9	6.9	0.96	0.44	0.07	0.09	0.70
Customer service/support	2,556	4,192	73.8	6.9	0.95	0.44	0.06	0.08	0.68
Hospitality/hotels/food services	89	147	71.3	6.7	0.93	0.46	0.06	0.12	0.69
Education/teaching	600	996	70.8	6.8	0.95	0.45	0.06	0.07	0.70
Managerial	892	1,462	74.1	7.1	0.97	0.45	0.06	0.09	0.68
Sales/retail	3,987	6,582	75.7	6.9	0.94	0.43	0.07	0.09	0.69
Other	1,665	2,721	72.1	6.9	0.96	0.43	0.07	0.08	0.70
Professional services	6,814	11,082	74.9	7.0	0.95	0.45	0.06	0.09	0.70

Source: Wuzzuf.com.

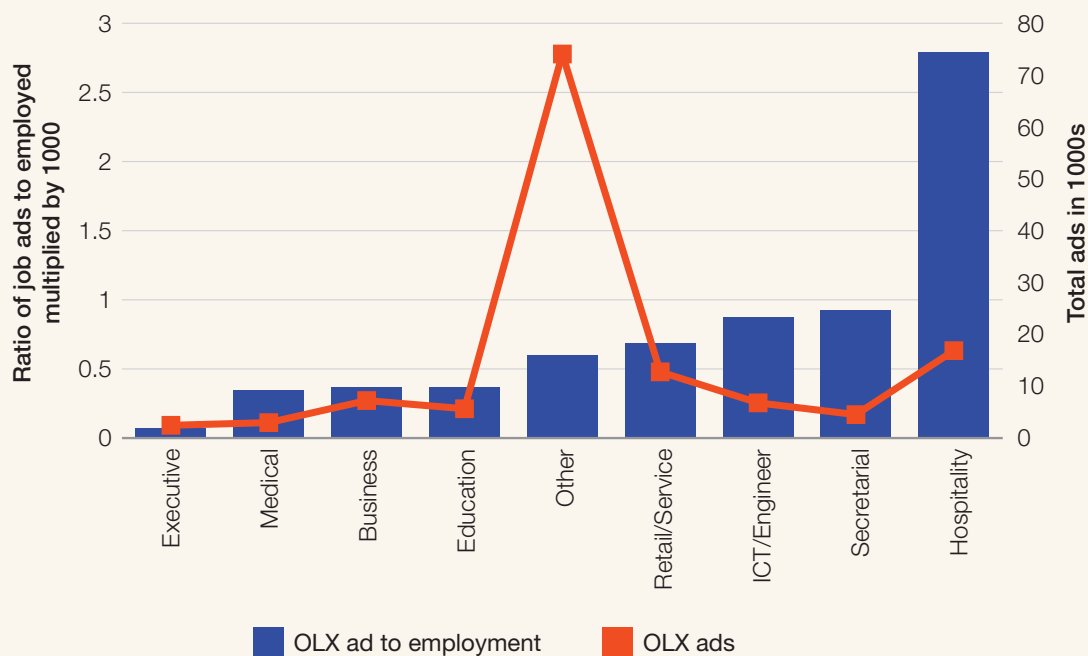
Note: Some ads are listed in multiple categories and receive double counting. The number of requirements is simply a count of the desired skills and competencies that are listed in the requirements noted in the advertisement.

Exploratory analysis: Skills constraints, expectations, and skill demands

To identify potential skill constraints, the number of postings for OLX job vacancies are compared to the share employed in the labor force in 2014 over broad industry groups.⁵² Educational and technical qualifications are imperfect proxies for skill shortages when the education system has been poor at building the right skills needed for the labor market. Standard labor force surveys that contain only the generalized basics of a person's education and technical qualifications are also incapable of identifying challenges companies may face in filling vacancies that require a specific set of skills that cannot be captured by broad qualifications. For example, the tourism sector often requires a high degree of soft skills but also English or foreign language skills.

There is evidence that the hospitality and tourism industries could be facing particularly high skill shortages, as these have many more job postings compared to secretarial, information and communication technology (ICT), engineering, retail, and service jobs.⁵³ Hospitality and tourism require quality customer service and English language skills, while ICT and engineering positions are focused on highly specific technical skills (figure 3.6). Information from Wuzzuf indicates that travel and hospitality jobs are the primary jobs that are in demand in aggregate numbers on this website after those in transport and logistic.

Figure 3.6. OLX Advertisements by Sector

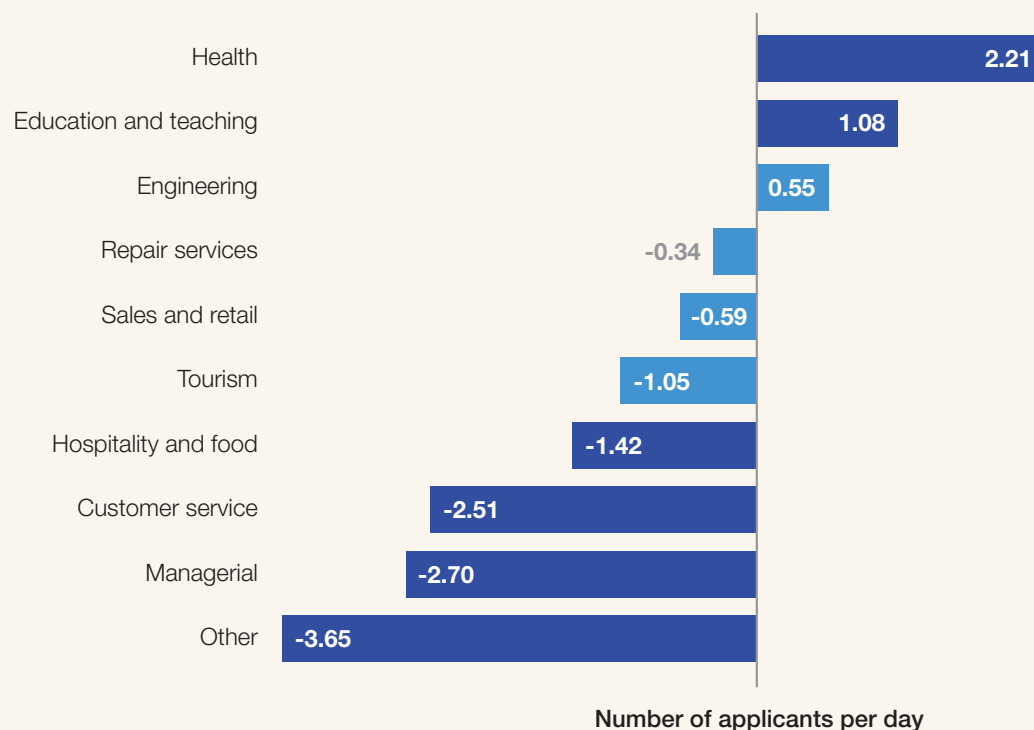


Source: OLX.com, downloaded August 30, 2017; Egypt LFS 2014 (OADM 2017).

Note: Job advertisements to employment ratio provides a measure of how demand compares to supply. Advertisements is just total quantity of job advertisements posted.

Mismatches in expectations between workers and employers can drive difficulties in labor market matching for the secretarial, retail, and service occupations. While these types of jobs require basic computer skills as well as good communication and customer service skills, a person with a quality secondary degree should have sufficient skills to be productive in these jobs. Yet many of these job advertisements require that applicants have a university or bachelor's education. In the Wuzzuf data, 40 percent of the nonmanagerial, sales and retail jobs list a bachelor's degree as a minimum requirement (table 3.9). This type of requirement could be driving rates of overqualification that stand at 37 percent for these occupations (annex table 3A.2). Similar type statistics are found in OLX, where nearly 50 percent of all sales jobs require a bachelor's degree (table 3.8). Simple regressions that control for industry and occupation show that sales, retail, and consumer services industry get significantly fewer applicants per day compared to jobs in the IT industry, even after controlling for key characteristics of the job posting (figure 3.7).⁵⁴ If expectations are the main factor driving constraints in labor market matching, then standard labor market interventions that match workers to jobs are unlikely to work. In Jordan, an experimental study that investigated using incentives, certification, and information to improve match outcomes for youth, found that these interventions had little impact due to educated youth desiring more prominent jobs than the ones employers were willing to offer for their level of experience and education (Groh et al. 2016). Weak labor market demand is reflected in employers assigning higher than necessary educational qualification to jobs. Given that many people have sufficient qualifications compared to the number of quality jobs available, employers could be using a university degree as a signal of greater skills to filter out a number of applicants.

Figure 3.7. Number of Applicants per Day on Wuzzuf Relative to Professional Service Jobs



Source: Wuzzuf.net, downloaded on August 31, 2017.

Note: Results come from a regression that includes controls for job type, Bachelors degree, number of requirements, number of days posted, and industry indicators. Bolded values are significant at the 10 percent level. The base comparison group is professional service jobs which from Table 3.9 has around 74 applicants per day.

While jobs vary in their requirements, communication and computer skills are highly important across occupations. Tag words associated with different Wuzzuf job advertisements reveal the critical skills and competencies needed for occupations more focused on productivity and efficiency (figure 3.8). Even in engineering occupations that are highly technical, basic soft skills that are critical for working in a team play an important role. These advertisements show the increasing importance for individuals to have a basic level of communication skills that can complement and humanize digital technologies for more modern and progressive occupations.

Building core skills with broader applicability to the global labor market can have payoffs in expanding labor market opportunities and lowering the risk that worker job outcomes are limited to domestic demand. As the OLX and Wuzzuf advertisements comprises a small percentage of those employed, there is limited evidence that the industries posting on them are facing major skill constraints. With unemployment numbers high among those with the sufficient qualifications, it suggests that qualification constraints are a small issue in Egypt compared to the problem of weak labor market demand or highly educated workers with poorly developed skills. Improving labor market matching will rest on improving demand but also on ensuring that students are able to have digital, communication, and English skills in addition to specific technical skills necessary for highly productive occupations.⁵⁵

Initial counts of tracking of job ads over time on OLX indicates that February showed a slight dip in vacancy postings compared to January and March (annex table 3A.8). Postings show a clear decline in page views over time, with 75 percent of page views occurring in the first week of posting. On average, architecture, accounting and retail service, and secretarial jobs appear to receive the most views on OLX.⁵⁶

Figure 3.8. Key Skills and Competencies for Different Occupations



Source: See figure 3.7.

Improving the usage of web data

The job advertisement analysis is an initial start to see what is possible through the usage of web-based data. While some basic trends in occupations and applications have been detailed for several months of data, collecting data over longer time periods can better identify whether these are true trends as opposed to seasonal effects. It is also possible to delve deeper into not just job ad vacancy counts but also potential trends in compensation, skills, and relevant qualifications that are needed to enter certain job sectors over time. Tracking views and applications to various job postings and length of time that job ads are posted can also be used to identify which types of jobs may face difficulties in finding the right skills. Resumé analysis can also be useful in identifying the skills that are possessed by individuals and how they match to the available jobs; this will researchers get a closer approximation of true skill shortages. More sophisticated machine-learning techniques and particularly deep learning for natural language processing makes it possible to identify relationships between skills and various occupations and tasks and determine how well these match to resume profiles.⁵⁷ Given that web data is relatively low cost and timely to collect and captures real skill demands, it is viewed as an important avenue for further research and investments.

Policy Approaches to Improving Labor Market Matching

Rectifying the problems of labor market matching in Egypt is challenging. On the supply side, educational investments require restraint until there is a clearer possibility for them to translate into skills that coincide with labor market demand. On the demand side, an uncompetitive private sector has hindered labor market matching; there is low demand for middle- and high-skilled applicants, resulting in high unemployment and overqualification among secondary and university-educated populations.

Identifying problems with the labor market is relatively easy. The bigger challenge is to design and implement interventions that are cost-effective and have an impact. The literature on impact evaluation shows that interventions are often only effective in certain contexts and difficult to generalize. Program success occurs when significant investments have been made in design to resolve major constraints and careful attention is paid to implementation, with incentives aligned to deliver impact. Cost-effective investments and allocation of budgets should rely heavily on rigorous program monitoring and evaluation before scaling up.⁵⁸

While the ideal is to provide exact guidance on where money should be allocated to improve labor market matching and explain why, this is a huge challenge without in-depth analytical assessments, evaluations, and detailed documentation of the expense. The following section discusses what has and has not worked in different contexts and when these solutions can be effective.

Shoring up public finance expenditures

The first-step to improving labor market matching requires that public investments be allocated to areas where problems are large and where there is clear commitment and scope for implementing programs with impact. While there are several positive initiatives where the government is currently allocating significant financial and labor resources, some programs are not resolving a key labor market constraint and for some the details of implementation remain unclear. Driving improvements in labor market matching ultimately will rest on Egypt's effectiveness in creating laws and regulations that have power and the detail to ensure implementation of incentives are aligned with creating impact.

The misallocation of educational resources that has focused on the expansion of free public university education even while a large share of the population still does not have access to a quality primary education is a major area in need of reform.⁵⁹ In 2014/15, LE 94.5 billion was spent on education, with approximately one-third going to higher education (OBG 2016). The many graduates ending up unemployed or in jobs for which they are overqualified are a signal that they have limited marketable skills to compete at a global level for modern and productive occupations. With Egypt's continued reliance on the public sector, to improve match outcomes for nearly 50 percent of the university education population, overqualification rates of nearly 25 percent, and unemployment rates that stand at nearly 20 percent of the population, it is clear that higher education investments are largely unproductive and ineffective. Improving labor market matching through improvements to the education system and enhancing the competitive environment for private sector demand should come first. Shoring up public finances can start with scaling down on allocation of expenditures for higher education, getting students to pay tuition (those who can afford it) and promoting merit-based entry into higher education.

As both labor market supply- and demand-side problems are the biggest issues, programs such as skill-training programs and employment assistance programs, could be reduced. These programs are likely to have minimal effects in expanding labor market opportunities; they are more likely to displace labor rather than improve overall employment outcomes. While these types of programs could have importance in helping the unemployed entering public sector employment and are actively advocated for in developed countries, this solution is likely contributing more to public financing deficits than any real improvements in long-term aggregate employment outcomes (Semlali and Angel-Urdinola 2012). Public sector employment is a poor substitute for quality private sector employment, as it artificially boosts employment numbers in the absence of better private sector opportunities.

In Egypt, the Ministry of Manpower and Migration oversees public employment services, acting as an intermediary between government, prospective employers, and the unemployed.⁶⁰ The ministry's webpage contains a registration portal for prospective job seekers and applicants to public sector jobs, where workers give a basic set of details about their industry and skill set of work. On April 6, 2018, there were 15,711 jobs listed by the ministry for jobs in the country with a summary contained in a pdf document. The document provides limited information for job seekers to search for and identify jobs that are well matched to their skills.

The LFS 2014 data reflects that over 60 percent of the unemployed, tertiary-educated population and about 90 percent of the unemployed with a primary education or lower use public employment services or have registered with a government ministry.⁶¹ However, these numbers may reflect the desire to obtain a quality public sector job rather than to move into private sector employment, which typically is more informal and less stable. In general, the unemployed that are more educated have a higher tendency to use fewer search methods on average. Moreover, a much higher proportion of the tertiary-educated unemployed use social networks in searching for their jobs compared to other methods. For example, around one-third of tertiary-educated individuals use social networks compared to only about one-tenth of those with a primary education. Job seekers also frequently appear to apply directly to employers in the job search process (annex table 3A.7). There is also an increasing frequency of using online tools in the job search process, with the prevalence of usage significantly higher among the educated population. Extrapolating information on the importance of public employment services in the job search process and labor market matching could be informed through additional studies and investments that provide greater information on the jobs available, given the current lack of data available online and given the presumably cost-intensive nature of the current set of services provided.

Closing loopholes in existing laws that leave too much room for interpretation and where there is an absence of clarity on the parties who have sufficient power and accountability to ensure enforcement for noncompliance could help to mitigate public financing constraints. For example, there are no clear standards for fines and punishments associated with minimum wages and labor legislation. As a result, it is not surprising that nearly 30 percent of all workers that were considered formally employed received wages that fell below the minimum wage line in 2014. The 2003 labor laws that brought more protection to workers may have helped individuals with existing jobs in formal firms to transition into better employment (Wahba and Assaad 2016), but had the potential consequence of reducing more formalized job creation (Langot and Yassin 2015). The emphasis should be on rigorously evaluating the design of laws and programs to better understand the ultimate effects of their implementation.

Boosting efficiency of public investments may be possible through digital technologies. Automation can complement rule-based legislation, quicken the implementation process, and bring transparency and fairness to government operations. In turn, public sector employees can shift their focus and effort to more productive activities that promote investments and learning rather than simply the processing and administration of bureaucratic rules. One of the highlights of government ICT has been the digital identification scheme in India that greatly helped improve transparency, eliminated the need for the poor to pay bribes to receive subsidies, and saved the government billions of dollars (Barnwal 2016; Muralidharan, Niehaus, and Sukhtankar 2016).

While ICT can bring many opportunities and create scalability, the ability to create impact through e-governance type projects will boil down to the government's commitment to the details of implementation. The World Bank (2016) indicates that many ICT projects fail, and there is mixed evidence on the guarantees for success due to variations in the quality of implementation.

Ensuring investments up to at least a primary education

Scraping together a living is hard enough for the average person, but for the 30 percent trying to make a subsistence living with no skills or financial capital can be an insurmountable challenge. The commitment to closing gaps in skills through education should be prioritized over making further investments in the expansion of university qualifications and skills that have little potential to be utilized. A basic set of skills are important for workers to be productive, to learn, and to grow over their working life. Investing early in building skills through education is important and complementary to later training investments (Heckman 2011). In Egypt, education has been found to be a significant determinant of improved prospects for upward mobility (Tansel and Ozdemir 2015). The long-term payoff in investing in a core set of basic, marketable skills is a reduction in the number of people that need government outlays to survive, greater productivity, and better capabilities to scale in sectors that are not heavily dependent on highly technical skills. Having a basic set of numeracy, literacy, computer, communication, and business skills are essential for improving the prospects for the many that will remain in informal employment.

Keeping children in school until completion requires building better infrastructure and transportation networks and taking innovative approaches. While early childhood education has the possibility to improve educational outcomes, more emphasis needs to be placed on ensuring these investments are effective, as there is no guarantee these investments will translate into valuable returns (Krafft 2015). The dropouts rates and the portion of people with no education is far higher in rural areas than elsewhere, and this could make it harder to scale through infrastructure development and labor-intensive interventions. Anecdotally, parents with little education who own small, informal businesses or farms often are the major deterrent to children staying in school. Conditional cash transfers given to parents that are provided contingent on their children staying in school can be effective incentives that have resulted in increasing the number of years of education, particularly when targeting younger ages (Behrman, Sengupta, and Todd 2005). Providing information to parents on the returns to education is extremely low cost and has been shown to result in a small increase in levels of education (Jensen 2010). Other possibilities include distance learning that can be delivered through technology, boarding schools, and providing bikes, which reduces the time needed to travel to school. See ADB (2015) for in-depth discussion and literature review of findings from rigorous evaluations.

Improving education quality and the relevancy of skills

The rapid pace of technological change demands high-quality skills, and creating them rests on developing a labor force that is open and capable of learning and adjusting to new demands. By developing quality and marketable skills of, prospective workers can sell their human assets both domestically and globally. Skills in communication, reading, writing, numeracy and ability to use digital technologies—rather than amassing educational qualifications—is what will help the large set of informal sector workers to improve their wages and employment potential.

The evidence from skill tests to diagnostics of the education system and the absence of employment prospects for university engineering graduates indicates that the education system has done poorly at developing marketable skills that match to private sector labor market demands. The Global Competitiveness report in 2013 ranked Egypt last out of 148 countries in the quality of primary education. More than 53 percent of the eighth grade population that took the Trends in International Mathematics and Science Study (TIMSS) mathematics test in 2007 did not pass the threshold for a basic level of skills that are critical for being productive in a modern economy (Assaad 2014; Hanushek and Woessmann 2010). While differences between siblings were exploited to show that there are generally high returns to secondary vocational education for males, these did not provide better returns to informal apprenticeships that were delivered outside of education (Kraaft 2017). The World Bank's SABER diagnostic tool shows that Egypt has significant room to improve the quality of education institutions that can deliver on better skills.⁶²

Reforming the education system will require restructuring curricula and ensuring teachers have the capabilities and capacity to help students learn the necessary skills. Complementing these must be strong institutions that impose accountability. Education programs are most effective in delivering skills when there is monitoring and evaluation, data collection, and accountability. Improvement requires a commitment to making evidence-based policy decisions. This includes measurement of inputs, teachers, and student skills. Quality human resource management that imposes accountability and creates incentives for school administrators and teachers to improve learning outcomes either through rewards (for example, pay, promotions, and training) or punishments are important predictors of learning outcomes across a variety of different countries (Bloom et al. 2015).

It is difficult to unpack all of the drivers in school quality. However, information related to monitoring and evaluation; *evidence-based* policy making and accountability; *curriculum content* that emphasizes technical and computer skills, with an emphasis soft skills, and remains current and consistent with labor market demands; and investments in early education show evidence of significant effects on learning outcomes across countries once controlling for a country's income and stock of human capital. In contrast, investments such as higher teacher wages, investing in teacher skills, financial aid, and smaller class sizes were not significant factors in improving learning outcomes, possibly because of the difficulty in capturing and ensuring the quality of implementation of these types of investments (ADB 2015).

There is a need to pay greater attention to evidence-based policy making and skill measurement that ensures accountability to learning rather than just counting the amount of time someone has spent in school. In the absence of such commitment, the likely result is that few people will have marketable skills for quality, tradable jobs and matching will worsen unless the government artificially boosts employment through an unsustainable system of providing more public sector jobs.

Covering skill gaps by providing greater incentives for female labor market participation

Female labor force participation stands at 25 percent. While rates of female participation are high among the more educated population, so are their rates of unemployment (table 3.10). This is a significant source of lost productivity and skills that could be tapped if there are immediate skill shortages. Currently, the government is investing in enhancing female labor force participation through female-friendly transportation programs and by providing public nurseries. This may have limited effects in combatting the female employment problem and disproportionately benefit the set of female employees that have already chosen to participate in public sector jobs, resulting in a misallocation of scarce financial resources. Weak labor market demand, laws that raise costs to female employment, and the structure of occupations that have remained highly manual and physical could be the primary constraints to female labor force participation.

Table 3.10. Labor Force Participation (LFP) Rates and Unemployment by Gender and Education

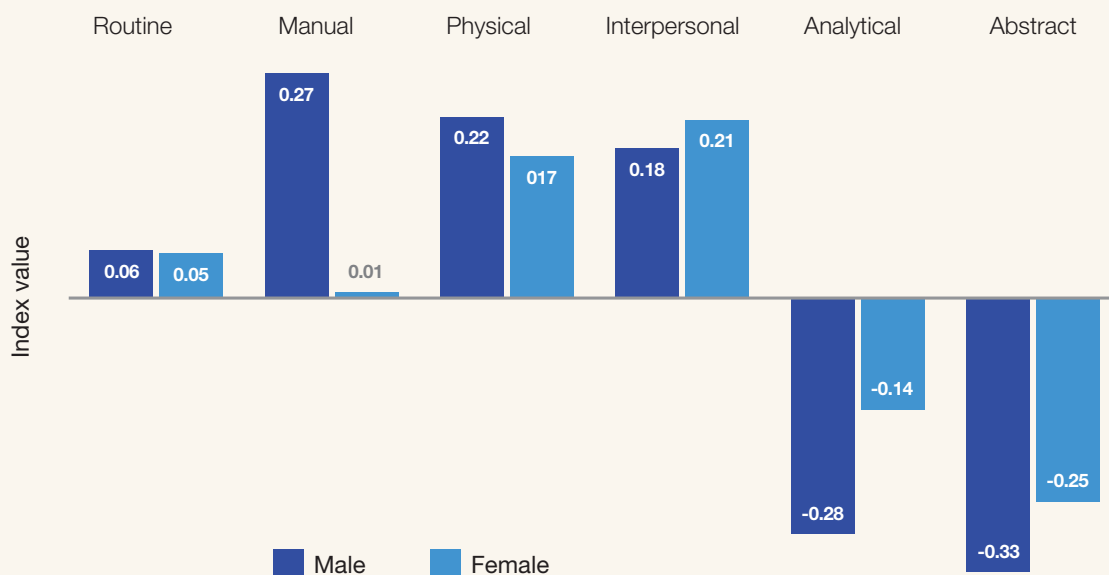
	Male			Female		
	Population share	LFP	Unemployment	Population share	LFP	Unemployment
None	14	88	6	20	20	10
Primary	5	66	12	4	9	12
Preparatory/secondary	10	29	11	8	4	17
Secondary vocational	14	92	11	11	33	34
Postsecondary	2	91	8	1	44	23
University	7	90	14	5	63	31

Source: See table 3.2

While marriage plays a significant role in the probability that a female drops out of the labor market, the channels and factors motivating exit from the labor force remain unclear and require further study (Assaad, Krafft, and Selwaness 2017). Demand- and supply-side factors could play a role in making marriage incompatible with private sector work. For example, Egypt's labor laws mandating the provision of maternity leave could inadvertently create stronger preference for males and single females due to the potential costs and productivity losses that arise from employing female labor that compound with weaknesses in labor market demand. In many socialist countries, equal maternity and paternity leave is mandated so that cost considerations do not create stronger preferences toward hiring male labor. The costs of hiring female labor can create unnecessary preferences toward males that perpetrate inequalities and also dull productivity in key jobs where females may actually be better equipped and have comparatively better skills in performing occupational tasks.

As the structure of the labor market in Egypt is disproportionately skewed toward manual and physical jobs in the private sector, the average job is less conducive to female labor force participation and employment. These types of jobs have been increasing over time relative to interactive, nonmanual jobs, in part because transportation and construction have been growing more than other sectors. Females on average are much more likely to be employed in occupations that are less manual and physical and more interpersonal compared to males (figure 3.9). Females tend to dominate or account for a large share of employment only in a few occupations: teaching (51 percent), health associates (66 percent), business administration associates (79 percent), agriculture laborers (47 percent), and legal associates (40 percent). Surprisingly, customer service and sales jobs have a very small percentage of females, despite these being primary drivers of increases in female employment in developed countries (Black and Spitz-Oener 2010).

Figure 3.9. Females Are Less Likely to Be Employed in Manual Tasks



Source: See figure 3.2. Note: Task content measures are designed to have a mean of 0 and standard deviation of 1 in the original data.

Automation can have significant benefits in creating the rise of service tasks that are less physically and manually intensive and can provide benefits that pave the way to greater female employment. Given sufficient levels of communication, literacy, and computer skills among women, greater proliferation of digital technologies and automation can shift employment opportunities in favor of females. In Mexico, automation driven through increased trade was found to benefit women through increased employment and a reduction in wage gaps within firms in blue-collar jobs (Juhn, Ujhelyi, and Villegas-Sanchez 2014). In Vietnam, the government's policy of promoting infrastructure investments and affordability of broadband Internet resulted in significant adoption of digital and computer technologies

in firms that increased the relative demand of females to males. The rise of lower-skilled interactive, service-related tasks compared to more manual, routine, and physically intensive tasks was found to be a likely reason for this shift toward female labor. However, the effects of ICT adoption on female employment was found to be significantly less in highly complex industries that likely were driven by lower levels of females developing critical science, technical, engineering, and mathematical (STEM) skills (Chun and Tang 2017). In Egypt, only half of all firms have adopted Internet technologies in their business operations, suggesting that greater proliferation and adoption of ICT could be helpful in improving female employment prospects (WBES data 2016).

Efficiency in financing requires better understanding of the main motivating supply and demand factors in Egypt that are preventing female labor force participation and employment. It also requires identifying the best solutions before investing in programs that will have limited effects. Rethinking Egypt's labor laws that possibly cause private sector employers to view the costs of hiring various genders differently can provide an additional step toward labor market parity. There are many programs and policies, such as those related to ICT, that have great potential to significantly improve the prospects for females and contribute to greater economic growth without explicitly targeting females. Innovation and evaluation are key to solving the Egypt's large problem of limited female labor market participation.

Improving employment and income prospects in rural areas

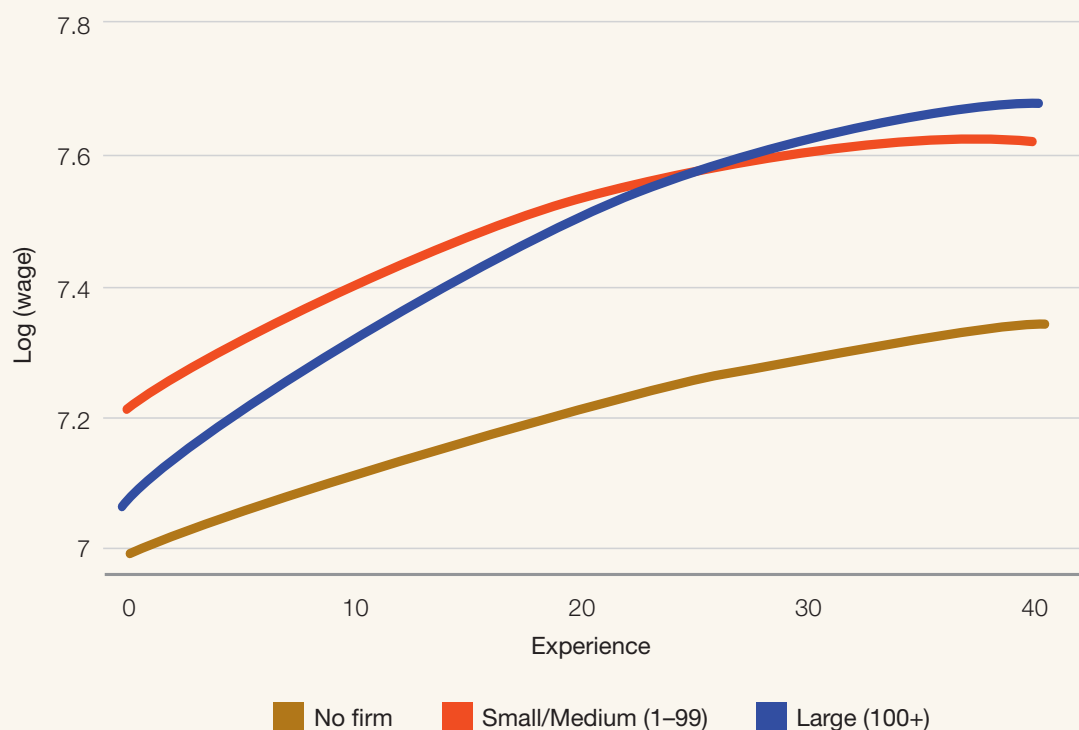
Agriculture is a substantial part of the economy in many governorates and still employs around 30 percent of the population. Assisting in fostering the development of sectors that are not heavily reliant on skills can bring broad benefits through value chain linkages. Much of labor in agriculture will remain informal far into the future, and trying to upskill this population is a long-term investment. More immediate returns can come from helping to promote sectors that draw on domestically produced raw products. In particular, value added agriculture or textile manufacturing can have significant returns to the farm sector by developing a more consistent source for local agricultural products. They also employ manufacturing labor that adds value to these products before potentially shipping out for export (Foster 2011). Other approaches can involve developing contracts between supermarkets and small farms. Miyata, Minot, and Hu (2009) found it was possible to set up contracts in China that significantly raised incomes of small farmers.

Improving agriculture prospects ultimately will rely on there being sufficient commitment and vision in developing an agriculture value added sector that closely links to quality production of domestic crops. While Egyptian cotton was historically an important source of income for agriculture, being referred to as "white gold," prospects reportedly have declined in the absence of an organization that assists in maintaining quality of cotton production and a domestic textile sector that shifted to using machines that are incompatible with processing Egyptian cotton (Hidji 2016). The fertility of the Nile Valley is an important asset that should be used to Egypt's advantage for improving labor market outcomes by carefully thinking about tradable crops it can produce at higher quality and where there is room for manufacturing to add value.

Generating greater private sector demand for labor

Jumpstarting private sector growth by creating an environment conducive to fostering the growth of firms that are competitive on a global scale is critical to developing a larger set of quality jobs and resolving the deficit in public finances. Quality jobs with higher wages and greater stability occur in private firms where real skills for productivity are highly valued and workers have the opportunity to learn. Workers in firms continue to have greater wage growth with additional years of experience compared to those that are not employed in firms (figure 3.10). Firms with 100 or more employees provide stability, as 75 percent of their workers are considered formal while only 30 percent of labor is formalized in smaller firms.

Figure 3.10. Wage Employment by Firm Size

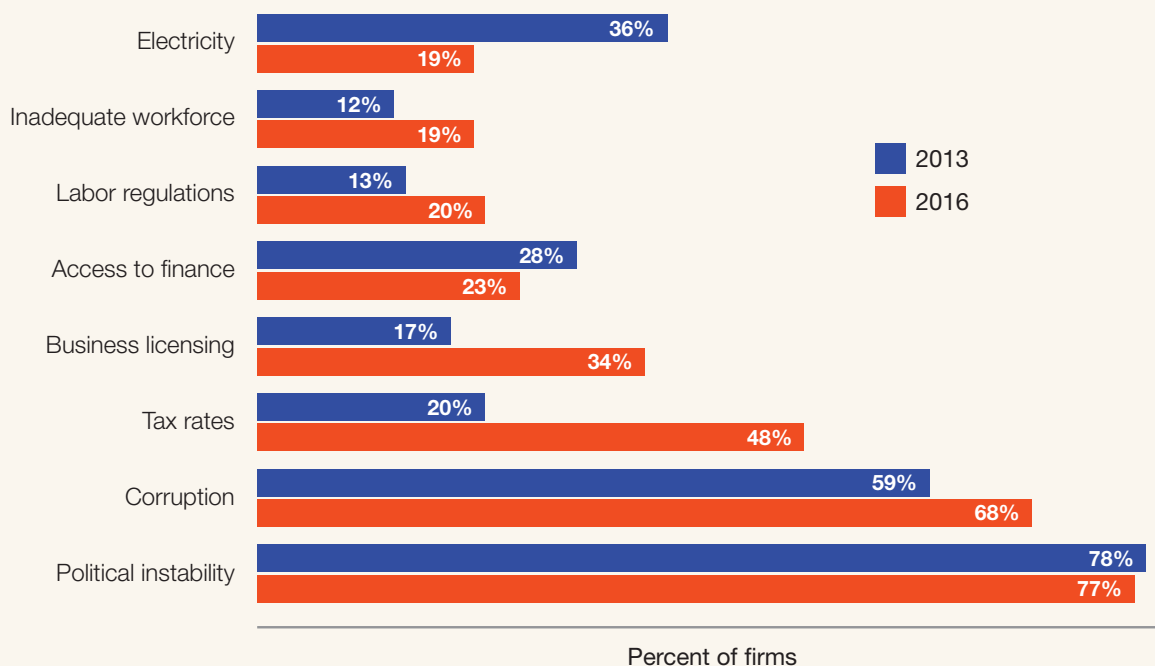


Source: LFS data from 2011–14 and 2016 (OAMDI 2016a, 2016b, 2016c, 2016d, 2018).

Note: Based on estimates from a Mincerian wage regression for a male population sample that is in the private sector. Regressions run separately for each type of firm employment indicator. Log real monthly wage is regressed on experience, experience-squared, education level (five variables), informality, industry, region and cohort group (five-year intervals). Results reported for individuals with at least a secondary education, formal sector, construction, living in Cairo. Experience represents number of years of working experience.

Institutionalizing fixed rules ensuring that firms face little changes in their fortunes due to prospects of political changes is key. The obstacles that the greatest share of firms cite as major to severe in 2016 were political instability (80 percent), corruption (70 percent), and tax rates (48 percent). In contrast, labor regulations and an inadequate workforce are cited as problematic by only 20 percent of all firms. This confirms that continuing to focus time and resources on skilling people above secondary education could have only limited effectiveness in improving job outcomes in the current investment climate (figure 3.11).

Figure 3.11. Issues Cited by Firms as Major Obstacle to Doing Business



Source: WBES 2013, WBES 2016.

The unequal application of rules has possibly hurt the largest, most innovative, and progressive firms the most. Correlating different firm, industry, and regional indicators with firm responses, those involved in FDI, large firms, and firms in ICT often cite corruption and business licensing as particularly problematic (annex table 3A.6). The more severe problems occur for firms located outside of Cairo. The ICT industry that is driving innovation and the tourism and hospitality market cite skill constraints as particularly problematic. This is consistent with the findings on skill gaps that were revealed through the labor force survey and online job data that suggests these industries could have great needs for very specific skills.

In-depth studies on the effects of political connections on firms in Egypt provide more definitive proof that preferential treatment has created an unequal playing field and dulled competition and labor market prospects. Exploiting data on street protests during 2011, Acemoglu, Hassan, and Tahoun (2017) found that firms listed on the stock market that were politically connected to the Hosni Mubarak regime saw losses of 13 percent in their valuation, emphasizing that political connections with the party in power significantly results in capturing excess rents. Chekir and Diwan (2015), using a similar dataset of firms listed on the stock market, estimate that political connections could be worth even more, at 20–23 percent of the market value of a firm, following from increases in market size, political power, and borrowing ability. They show that rate of return on assets was 3 percentage points lower compared to nonconnected firms, which underscores how unfair rules and applications of laws and

privileges can allow less innovative and profitable firms to succeed and even dominate markets. More detailed evidence shows that these connections occurred through the channels of trade protection, energy subsidies, access to land, and regulation enforcement. The consequences of unfair application of rules was shown to significantly slow employment growth and skew the distribution of employment toward smaller, less productive firms (Diwan, Keefer, Schiffbauer 2016). In 2006, the share of large firms with political connections was estimated to account for 50 percent of all firms.

Automation and institutionalization of e-governance is a potential approach to improving registration of firms and broadening the tax base. A number of initiatives are under way that include a one-stop shop for business licensing, tax incentives to promote investments, and a bankruptcy law that allows firms to declare bankruptcy rather than being forced to resort to the courts. One-stop shops that have greatly sped up the rules and process of registration been found to have significant effects on the registration of new firms in Mexico (Bruhn 2011). While these effects were limited mostly in the first 15 months of implementation, they still were potentially important in increasing the base of tax revenues (Kaplan, Piedra, and Seira 2011). Simplifying registration that makes it easier for small firms to register can also be important to improving the productivity and employment growth in small firms relative to those that did not register (Fajnzylber, Maloney, and Montes-Rojas 2011). However, the effects of formalization is uneven across countries. In particular, randomized control trial (RCT) of incentives for firms in Sri Lanka to formalize found that registration had no effect on firm outcomes, but it did allow the government to better track and ensure these firms paid for taxes (De Mel, McKenzie, and Woodruff 2013).

Committing to e-governance and automation is complementary to legislation that is rules based with limited room for broad interpretation and implementation. So far, the discussion on reported initiatives being implemented based on a foundation of e-governance and digital automation has received limited discussion in the news. The upside is that these initiatives could allow financial and staff resources to be shifted more to initiatives that can spur private sector investments rather than spending time on the review of applications. While there has been more limited evidence so far on the effectiveness of digital automation, Paunov and Rollo (2016) found that the Internet had significant and positive spillovers on firm productivity, based on a large set of firms in developing countries from 2006–11, but also drove up inequality, as only the most productive firms experienced productivity gains. In Egypt, there is still significant room to spread the proliferation of broadband Internet, as only 56 percent of all firms used email to communicate with suppliers and 50 percent had a website (WBES 2016).

Egypt's reliance on having a large public sector as the main employer of quality, higher skilled jobs is impossible to sustain effectively, especially as an increasing number of workers becomes educated. Developing strong private sector demand in tradable sectors is an important step toward shoring up public finances and shifting the incentives for high-skilled workers to build increasingly productive and marketable skills. Government stability and a business climate where there is a level and fair playing field, so that the best firms are productive and profitable and there is incentives to upgrade technology and compete on a global scale, are key challenges that entail a large shift from recent historical

practices. With many details of implementation on the business and investment climate still to be decided, and little data to measure and track implementation, it is an open question on the direction and impact the reforms will make on actual labor market demand.

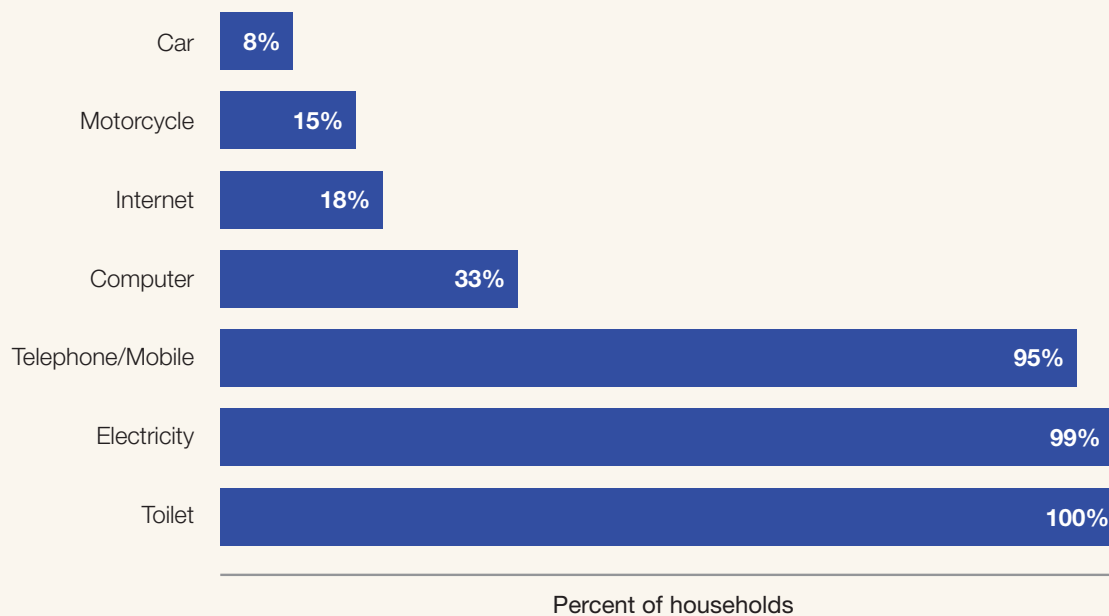
Investing in ICT infrastructure and ensuring access

Infrastructure investments in ICT, roads, electricity, and transportation networks that provide broad access are often more failsafe than policy reforms and program investments where there are significant complexities to getting the details right so that they have an impact. Infrastructure is observable and is a public good that has been shown to provide significant payoffs over multiple years in cross-country regression analysis (Loayza and Odawara 2010).

The spread and proliferation of broadband Internet access offers the potential to transform employment prospects by making it easier for workers to sell their skills. In the United States, expansion of Internet infrastructure was associated with a 1.8 percentage point increase in the employment rate. The effects were larger in more isolated areas, and it is hypothesized that this is because of better labor market matching and information (Atasoy 2013). The laying submarine cables that brought high-speed Internet access to Africa resulted in significant improvements in labor market outcomes and benefitted the least educated most in nearly all of 14 African countries that were analyzed (Hjort and Poulsen 2017). Given that penetration rates are still low (figure 3.12), ensuring greater proliferation and access has the possibilities of opening up opportunities for skilled and semiskilled workers to earn money by providing services through the cloud. Upwork, Crowdfunder, and Mechanical Turk are just a few of the microwork platforms where there are possibilities to earn money for completing basic tasks such as website and image categorization, given a person with essential reading and computer skills plus Internet access. Moreover, Internet access remains an important part of expanding income opportunities in domestic markets. Both Careem and Uber are platforms that have created significant opportunities for individuals to provide transport services.

While Egypt's infrastructure investments have resulted in nearly complete coverage of households in terms of electricity, water, and mobile phones, there continues to be a large gap in the number of households that have access to the Internet, as only 20 percent are documented to have access (figure 3.12). In Uganda, mobile phone coverage was found to improve market participation of farmers in remote areas who were producing perishable crops (Muto and Yamano 2009). Jensen (2007) found that the introduction of mobile phone coverage in India helped to improve functioning in the fishing market by reducing price dispersion and eliminating waste, resulting in an increase consumer and producer welfare. ICT can also provide significant opportunities to rural households by improving agricultural production, farm profitability, job opportunities, and adoption of better farming practices. However, the challenge in ICTs relies on ensuring connectivity of marginalized populations, usefulness of information provided, and capacity of households to understand the information they receive (Nakasone and Torero 2016).

Figure 3.12. Household Assets and Ownership



Source: Egypt household income and expenditure survey 2015 (OAMDI 2017a).

Constraints by vested interests and the complexities of correctly implementing existing programs could make it a substantial challenge to ensure that investments have an impact and are cost-effective. Helping to generate greater access to ICT infrastructure by ensuring quality speeds and affordability could play an important role in improving labor market outcomes with fewer implementation risks.

Evolving measures for labor market assessments

The common approach to identifying mismatches using standard labor force surveys relies on identifying the mean years of education in a given occupation. If a person has an education one standard deviation above or below the mean, then they are overqualified or underqualified. The flaw in this approach is that comparing trends over time is difficult because the mean education observed in an occupation is an outcome of labor market demand and supply relationships. This leads to different outcomes when comparing across time or countries. These measures are not forward looking, as they possibly underestimate the levels of underqualification and overestimate overqualification in the economy.⁶³ Approaches that are significantly more robust to the one used in this analysis are based on self-perceptions of the education needed, which can be triangulated with information of the tasks utilized and needed for the job.⁶⁴

There is a need for improving measures for labor market matching to identify skill gaps and shortages. The current approach is sufficient as a first pass when the magnitude of issues are large. An important avenue to invest in the future is in the documentation of job vacancies, skill and educational requirements, and the length of time that jobs go unfulfilled. The web provides a low-cost and valuable source of information to leverage for jobs that are most likely to face skill constraints. Using this data to evaluate the education system, curriculum, and skills of individuals is important to reworking the education system to improve long-term labor market matching.

The quality of education can play a strong role in observed mismatches. As technology and automation rapidly change the tasks in demand, the need for timely information will be critical to ensuring that educational curriculum and the development of skills in Egypt are aligned with labor market demands. Creating detailed skills that are in demand and that are relevant to specific occupations is important information for strategic policy making and for sharing widely with students, parents, and teachers to provide them with basic knowledge of the critical skills that need to be learned when targeting different occupations. When documenting the skills that workers possess in contrast to the skills that are needed by the labor market, it is especially important to identify whether the education system needs fixing or if the focus should instead shift to improving firm competition that can capitalize on worker skills.

Conclusions

Transforming the labor market to one that matches people's skills to the jobs that are available is critical to promoting sustainability in public finances and social welfare. Mismatches between education and labor market demands that resulted in high level of unemployment among university-educated youth potentially played a significant role in the Arab Spring (Campanate and Chor 2012). While education itself does not fundamentally change an individual's perspective or outlook, it does have a strong effect on political participation, with unemployment freeing up the time to be more politically active (Pellicer et al. 2017).⁶⁵ Continuing to have the public sector be the main source of high-quality, stable jobs is unsustainable and provides insufficient incentives for building quality marketable skills (Assaad 2014). A healthy labor market will be driven by a strong labor market demand in the private, tradable sectors that is aimed at efficiency and capitalizing on the skills that are available.

Reprioritizing expenditures that focuses on the production of high-quality education at all levels and expanding access to education at both the primary and secondary levels is essential to reducing inefficiencies in labor market matching. This is important to fully address prior to attempting to expand public financing that provides free matriculation to tertiary education. Consistently undertaking efforts to measure, document, and analyze these problems is important to better ensure that money is allocated to investments that have reach in improving labor market outcomes. This involves assessments of not only the skills that prospective workers possess but also the skills that are in demand.

With rapid technological change, there is increasing urgency to improve the quality of education so that it translates into valuable skills. This requires focusing on modern skills that leverage computers and places greater emphasis on communication, numeracy, literacy, and writing. Improving managerial skills that contribute to labor productivity and innovation also remains important for the large share of managers with little education. The problem of informal employment will likely take many years to resolve, even with improvements in the investment climate. A greater emphasis on teaching basic business and entrepreneurial skills is potentially important even for those that end up in informal employment. Investing in skills rather than the expansion of educational qualification is the best bet to lowering the risk of labor market mismatch. With globally marketable skills, the uncertainty of fixing the labor market problems at home diminishes, as there are a growing number of opportunities to provide services through the cloud.

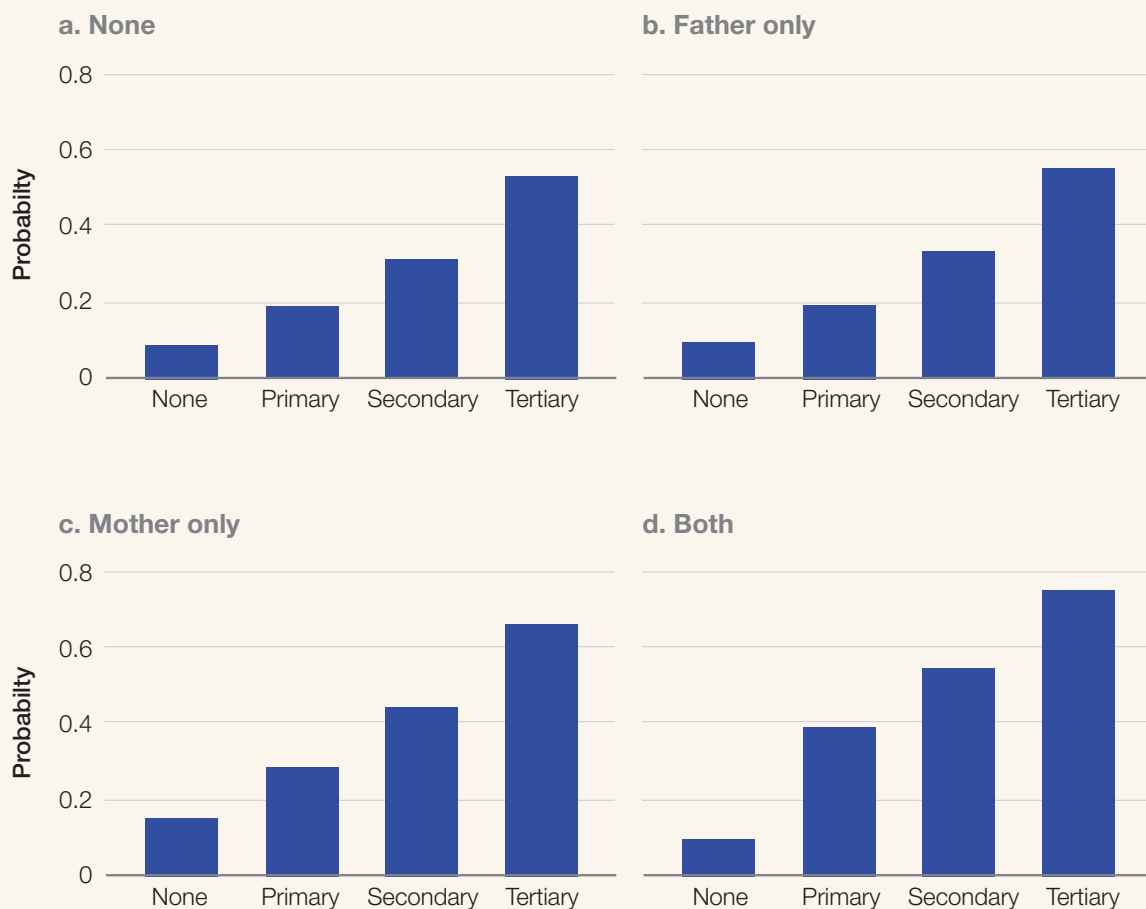
Investments in active labor market programs that provide training, employment, and career services, and subsidies to those that are out of work, should be rethought. These programs are likely to provide little benefits in return for the costs, given that the most pressing problem is the low and limited formal sector demand. Moreover, information and transportation programs may help only so much. The rigorous evidence provided through RCTs has shown that, with the exception of information, few have observed big enough impacts to justify their costs (Jensen 2012; Phillips 2013; McKenzie 2017). Caution should also be exercised when investing in training programs. There are few examples of successes on the effectiveness of training programs for microenterprises, where individuals typically have more limited skills (McKenzie and Woodruff 2014). Youth unemployment and training programs also often fail to work effectively due to the difficulty of implementation, but also weak labor market demand (Kluve et al. 2016). Much of the time, programs that focus on improving labor market matching simply result in the displacement of job-finding rates for other workers rather than actual improvements in aggregate labor market outcomes. This emphasizes the high degree of importance of having monitoring and evaluation and commitment to measuring impact before providing support to these programs over the long term.

There are no quick fixes. Connections and social status have historically been a significant factor in determining a person's ability to enter higher education and into a high-quality job or whether a company grows. This should not happen in an environment that is trying to promote productivity by ensuring that the most capable workers are matched with jobs and the most innovative companies succeed. However, the labor market is highly static with government employment and people out of the labor force as the most common states (Tansel and Ozdemir 2015). The inequities are extremely vast, with little mobility, causing family background to play a major role in job outcomes (Assaad, Krafft, and Salehi-Isfahani 2017; Assaad, Badawady, and Krafft 2016; Assaad et al. 2017). This suggests that there is need to have a more concerted effort to provide opportunities based on merit. Evidence suggests that a male from the least advantaged family has only a 9 percent chance of enrolling in university in contrast to a 97 percent chance for a child from the most advantaged family (Assaad 2013). Having a mother that is employed in government plays a significant role in whether an individual attends university as well as being better matched to his or her job even after controlling for

a parent's highest level of education (figure 3.13 and figure 3.14). The existence of an unfair system lowers expected returns to the best students and can cause them to underinvest in developing critical skills while potentially blocking great companies from investing and entering the Egypt labor market. Continuing this trend where political connections are the overriding factor will likely make it harder for many policies, no matter how well intended, to have much of an impact.

With technologies shifting the tasks and skills that are in demand, it is time to grab hold and institute change. Digital technologies provide substantial opportunities in helping improve labor market outcomes by creating scalability and lowering the costs to new business entry. Instituting rules-based legislation that can be automated is useful for improving efficiency in investment-climate legislation when there is careful attention placed on implementing with incentives. For individuals, digital technologies can improve access to quality education and create labor market opportunities if there is more careful attention to building more modern and useful digital skills. Ultimately, the ability to drive impacts and improve labor market matching in Egypt will rely critically on a commitment to the details of implementation.

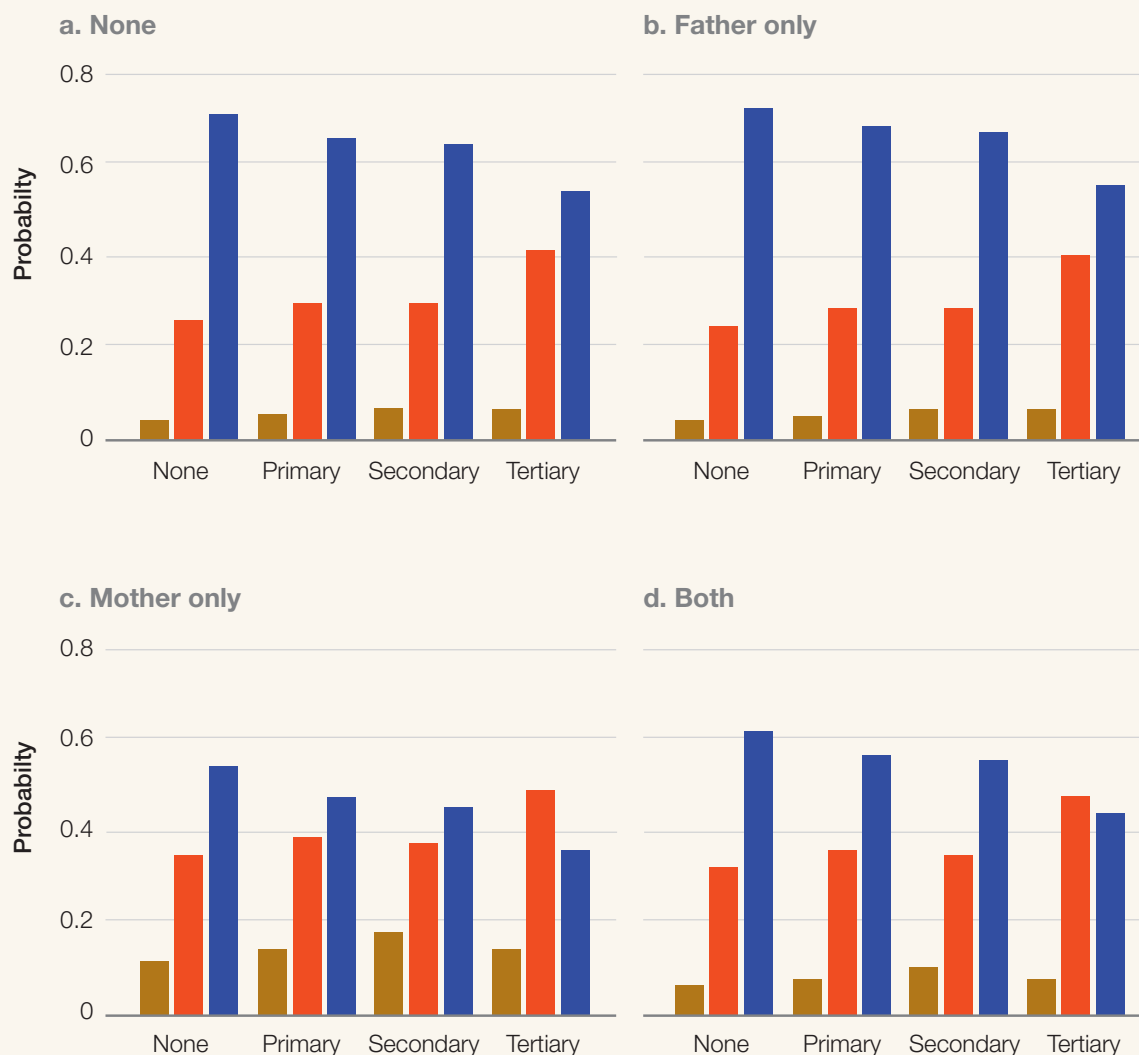
Figure 3.13. Probability of Obtaining University Education, by Parent's Education Level and Parental Government Status



Source: OAMDI (2013, 2016a, 2016b).

Note: Probability from probit regression of the probability of attending university for youth (15–29) conditional on parent's maximum level of education (mother or father), gender, age, age-squared, both parent's working, round, cohort (five-year intervals), regional controls, and parent's governmental status. Results reported for males, at age 29, who had both parents working in 2012 and lived in Cairo.

Figure 3.14. Probability of Job Matching for the University Educated, by Parent’s Education Level and Parental Government Status



Source: OAMDI 2013, 2016a, 2016b.

Note: Probability from multinomial regression of the probability of job outcome for male youth (15–29) that has reached a university education. Conditional on parent’s maximum level of education (mother or father), gender, age, age-squared, both parent’s working, round, cohort (5 year intervals), broad regional controls, and parent’s governmental status. Results reported for males, at age 29, who had both parents working in 2012 and lived in Cairo. The ELPMS 2012 has significantly lower rates of unemployment among university educated students compared to the LFS 2012: for example, less than 10 percent versus more than 20 percent in the LFS. This may indicate that aggregate estimates may not be very close to the truth and the ELPMS should mainly be used for looking at patterns and correlations, but not necessarily absolute estimates.

ANNEX A. TABLES

Table 3A.1. Distribution of Employed by Occupation, Industry, and Job Match, 2016

	All	Male	Female	Urban	Rural	Age 15 to 29	Age 30 to 49	Age 50 to 65
OCCUPATION								
Managerial	12	14	4	10	14	4	12	26
High-skilled (professional)	11	8	22	17	7	8	13	12
High-skilled (associate)	9	7	15	11	7	9	8	11
Middle-skilled (routine)	23	28	8	27	21	27	25	15
Middle-skilled (nonroutine)	18	21	9	22	16	19	20	14
Low-skilled	26	21	43	13	35	34	21	22
INDUSTRY								
Agriculture	25	21	38	5	39	29	20	29
Manufacturing	10	12	5	14	7	12	11	6
Other industry	13	16	0	11	14	15	14	6
Services (low-skilled)	24	26	15	33	17	26	25	18
Services (high-skilled)	6	5	12	11	3	9	5	4
Government/public	22	20	30	26	20	9	26	37
JOB MATCH								
Matched	41	41	40	51	34	40	46	32
Overqualified	21	19	25	18	22	33	18	7
Underqualified	38	39	34	30	43	27	36	61

Source: See table 3.2.

Table 3A.2. Occupation Skills Mismatch

Occupation category (ISCO two-digit)	ALL						PUBLIC SECTOR						ALL					
	Emp.	Inf.	Job match			Emp.	Inf.	Job match			Education			Certification				
			Match	Over	Under			Match	Over	Under	<Prim.	Sec.	Ter.	STEM	Health	Edu.	Bus.	
CEOs	0.0	2	74	0	26	0.1	0	74	0	26	14	12	74	5	6	10.1	22	
Administrative managers	13.4	8	32	8	60	5.6	1	60	0	40	52	28	19	13	2	1.8	12	
Production managers	0.2	0	78	0	22	0.9	0	79	0	21	1	21	78	12	2	7.5	47	
Science and engineering prof.	0.9	34	99	0	1	1.4	2	99	0	1	0	1	99	81	10	2.0	2	
Health prof.	0.8	15	95	0	5	2.6	1	93	0	7	0	5	95	1	73	0.2	0	
Teaching prof.	6.4	15	83	0	17	22.0	2	83	0	17	0	17	83	9	3	38.9	6	
Business administration prof.	3.3	32	92	0	8	7.3	4	89	0	11	0	8	92	3	0	2.3	48	
Science and engineering assoc.	2.3	26	73	24	3	5.2	3	79	19	2	3	73	24	63	0	0.8	8	
Health associates	1.4	11	58	40	2	4.9	2	56	44	0	2	58	40	8	36	1.9	4	
Business administration assoc.	0.0	48	58	42	0	0.1	33	53	47	0	0	58	42	22	0	8.7	26	
Legal associates	5.3	31	48	48	3	17.5	17	56	42	2	3	48	48	15	3	5.1	53	
Keyboard	2.1	26	58	39	3	4.4	3	71	26	3	3	58	39	20	0	1.9	46	
Customer service	0.5	27	52	44	4	1.2	3	69	29	3	4	52	44	18	0	0.9	36	
Service and sales	4.3	53	39	21	41	7.8	1	25	36	39	41	39	21	15	0	0.5	10	
Sales	6.2	90	47	20	33	0.3	18	52	34	14	33	47	20	21	1	1.3	21	
Building and construction	10.5	95	47	5	48	0.9	7	53	1	46	48	47	5	21	0	0.4	11	
Metal	2.5	73	43	9	48	1.5	6	49	5	46	48	43	9	24	0	0.4	5	
Handy print	0.7	79	47	8	45	0.1	8	58	7	35	45	47	8	23	0	0.3	13	
Electronic and trade	2.6	86	43	5	52	0.3	11	43	7	50	52	43	5	19	0	0.5	10	
Machine operator	3.4	61	44	6	50	1.6	4	50	5	45	50	44	6	22	0	0.3	15	
Drivers	7.5	84	49	7	44	2.8	4	52	3	45	44	49	7	23	0	0.2	11	
Cleaners and helpers	7.4	57	13	43	43	11.0	7	18	33	49	57	37	6	14	0	0.2	9	
Agriculture laborer	17.5	96	11	43	47	0.4	15	11	41	48	57	39	4	12	0	0.2	9	
Mining and mfg. laborer	0.5	95	13	36	51	0.0	23	0	65	35	64	33	4	12	0	0.2	7	

Source: See table 3.2.

Table 3A.3. Labor Force Statistics by Governorate

Governorate	Labor force participation		Unemp.	Informal worker	Job match			Public sector		Ratio public to private wage
	All	Female			Match	Over	Under	Employment	Job match	
Alexandria	46	21	14	46	17	36	54	20	65	1.3
Aswan	47	25	20	52	28	17	56	34	67	1.5
Asyout	44	18	12	36	21	43	65	22	60	1.4
Behira	58	34	13	33	23	43	64	18	55	1.3
Beni-Suef	55	29	10	32	17	51	68	19	60	1.3
Cairo	48	25	15	52	20	28	55	23	67	1.0
Dakahlia	47	22	12	43	20	37	57	26	62	1.3
Damietta	52	25	11	43	20	37	68	20	67	1.3
El-wadi El-Gidid	58	23	10	47	30	23	39	50	62	1.6
Fayoum	49	18	10	35	14	50	66	15	53	1.2
Gharbia	48	27	14	44	20	36	58	28	60	1.3
Giza	45	20	14	42	18	40	63	18	60	1.3
Ismaelia	52	29	14	44	20	35	58	26	63	1.4
Kafr-El-sheik	49	26	11	35	21	44	58	20	59	1.3
Kalyoubia	51	24	13	44	21	35	59	23	59	1.3
Luxor	42	17	17	42	26	31	67	27	64	1.9
Matrouh	50	12	10	49	11	39	62	31	69	1.2
Menia	51	27	13	32	21	47	68	18	57	1.3
Menoufia	52	29	9	40	27	33	61	25	56	1.2
North Sinai	54	25	17	58	25	16	47	47	72	1.3
Port Said	51	29	18	65	21	13	33	39	77	1.5
Qena	42	17	12	37	28	35	69	21	59	1.5
Red Sea	51	20	21	59	22	19	45	30	72	1.6
Sharkia	51	27	14	41	19	39	54	26	60	1.2
South Sinai	49	7	6	47	15	38	57	37	57	1.3
Suez	49	26	24	54	17	29	43	36	55	1.8
Suhag	42	17	11	33	19	48	73	17	60	1.2

Source: See table 3.2.

Table 3A.4. Top Occupations That Account for Most of Observed Mismatch

Problem	OCCUPATIONS		
	Underqualification	Overqualification	Informality
Alexandria	Drivers (2), construction (2)	Cleaners/helpers (2), sales (1)	Construction (4), drivers (3)
Aswan	Admin. managers (1), ag. laborer (1)	Ag. laborer (5), cleaners/helpers (2)	Ag. laborer (6), construction (4)
Asyout	Ag. laborer (4), construction (4)	Ag. laborer (5), cleaners/helpers (1)	Ag. laborer (10), construction (7)
Behira	Ag. laborer (7), admin. managers (6)	Ag. laborer (7), legal assoc. (1)	Ag. laborer (17), drivers (3)
Beni-Suef	Ag. laborer (10), admin. managers (5)	Ag. laborer (4), cleaners/helpers (1)	Ag. laborer (16), construction (6)
Cairo	Construction (2), drivers (1)	Cleaners/helpers (2), legal assoc. (1)	Sales (3), construction (3)
Dakahlia	Admin. managers (4), ag. laborer (3)	Ag. laborer (3), legal assoc. (1)	Ag. laborer (6), construction (4)
Damietta	Elec. and trade (3), admin. managers (3)	Ag. laborer (4), legal assoc. (1)	Ag. laborer (7), elec. and trade (7)
El-wadi El-Gidid	Ag. laborer (3), admin. managers (3)	Ag. laborer (7), cleaners/helpers (2)	Ag. laborer (12), drivers (2)
Fayoum	Admin. managers (5), ag. laborer (4)	Ag. laborer (3), cleaners/helpers (1)	Construction (8), ag. laborer (8)
Gharbia	Admin. managers (3), ag. laborer (2)	Ag. laborer (3), legal assoc. (1)	Ag. laborer (5), construction (4)
Giza	Construction (3), cleaners/helpers (2)	Cleaners/helpers (2), ag. laborer (1)	Construction (4), drivers (3)
Ismaelia	Ag. laborer (4), admin. managers (3)	Ag. laborer (4), cleaners/helpers (2)	Ag. laborer (9), construction (4)
Kafr-El-sheik	Admin. managers (7), ag. laborer (5)	Ag. laborer (4), legal assoc. (1)	Ag. laborer (10), construction (3)
Kalyoubia	Admin. managers (2), drivers (2)	Ag. laborer (2), cleaners/helpers (2)	Ag. laborer (4), sales (4)
Luxor	Construction (4), ag. laborer (3)	Ag. laborer (4), cleaners/helpers (1)	Ag. laborer (8), construction (7)
Matrouh	Construction (4), drivers (3)	Cleaners/helpers (2), legal assoc. (1)	Construction (9), sales (5)
Menia	Ag. laborer (8), admin. managers (5)	Ag. laborer (6), cleaners/helpers (1)	Ag. laborer (14), construction (5)
Menoufia	Ag. laborer (4), admin. managers (3)	Ag. laborer (7), legal assoc. (1)	Ag. laborer (12), construction (4)
North Sinai	Drivers (1), admin. managers (1)	Ag. laborer (4), cleaners/helpers (2)	Ag. laborer (6), drivers (4)
Port Said	Drivers (1), admin. managers (1)	Cleaners/helpers (2), legal assoc. (2)	Drivers (3), sales (2)
Qena	Ag. laborer (4), construction (3)	Ag. laborer (6), cleaners/helpers (1)	Ag. laborer (11), construction (7)
Red Sea	Drivers (1), admin. managers (1)	Cleaners/helpers (2), ag. laborer (1)	Drivers (5), construction (3)
Sharkia	Admin. managers (5), ag. laborer (4)	Ag. laborer (3), cleaners/helpers (1)	Ag. laborer (8), construction (3)
South Sinai	Drivers (6), construction (3)	Cleaners/helpers (3), legal assoc. (1)	Drivers (9), construction (7)
Suez	Admin. managers (3), drivers (2)	Cleaners/helpers (2), legal assoc. (1)	Construction (3), drivers (3)
Suhag	Ag. laborer (6), construction (4)	Ag. laborer (4), cleaners/helpers (1)	Ag. laborer (11), construction (8)

Source: See table 3.2.

Note: Parentheses include proportion of employed for those related to occupations or proportion of labor force for those related to education in the governorate.

Table 3A.5. Supply- and Demand-side Problems by Governorate

	MATCH (1)				MATCH (1)				SUPPLY PROB. > DEMAND PROB.	
	Supply		Demand		Supply		Demand		Match (1)	Match (2)
	≤ Primary ed	Secondary ed. +	≤ Primary ed	Secondary ed. +	≤ Primary ed	Secondary ed. +	≤ Primary ed	Secondary ed. +		
Alexandria	32	2	1	35	35	11	0	32	0	1
Aswan	13	2	1	54	15	14	0	51	0	0
Asyout	38	2	3	38	41	9	0	36	0	1
Behira	38	1	5	38	43	10	0	36	0	1
Beni-Suef	46	2	3	33	49	10	0	31	1	1
Cairo	24	2	1	41	25	11	0	37	0	0
Dakahlia	30	3	1	40	32	13	0	38	0	1
Damietta	32	2	1	45	34	15	0	38	0	1
El-wadi El-Gidid	17	4	3	34	21	19	0	33	0	1
Fayoum	46	2	2	35	47	10	0	33	1	1
Gharbia	31	2	1	40	33	12	0	38	0	1
Giza	36	1	1	37	38	9	0	34	0	1
Ismaelia	30	2	3	38	34	11	0	37	0	1
Kafr-El-sheik	38	3	2	36	40	12	0	34	1	1
Kalyoubia	31	2	2	39	33	11	0	36	0	1
Luxor	26	2	2	49	28	10	0	47	0	0
Matrouh	36	1	1	35	38	11	0	33	1	1
Menia	42	2	3	37	45	9	0	36	1	1
Menoufia	30	2	3	41	34	12	0	38	0	1
North Sinai	12	4	1	46	14	19	0	44	0	0
Port Said	10	2	1	38	11	18	0	35	0	0
Qena	31	1	2	47	33	9	0	45	0	0
Red Sea	15	3	1	44	16	15	0	43	0	0
Sharkia	32	3	2	38	34	12	0	36	0	1
South Sinai	36	1	1	32	38	12	0	30	1	1
Suez	19	5	0	43	21	16	0	41	0	0
Suhag	43	2	3	38	47	7	0	36	1	1

Note: See table 3.5 for various match definitions.

Table 3A.6. Ordered Logit Regressions on Degree to Which Labor Regulations and Inadequate Labor Force Are Obstacles

	Tax rates	Corruption	Business licensing	Access to finance	Labor regulations	Inadequate labor force
Foreign direct investment	-0.024 (0.025)	0.272*** (0.026)	0.465*** (0.026)	0.163*** (0.027)	0.467*** (0.026)	-0.110*** (0.030)
Firm: subsidiary	-0.140*** (0.016)	0.392*** (0.016)	-0.054*** (0.016)	-0.123*** (0.016)	0.765*** (0.017)	0.127*** (0.018)
Size: Micro	-0.727*** (0.028)	-0.410*** (0.027)	0.043 (0.031)	1.006*** (0.029)	-0.600*** (0.038)	-0.172*** (0.035)
Size: Medium	-0.076*** (0.013)	-0.171*** (0.014)	0.297*** (0.013)	0.238*** (0.014)	-0.004 (0.015)	0.464*** (0.015)
Size: Large	-0.126*** (0.023)	0.408*** (0.024)	0.536*** (0.023)	0.398*** (0.022)	0.342*** (0.024)	1.113*** (0.024)
Ind: Food and beverage	0.520*** (0.016)	-0.193*** (0.016)	0.487*** (0.016)	-0.251*** (0.016)	0.252*** (0.017)	-0.323*** (0.018)
Ind: Textiles and garments	0.943*** (0.027)	-1.144*** (0.026)	-0.622*** (0.028)	-0.112*** (0.025)	0.101*** (0.029)	-0.528*** (0.031)
Ind: Leather products	-0.347*** (0.045)	0.030 (0.042)	0.196*** (0.043)	0.591*** (0.044)	-0.569*** (0.058)	-1.164*** (0.072)
Ind: Wood products and paper	0.153*** (0.026)	-0.899*** (0.027)	0.218*** (0.027)	0.456*** (0.026)	-0.620*** (0.036)	-0.436*** (0.033)
Ind: Petrochemicals	-0.283*** (0.043)	-1.446*** (0.045)	-0.005 (0.046)	-0.600*** (0.046)	-0.681*** (0.055)	-0.779*** (0.058)
Ind: Chemicals	-0.087 (0.054)	-0.065 (0.053)	0.218*** (0.053)	-0.385*** (0.053)	0.292*** (0.056)	0.278*** (0.051)
Ind: Nonmetallic minerals	0.303*** (0.042)	-0.408*** (0.045)	-0.405*** (0.044)	0.391*** (0.041)	-0.095** (0.046)	-0.473*** (0.050)
Ind: Basic metals	0.165*** (0.031)	-0.565*** (0.030)	-0.384*** (0.030)	-0.284*** (0.030)	-0.542*** (0.037)	0.629*** (0.033)
Ind: Mach., equip., and elec.	0.042 (0.036)	-0.481*** (0.038)	0.205*** (0.038)	0.138*** (0.037)	0.304*** (0.040)	-0.482*** (0.043)
Ind: Hospitality and tourism	0.324*** (0.017)	0.137*** (0.018)	-0.409*** (0.017)	-0.184*** (0.018)	0.430*** (0.018)	0.350*** (0.019)
Ind: Transport	-0.224*** (0.041)	-0.764*** (0.047)	-0.187*** (0.044)	-0.730*** (0.049)	-0.547*** (0.056)	-0.904*** (0.060)
Ind: ICT	-0.239*** (0.058)	0.785*** (0.058)	0.401*** (0.070)	1.358*** (0.059)	1.807*** (0.059)	0.931*** (0.067)
Ind: Real estate and const.	0.111* (0.057)	0.230*** (0.065)	-0.106* (0.061)	0.153** (0.063)	0.017 (0.070)	-0.242*** (0.071)
Constant cut1	-1.113*** (0.013)	-1.652*** (0.015)	-0.765*** (0.013)	-0.270*** (0.013)	0.886*** (0.014)	1.016*** (0.015)
Constant cut2	-0.382*** (0.013)	-1.300*** (0.014)	-0.032** (0.013)	0.768*** (0.013)	1.328*** (0.015)	1.488*** (0.015)
Constant cut3	0.456*** (0.013)	-0.373*** (0.013)	0.867*** (0.013)	1.779*** (0.014)	2.187*** (0.016)	2.268*** (0.016)
Constant cut4	1.996*** (0.014)	1.189*** (0.014)	2.172*** (0.015)	3.191*** (0.017)	3.064*** (0.018)	3.537*** (0.019)
Observations	102,077	102,796	99,663	102,668	102,121	102,693

Source: WBES 2016.

Table 3A.7. Job Search Methods of the Unemployed

	None	Primary	Secondary	Tertiary
Number of observations	1,026	844	6,031	3,729
Registering with public/private employment service	2	2	7	15
Participating in employment competition	1	1	11	22
Obtaining financial resources and applying for permits/licenses	7	5	2	1
Searching for private project	8	5	2	2
Using social network	95	55	79	68
Applying directly to employer	9	8	19	37
Using job ads on tv/newspaper	31	22	33	29
Using online job searching	10	5	17	42
Waiting in gathering place	11	7	2	2
Other methods	7	5	2	1
Average number of search methods	1.7	1.1	1.6	1.8

Source: See table 3.2; Egypt Labor Force Survey 2016 (OAMDI 2018).

Note: All measures are in percent unless otherwise indicated.

Table 3A.8. Job Advertisements over Time on OLX.com

	Accounting	Architecture and engineering	Art and design	Business development	Construction	Consulting	Education	Executive	HR and recruiting
1/1/2018	1,592	1,184	823	125	1,182	288	1,905	1,013	484
2/1/2018	1,366	1,055	742	122	1,165	242	1,900	1,165	665
3/1/2018	1,266	1,102	876	143	1,097	252	1,167	903	833

	Hospitality	IT and telecom	Marketing and PR	Medical and health	Retail	Sales	Secretarial	Other
1/1/2018	6,051	1,628	3,589	1,326	2,051	3,540	3,315	31,736
2/1/2018	5,007	1,795	3,554	1,310	1,924	3,301	3,164	25,537
3/1/2018	6,182	1,284	3,770	1,547	2,343	3,468	3,183	29,806

Source: OLX timeseries data January 1, 2018, through March 31, 2018.

CHAPTER 4

PHASING OUT ENERGY SUBSIDIES AS PART OF EGYPT'S ECONOMIC REFORM PROGRAM: IMPACTS AND POLICY IMPLICATIONS

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Introduction

By the end of the 2015/16 fiscal year, a long-standing mix of high government deficits, an overvalued exchange rate, a growing current account deficit, and declining gross international reserves had resulted in low economic growth and severe shortages of foreign exchange in Egypt (IMF 2018).⁶⁶ The fiscal deficit had reached around 12.5 percent of gross domestic product (GDP in 2015/16) as a result of increasing government spending on subsidies and interest payments combined with lower revenues. The current account deficit reached around 6 percent of GDP in 2015/16 as tourism revenues, foreign direct investment, and remittances had all declined over the previous years (CBE 2018). The GDP growth rate had dropped to 2.2 percent in 2012/13. And while GDP growth had recovered to 4.3 percent in 2015/16, this growth rate was still below the average rate of 5.5 percent that prevailed from 2004 to 2010 and was insufficient to reduce poverty and unemployment (MPMAR, various years).

Facing these severe economic challenges, the government of Egypt (GOE) put in place a comprehensive economic reform program to restore macroeconomic stability and promote inclusive growth.⁶⁷ The reform program includes the floating of the exchange rate,⁶⁸ the phasing out of energy subsidies, and the introduction of a value-added tax (VAT) as its main elements. With the aim of improving the business climate and boosting investors' confidence, the GOE has also formulated a new investment law to ease the establishment of new companies and encourage more investment. In the same context, the Central Bank of Egypt (CBE) has eased restrictions on foreign currency transfers to facilitate the repatriation of profits for foreign companies operating in Egypt (EIU 2017). To protect the poor and vulnerable from the anticipated (negative) impacts of such a comprehensive reform program, the GOE also expanded its social safety net by reforming and scaling up food subsidies and introducing a cash transfer program.⁶⁹ The GOE has moved food subsidies from a ration card to a voucher-based system and increased the food subsidy allocations in 2017/18, increasing the monthly allowance per card from EGP 15 to EGP 21 for about 71 million beneficiaries (MoF 2017). In March 2015, the GOE also introduced a cash transfer program, *Takaful and Karama*, to provide income support to poor families with children, to the elderly poor, and to people with disabilities (MoF 2017).

While there are signs that the economy is rebounding and Egypt's economic outlook is becoming more favorable (IMF 2018), it is less clear how the reform program has affected households, especially those of the poor. The objective of this chapter is to estimate the impact of the economic reform program on households based on simulations using prereform data, with a specific emphasis on the energy subsidy reform. We focus on the energy subsidy reform for several reasons:

- The energy subsidy reform is an ongoing process that is planned to continue until at least 2020, when domestic energy prices should reach world market levels.⁷⁰ As such, the findings from the simulations done in this chapter are not only useful for estimating the distributional impacts of the reform steps taken between 2014 and 2017 but may also help decision making regarding the size of the expected impacts that are still to come.
- The devaluation was a one-time shock to the economy, rather than an ongoing policy reform process. As such, while we capture the devaluation as part of our scenarios, we put less emphasis on this issue in our discussion of results.
- We do not specifically examine the impact of VAT, as the shift from the preexisting sales tax to a VAT is more a shift in tax systems rather than a new tax. It is not expected to have large distributional implications. In addition, the absence of detailed data on the new and old tax rates by specific product and their matching to data in the social accounting matrix (SAM) would make it extremely difficult to assess such a shift in an economy-wide framework.⁷¹
- Finally, we include the impact of scaling up the food subsidies and the introduction of the cash transfer program in our analysis to estimate how those programs may have helped households mitigate the impacts of the energy subsidy reforms, especially poor households.

The remainder of this chapter is structured as follows. The next section first presents the global literature on the impacts of energy subsidy reforms and currency devaluations. In its second part, it provides country-specific background for Egypt. The subsequent section presents the economy-wide model for Egypt and scenarios run in the model reflecting the recent economic reforms. Following these are sections that discuss the results and present conclusions.

Energy Subsidies in Egypt in the Context of Currency Devaluation

Global experience

In the absence of more sophisticated social welfare systems, energy subsidies are still in place in several, mainly low- and middle-income countries. These subsidies have the objectives of redistributing wealth among citizens and shielding domestic consumers from increases in international energy prices and excessive volatility in those prices (IMF 2017). However, energy subsidies represent a fiscal burden on the government budget, often contribute to large fiscal deficits, and drain resources from more growth-promoting and poverty-reducing spending, such as on infrastructure, education, and health. The existence of subsidies and related incentives for overconsumption of energy can also contribute to a deterioration in the balance of payments, owing to higher energy imports (for energy-importing countries). High levels of subsidy also often lead to distortions in the economy, as energy subsidies usually create a bias in favor of capital-intensive and energy-intensive industries, such as petrochemicals, steel, cement, fertilizers, aluminum, and copper, diverting resources toward these sectors at the expense of more labor-intensive and, thus, job-creating industries (IMF 2015). Energy subsidies often hinder economic diversification and reduce incentives toward the adoption of more innovative technologies, especially energy-efficient technologies. In addition, subsidized energy prices often tend to benefit better-off households, owing to their higher energy consumption, e.g., through car ownership and the use of air conditioners (IMF 2017). For example, the IMF estimates that the poorest quintile in Egypt, Jordan, Mauritania, Morocco, and Yemen receive only between 1 and 7 percent of total diesel subsidies, while the richest quintile received 42 to 77 percent of the total value of these subsidies (El-Katiri and Fattouh 2015).

In light of these serious disadvantages of energy subsidies, the number of countries engaging in energy subsidy reforms has increased in recent years, including in Middle East and North Africa (MENA) in countries, such as Egypt, Jordan, and Sudan. However, research and empirical evidence show that phasing out energy subsidies can lead to a short-term decline in GDP during the adjustment process as enterprises face higher costs of energy inputs (Verme 2016). Moreover, the increase in energy prices negatively affects real household incomes directly through higher energy prices and indirectly through higher prices of other goods and services that come with the higher costs for intermediate inputs, such as transportation, trade, and others. Coady, Flamini, and Sears (2015) et al. estimate that an increase of \$0.25 per liter in fuel prices may result in a 5.5 percent decline in real household incomes, on average, across 32 countries. The impact ranges from 3.5 percent in South and Central America to 7.0 percent in MENA, where retail prices are still comparatively low. In Egypt, several studies estimated the potential impact of energy-subsidy reform. Griffin, Laursen, and Robertson (2016) and Banerjee et al. (2017) used dynamic computable general equilibrium (DCGE) models and

found that the impact of the energy subsidy cut in July 2014 should lead to only a modest decline in real household consumption and only a slight increase in poverty in the short term, while resulting in sizeable structural change in the economy and increase in economic growth in the longer term. Since these two studies for Egypt were conducted, the GOE has scaled up its economic reform agenda significantly by floating the exchange rate and by further cutting energy subsidies.

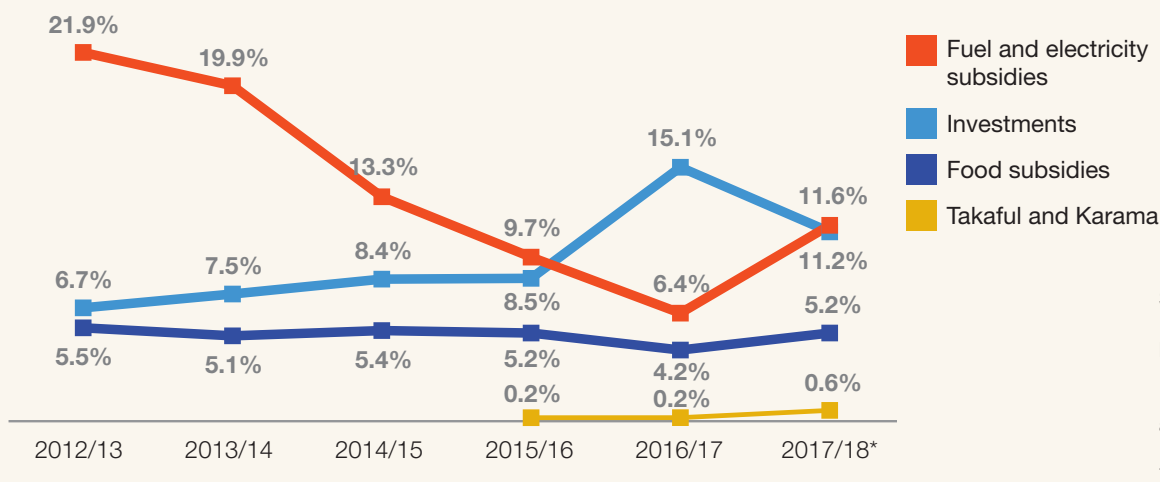
Based on the international literature, several factors are likely to be important for the successful implementation of energy subsidies.

- Communicating to citizens the rationale for energy subsidy reform can help obtain buy-in and support for the reform (Coady, Flamini, and Sears 2015).
- Rather than phasing out energy subsidies at once, a gradual approach spanning several years can be preferable to give enterprises and households time to adjust (Breisinger, Engelke, and Ecker 2012; Coady, Flamini, and Sears 2015).
- Successful implementation of energy subsidy reform also depends on a credible compensation mechanism, such as a comprehensive social safety net, to mitigate the negative impacts on the poor (Kandil 2010; Salehi-Isfahani 2016). New targeted measures to mitigate the impact of energy price increases on the poor, such as targeted (conditional) cash transfers, have worked well in countries like Brazil, Indonesia, Mexico, and Turkey. Other countries have expanded existing programs and improved their targeting: for example, school meals, public works, reduction in education and health fees, or subsidized mass transportation in countries like Mozambique, Ghana, Niger, and Nigeria (Coady, Flamini, and Sears 2015). Drawing on these experiences, Egypt chose a “mixed approach,” both increasing existing programs, especially food subsidies, and introducing a new cash program, Takaful and Karama.

Energy subsidy reform and devaluation in Egypt

Before energy subsidies and, specifically, fuel subsidies were first reduced in 2014,⁷² fuel and electricity subsidies together accounted for 21.9 percent of total government expenditure and 6.0 percent of GDP (figure 4.1). Since 2013/14, the share of energy subsidies in government expenditure has steadily declined and the investment share in expenditure has constantly increased. The share of government expenditures made up by food subsidies remained relatively constant, while that for cash transfer program, Takaful and Karama, has steadily increased since its introduction in 2015.

Figure 4.1. Energy Subsidies, Food Subsidies, and Investment, 2012/13 to 2017/18, as a Percentage of Total Government Expenditure



Source: Ministry of Finance, 2018, monthly bulletin.

Note: T&K = Takaful and Karama.

*Projected

During the first wave of subsidy cuts in 2014, the GOE introduced substantial fuel price increases: a 64 percent increase in diesel prices, a 78 percent increase in the price for gasoline 80, a 40 percent increase in gasoline 92 prices, and a sixfold increase in prices for the largest residential users of natural gas. Heavily subsidized liquefied petroleum gas (LPG) was excluded from the subsidy cut (IMF 2015).⁷³

The decline in international prices in late 2014 and early 2015 reduced the gap between international and domestic prices, offering a good opportunity to adopt a more sustained program of fuel subsidy cuts. Figure 4.1 shows the declining share of energy subsidy as a percentage of total government expenditures. The fiscal savings were estimated at around 44 billion Egyptian pounds, but the fiscal space was still limited by the high costs for debt service and large wage bills (IMF 2015).

Table 4.1. Subsidy by Type of Fuel, 2014/15

	Mazot (fuel oil)	Kerosene	LPG	Gasoline	Diesel (solar)
Total annual subsidy (million EGY pounds)	16,031	53	19,116	20,147	44,904
Share in total fuel subsidy (percent)	16.0	0.1	19.1	20.1	44.8
Total sales revenues (million EGY pounds)	28,860	26	1,120	14,335	25,120
Total cost (million EGY pounds)	44,891	79	20,236	34,482	70,024
Share of subsidy to cost	35.7	67.1	94.5	58.4	64.1

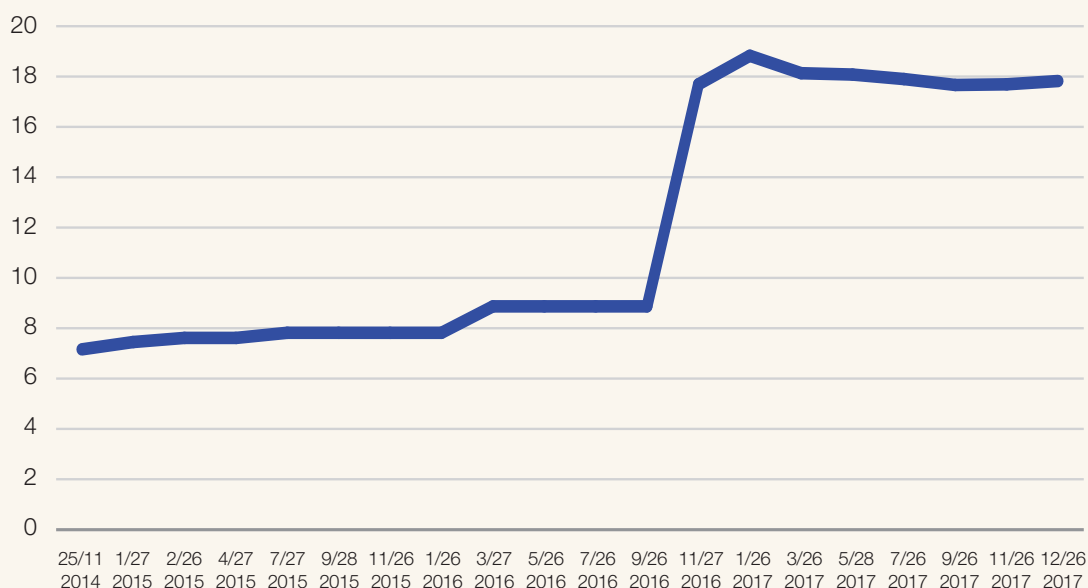
Source: MoF 2014.

Note: LPG = liquefied petroleum gas.

However, after the 2014 reform, fuel products still remained heavily subsidized, especially for LPG, diesel, kerosene, and gasoline, as shown by the share of subsidy to cost ratios (table 4.1). Hence, the government continued its firm commitment toward fiscal reform by further cutting fuel subsidies.⁷⁴ In 2016 and 2017, the LPG price was raised first by around 87.5 percent and then 100 percent, respectively, gasoline 80 by 46.9 and 55.3 percent, gasoline 92 by 34.6 and 43.0 percent, diesel by 30.6 and 55.3 percent, and Mazot (fuel oil) by around 40 percent in 2017. Electricity prices also increased by around 30 and 40 percent in 2016 and 2017, respectively.⁷⁵ Following these measures, the fiscal deficit for FY 2016/17 was reduced to 10.9 percent as a share of GDP (MoF 2017). Nevertheless, fuel remains heavily subsidized, largely as a consequence of the floating of the exchange rate in November 2016. Therefore, after several years of decline, the share of energy subsidies in government expenditures is projected to increase again from 6.4 percent to 11.6 percent between 2016/17 and 2017/18 (figure 4.1).

The currency devaluation became necessary as Egypt's international position encountered a fundamental disequilibrium. After a period of volatility, the exchange rate stabilized at about EGP 18.0 per US\$1.0 compared to EGP 8.8 before the float (figure 4.2) (IMF 2018). Economic theory and empirical evidence show that, following such a devaluation, relative prices usually divert consumption toward lower priced, domestically produced goods and services and make exports more competitive. As with energy subsidy cuts, however, large currency devaluations often lead to a short-term reduction in economic output, higher prices for imported goods, and declining real incomes (Copper 1971; Bussière, Saxena, and Tovar 2010; Kandil 2011). Indeed, early evidence suggests that Egypt is no exception. As of July 2017, the trade balance deficit had decreased by around 8.4 percent due to an increase in export earnings by nearly 16 percent and a decrease in imports by 0.5 percent. In addition, international currency reserves more than doubled by October 2017, reaching US\$36.7 billion compared to US\$17.5 billion in June

Figure 4.2. Exchange Rate for the Egyptian Pound to the US Dollar from 2014 to 2017



Source: CBE 2018.

2016, equivalent to more than seven months of import coverage (CBE 2017). Confidence in the Egyptian pound has also returned, and US dollar shortages in the banking system have been eliminated. However, depreciation has sharply increased inflation during the first year following the exchange rate reform, likely affecting households' purchasing power and real incomes significantly. At the beginning of 2018, inflation had been significantly reduced and stabilized.

To get a first “feel” as to how these significant changes in energy subsidy policy and exchange rates may have affected the Egyptian economy and households, the next section provides an overview of the role of energy in the Egyptian economy as a background for the subsequent economy-wide analysis.

Overview of the role of energy in the Egyptian economy

We first provide a summary of the most important structural features of the Egyptian economy and related elasticities, which together determine the results of the DCGE-based simulations (tables 6.2 to 6.4). Columns 1 and 2 of table 4.2 describe the structure of production across economic sectors in fiscal year 2012/13, that is, shortly after the 2011 Egyptian revolution and immediately before the beginning of the reform process.

The structure of gross output reveals the typical composition of production often found in middle-income, semi-industrialized countries, where agriculture still constitutes a relatively large share of gross domestic output. Egypt's agricultural value added as a share of GDP is about 10 percent—lower than for lower middle-income countries but higher than for MENA countries. Energy production makes up 20 percent of total production in Egypt, with crude oil, natural gas, petroleum products, and electricity contributing 5.6, 3.1, 9.0, and 2.9 percent, respectively.

The importance of intermediate energy inputs for each sector is indicated by the per-unit total intermediate input coefficients in column 3 in combination with the energy input shares in column 4. As shown in columns 4 and 5, energy inputs make up a large share of total production cost in natural gas, manufacturing of textiles and of nonmetallic mineral products, as well as in electricity production and the transport sector. This implies that any rise in energy prices as a result of the energy price reforms increases intermediate input costs in these sectors, thereby hampering the competitiveness of energy-intensive sectors both on international markets for commodities and on national markets for factors of production.

Table 4.2. Structure of Supply

	Initial output 2012/13 (billions EGP)	Output share (percent)	Per-unit total intermediate input share (percent)	Per intermediate input energy share (percent)	Per-unit energy share (percent)	Per-unit hired labor share (percent)	Per-unit family labor share (percent)	Per-unit capital share (percent)	Per-unit land share (percent)	Partial supply elasticity ϵ_S	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	
1	Agriculture	286.0	9.4	42.6	18.5	7.9	16.8	41.8	27.8	13.6	0.12
2	Forestry	0.1	0.0	15.3	10.2	1.6	89.0		11.0		0.62
3	Fishing	18.3	0.6	11.0	9.6	1.1	21.4		78.6		0.15
4	Crude oil	169.8	5.6	7.0	19.0	1.3	1.6		98.4		0.01
5	Natural gas	94.1	3.1	39.1	73.0	28.5	5.4		94.6		0.04
6	Metal ore mining	1.9	0.1	4.6	21.0	1.0	8.1		91.9		0.06
7	Other mining	12.3	0.4	59.7	11.6	6.9	12.4		87.6		0.09
8	Mining support	32.7	1.1	26.8	1.1	0.3	1.1		98.9		0.01
9	Food processing	161.2	5.3	80.0	5.9	4.7	30.2	41.9	27.9		0.21
10	Beverages	17.4	0.6	69.8	3.5	2.4	16.7	50.0	33.3		0.12
11	Tobacco	6.3	0.2	62.7	5.8	3.6	47.1	31.7	21.2		0.33
12	Textiles	19.0	0.6	65.6	23.0	15.1	61.6	23.0	15.4		0.43
13	Clothing	22.7	0.7	49.7	8.3	4.1	25.0	45.0	30.0		0.18
14	Leather	6.0	0.2	43.5	6.7	2.9	20.4	47.8	31.8		0.14
15	Wood processing	5.0	0.2	57.7	11.6	6.7	39.1	36.5	24.4		0.27
16	Paper	11.5	0.4	74.6	7.2	5.4	28.6	42.8	28.6		0.20
17	Petrol refining	271.8	9.0	67.3	4.2	2.8	7.0		93.1		0.05
18	Chemicals	86.6	2.9	47.0	20.0	9.4	14.9		85.1		0.10
19	Nonmetallic mineral products	50.8	1.7	48.7	51.1	24.9	16.0	50.4	33.6		0.11
20	Basic metals	129.0	4.3	71.2	11.7	8.3	19.1	48.5	32.4		0.13
21	Equipment	21.9	0.7	57.1	9.7	5.5	18.7	48.8	32.5		0.13
22	Machinery	8.2	0.3	73.1	8.3	6.1	57.7	25.4	16.9		0.40
23	Vehicles	10.7	0.4	80.4	8.2	6.6	42.2	34.7	23.1		0.30
24	Other manufacturing	63.7	2.1	49.0	7.6	3.7	13.1	52.1	34.7		0.09
25	Electricity	87.1	2.9	86.3	94.9	81.8	98.9		1.1		0.69
26	Water	14.3	0.5	18.5	39.9	7.4	47.8		52.2		0.33
27	Construction	213.0	7.0	47.8	11.6	5.6	8.4	55.0	36.7		0.06
28	Trade	277.7	9.2	12.7	47.3	6.0	10.0	54.0	36.0		0.07
29	Transport	148.2	4.9	28.6	67.3	19.2	21.1	47.3	31.5		0.15
30	Hotels	32.1	1.1	21.0	15.8	3.3	16.1	50.4	33.6		0.11
31	Communications	56.2	1.9	26.7	7.6	2.0	11.7	53.0	35.3		0.08
32	Financial services	63.0	2.1	15.4	8.8	1.4	48.4	31.0	20.6		0.34
33	Real estate	140.0	4.6	15.8	2.2	0.3	2.7	58.4	38.9		0.02
34	Business services	27.5	0.9	15.6	7.3	1.1	16.2	50.3	33.5		0.11
35	Public administration	117.5	3.9	27.1	11.6	3.1	94.0		6.0		0.66
36	Education	89.4	3.0	10.2	7.5	0.8	78.0		22.0		0.55
37	Health	64.8	2.1	27.4	8.7	2.4	51.2		48.8		0.36
38	Other services	193.7	6.4	35.3	14.7	5.2	28.8	42.7	28.5		0.20
	TOTAL	3031.5	100.0				22.5	31.7	44.5	1.2	

Source: Egypt DCGE model.

Table 4.3. Demand Structure and Foreign Trade

						Own-price elasticities of demand		Trade elasticities
	Export share (percent)	Export-output share (percent)	Import share (percent)	Import-demand share (percent)	Imported-total intermediate input share (percent)	Urban households: from lowest to highest quintile	Rural households: from lowest to highest quintile	Identical transformation and substitution elasticities: σ_q and σ_q
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1 Maize			2.7	36.6	14.2	-0.107 -0.181	-0.097 -0.122	1.30
2 Rice					14.2	-0.111 -0.182	-0.078 -0.116	5.05
3 Wheat			4.0	49.9	14.2	-0.110 -0.181	-0.094 -0.120	4.45
4 Other cereals	0.0	3.1	0.0	12.3	14.2			1.30
5 Vegetables			0.7	9.5	14.2	-0.084 -0.111	-0.089 -0.105	1.85
6 Fruits and nuts	2.1	4.5	0.6	11.1	14.2	-0.183 -0.282	-0.153 -0.214	1.85
7 Oil seeds	0.2	15.4	1.6	80.8	14.2	-0.115 -0.193	-0.092 -0.138	2.45
8 Living plants	0.1	22.1	0.1	71.7	14.2	-0.106 -0.181	-0.075 -0.114	2.45
9 Plants used for sugar manufacturing					14.2	-0.132 -0.225	-0.121 -0.181	2.70
10 Unmanufactured tobacco	0.0	83.9	0.1	99.9	14.2	-0.096 -0.165	-0.097 -0.146	3.25
11 Beverages and spice crops	0.8	4.5	0.8	10.2	14.2	-0.153 -0.255	-0.101 -0.150	3.25
12 Wood and other forestry products	0.0	31.9	0.2	93.4	2.9	-0.094 -0.161	-0.067 -0.101	2.50
13 Live animals			0.2	1.0	14.2	-0.178 -0.302	-0.137 -0.201	2.00
14 Fishes					0.1	-0.133 -0.211	-0.097 -0.141	1.25
15 Coal and lignite; peat	0.1	62.2	0.1	83.5	14.3		-0.101 -0.101	3.05
16 Crude oil	6.1	12.0	4.3	13.1	14.3			5.20
17 Natural gas	3.2	11.0			7.1	-0.114 -0.170	-0.080 -0.118	17.20
18 Metal ores and other minerals	1.3	28.5	1.1	35.9	19.3	-0.201 -0.342	-0.511 -0.77	0.90
19 Meat, fish, fruits, vegetable products	1.4	15.7	5.5	62.3	5.8	-0.187 -0.272	-0.155 -0.198	2.00
20 Food oil	0.2	2.2	0.1	1.5	0.7	-0.120 -0.195	-0.100 -0.144	3.30
21 Dairy products	0.8	14.7	1.1	34.4	21.6	-0.150 -0.241	-0.109 -0.158	3.65
22 Flour, rice	0.6	5.9			21.6	-0.113 -0.182	-0.088 -0.134	2.60

							Own-price elasticities of demand		Trade elasticities
		Export share (percent)	Export-output share (percent)	Import share (percent)	Import-demand share (percent)	Imported-total intermediate input share (percent)	Urban households: from lowest to highest quintile	Rural households: from lowest to highest quintile	Identical transformation and substitution elasticities: σ_q and σ_q
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
23	Sugar	0.4	8.0	0.1	4.1	21.6	-0.137 -0.226	-0.126 -0.184	2.70
24	Pasta and tea and other food products	1.5	6.7	1.7	13.5	21.6	-0.207 -0.277	-0.134 -0.164	2.00
25	Beverages			0.1	1.9	18.7	-0.164 -0.271	-0.106 -0.160	1.15
26	Tobacco products	0.3	7.2	0.5	42.9	55.2	-0.112 -0.170	-0.112 -0.155	1.15
27	Yarn and textile	2.9	31.6	2.2	50.4	35.8	-0.198 -0.322	-0.240 -0.343	3.75
28	Knitted or crocheted fabrics;	2.9	19.6	0.8	22.4	32.9	-0.239 -0.372	-0.175 -0.244	3.70
29	Leather and leather products, footwear	0.3	14.7	0.2	23.7	28.1	-0.198 -0.332	-0.141 -0.208	4.05
30	Products of wood	0.0	2.3	1.9	67.6	38.9	-0.201 -0.348	-0.511 -0.774	3.40
31	Paper and paper products	0.9	11.9	2.1	38.4	31.2	-0.419 -0.693	-0.350 -0.521	3.40
32	LPG	0.6	5.3	2.6	26.8	14.6	-0.103 -0.162	-0.075 -0.104	2.10
33	Gasoline 80	1.2	12.5	3.2	38.3	14.6	-0.129 -0.233	-0.101 -0.156	2.10
34	Gasoline 90/92	1.3	12.5	3.7	38.3	14.6	-0.129 -0.235	-0.101 -0.156	2.10
35	Gasoline 95	0.0	12.5	1.8	98.3	14.6	-0.174 -0.220	-0.135 -0.157	2.10
36	Kerosene	0.6	99.5	1.6	99.9	14.6	-0.096 -0.161	-0.070 -0.103	2.10
37	Solar	2.3	6.0			14.6	-0.098 -0.173	-0.076 -0.107	2.10
38	Mazot (heavy fuel oil)	1.0	6.0			14.6	-0.095 -0.171	-0.068 -0.107	2.10
39	Glass and glass products	2.7	13.3	0.7	9.1	38.2	-0.371 -0.608	-0.295 -0.422	3.30
40	Basic chemicals and other chemical products	10.5	34.8	13.9	58.2	38.2	-0.134 -0.203	-0.108 -0.15	3.30
41	Basic metals	8.7	19.2	10.3	33.4	27.6	-0.259 -0.364	-0.610 -0.801	4.20
42	Radio, television, and communication equipment and apparatus	0.3	14.7	2.1	74.2	36.3	-0.141 -0.240	-0.212 -0.321	4.05
43	Electrical machinery and apparatus	2.9	32.1	12.5	80.2	26.1	-0.147 -0.249	-0.220 -0.332	4.05

						Own-price elasticities of demand		Trade elasticities
	Export share (percent)	Export-output share (percent)	Import share (percent)	Import-demand share (percent)	Imported-total intermediate input share (percent)	Urban households: from lowest to highest quintile	Rural households: from lowest to highest quintile	Identical transformation and substitution elasticities: σ_q and σ_q
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
44 Transport equipment	0.4	8.8	4.9	75.7	41.9	-0.187 -0.343	-0.144 -0.222	2.80
45 Furniture	0.8	11.5	0.6	19.1	36.5	-0.207 -0.348	-0.523 -0.78	3.75
46 Electricity transmission and distribution					13.8	-0.107 -0.168	-0.076 -0.106	2.80
47 Water distribution					11.5	-0.104 -0.172	-0.079 -0.117	2.80
48 Construction services	1.1	1.7	0.4	0.9	14.0	-0.144 -0.245	-0.215 -0.326	1.90
49 Wholesale and retail trade services					13.3	-0.207 -0.341	-0.167 -0.249	1.90
50 Transport services	16.7	29.8	1.0	3.7	24.9	-0.196 -0.362	-0.183 -0.285	1.90
51 Lodging	18.7	74.5	3.1	43.5	25.7	-0.154 -0.241	-0.113 -0.164	1.90
52 Telecommunications services	1.7	9.2	0.4	3.7	20.5	-0.285 -0.445	-0.192 -0.277	1.90
53 Financial intermediation	0.6	2.9			14.6	-0.225 -0.371	-0.178 -0.265	1.90
54 Real estate services					20.4	-0.205 -0.283	-0.127 -0.156	1.90
55 business services	1.3	7.4	3.2	23.4	22.6	-0.207 -0.343	-0.174 -0.257	1.90
56 Public administration services	0.8	2.2	1.5	6.1	4.7	-0.202 -0.343	-0.169 -0.25	1.90
57 Education services					16.5	-0.300 -0.501	-0.265 -0.398	1.90
58 Health and social services					26.5	-0.251 -0.402	-0.222 -0.332	1.90
59 Other services					17.3	-0.211 -0.363	-0.175 -0.273	1.90
TOTAL	100.0	9.7	100.0	17.5				

Source: Egypt DCGE model.

Table 4.4. Structure of Household Income and Expenditures

	Household income (percentage share of total)				Household expenditures (percentage share of total)							
					Net transfers from			Total (billions EGP)	Energy*	Non-energy	Taxes	Savings****
	Hired labor	Family labor	Capital profits	Land	Enter-prises	Govern-ment	Abroad***					
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	
All households**	18.55	15.05	9.46	1.28	48.77	0.28	6.61	1,749.69	9.2	71.9	2.2	16.7
Urban households	14.51	11.09	7.39	0.76	61.94	0.36	3.95	904.07	9.5	69.9	2.4	18.2
Urban poor households	23.49	39.56	8.86	0.41	24.87	0.29	2.51	165.95	8.6	75.3	2.2	13.9
Urban middle-income households	18.68	6.26	8.03	0.56	62.97	0.37	3.14	297.81	9.1	73.2	2.4	15.2
Urban high-income households	8.30	3.63	6.41	1.02	75.22	0.38	5.04	440.31	10.1	65.6	2.5	21.8
Rural households	22.87	19.28	11.67	1.84	34.69	0.20	9.46	845.62	8.8	74.0	2.1	15.1
Rural poor households	30.47	32.02	12.85	0.68	10.99	0.17	12.82	192.27	7.0	82.1	2.5	8.5
Rural middle-income households	26.36	16.75	13.18	1.40	32.83	0.17	9.33	314.24	9.1	76.2	2.1	12.6
Rural high-income households	15.32	14.41	9.61	2.90	49.84	0.25	7.67	339.11	9.6	67.4	1.7	21.3

Note: Numbers are based on base year model solution.

* Estimates of energy consumption shares may differ from purely household-survey-based estimates. This is because the underlying SAM combines information from the Ministry of Petroleum on total household consumption of fuel with shares derived from the household survey (see next section for more details).

** Poor households refer to the lowest two quintiles in the household income distribution. Middle-income households include the 3rd and 4th quintiles. High-income households refer to the 5th quintile.

*** Net transfers from abroad, including remittances, but also interest payments or receipts on private assets or liabilities.

**** Savings are calculated residually as the difference between total income and recurrent expenditures on income taxes, consumption, and transfers.

Each sector's use of labor, capital, and land is an important determinant of the distributional implications that changes in the respective sector's output have on households (table 4.2, columns 6 to 9).⁷⁶ Not surprisingly, self-employed and family workers dominate in agriculture and more informal sectors, whereas family labor does not play a significant role in the mining, chemical, utility, and public services sectors that are more dominated by capital and formal employment. As expected, agriculture and agricultural-processing sectors as well as services are among the most labor-intensive sectors, while the mining, chemicals, petrol, and water sectors are among the most capital-intensive sectors, with other industries somewhere in between.

The supply elasticities determine the sectoral results of reform simulations in the model (table 4.2, column 10). Because production technology for sectoral value-added is modelled by two-level constant elasticity of substitution production functions, the shares observed in the benchmark equilibrium data, together with the factor substitution elasticities, provide us with a set of partial labor demand and output elasticities. Given this technology specification and identical factor substitution elasticities of 0.7 for any pair of primary factors in all production sectors, price elasticities are highest in hired-labor-intensive sectors with a large share of hired labor value-added in total value-added, such as, for example, forestry, electricity, or textiles.

The impact of energy price changes and currency devaluation are also expected to differ depending on sectors' trade orientation and structure of final demand (table 4.3). Column 1 in table 4.3 indicates that 24 out of the 44 tradable-producing sectors export more than 10 percent of their output, with tobacco, coal, kerosene, and hotel services being the most export-oriented sectors in the economy. By international standards, export ratios are low and reflect a country with a large domestic market and a relatively inward-looking development strategy (Nin-Pratt et al. 2018). On the import side, a mixed picture emerges when one considers both the share of imports in domestic demand, which indicates the degree of "import orientation," and the share of imported intermediate inputs in total intermediate inputs, which indicates the degree of "import dependence." Food crop sectors and "other industry" are the most import-oriented sectors, while most agricultural and food-processing subsectors are highly import dependent. Rice, sugar, fish, electricity, water, trade, real estate, and other services are the only sectors with no or little international trade, but 26 percent of total intermediates used in the health sector are imported. Thus, devaluation is expected to have a strong negative indirect impact, including in nontradable sectors.

The foreign trade elasticities used in the simulations (table 4.3, column 8) capture the extent of product differentiation due to differences in quality and degree of product homogeneity. These elasticities are taken from the Global Trade Analysis Project data set (Aguiar, Narayanan, and McDougall 2016) and are generally higher for primary goods than for manufactured goods and services. We assume identical import substitution and export transformation elasticities for individual goods. Together with the trade shares shown in columns 2 and 4, these trade elasticities determine the sectors' trade adjustment flexibility to terms-of-trade-shocks.⁷⁷

On the demand side, (i) the demand for intermediate goods is modeled as Leontief technology and therefore is not price sensitive; (ii) investment demand is specified by fixed capital composition shares; and (iii) government consumption demand is determined exogenously. The partial equilibrium price elasticity of demand for the composite good in each sector is almost completely determined by the price elasticity of consumer demand. Consumer demand is derived from a linear expenditure system with exogenously estimated income elasticities of demand. The resulting partial own-price elasticities are shown in columns 6 and 7. Own-price elasticities of demand for energy goods are generally absolutely lower for rural than for urban households and within each region are lower for poorer than for richer households, implying higher direct welfare losses for rural compared to urban households and for poorer compared to richer households, as a result of higher consumer prices for energy.⁷⁸

The main impact transmission channels for households are through changes in factor remuneration on the income side and through changes in consumer prices on the expenditure side. Moreover, devaluation affects household welfare via changes in transfers from abroad, which are fixed in foreign currency and increase in domestic currency with the devaluation of the Egyptian pound. Table 4.4 summarizes income and expenditure patterns for urban and rural households.

Poor households, which make up 40 percent of total population (according to a US\$2-a-day poverty line), account for about 20 percent of total household income, whereas the population and income shares are 57 percent and 48 percent for rural households and 43 percent and 52 percent for urban households. The sources of household incomes are strongly related to factor and human capital endowments. Rural households receive most of their income from the provision of labor (more than 40 percent), both as family (20 percent) and hired (23 percent) labor, while labor income makes up only 25 percent of total urban income. Yet labor income is the dominant income source of poor households both rural and urban. In addition, rural households are the primary recipients of remittances from abroad. Moreover, per-capita remittances are higher for poorer than for richer rural households. Thus, poor rural households are expected to partly benefit from higher remittances in local currency as a result of devaluation. On the expenditure side, the major difference between households is that urban households spend a slightly larger share of their earned income on energy, including electricity, compared to rural households, and this share is generally larger for richer than poorer households in both regions.

This overview of key structural features of the Egyptian economy and households has provided important insights into possible distributional outcomes of the economic reform package. The next section describes the methodology that allows for quantifying these outcomes based on a DCGE model.

An Energy-Focused Dynamic Computable General Equilibrium Model for Egypt

Data and model

As the basis of our analysis, we augment the SAM 2012/13 for Egypt (CAPMAS 2016) aggregated by the Central Agency for Public Mobilization (CAPMAS) with data from the Ministry of Petroleum and a previous energy-focused SAM 2010/11 by Griffin, Laursen, and Robertson (2016). Key changes include the following:

The SAM has been rearranged and aggregated to be consistent with the International Food Policy Research Institute's (IFPRI) SAM and the structure of the DCGE model.

The intermediate consumption matrix for fuel has been disaggregated and now consists of LPG; gasoline 80, 90, 92, and 95; kerosene; diesel; and “other fuels” commodities. In doing so, first, we use the SAM 2010/11 developed by Griffin, Laursen, and Robertson and split diesel fuel from other fuels using aggregate numbers provided by the Ministry of Petroleum. Then we split “other fuels” according to the shares that were calculated using the data of the Ministry of Petroleum. In doing so, we assume that all SAM sectors follow the national fuel input distribution. Yet sectoral differences in overall fuel intensities as well as natural gas and electricity intensities imply that production sectors are affected quite differently by the fuel subsidy reform.

For the final household consumption matrix, we used the aggregate final consumption numbers from the Ministry of Petroleum and then split the various fuel types across 10 household types by using shares from the 2012/13 Household Income and Expenditure Survey leading to varying budget shares for energy items both across energy sources and across households.⁷⁹

The resulting SAM has 38 production activities; 59 commodities; 11 factors of production; 10 household types (rural and urban and by expenditure quintile); various tax accounts, including sales subsidies; savings/investment account; enterprise account; and the rest-of-the-world account. Because the focus of this chapter is on energy, the multisectoral DCGE model has a special emphasis on energy-related activities and their linkages to other production sectors. A sectoral distinction is made within industry between energy-producing sectors (crude oil, natural gas, petrol, and electricity); energy-dependent sectors (textiles, nonmetallic mineral products, electricity, and water collection, treatment, and supply); and other industrial sectors. Finally, there are 11 service sectors, two of them (wholesale and retail trade, and transport) being highly dependent on energy intermediate inputs. An aggregate version of the SAM can be found in annex 6A. It should be noted that the constructed SAM might not reflect true financial costs of energy subsidies. This is due to the fact that disaggregated data for these costs are difficult to obtain and may imply that the true subsidy rates are higher than the ones calculated based on the SAM constructed by CAPMAS. As this caveat is likely to cause unrealistic adjustments of the

budget deficit over the simulation period, we assume that the reduction of the budget deficit is fixed over time. The implication of this approach is that the model and the interpretation of results focuses on the real economy and households rather than on fiscal developments.

The DCGE model is based on this SAM to represent the initial equilibrium position of the Egyptian economy and provides numerical values to several key parameters of the analytical model. The analytical model belongs to a class of dynamic planning models developed by Dervis, deMelo, and Robinson (1982). The model used here to investigate the short- and long-term impacts of energy subsidies and devaluation follows a standard specification as documented in Diao and Thurlow (2012). One distinguishing characteristic of this type of model is its rooting in microeconomic theory: producers minimize costs subject to certain technology constraints and prices, while consumers maximize utility subject to a budget constraint and prices, with prices of energy goods diverging from world market prices and cost-recovery prices. Another trait is the detailed attention devoted to income and expenditure flows, including the extended functional distribution of factor income across sectors and the distribution of functional income to the owners of factors—that is, different households—which allows for impact analysis. SAMs rather than input-output tables provide the structural backbone of these models.

The core equations of the model are summarized in table 4.5.

The following points describe the Egypt-specific features of the model and those parts of the Diao-Thurlow model that are most relevant for the subject of this chapter, namely, the impacts of changing local energy prices and of the devaluation of the Egyptian pound.

Producers in the model are price takers in output and input markets and maximize profits using constant returns-to-scale technologies. Primary factor demands are derived from constant elasticity of substitution value-added functions, while intermediate input demand by commodity group is determined by a Leontief fixed-coefficient technology. Exceptions are crude oil and natural gas production, for which production is determined by Egypt's conservation and export strategies for natural resources. For these two energy sectors, output is determined exogenously by given investments under Leontief production technology for both intermediate inputs and primary factors.

The decision of producers regarding production for domestic versus foreign markets is governed by constant elasticity of transformation functions that distinguish between exported and domestic goods in each traded commodity group. Under the small-country assumption, Egypt faces perfectly elastic world demand curves for its exports at fixed world prices. The revenue-maximizing equilibrium ratio of exports to domestic goods in any traded commodity group is determined by the relative prices for these two commodity types. Again, the exceptions are crude oil and natural gas, for which exports are determined residually as the difference between exogenous supply and endogenous domestic demand.

Table 4.5. Equations of the Egypt Dynamic Computable General Equilibrium Model

<p>I. Prices</p> <p>(1) $PM_i = pwm_i(1 + tm_i)\bar{R}$</p> <p>(2) $PE_i = pwe_i/(1 + te_i)\bar{R}$</p> <p>(3) $PQ_i = f(PM_i, PD_i)$</p> <p>(4) $PX_i = g(PE_i, PD_i)$</p> <p>(5) $PV_i = PX_i - \sum_j a_{ij} PQ_i$</p> <p>(6) $CPI = \sum_i \Omega_i PQ_i$</p> <p>(7) $DPI = \sum_i \Psi_i PD_i$</p> <p>II. Production, employment, and wage rates</p> <p>(8) $QX_i = f(\bar{K}_i, L_{fi})$</p> <p>(9) $W_f = PV_i(\delta QX_i / \delta L_{fi})$ f= labor, land</p> <p>(10) $LD_f = \sum_i L_{fi}$</p> <p>(11) $LD_f - \bar{L}S_f = 0$</p> <p>III. Foreign trade</p> <p>(12) $E_i = h(PE_i/PD_i)$</p> <p>(13) $M_i = m(PM_i/PD_i)$</p> <p>(14) $\sum_i pwm_i M_i - \sum_i pwe_i E_i - \bar{F} = 0$</p>	<p>IV. Income and flow of funds; endogenous variables calculated</p> <p>(15) Y_h: income of households</p> <p>(16) Y_g: government revenues</p> <p>(17) S: total investment</p> <p>IV. Sectoral demand and product markets</p> <p>(18) $I_i = \phi_i S$</p> <p>(19) $Z_i = \sum_j b_{ij} I_j$</p> <p>(20) $V_i = \sum_j a_{ij} QX_j$</p> <p>(21) $C_i = \sum_h q_{ih} (1 - s_h) Y_h / PQ_i$ j=g, G</p> <p>(22) $D_i = d_i(V_i + C_i + Z_i)$</p> <p>(23) $d_i = 1/f_i(M_i/D_i, 1)$</p> <p>(24) $XD_i = D_i + E_i$</p> <p>(25) $XD_i - QX_i = 0$</p> <p>V. Dynamics</p> <p>(26) $LS_{ft} = LS_{ft-1}(1 + \varphi_f)$</p> <p>(27) $LS_{ft} = LS_{ft-1}(1 - \eta) + \sum_i \frac{PQ_{ft-1} I_{ft-1}}{\kappa} \varphi_f$</p> <p>(28) $\alpha_{it} = \alpha_{it-1}(1 + \gamma_i)$</p>
<p>Subscripts</p> <p>f factor groups (labor, capital, and land)</p> <p>h household groups</p> <p>i, j sectors</p> <p>t time periods</p> <p>Exogenous variables</p> <p>\bar{R} nominal exchange rate</p> <p>\bar{F} foreign savings balance</p> <p>pwm world import prices</p> <p>pwe world export prices</p> <p>Exogenous parameters</p> <p>α factor productivity</p> <p>Ω consumer price index weights</p> <p>Ψ producer price index weights</p> <p>ϕ investment allocation shares</p> <p>b capital composition coefficients</p> <p>a input-output coefficients</p> <p>q expenditure shares</p> <p>s savings rates</p> <p>tm tariff rate</p> <p>te export subsidy rate</p> <p>φ land and labor supply growth rate</p> <p>η capital depreciation rate</p> <p>γ Hicks neutral rate of technical change</p> <p>κ base price per unit of capital stock</p>	<p>Endogenous variables</p> <p>PM import price</p> <p>PE export price</p> <p>PQ commodity price</p> <p>PX output price</p> <p>PV unit value-added</p> <p>CPI consumer price index</p> <p>DPI producer price index</p> <p>QX output quantity</p> <p>M import quantity</p> <p>E export quantity</p> <p>L labor and land demand quantity</p> <p>W average factor return</p> <p>L factor demand quantity</p> <p>Y household income</p> <p>YG government revenue</p> <p>S total investment</p> <p>I investment by sector of destination</p> <p>Z investment by sector or origin</p> <p>V intermediate demand</p> <p>C consumption demand</p> <p>D domestic demand</p> <p>d domestic demand ratio</p> <p>XD total demand for domestic output</p> <p>f(-) CES cost function</p> <p>g(-) CET revenue function</p>

Source: Compilation based on Diao and Thurlow 2012.

Notes: CES = constant elasticity of substitution; CET = constant elasticity of transformation.

There are seven labor groups: unskilled, semiskilled, and skilled labor in both urban and rural regions as well as mixed or family labor, which consists of smallholders (and family members) in agriculture and self-employed workers and their family members in manufacturing and services sectors. There are also three types of capital, which are used exclusively in agriculture, mining, or other sectors. All labor types, except family labor, are fully employed and mobile across sectors in the long term. This means that workers in each group receive the same wage in every sector. In the very short term, economy-wide wages for hired labor are assumed to be fixed, with labor demand determined by changes in sectoral real producer wages. Thus, increasing sectoral real producer wages (the relationship between wages and per-unit value-added) will lead to increasing unemployment and vice versa.

Capital is assumed to be fixed and sector-specific in the short term, that is, within individual periods, but new capital from past investment is allocated to sectors according to profit rate differentials under a “putty-clay” specification in the medium to long term. Again, the exceptions are the crude oil and natural gas sectors, for which mining capital is allocated according to Egypt’s investment plan.

The level of foreign savings is assumed to be exogenous and fixed at the initial level. The level of investment is determined by the level of savings in the economy, the latter being the sum of private, public, and foreign savings.

The model’s variables and parameters are calibrated to observed data from the national SAM that captures the initial equilibrium structure of the Egyptian economy in fiscal year 2012/13 (labelled 2012 in the model and the simulations). Parameters are then adjusted over time to reflect demographic and economic changes, and the model is re-solved for a series of new equilibria for the period 2012 to 2025.⁶⁰ Between periods, the model is updated to reflect exogenous rates of land and labor expansion (and capital and output expansion in crude oil and natural gas production). The rate of capital accumulation is determined endogenously, with the level of investment from the previous period converted into new capital. The new capital is added to previous capital stocks after applying a fixed long-term rate of depreciation. Finally, the model captures total factor productivity through the production function’s shift parameter, with the rate of technical change determined exogenously.

Specifications of the scenarios

In order to unpack the impacts of the economic reform package in Egypt, we design five different scenarios (table 4.6). Each scenario is simulated for four different combinations of economic assumptions (closures):

- Two possible uses are posed for the government savings from the energy subsidy reform (saving-investment closure). As presented in table 4.6: (a) Saved funds are used to finance investment exclusively, or (b) saved funds finance both public investment and consumption.
- Two different assumptions for the labor markets: (i) Labor supply adjusts to economic shocks, with wages being fixed. This specification allows the model to simulate unemployment and reflects short-term economic adjustment. And alternatively, (ii) under the assumption of full employment, wages adjust to economic shocks and the growth of labor supply is restricted by the growth rates of the population. These simulations reflect long-term economic developments.

Table 4.6. Economic Scenarios and Associated Economic Assumptions (closures)

Savings-investment closures	(a) Energy subsidy savings used to finance investment exclusively		(b) Energy subsidy savings finance both public investment and consumption	
Scenarios	(i) Short-term time horizon (unemployment)	(ii) Short- and long-term time horizons (full employment)	(i) Short-term time horizon (unemployment)	(ii) Short and long-term time horizons (full employment)
1. Base (reference)	Baseline scenario (BASE)	Baseline scenario (BASE2)	Baseline scenario (BASEa)	Baseline scenario (BASE2a)
2. Energy subsidy reform	Energy subsidy reform (ESR1)	Energy subsidy reform (ESR21)	Energy subsidy reform (ESR1a)	Energy subsidy reform (ESR21a)
3. Energy subsidy and devaluation reform	Energy subsidy and devaluation reform (ESR2)	Energy subsidy and devaluation reform (ESR22)	Energy subsidy and devaluation reform (ESR2a)	Energy subsidy and devaluation reform (ESR22a)
4. Energy subsidy, devaluation, and food subsidy reform	Energy, food subsidy, and devaluation reform (ESR3)	Energy, food subsidy, and devaluation reform (ESR23)	Energy, food subsidy, and devaluation reform (ESR3a)	Energy, food subsidy, and devaluation reform (ESR23a)
5. Energy subsidy, devaluation, food subsidy, and cash transfer reform	Energy, food subsidy, devaluation, and cash transfer reform (ESR4)	Energy, food subsidy, devaluation, and cash transfer reform (ESR24)	Energy, food subsidy, devaluation, and cash transfer reform (ESR4a)	Energy, food subsidy, devaluation, and cash transfer reform (ESR24a)

Given different types of the economic assumptions/closures, each of the analyzed reform scenarios is considered as a counterfactual versus its own base (reference) scenario. Table 4.6 presents the summary mapping between economic scenarios and simulations.

Base (reference) scenario (BASE, BASE2, BASEa, and BASE2a simulations): The reference scenario represents Egypt's economic development along its path in the absence of the reforms that were initiated in 2014. Most importantly, it is assumed that the government fully controls domestic prices of the fuel commodities. This means that within the framework of the DCGE model, “base” simulations assume fixed prices of the fuel commodities for the whole simulation period.

Energy subsidy reform scenario (ESR1, ESR21, ESR1a, and ESR21a simulations): Within this scenario, we consider two stages of the energy subsidy reform: the period 2014 to 2017 that simulates already observed price changes for the energy commodities, and the period 2014 to 2025 that in addition assumes a further increase in energy prices until a complete phaseout of the energy subsidies. It should be noted that the DCGE model and the SAM used in our analysis do not allow for the possibility of price discrimination, and all institutions are assumed to pay the same price for energy commodities. Accordingly, we introduce price changes in the model as uniform growth rates of average registered prices of energy commodities. Price changes of the energy commodities (period 2014 to 2017) were calculated based on information from different sources that include several decrees of the Ministry of Petroleum, reports of the Ministry of Electricity, IMF reports, and several issues of the *Egypt Oil & Gas* newspaper (annex table 6B.1).

To simulate the complete phasing out of the energy subsidies, we make several important assumptions. First, we use information from the IMF (2017) country report that the price-to-cost ratio for gasoline and diesel reached 68 percent in 2017. Accordingly, we assume that the same price-to-cost ratio was reached by 2017 for all other energy commodities. Furthermore, we assume a linear one-to-one relationship between growth rates of the energy commodity prices and cost-recovery ratio. Last, but not least, we assume that the objective of 100 percent cost recovery should be reached by 2021,⁸¹ as a result of even year-to-year growth of registered prices starting from 2018. All in all, given these assumptions, we assume that prices of all energy commodities increase 10.12 percent each year in the period 2018 to 2021.

Energy subsidy and devaluation reform scenario (ESR2, ESR22, ESR2a, and ESR22a simulations): In addition to the described energy subsidy reform, this scenario simulates the 100 percent devaluation of the Egyptian pound in 2017. Accordingly, in addition to the growth of the registered prices of energy commodities, comparing to the base, this simulation assumes a 100 percent increase of all payment and receipts from the rest the world (export, import, remittances, foreign aid, and so forth).

Energy subsidy, devaluation, and food subsidy reform scenario (ESR3, ESR23, ESR3a, and ESR23a simulations): In addition to two of the previous scenarios, this scenario assumes fixed increases of the subsidy rates of food commodities. In particular, it was assumed that all food subsidy rates (negative sales taxes of food commodities) are changing uniformly in line with the budgeted increase of the food subsidies program. Starting from 2013 subsidy payments (and subsidy rates) in

the energy subsidy and devaluation reform scenario above, this implies that the subsidy rates for all food items are adjusted on average by 23.4 percent annually (annex table 6B.2). Given average initial food subsidy rates of 8.8 percent, this implies that on average food prices increased by 2.1 percent less compared to what they would have increased without the additional food subsidies.

Energy subsidy, devaluation, food subsidy, and cash transfers reform scenario (ESR4, ESR24, ESR4a, and ESR24a simulations): Finally, in addition to the previous scenarios, this set of simulations assumes the increase of cash transfers from the government to poor households based on information from the Ministry of Social Solidarity (annex table 6B.3).

Impacts of the reform program on the economy and households

This section examines the effects of the energy price reform and devaluation of the Egyptian pound based on the DCGE model. Because we are primarily interested in the impact on income distribution and household welfare, emphasis is given to how and why individual production sectors are affected differently and the impact channels that affect sectoral, functional, and household income distribution.

The increase in energy prices negatively impacts the macroeconomy in the short run but accelerates economic growth in the longer run. Table 4.7 contrasts the short- and long-run magnitudes of changes in the major components of real GDP under alternative assumptions on the use of subsidy savings—subsidy savings are either completely used to finance additional investment (columns 2, 4, and 6) or are used for a combination of investment and consumption spending (columns 3, 5, and 7). Moreover, short-run results differentiate between the very short run—individual years within the reform period 2014 to 2017 with downward rigid wages—and the three-year period 2014 to 2017 with flexible wages. The results reflect findings (and expectations) from other countries that higher energy prices reduce absorption and real GDP in the short term (columns 2 and 3) but have positive impacts (columns 4 to 5) even if phasing out remaining energy subsidies further increases energy prices (columns 6 and 7). The reason is that higher energy costs in combination with rigid wages lead to an increase in sectoral real producer wages in the short run, which leads producers to reduce production and release workers. This increases unemployment and reduces real GDP and absorption by 2.8 and 2.3 percent, respectively. The reduction in production and employment is most pronounced in energy-intensive sectors with a high share of hired labor inputs. These indirect wage and employment effects are less pronounced in the longer run, when flexible wages lead to a reallocation of factors between sectors. Higher investments and the reallocation of factors to less energy-intensive sectors following the phasing out of remaining energy and electricity subsidies over the period 2018 to 2021 will increase both real GDP and total absorption. As shown in columns 6 and 7 of table 4.7, real GDP is estimated to increase between 0.6 and 1.8 percent and absorption between 1.0 and 2.1 percent, depending on the way savings from energy subsidies are used.

Table 4.7. Short-Term and Long-Term Macroeconomic Impacts of Energy Price Reforms under Alternative Spending Options of Subsidy Savings, Percentage Change from BASE

	Base year (2012)	Short term (2014–17): Fixed wages		Short term (2014–17): Flexible wages		Long term (2014–25): Flexible wages	
	GDP shares	Savings finance investment	Savings finance investment and con- sumption	Savings finance investment	Savings finance investment and con- sumption	Savings finance investment	Savings finance investment and con- sumption
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Absorption	110.5	-2.3	-2.3	0.4	0.4	2.1	1.0
Private consumption	81.1	-4.6	-3.8	-1.4	-1.9	-2.4	-6.5
Fixed investment	14.6	8.9	2.9	11.2	4.1	29.6	14.9
Government consumption	12.1	0.0	1.3	0.0	11.1	0.0	36.2
Exports	18.5	-2.2	-2.8	0.6	-0.7	-0.2	-4.9
Imports	-29.0	-1.5	-1.8	0.4	-0.5	-0.1	-3.3
GDP at market prices	100.0	-2.5	-2.6	0.5	0.4	2.3	1.1
Net indirect taxes	-4.0	-11.5	-12.3	-9.4	-11.0	-12.3	-16.1
GDP at factor cost	104.0	-2.8	-2.9	0.1	0.0	1.8	0.6

Source: Egypt DCGE model.

Note: Absorption is total domestic demand, that is, the sum of private and government consumption plus fixed investment and stock changes. The latter is not shown in the table but makes up 2.7 percent of GDP at market prices in the base year 2012.

Higher energy prices lead to a redistribution from consumption toward investment. In the short term, fixed investment is estimated to increase between 2.9 and 8.9 percent, while private consumption is estimated to fall by between 3.8 and 4.6 percent compared to the baseline scenario. The magnitude of these effects largely depends on how savings of subsidy payments are spent. If all savings go to investment spending, then the reduction of the government budget deficit leads to a significant increase in fixed investment of 8.9 percent in the short term. Yet if part of the savings is used for public consumption purposes, such as increases in public sector wages,⁸² the combination of consumption smoothing by households and increasing government consumption will lead to lower private and public savings. This, in turn, lowers investment and reduces private income and consumption in both the short and long terms.

The extent to which subsidy savings are used for consumption or investment affects the foreign trade balance. Since investment demand is import intensive,⁸³ any change in investment demand affects import demand and the trade balance. While import demand with the energy price reforms generally is shown to decline when all public savings from energy subsidy payments are used to finance investment expenditures (table 4.7, columns 2, 4, and 6), the decline in import demand is less than when the savings from subsidies are used for investment and consumption (columns 3, 5, and 7). When the subsidy savings are used only for investment, imports are reduced by 1.5 and 0.1 percent in the short run and the long run, respectively, compared to a reduction by 1.8 and 3.3 percent if the savings from subsidies are used for both investment and consumption.

Economic sectors are affected differently from energy subsidy reform in the short term, ranging from growth acceleration in mining and construction to reduction in output for the energy sector and all other sectors (table 4.8). Mining and construction are the only sectors that are projected to benefit from the reduction of energy subsidies both in the short and long run. Real GDP generation in mining (including the energy sectors crude oil and natural gas production) increases slightly in the short run with increasing labor market flexibility (columns 4 and 5 versus columns 6 and 7) and strongly in the long run, with the complete phasing out of energy subsidies. The effect can be traced back to the (exogenous) investments in the crude oil and natural gas sectors, which dominate the mining sector. Income generation in the construction sector increases between 1.6 to 8.2 percent in the short run, depending on labor market flexibility and the use of subsidy savings. The benefits are solely attributable to higher prices and increasing investment demand, that is, the use of subsidy savings, which overcompensate the losses resulting from higher intermediate input costs, that is, higher energy prices. Moreover, construction is almost a nontradable good—with low import and export shares of 0.9 and 1.7 (table 4.3)—and therefore not directly affected by world market price changes. Most importantly, according to the SAM for Egypt, construction services are strongly related to investments (78 percent of total supply) and as intermediate input in other sectors' production (14 percent of total supply). All other sectors experience real income losses as a result of increasing production costs. The changes in real income are most pronounced in other manufacturing, particularly textiles, machinery, and vehicles; utilities, including electricity and water; and the transport sector, all of which heavily depend on energy inputs (table 4.2).

In the longer term, more economic sectors are expected to benefit from energy subsidy reform, including agriculture, agroprocessing, and nontransport services. In the medium and long term, when wages are flexible and hired labor is mobile across sectors, fully employed labor together with higher investment and changes in sectoral real producer wages lead to an increase in both real GDP and absorption or overall welfare, reallocation of income from energy to nonenergy sectors, and reallocation from energy-intensive to non-energy-intensive sectors (table 4.8). These sectors include agriculture, agroprocessing, and nontransport services.

Table 4.8. Short-Term and Long-Term Sectoral Impacts of Energy Price Reforms under Alternative Spending Options of Subsidy Savings, Percentage Change from BASE

	Base year (2012)	Short term (2014–17): Fixed wages		Short term (2014–17): Flexible wages		Long term (2014–25): Flexible wages	
	GDP shares	Savings finance investment	Savings finance investment and con- sumption	Savings finance investment	Savings finance investment and con- sumption	Savings finance investment	Savings finance investment and con- sumption
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
GDP	100.0	-2.8	-2.9	0.1	0.0	1.8	0.6
Energy	17.4	-1.9	-1.9	-1.2	-1.4	-2.7	-3.5
Nonenergy	82.6	-3.0	-3.1	0.4	0.3	2.7	1.4
Agriculture	9.9	-3.1	-2.9	0.0	-0.4	1.7	-1.6
Industry	38.0	-1.6	-2.4	0.3	-1.0	2.5	-1.6
Mining	13.5	0.0	0.1	0.1	0.2	2.8	3.5
Manufacturing	17.1	-5.3	-5.6	-2.0	-3.3	-5.6	-10.9
Agroprocessing	2.2	-2.8	-2.6	-0.4	-1.1	0.3	-2.9
Other manufacturing	14.9	-5.7	-6.0	-2.3	-3.6	-6.4	-12.0
Utilities	1.3	-6.5	-6.3	-3.4	-3.4	-7.4	-7.8
Construction	6.1	6.2	1.6	8.2	2.8	25.2	12.3
Services	52.1	-3.6	-3.2	0.0	0.8	1.3	2.4
Transport	5.8	-9.3	-9.4	-5.1	-6.4	-25.2	-28.6
Other services	46.3	-2.9	-2.5	0.6	1.7	4.8	6.5

Source: Egypt DCGE model.

Despite these overall gains and positive impacts on several sectors, the impact on household consumption in the short and longer term is projected to be negative (table 4.7). Increasing energy prices and the accompanying reduction of energy subsidies improve economic growth prospects and absorption possibilities over time, but lead to lower private (household) consumption by between 1.4 and 6.5 percent. The total reduction of private consumption is largest if all energy and electricity subsidies are phased out and a large part of public sector savings of energy subsidies are used to finance public sector consumption, which essentially entails remuneration of public sector employees. If we assume that absorption shares for private and government consumption (and investment) are kept constant, this implies that government consumption of nontradable public goods would increase by more than 35 percent over the period 2014 to 2025. In this case, the energy subsidy reform not increases not only energy prices and intermediate input cost but also the cost of public services, thereby hampering growth (0.6 percent rather than 1.8 percent) and income generation in the private sector. In addition, the factor market effects will lead to a redistribution of income and changes in consumer prices, which affect individual household's welfare differently.^{B4} As shown in table 4.9, almost all households experience welfare losses, both in the short term and the long term.

The exception is urban high-income households, whose real consumption increases slightly by 1.1 percent in the long run, when all subsidies are phased out and all savings of energy subsidy payments are used to finance additional investment. This positive effect is caused by the strong expansion of the construction sector, which relies heavily on capital, one of the main income sources of urban high-income households. All other urban households experience welfare losses ranging from 1.5 percent for medium-income households in the short run and with flexible labor markets (column 4) to 16.0 percent for poor households in the long run, when subsidy savings are used for investment and consumption (column 7). Rural households are on average more strongly negatively affected by higher energy prices than urban households, despite their lower energy spending share. In addition, rural poor households and urban high-income households benefit most from labor market flexibility in the short run.

Table 4.9. Short-Term and Long-Term Welfare Impacts of Energy Price Reforms under Alternative Spending Options, Percentage Change from BASE

	Base year (2012)	Short term (2014–17): Fixed wages		Short term (2014–17): Flexible wages		Long term (2014–25): Flexible wages	
	GDP shares	Savings finance investment	Savings finance investment and con- sumption	Savings finance investment	Savings finance investment and con- sumption	Savings finance investment	Savings finance investment and con- sumption
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
All households	100.0	-5.3	-4.5	-2.1	-2.6	-5.6	-9.2
Rural households	49.4	-5.6	-4.9	-3.0	-3.2	-8.5	-11.0
Rural poor households	12.1	-3.0	-3.2	-1.4	-2.0	-6.4	-8.5
Rural medium-income households	18.9	-4.8	-4.0	-2.8	-2.6	-8.1	-9.5
Rural high-income households	18.4	-8.0	-6.7	-4.3	-4.5	-10.2	-14.0
Urban households	50.6	-5.0	-4.2	-1.2	-1.9	-2.5	-7.2
Urban poor households	9.8	-6.1	-6.7	-3.1	-4.8	-10.7	-16.0
Urban medium-income households	17.3	-4.6	-3.6	-1.5	-1.6	-2.6	-5.9
Urban high-income households	23.5	-4.8	-3.5	-0.2	-1.0	1.1	-4.5

Source: Egypt DCGE model.

Energy subsidy reform has a stronger impact on households than does the currency devaluation over time. The devaluation adds to the negative impact of energy subsidies on household welfare, lowering consumption of all households both in the short and the long run (table 4.10). Yet, the negative quantitative impact of devaluation seems to be limited—welfare losses increase by less than 1 percentage point if energy subsidy cuts are combined with a 100 percent devaluation of the Egyptian pound, as happened at the end of 2016.⁸⁵ The reason is that devaluation affects both the demand and the supply side, and household welfare is affected both via increasing prices for imports and via increasing prices for import substitutes and export goods. At the macroeconomic level, the overall import-demand share of 17.5 percent and the overall export-supply share of 9.7 percent would suggest a sizable negative impact of a 100 percent devaluation. Yet several sectors are both import oriented, with high shares of imports in domestic absorption of the respective good, and export oriented, with high shares of exports of domestic production (table 4.3). These sectors benefit twice from devaluation: import substitution by consumers in response to higher prices of imports drives up prices for domestically produced substitutes. At the same time, export transformation by domestic producers in response to higher export prices reduces domestic supply, which enforces upward pressure on domestic prices.

In fact, results suggest that the currency devaluation only modestly adds to the negative impacts on households, especially in the longer run. The reason is that devaluation, besides increasing the cost of living through higher import prices, also leads to import substitution and export expansion on the supply side. In the short run, higher producer prices lead to lower increases in sectoral real producer wages and lower unemployment. In addition, devaluation increases the local currency equivalent of remittances from abroad, which benefits all households, particularly rural households (table 4.4). Together, energy subsidy reform and devaluation reduce household welfare by between 5.3 and 6.0 percent if subsidy savings are exclusively invested or shared by consumption and investment spending, respectively. In any case, rural high-income households and urban poor households experience the highest welfare losses. Food subsidies benefit all rural households and poor urban households at the expense of medium- and high-income urban households, while the design of the cash-transfer program leads to a redistribution of welfare from richer urban and rural households to poor urban and rural households, with the main beneficiaries being poor rural households. This holds true in both the short and long runs (tables 6.10 and 6.11).

Within all household groups, high-income households in rural areas and poor households in urban areas tend to be the most heavily affected by the combination of energy subsidy cuts and currency devaluation. The notable beneficiary group is urban high-income households, which lose only slightly in the medium term and even benefit slightly from energy price reform in the long term, if public savings from the phasing out of energy subsidies leads to a significant increase of investment (table 4.7, column 7) and a significant expansion of construction of 25 percent (table 4.8). Earning a large share of their income from capital and mixed income, urban high-income households benefit from the expansion of family labor and capital-intensive construction.

The increase in food subsidies and the introduction of the cash-transfer program (Takaful and Karama) helps mitigate the negative impact on the poor. Tables 6.10 and 6.11 show first the short-run and then the long-run impacts on household welfare of energy subsidy cuts (columns 2 and 3), with devaluation (columns 4 and 5), with food subsidies (columns 6 and 7), and finally the total reform package, including cash transfers to poor rural and urban households (columns 8 and 9). Our estimates suggest that without the increase in food subsidies, welfare losses would have been between 7.5 and 8.7 percent for urban poor households and about 4.0 percent for the rural poor. Without the cash-transfer program, welfare losses would have been between 7.1 and 7.5 percent for the urban poor and about 3.5 percent for rural poor. The two measures combined increased poor households' welfare by about 2 percentage points in rural areas, but only by 0.3 percent in urban areas. While both measures lower consumption losses of poor households, cash transfers tend to be more effective, as they are targeted at the lowest two rural and urban income quintiles, while the labor market effects of food subsidies also benefit rural medium-income households in the third and fourth rural income quintiles.

Table 4.10. Short-Term Welfare Impacts of the Reform Package, Percentage Change from BASE

	Base year (2012)	Energy subsidy reform		Energy subsidy and devaluation reform		Energy subsidy, food subsidy, and devaluation reform		Energy subsidy, food subsidy, devaluation, and cash-transfer reform	
	Consump-tion shares	Savings finance investment	Savings finance investment and con-sumption	Savings finance investment	Savings finance investment and con-sumption	Savings finance investment	Savings finance investment and con-sumption	Savings finance investment	Savings finance investment and con-sumption
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
All households	100.0	-5.3	-4.5	-6.0	-5.3	-5.9	-5.2	-5.9	-5.2
Rural households	49.4	-5.6	-4.9	-6.3	-5.6	-6.1	-5.4	-5.9	-5.2
Rural poor households	12.1	-3.0	-3.2	-3.9	-4.0	-3.5	-3.6	-2.1	-2.2
Rural medium-income households	18.9	-4.8	-4.0	-5.5	-4.8	-5.3	-4.6	-5.5	-4.8
Rural high-income households	18.4	-8.0	-6.7	-8.7	-7.5	-8.4	-7.2	-8.6	-7.5
Urban households	50.6	-5.0	-4.2	-5.7	-4.9	-5.8	-5.0	-5.9	-5.2
Urban poor households	9.8	-6.1	-6.7	-7.2	-7.6	-7.1	-7.5	-6.9	-7.3
Urban medium-income households	17.3	-4.6	-3.6	-5.3	-4.3	-5.4	-4.4	-5.7	-4.7
Urban high-income households	23.5	-4.8	-3.5	-5.3	-4.2	-5.5	-4.4	-5.8	-4.6

Source: Egypt DCGE model.

Table 4.11. Long-Term Welfare Impacts of the Reform Package, Percentage Change from BASE

	Base year (2012)	Energy subsidy reform		Energy subsidy and devaluation reform		Energy subsidy, food subsidy, and devaluation reform		Energy subsidy, food subsidy, devaluation, and cash-transfer reform	
	Consump-tion shares	Savings finance investment	Savings finance investment and con-sumption	Savings finance investment	Savings finance investment and con-sumption	Savings finance investment	Savings finance investment and con-sumption	Savings finance investment	Savings finance investment and con-sumption
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
All households	100.0	-2.1	-2.6	-2.8	-3.3	-2.8	-3.3	-2.8	-3.3
Rural households	49.4	-3.0	-3.2	-3.7	-3.9	-3.5	-3.7	-3.3	-3.5
Rural poor households	12.1	-1.4	-2.0	-2.3	-2.7	-2.0	-2.4	-0.5	-0.9
Rural medium-income households	18.9	-2.8	-2.6	-3.5	-3.3	-3.3	-3.1	-3.5	-3.4
Rural high-income households	18.4	-4.3	-4.5	-4.9	-5.3	-4.7	-5.0	-4.9	-5.3
Urban households	50.6	-1.2	-1.9	-1.8	-2.6	-2.0	-2.8	-2.2	-3.0
Urban poor households	9.8	-3.1	-4.8	-4.1	-5.6	-4.1	-5.6	-3.9	-5.3
Urban medium-income households	17.3	-1.5	-1.6	-2.1	-2.3	-2.3	-2.5	-2.5	-2.8
Urban high-income households	23.5	-0.2	-1.0	-0.6	-1.6	-1.0	-1.9	-1.2	-2.1

Source: Egypt DCGE model.

Table 4.12. Short-Term and Long-Term Welfare Impacts of Energy Price Reforms, Devaluation, Food Subsidies, and Cash Transfers under Alternative Spending Options, Percentage Change from BASE

	Short term (2014–17): Fixed wages		Short term (2014–17): Flexible wages		Long term (2014–25): Flexible wages	
	Savings finance Investment	Savings finance investment and consumption	Savings finance Investment	Savings finance investment and consumption	Savings finance Investment	Savings finance investment and consumption
	[1]	[2]	[3]	[4]	[5]	[6]
All households	-5.9	-5.2	-2.8	-3.3	-7.0	-10.8
Rural households	-5.9	-5.2	-3.3	-3.5	-9.2	-12.0
Rural poor households	-2.1	-2.2	-0.5	-0.9	-4.4	-6.4
Rural households, lowest quintile	-0.1	0.1	1.0	0.9	-0.7	-2.0
Rural households, 2nd quintile	-3.5	-3.7	-1.6	-2.2	-7.1	-9.5
Rural medium-income households	-5.5	-4.8	-3.5	-3.4	-9.8	-11.5
Rural households, 3rd quintile	-6.1	-5.7	-4.2	-4.3	-11.8	-13.6
Rural households, 4th quintile	-5.0	-4.1	-3.0	-2.6	-8.1	-9.6
Rural high-income households	-8.6	-7.5	-4.9	-5.3	-11.7	-15.8
Urban households	-5.9	-5.2	-2.2	-3.0	-4.7	-9.6
Urban poor households	-6.9	-7.3	-3.9	-5.3	-12.6	-17.3
Urban households, lowest quintile	-5.1	-5.4	-2.6	-3.8	-9.4	-13.6
Urban households, 2nd quintile	-8.0	-8.5	-4.8	-6.3	-14.7	-19.8
Urban medium-income households	-5.7	-4.7	-2.5	-2.8	-4.9	-8.6
Urban households, 3rd quintile	-4.4	-3.8	-1.4	-1.9	-3.0	-6.7
Urban households, 4th quintile	-6.5	-5.4	-3.4	-3.5	-6.3	-9.9
Urban high-income households	-5.8	-4.6	-1.2	-2.1	-1.2	-7.1

Source: Egypt DCGE model.

However, there is room for further expanding the social safety net, as not all poor households are able to maintain their prereform consumption levels, especially when energy subsidies are phased out. This effect is expected, as the Takaful and Karama program currently does not yet cover all poor households and the food subsidy system does not reach all poor households. The simulation results suggest that with the help of food subsidies and Takaful and Karama, only the poorest rural households—the lowest rural income quintile—are able to keep their consumption level constant despite higher energy prices and devaluation in the short run. Moreover, the poorest rural households tend to slightly benefit from the reform package in the long run, as the reallocation of factors from energy-intensive to non-energy-intensive sectors and from less tradable toward more tradable sectors leads to an increase in the remuneration of self-employed and family labor (table 4.12, columns 1 to 4). Finally, the results suggest that a total phasing out of energy subsidies over the period 2018 to 2021 requires additional support to protect the poorest in Egypt from the negative impacts of the energy reforms.

Conclusions and Policy Recommendations

There are only a few countries in the world that have implemented a comprehensive economic reform package that is comparable in terms of time and scope to the one in Egypt. A main lesson from countries that did implement such reforms is that protecting the poor from the negative impacts of energy subsidy reform is critical for success. Early evidence from Egypt shows that the economic reform package is achieving its intended economic outcomes, including improvements in the current account balance and budget deficit and an acceleration of economic growth. The findings of this paper suggest that the positive macroeconomic impacts are likely to increase over time if the reform program is sustained. In addition, the model results suggest that the increase in food subsidies and the introduction of the Takaful and Karama program helped in mitigating the negative impacts of the reform program on households, especially for the poor. Several key messages emerge from this study:

The implementation of the economic reform package should be sustained. Early numbers from the CBE, the Ministry of Finance, and CAPMAS suggest that key macroeconomic indicators are improving. As such, macroeconomic considerations, such as the reduction of the public-sector budget deficit, reduction of the balance of payments and current account deficit, and savings for investment mobilization, call for the continued phasing out of energy subsidies. However, our analysis suggests that it will take time for the full positive impact of reform to materialize, especially for certain sectors and for households. In order to give economic sectors and households time to adjust to higher energy prices, especially in combination with the effects of devaluation, our results suggest that continuing a gradual approach to phasing out energy subsidies is preferable to a quick phasing out.

There are several measures that would likely accelerate the positive impacts of reform. The literature suggests that providing a more enabling business environment for enterprises, entrepreneurs, and workers is essential for raising productivity and competitiveness (WEF 2015). The new investment law enacted by the parliament in 2017 is a first step in this direction. In addition, our findings suggest that measures that increase labor market flexibility, such as labor law reforms and technical and vocational training, are critical to help workers to move between sectors, especially for unskilled labor. Regarding the longer-term impact of the currency devaluation, it is important that the real devaluation is not undermined by sharply increasing wages in both the public and private sectors.

Social protection measures should be continued and scaled up in parallel to phasing out energy subsidies. Our findings show that increasing food subsidies and the introduction of Takaful and Karama has protected the people from the short-term negative impact of the reform program. But, fully phasing out energy subsidies over coming years will require additional support for poor households, especially the urban poor. While it is beyond the scope of this chapter to enter the debate about whether food or cash transfers are preferable, results from this study confirm earlier findings that food subsidies are effective in reducing the negative welfare effects of the reforms on rural and urban poor households, but that they are not well targeted. Targeted cash transfers to the poorest rural and urban households are more effective and efficient in protecting the poor.

ANNEX A. SOCIAL ACCOUNTING MATRIX FOR EGYPT, 2012/13

Table 4A.1. Macro Social Accounting Matrix, Egypt, 2012/13 (billions EGP)

Revenues/ Expenditures	Activities	Commodities	Transaction costs	Institutions			Institutions			Capital account	Rest of the world	TOTAL
				Labor	Capital	Land	Enter-prises	House-holds	Government			
Activities		3,032										3,032
Commodities	1,212		276					1,418	211	303	323	3,743
Transaction costs		276										276
Labor	987											987
Capital	811											811
Land	22											22
Enterprises				399	645			21	96		-36	1,125
Households				588	166	22	874		5		116	1,770
Government			-71				112	39			1	82
Capital account							139	292	-231	47	102	350
Rest of the world		506										506
TOTAL	3,032	3,743	276	987	811	22	1,125	1,770	82	350	506	

Source: Computed from CAPMAS SAM 2012/13.

ANNEX B. SCENARIO INPUTS AND ASSUMPTIONS

Table 4B.1. Year-to-Year Growth Rates of the Registered Prices of Fuel Commodities, 2014 to 2107 (percent)

Commodity	2014	2015	2016	2017
Natural gas*	111.0	8.2	32.0	72.4
LPG	-	-	87.5	100.0
Gasoline 80	77.8	-	46.9	55.3
Gasoline 92	40.5	-	34.6	42.9
Gasoline 95	6.8	-	4.0	-
Kerosene	63.6	-	30.6	55.3
Diesel	63.6	-	30.6	55.3
Mazut**	26.3	-	8.6	40.0
Electricity***	26.0	17.3	30.0	40.0

* The price changes of natural gas were calculated based on a weighted average of registered prices for residential and nonresidential use. Weights were obtained from the webpage of the International Energy Agency (IEA 2018). Prices for residential and nonresidential categories were calculated as simple averages of registered prices for different subcategories of users.

** Price changes for mazut (heavy fuel oil) for the years 2014 to 2016 were calculated based on a simple average of registered price for different categories of users. For the price change in 2017, information from the IMF (2017, 70–71) country report was used.

*** The price changes of electricity in the years 2014 and 2015 were calculated based on a weighted average of the registered prices for residential and nonresidential use. Weights were obtained from the webpage of the International Energy Agency (IEA 2018). Prices for residential and nonresidential categories in turn were calculated as simple averages of registered prices for different subcategories of users.

Table 4B.2. Subsidy Rates of Selected Food Commodities, 2014 to 2107 (percent)

	Wheat	Sugar	Cooking oil	Flour	Rice	Seeds, etc.	Fruits and nuts	Vegetables
2014	60.4	58.7	30.8	16.8	13.6	8.2	2.4	1.5
2015	65.5	63.7	33.4	18.2	14.8	8.9	2.6	1.6
2016	63.0	61.3	32.1	17.5	14.2	-8.5	2.5	1.5
2017	-96.7	94.1	49.3	26.8	-21.8	13.1	3.9	2.4

Note: Since subsidy rates are modeled as negative indirect tax rates, this implies new (negative) indirect tax rates. As such the same positive numbers shown in the table are introduced as negative values in the model.

Table 4B.3. Year-to-Year Growth Rates of Budgeted Cash-Transfers Program, 2015 to 2107 (percent)

	2015	2016	2017
Poor urban households	151	85	70
Poor rural households	934	127	85

CHAPTER 5

THE IMPACT OF FISCAL POLICY ON INEQUALITY AND POVERTY IN EGYPT

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Introduction

The Arab Republic of Egypt is the most populous country in North Africa and the Arab World, with a population of approximately 95 million inhabitants. It is rich in natural resources, with the oil and gas sector making up approximately 15 percent of the country's gross domestic product (GDP). Its population has been rapidly increasing in recent years—at a pace of 2.6 percent since 2006—and due to the fact that the majority of the country is desert lands, the population density has also been increasing, as most of the population is settled along the Nile.

Egypt experienced a period of robust growth from 2005 to 2009, averaging an annual rate of 4.2 percent in real GDP per capita. The global financial crisis, and the political turmoil experienced in the wake of the Arab Spring in 2011, led to a slowdown of the economic activity and an average growth in real GDP per capita (in 2011 PPP) of 0.66 percent between FY10 and FY13. This rate has picked up since then, reaching 2.18 percent in FY15 and 2.26 percent in FY16.

Economic growth in the past few years has had limited success in lifting the population out of poverty. According to official figures, 27.8 percent of the Egyptian population was considered poor in 2015.⁸⁶ Moreover, important disparities in welfare across regions is an enduring feature: in Metropolitan Egypt about 15 percent of the population was considered poor, whereas in rural areas of Upper Egypt this share was almost four times higher. In terms of consumption inequality measured using the Household Income, Expenditure, and Consumption Survey (HIECS), Egypt is among the countries with lowest levels (as measured by the Gini index). It is notable, however, that a slight uptick has been found in the period between 2012/13 and 2015, with the Gini index being 30.8.⁸⁷

The government of Egypt (GoE) has introduced several flagship economic reforms aimed at correcting macroeconomic imbalances, addressing foreign exchange shortages, and improving the competitiveness of the economy. The package of reforms includes the devaluation of the Egyptian pound in March 2016, the adoption of a floating exchange rate in November 2016, and the implementation of the Civil Service Law. The government has also implemented a fiscal consolidation program, the highlights of which are the streamlining of energy subsidies and the adoption of a value-added tax (VAT) rate to replace the

already existing goods and services tax (the general sales tax, or GST). On the business environment side, an industrial licensing law and a new investment law have been passed, and new insolvency and company laws are currently under discussion in the parliament. These reforms are aimed at improving the business environment to encourage private sector-led growth.

The reforms have had a positive effect on the fiscal accounts and external accounts. On the fiscal accounts side, Egypt's overall deficit decreased in FY17 to 10.9 percent of GDP (preliminary figures) compared to 12.5 percent of GDP a year earlier. Similarly, the primary deficit decreased to 1.8 percent of GDP in FY14, compared to 3.5 percent of GDP in the previous fiscal year. This improvement in Egypt's fiscal stance is due to both improvements in revenues which recorded 19.0 percent of GDP in FY17 compared to 18.1 percent of GDP in FY16 and a decrease in expenditures which came in at 29.8 percent of GDP in FY17 compared to 30.2 percent of GDP a year earlier. The increase in revenues was mainly driven by an increase in taxes on goods and services (the VAT) while the decrease in expenditure was mainly driven by a decrease in the wage bill.

The government's current fiscal objectives are to continue to address macroeconomic imbalances, including reducing the public debt level and repaying all arrears owed to foreign oil companies, while creating space for social protection programs. The government has started to implement its constitutional mandate of devoting 10 percent of GDP in social spending. To widen the protection granted to the segments of society that are most at risk, the government has increased the amount and coverage of the conditional cash transfer program (Takaful and Karama); the amount was increased by LE 100 for all households in July 2017 and the program currently covers almost 2 million households. Starting in FY18, the government has also increased the allotment on the food ration cards from LE 21 to LE 50 per person per month. Income tax thresholds were increased, state pensions were increased by 15 percent, and an exceptional cost of living bonus was paid to state workers.

Recognizing the challenges faced by the GoE, it is imperative to produce evidence that can inform decisions regarding government allocation for spending across social programs. The GoE is engaged in a new vision that moves away from using universal subsidies as a poverty reduction strategy, while scaling up targeted transfers, engaging the private sector, and encouraging its growth by passing laws that aim to improve the business regulatory environment as well as promote competitiveness.

To contribute to the policy dialogue, this study assesses the redistributive impact of fiscal policy in Egypt using an internationally recognized methodology developed by the Commitment to Equity (CEQ) Institute (see Lustig 2018). The study's objective is to estimate the impact of fiscal revenue collections (taxes) and fiscal expenditures—direct cash and near-cash transfers, in-kind benefits, and subsidies—on household-level inequality and poverty. It then provides evidence to help policymakers and Egyptian stakeholders understand the trade-offs inherent between the government's current fiscal policy priorities (such as energy policy) and other, social goals (such as poverty reduction). The assessment is based on the fiscal policies as of 2015, since that is the most recent year for which a household survey is available and allows for estimating the incidence of all the policies analyzed.

Using the standard approach of the CEQ model, the impact of the fiscal system in the Egyptian population is described via an estimation of prefiscal and postfiscal income measures. The prefiscal measure comprises market income before any transfers (including, for instance, public spending on health and education, farming inputs, fuel and energy subsidies, and unconditional cash transfers) or taxes (including personal income taxes, general sales tax, property taxes, and so forth) of any kind have been received or paid by the household. Postfiscal income⁸⁸ takes prefiscal income and adds to it a subset of executed fiscal policies: subsidies and direct transfers received, direct and indirect taxes paid, and in-kind transfers received through use of services.⁸⁹ Poverty and inequality measures then are derived under pre- and postfiscal income measures. Thus, by comparing these welfare indicators for the distribution of each income measure, the chapter shows the poverty (inequality) enhancing or reducing effects of different areas of fiscal policy.

Overall, Egyptian fiscal policy reduces income inequality; many individual fiscal programs also reduce inequality. The largest reduction in inequality is created by public expenditures on the primary education system. Among the comparator countries Egypt's fiscal policies place it in the median of the distribution in terms of inequality reduction. Fiscal policies in Egypt also lead to a decrease in poverty. The poverty headcount ratio falls because, even though poor households capture few of the energy subsidies available, direct transfer spending—coming mostly from the Tamween (food smartcard) and Baladi (bread allowance) programs—*improves* the net cash position of poor households relative to their prefiscal income magnitudes. Fiscal policy could be more effective at reducing poverty if transfers and subsidies were targeted to the less-well off. Finally, while the effects on inequality and poverty reduction of fiscal policies are evident, the large gap between the government's expenditures and revenues help explain these positive outcomes. A more sustainable approach on fiscal policy (coupled with inclusive growth) will be required to keep promoting poverty reduction in the long term.

The rest of this chapter is organized as follows. The next section provides an overview of transfer and taxes in Egypt. Following that is an explanation of the methodology behind the assessment and a description of the data sources. The subsequent section provides an overview of the main findings with international benchmark comparisons. Finally, a conclusion spells out the implications of the results for policy in Egypt.

Government Expenditures and Revenues in Egypt

The fiscal system in Egypt comprises a large set of social expenditures, subsidies and transfers, and revenues from both direct and indirect taxes. On the expenditure side, government-provided benefits include spending on health and education, conditional and means-tested cash transfers programs, transfers to vulnerable groups (such as widows, children, and the elderly), and pension payments. The food smartcard program includes the distribution of an allotment of bread and a transfer to the beneficiary family to purchase goods at a family store. Energy subsidies in electricity, liquefied petroleum gas (LPG), gasoline, and other fuel products are also a large part of the social protection program the government relies on to support the low-income segment of society. On the tax side, instruments include personal income taxes, corporate income taxes, a property tax, a goods and services tax,⁹⁰ and excise taxes on alcohol, tobacco, fuel, and other selected products.

Table 5.1 provides a snapshot of public expenditures in fiscal year 2015.⁹¹ Social expenditures—defined here as social protection, education, health, and housing and public utilities spending—account for 9.7 percent of GDP, equivalent to 32 percent of total expenditures. Subsidy spending (in specific commodities) accounts for approximately 13.6 percent of total expenditures (and 4.1 percent of GDP). Meanwhile, infrastructure—labeled economic affairs in table 5.1—accounts for 5.4 percent, while defense and law and order account for approximately 12 percent.

The CEQ assessment aims to incorporate the largest number of policies for which there is data of a certain quality and level of disaggregation. Any fiscal components for which the expenditure categories are too broad, or for which the benefits (or payments) cannot be clearly mapped into the household survey data, are not deemed as informative and are not included in the exercise. Table 5.1 provides a snapshot of the fiscal expenditures covered by this assessment. Defense spending and infrastructure are not covered, nor are the subsidies destined to farmers or water subsidies. Subsidies on food items and energy products are captured by the exercise. Crucially, a large share of the social protection portfolio is also incorporated, with the exception of the budget line on housing and public utilities. Government expenditures on education are integrated into the analysis, although the level of disaggregation to assign benefits is restricted by the availability of two budget lines only: primary, preparatory, and secondary, on one hand, and tertiary education, on the other. The public service pension fund is included, but, as will be explained, the study treats these expenditures as part of the public sector or civil service wage bill rather than as a tax and transfer program.

Table 5.1. Egypt Government Expenditures, FY15

	Expenditures			Included in analysis?
	Egyptian pounds (billions)	Share of expenditures (%)	GDP (%)	
TOTAL expenditure	733.4	100.0	30.0	
Social spending	236	32.2	9.7	
Social protection	86.1	11.7	3.5	
Pension fund contributions	33.2	4.5	1.4	Yes*
Direct cash transfers	13.5	1.8	0.6	
Takaful ^a	0.5	0.1	0.02	Yes
Karama ^a	0.01	0.0	<0.01	Yes
Grants to the general government	6.2	0.8	0.25	No
Child assistance and monthly allowances ^b	0.096	0.0	<0.01	No
Social solidarity transfers ^c	6.7	0.9	0.27	No
Tamween program^d	39.4	5.4	1.61	Yes
Education	92.3	12.6	3.8	
Primary, preparatory, and secondary	65.7	9.0	2.7	Yes
Tertiary	20.9	2.8	0.9	Yes
Other educational levels^e	5.7	0.8	0.2	No
Health	37.2	5.1	1.5	Yes*
Housing and public utilities^f	20.4	2.8	0.8	No
Subsidies to commodities^g	99.9	13.6	4.1	
Energy	97.5	13.3	4.0	
Electricity	23.6	3.2	1.0	Yes
Fuel	73.9	10.1	3.0	Yes
Farmers	1.3	0.2	0.05	No
Water	0.9	0.1	0.04	No
Medicine and infant dairy subsidies	0.2	0.0	0.01	No
Economic affairs^h	39.9	5.4	1.6	No
Defense,ⁱ public order, safety spending	87.8	12.0	3.6	No
Other^j	269.8	36.8	11.0	No

Source: Ministry of Finance.

* Expenditures included may not be fully allocated within HIECS 2015 for various reasons. See the methodology section of this chapter on allocative methods and assumptions.

a Takaful and Karama were pilot programs in FY15 and were off budget for that fiscal year, but by the end of calendar year 2015 the programs had reached 165,000 poor households in seven governorates. Today the programs have reached just over 2 million poor households in the 27 governorates of the country.

b These transfers are given to families of soldiers, Hala'ib and Shalateen families (border dispute area with Sudan), and other vulnerable groups.

c Typically referred to as "social pensions" in GoE documentation, this program is a noncontributory, nonconditional cash transfer that targets certain populations. It is not means-tested, but the beneficiaries are broadly defined to be poor or vulnerable populations (for example, orphans, widows, children of divorced parents, and disabled children).

d The program's expenditures are related to three categories: purchases of wheat (small share); spending on loaves of bread that are

made available (five loaves per person per day) to all card holders; and the ration card allotment to purchase from a list of basic staples from family stores (allotment was LE 15 per person per month). Each component may be treated differently as part of the CEQ methodology.

e Includes expenditures on pre-primary education, as well as spending on education at unspecified level, assistance services, and research and development activities.

f Housing and public utilities includes spending on water

and wastewater treatment as well as sewerage infrastructure and housing infrastructure with a focus on the development of slums.

g Subsidies relate to expenditures specific to the stated categories and do not reflect the government's broader classification of subsidies and grants that are spread across different functional classifications (for example, cash transfers to vulnerable groups and contributions to pensions funds).

h Economic affairs encompass all spending on transportation

and agricultural infrastructure and to a lesser extent energy infrastructure.

i This category does not include spending on the military branch.

j The "other" category includes general public service expenditures (of which LE 192.8 billion were spent on debt servicing); expenditures in youth, culture, and religious affairs (public sports clubs, mosques, churches, and so forth); and environmental protection expenditures (environmental assessments, water sanitation units, and so on).

It is important to highlight that the CEQ exercise should not be understood as an estimate of all expenditure categories that may have an effect on households' welfare. Some public expenditure elements have private analogues. In certain countries, the existence of private pension funds may allow individuals who do not belong to the public contributory pension system to contribute and receive income from these. Such goods and services are included in measures of income but are not part of the fiscal system and we do not attempt to determine their impact on welfare or inequality. Households may also spend on private education and tutoring for their children. As long as these are not payments or benefits from the public system, they are not part of the exercise.

In what follows, we provide an overview of each of the main fiscal tools and illustrate the policies that are part of the CEQ analysis. Given data limitations, the analysis is based on a snapshot of the Egyptian policy landscape as of 2015. This is because the latest available HIECS is from calendar year 2015, and the crux of the exercise is to be able to map the information from administrative data (government accounts) to the distribution of Egyptian households observed in the survey and estimate the benefits (payments) they receive (make).

Expenditures

TAMWEEN PROGRAM (DIRECT TRANSFER)

The Tamween food program consists of two parts: the Baladi bread program (covering around 76.8 million beneficiaries) and the food ration cards (covering 71 million beneficiaries). The bread component alone, which is available to all Egyptians, is the second-largest expenditure item in Egypt's safety net program after fuel subsidies (accounting for around 1.5 percent of GDP in FY17 and 1.7 percent of GDP in FY15). Government spending on ration card allotments, provided only to registered households, comprises about 0.5 percent of GDP. Thus, beneficiaries of the program receive a monthly allowance or transfer for the purchase of food items, as well as a daily allotment of Baladi bread loaves.

The Tamween program, previously commonly referred to the Tamween food subsidy system, was first introduced in the 1940s mostly through price and production controls with the aim of ensuring that basic commodities were available for all Egyptians at a time of high international food prices due to World War II. The first ration cards were introduced in 1945 and came with an allotment of kerosene, sugar, cooking oil, and tea. President Nasser came to power in 1956 and expanded the system, tightening the government's control over prices of different commodities, most notably wheat. The cost burden of the system gradually increased and reached unsustainable levels by the end of

the 1970s. President Sadat attempted to reform the system in 1977 and was met with huge social discontent causing him to backtrack on the reforms. In the Mubarak era, two major reforms were introduced: (i) limits on eligibility for subsidies by introducing lower-valued ration cards for relatively better-off beneficiaries and freezing registration for new comers (children born after 1988), and (ii) cost savings in the provision of food subsidies by reducing the number and weight of subsidized rationed food items. The system continued as is, with minor changes to the quantity and type of subsidized food items and the type and the requirements for the Baladi bread until 2014, when the government overhauled the entire system, reforming the ration cards and automating the process.

In 2014, the government introduced changes to the Baladi bread system and the ration food system. In the Baladi bread program, the government improved the supply chain by shifting toward output-based financing. The government no longer subsidized the flour bakeries used to produce the Baladi bread and instead started subsidizing the loaves of bread themselves that are distributed to citizens through a smart card. This has helped eradicate the black market in wheat and thus reduce the cost on the budget. The government also capped the allowed loaves of bread per person per day at five. On the ration food cards, the government moved away from subsidized commodity quotas, through which households were entitled to purchase a predetermined quantity of a list of items at subsidized prices, to an allowance-based system. Under the old system, each beneficiary household was allowed a specific monthly quantity of subsidized basic food commodities (cooking oil, sugar, rice, and macaroni). The new system provided a monthly allowance of LE 15 per beneficiary (registered in the household's card), and the card holder is free to buy any product from a basket of 20 food commodities. Regarding the Baladi bread, beneficiaries were no longer able to purchase any quantity of bread at 5 piasters, but were now entitled to 5 loaves per day for each registered member in household. Moreover, any unused allowance for Baladi bread at the end of each month can be converted into "points" and used to buy other food commodities within the same smart card system. For any unused loaf of bread, credit worth 10 piasters is put on the beneficiary's card for the purchase of items in the family store. This offers an incentive for citizens to ration their use of Baladi bread while allowing them to set their consumption priorities of available food commodities. Changes to the allowance of the card have been introduced, but it is this set up that will be analyzed in the present study.⁹²

TAKAFUL AND KARAMA (DIRECT TRANSFER)

Two new cash transfer programs—Takaful (Solidarity Conditional Cash Transfer) and Karama (Dignity Unconditional Cash Transfer for the disabled and old)—were introduced in April 2015. Takaful and Karama are poverty-targeted cash transfer programs that uses proxy means testing to identify eligible households. Households are responsible for self-reporting their data so that the Ministry of Social Solidarity can estimate the level of household welfare and then assess eligibility. The program was first implemented in seven governorates across the country and by the end of 2015 had reached just under 170,000 households.⁹³ Remarkable progress has been made with the expansion of the program nationwide; it exceeded its target of reaching 1.5 million households by reaching just above 2 million households in the 27 governorates (9.4 million individuals), of whom 92 percent were women in the first quarter of FY18. Additionally, the cabinet has recently decided to increase the monthly transfers by LE 100 in July 2017 so the national budget allocated to the program in FY18 reached LE 7.7 billion compared to LE 4.1 billion in FY17, an increase of 89 percent.

ELECTRICITY SUBSIDIES

Electricity in Egypt has historically been highly subsidized. In 2014, the government embarked on a reform program to slowly phase out subsidies by 2019, leaving only limited support for electricity to benefit low-income household (generally defined as the “lifeline” that reached households in the lowest bracket of consumption). However, the implications of the adoption of a floating exchange rate regime in November 2016 led the GoE to delay the full implementation of the reforms to 2022, although by FY18, four rounds of subsidies removals have already taken place, once a year since 2014 (table 5.2). Subsidies are currently still in place for households as well as industrial and commercial consumers. In 2015, Egypt’s power supply stood at 13 megawatts (MW),⁹⁵ of which approximately 80 percent comes from thermal sources, with the remainder generated from hydro and renewable sources. Following severe power outages in the summer of 2014, the government implemented a fast track plan to build new power plants to meet the needs of a growing population and avoid power outages in the summer of 2015. Currently Egypt does not have any power gaps and can provide for all of the electricity needs of the country.

Table 5.2. Energy Price Increases and Cost (recovery) Gap

	Year-on-year changes (percent)				Cumulative changes (percent)	Prices as of July 2017 (LE)	Current cost to the government (EGP)*
	2014	2015	2016	2017			
Diesel (per liter)	64	0	31	55	232	3.65	5.95
Gasoline 80 (per liter)	78	0	47	55	306	3.65	5.95
Gasoline 92 (per liter)	41	0	35	43	170	5	6.4
Gasoline 95 (per liter)	7	0	0	6	14	6.6	6.2
LPG (per cylinder)	0	0	88	100	275	30	128
Natural gas (vehicles, per cubic meter)	144	0	45	25	344	2	3.2
Electricity	31	19	33	40	190	NA	NA

Source: World Bank Third Egypt DPF.

Note: EGP = Egyptian pound; LPG = liquefied petroleum gas.

* As per statements of the minister of petroleum in February 2017, this includes imported fuels as well as fuels produced domestically.

About 44 percent of the electricity generated in 2015 was consumed by households, while 26 percent was consumed by the industrial sector and the remainder by the commercial sector, agricultural, and government authorities. The subsidies are delivered to all sectors in the same way: power is sold to consumers at subsidized prices while the Treasury carries the burden of the difference in the cost of production and distribution. The prices (and thus the extent of the subsidy) differ depending on the type of consumer and the amount of consumption. Lower household consumption brackets receive more subsidies than the higher brackets. A high number of brackets, it is argued, allows the government to ensure that the households with the smallest consumption are less affected by the removal of subsidies and the subsequent increases in prices. As such, the government increases the prices for some categories beyond the actual cost so that they can cross-subsidize the rest. For example, some residential segments are currently paying 13–26 percent of the actual cost, while some large consumers are estimated to pay around 129 percent. However, the current prices are still not cost-reflective across the board; the extent of the gap depends on the different sectors as well as the different segments within the sectors. Finally, industrial consumers receive the least amount of subsidies, in an attempt to adjust the incentives energy intensive industries receive.

FUEL SUBSIDIES

Egypt is rich in mineral resources, especially natural gas and crude oil. In the past few years, due to the economic difficulties the country was facing, the Ministry of Petroleum and Mineral Resources (and its subsidiaries, notably the Egyptian General Petroleum Company and the Egyptian Natural Gas Holding Company) have had to import both petroleum and natural gas to ensure that the country's needs are met. Fuels have also historically been highly subsidized in Egypt, and in 2014 the government began to implement a reform program to slowly phase out fuel subsidies, leaving only limited support for LPG (table 5.2). Three rounds of subsidy removals have been implemented since. However, subsidies remain in place for all fuel products except Gasoline 95, which is at a price greater than cost recovery.

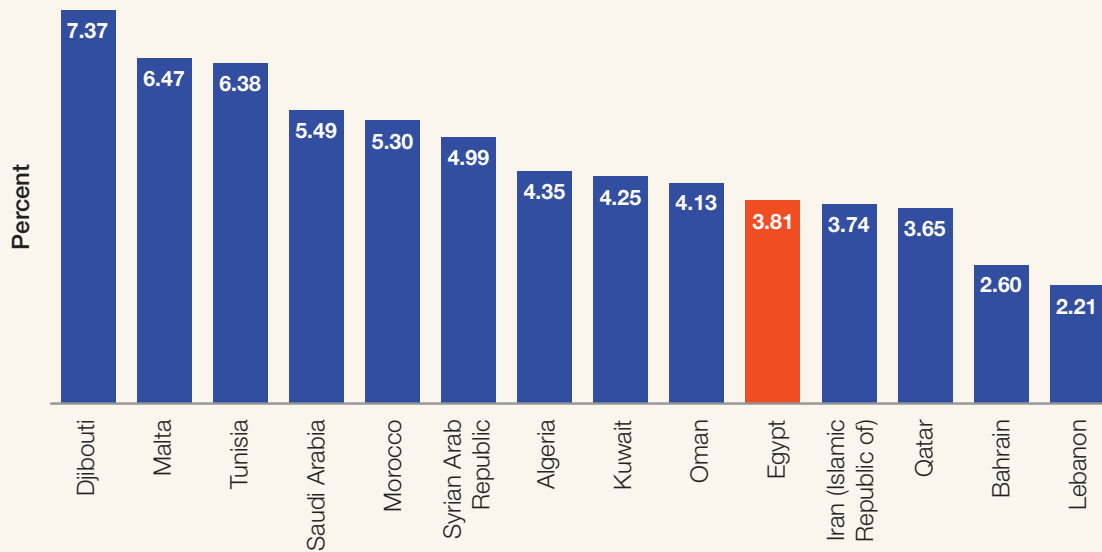
Fuels are sold to all consumers, (commercial, industrial, and households) at a subsidized price that is the same across all different consumers. Prices do not adjust to market conditions and are fixed by the government. As a result, the Treasury carries the burden of the difference in cost and the financing gap is covered directly by an on-budget transfer. This burden has varied throughout the past few years, and the decrease in the international price of oil in 2014 helped to reduce the subsidy bill while the devaluation of the Egyptian pound in November 2016 caused the fuel subsidy bill to double to LE 115 billion in FY17 from LE 51 billion in FY16. In FY15, the fuel subsidy bill stood at LE 74 billion

EDUCATION (IN-KIND TRANSFER)

The importance of the education sector in Egypt has increased in the past four years as the country has become more concerned with human capital development. Articles 10 and 21 of the 2014 constitution mandate that the government spend 6 percent of gross national product on education (both pre-university and university education) by FY17. The government has not yet achieved this target, although it has been increasing the allocation to the education sector to help achieve this goal.⁹⁶ In absolute terms, spending on education has almost tripled since FY09 from LE 39.8 billion to LE 92.3 billion in FY15.⁹⁷ However, as a percent of GDP the allocation has shown a slightly decrease to 3.78 percent in FY15 from 3.83 percent in FY09.

In terms of total government expenditure, the share of education has increased to 12.6 percent in FY15 from 11.3 percent in FY09. In FY15, education was the sector with the third largest share in the budget, preceded by general public services and social protection. Compared to other countries in the region, Egypt ranks on the lower end of spending on education, both as share of total government expenditure and as a share of GDP (figure 5.1 and figure 5.2), over the period from FY05–FY15. It is worth noting that, in this comparison, The Islamic Republic of Iran is the only country with a similar population to Egypt, and although the two rank close in education spending as a share of GDP, The Islamic Republic of Iran ranks much higher as a share of total government spending.

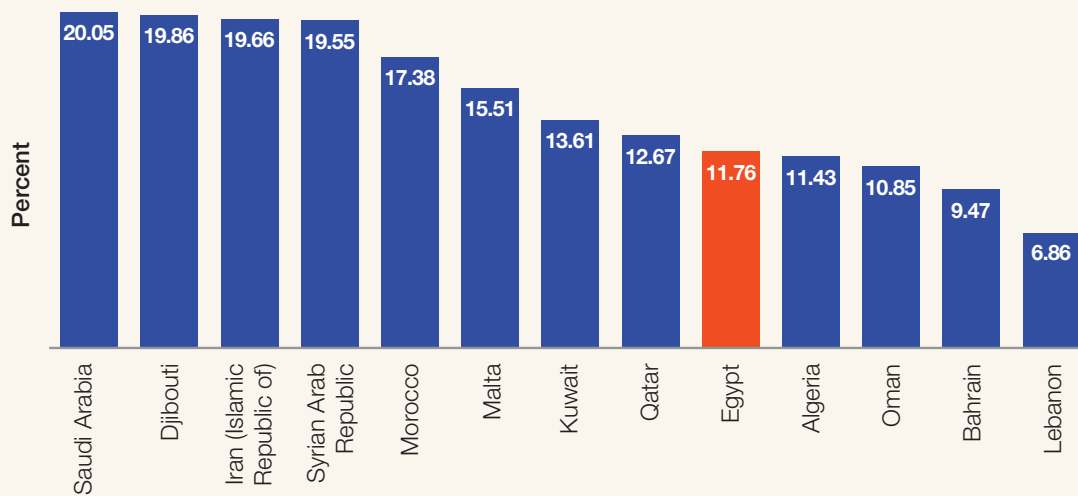
Figure 5.1. Middle East and North Africa (MENA) Public Education Spending as a Percentage of GDP (FY05–FY14 averages)



Source: UNESCO 2017.

Note: This list excludes the countries in the MENA for which no data was available, notably Iraq, Jordan, Libya and the United Arab Emirates. It is also worth noting that Algeria only had one data point for FY08.

Figure 5.2. MENA Public Education Spending as a Percentage of Government Spending (FY05–FY15 averages)



Source: UNESCO 2017.

As is common in this sector, the majority of spending goes to the compensation of employees. However, since FY09, the share of compensation of employees in total education spending has grown from 78.7 percent to 83.6 percent in FY15 at the expense of investments in education (which mostly include the construction of new schools) and purchase of goods and services (which cover purchase of school supplies and equipment, as well as maintenance of equipment and school buildings). Both items have each decreased by a little over 2 percentage points in the same period.

The available government expenditure data does not allow for the identification of the amounts spent on primary, preparatory, and secondary education separately, the data available group all expenditures that are in the levels below tertiary education into one figure. As such, the cost, in nominal terms, per student in pre-university education in FY09 was LE 1,408 and has grown to LE 3,125.9 in FY15. The nominal cost per student for university education has reached LE 10,180.1 in FY15 compared to LE 5,057.6 in FY09. In total numbers, spending on pre-university education is more than double the spending on university education. However, only about a tenth of students enrolled in the primary level continue to tertiary education.

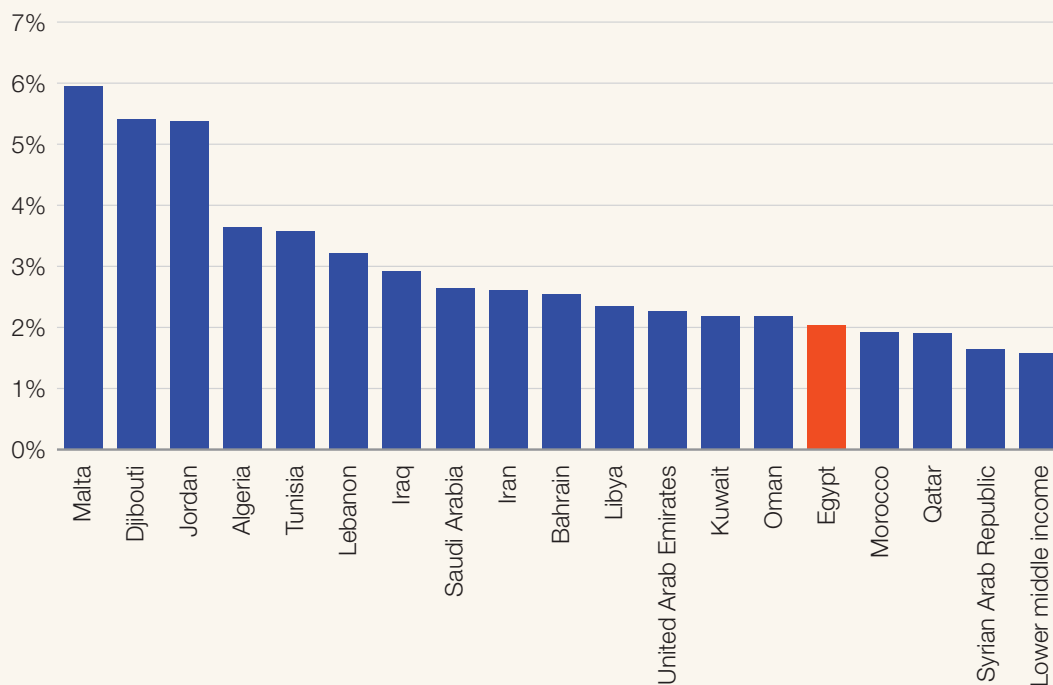
HEALTH (IN-KIND TRANSFER)

Similar to education, with the changes taking place in the country since 2011, spending on health has become a priority for the GoE in the past three or four years. Article 18 of the 2014 Constitution mandated that 3 percent of gross national product be spent on health by FY17. Also similar to education, the target has not yet been reached. However, in absolute terms, spending on health has been doubled from FY09 to FY15, reaching LE 37.2 billion in FY15. As a percent of GDP, the spending on health has been stable over the same period at 1.4–1.5 percent. It has, however, increased as a share of total government spending to 5.1 percent in FY15 from 4.5 percent in FY09. Per capita public health spending has also increased in nominal terms, reaching LE 418 in FY15 from LE 400 in FY09. This represented a 4.6 percent increase while the population grew at 15.6 percent during the same period.

Compared to its MENA neighbors, Egypt is on the lower end of the spectrum in terms of spending on health as a percent of GDP. Egypt fares better than the lower middle income average (figure 5.3), but as a share of total government spending on health, it is lower than the average spending of a lower middle income country (figure 5.4).

The largest share of the public spending in this sector goes to the compensation of employees, however. Since FY09, the share of compensation of employees in total health spending has grown from 44.6 percent to 60.8 percent in FY15 at the expense of investments in health (which mostly include the construction of new hospitals and health facilities) and purchase of goods and services (which cover purchase of medical supplies and equipment and the maintenance of hospitals and medical equipment). Both of these items have each decreased by a little over 7 percentage points in the same period.

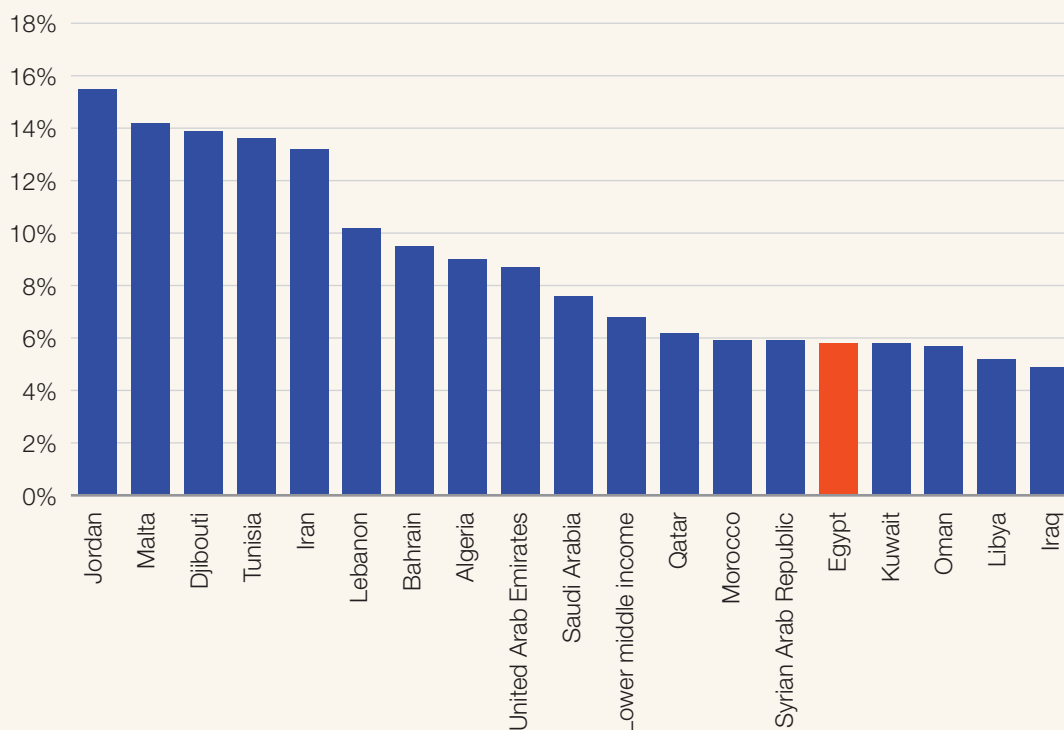
Figure 5.3. MENA Public Health Spending as a Percentage of GDP (FY05–FY14 averages)



Source: WDI 2017.

Note: The latest year available in the dataset for the chosen variables is FY14.

Figure 5.4. MENA Public Health Spending as a Percentage of Total Government Spending (FY05–FY14 averages)



Source: WDI 2017.

Two aspects of the health sector are important to note. The first point relates to the funding of the sector. The spending on budget as described above represents only about half of spending on public health services and hospitals.⁹⁸ Since the amount allocated in the budget is too little to cover the expenses of the sector, hospitals, health facilities, and health units have created other ways to fund the sector. They have three streams of income outside of the amount allocated in the budget:

1. *Special funds* are a revenue stream that is not represented in the official budget, although governed by ministerial decree. These funds come from four main sources:
 - a. The private wing inside the hospitals is for people who require special services or who want a specific doctor; they pay a fee for the services provided to them. This fee is smaller than the private sector but greater than the public-sector fee.
 - b. Small fees that all citizens pay when they are at a hospital, tickets to visit sick relatives, and small fees for x-rays or blood tests: a portion of the revenue from these fees goes into the special funds.
 - c. Donations from private citizens go directly into the special funds.
 - d. Revenues also come from the Citizens Treatment at the Expense of the State program.⁹⁹
2. *The Health Insurance Authority* is an economic authority and so independent of the budget sector. This institution funds services in public hospitals for the people paying insurance under the authority. Additional funds are obtained from certain fees levied on individuals receiving care. In certain occasions, the authority has received budget transfers to cover operating losses.
3. *Direct out-of-pocket spending* is sometimes done by private citizens. These amounts differ depending on the coverage of the person seeking treatment and the type of treatment.

A second important aspect of the health care system in Egypt is the coverage and the pricing of services and consequently the out-of-pocket expenses. Coverage of health insurance follows distinct rules for children and adults:

- Newborn babies are automatically covered at birth until they reach school age. Once they reach school age they have to be enrolled in school for the coverage to continue. If they are not enrolled, they lose their coverage. (This is a way to try to incentivize mothers to send their children to school). Once the children graduate high school they are no longer covered.
- As an adult, you are only covered if you are employed and your employer makes a 3 percent health insurance contribution from the basic salary (currently the system covers 58 percent of the population). Employers can opt out of the public health insurance system if they can offer a private alternative. If an employed individual is covered, his or her family is not. This means that a man that is employed will be covered but his unemployed wife will not be covered.

Pricing of services is correlated with insurance coverage, but the pricing system has other nuances:

- Anyone covered by the health insurance system will most likely not make any payments when receiving health services.
- An individual who is not covered will pay very minimal fees if they visit a public hospital. Anecdotal evidence suggests that if an individual has a fever, for instance, and is going for a check-up at a clinic, he or she will only have to pay LE 1 to LE 5 the check-up and a small portion of the medicine required. (Medicine is already subsidized so any payment will be very small). In comparison, a private clinic visit costs anywhere between LE 250 and LE 400. If, on the other hand, an individual is admitted to the hospital for surgery he or she will pay somewhere in the range of LE 100 to LE 500 depending on the type of surgery. A natural birth costs LE 100 as opposed to it costing LE 8,000 to LE 10,000 in a private hospital. A Cesarean-section will cost LE 350 as opposed to LE 12,000 to LE 15,000 in a private hospital.

The third option is an individual that is not covered by health insurance and requests to be treated in the private wing (which the government labels “economic treatment”). The amount paid will be slightly higher than the amounts described just above. The individual will obtain a slightly better service in terms of waiting time and accommodation facilities. However, the doctors, nurses and clinic and operating rooms are the same.

OTHER

There are other subsidy expenditures in the FY14/15 budget: for example, subsidy expenditure that delivers loans at concessional rates or transportation subsidies. However, these expenditures are minor compared to energy subsidy spending and these additional subsidies are not allocated in the CEQ.

Revenues

Egypt’s revenue system is comprised of direct and indirect taxes as well as nontax revenue streams like property and asset income (for example, from the Suez Canal and other public sector economic authorities). Table 5.3 provides a snapshot of public revenue sources in the FY15. Income taxes account for approximately two-fifths of tax revenue, and corporate income tax makes up approximately 70 percent of income tax revenue. Personal income taxes and real estate transaction taxes represent approximately 9 and 6 percent of tax revenues, respectively.

Indirect taxes on the purchase of (non-real-estate) goods and services also contribute approximately two-fifths of all tax revenues. In FY15, there was a general sales tax system that applied to goods and services alike as well as a set of customs duties applying to certain imported goods.

Table 5.3. Government of Egypt's Revenue Sources, Fiscal Year 2015

	Revenues			Included in analysis?
	Egyptian pounds (billions)	Share of revenues (%)	GDP (%)	
TOTAL revenue and grants	465.2	100.0	19.0	
Revenue	439.8	94.5	18.0	
Tax revenue	305.9	65.8	12.5	
Direct taxes	150.9	32.4	6.2	
Personal income tax ^a	38.2	8.2	1.6	Yes*
Corporate income tax	91.6	19.7	3.7	No
Taxes on property	21.1	4.5	0.9	No
Indirect taxes	155.0	33.3	6.3	
Sales tax (goods and services) ^b	65.5	14.1	2.7	Yes*
Excise taxes ^c	41.4	8.9	1.7	Yes*
Customs duties (stamp taxes)	7.7	1.7	0.3	No
Taxes on exports	21.9	4.7	0.9	No
Other taxes ^d	18.53	4.0	0.8	No
Nontax revenue	133.8	28.8	5.5	
Sales of goods/services	26.5	5.7	1.1	No
Property income/ fines, penalties/ voluntary transfers	83.2	17.9	3.4	No
Miscellaneous revenues	24.2	5.2	1.0	No
Grants^e	25.4	5.5	1.0	No

Source: Ministry of Finance.

*Revenue collections included may not be fully allocated within the HIECS 2015 for various reasons. See the section on methodology for detail on the allocative methods and assumptions.

a Personal income tax includes taxes from employment, other activity, and capital gain taxes.

b Sales of goods represent 53.4 LE billion.

c Includes 39.7 LE billion of excise taxes on domestic goods.

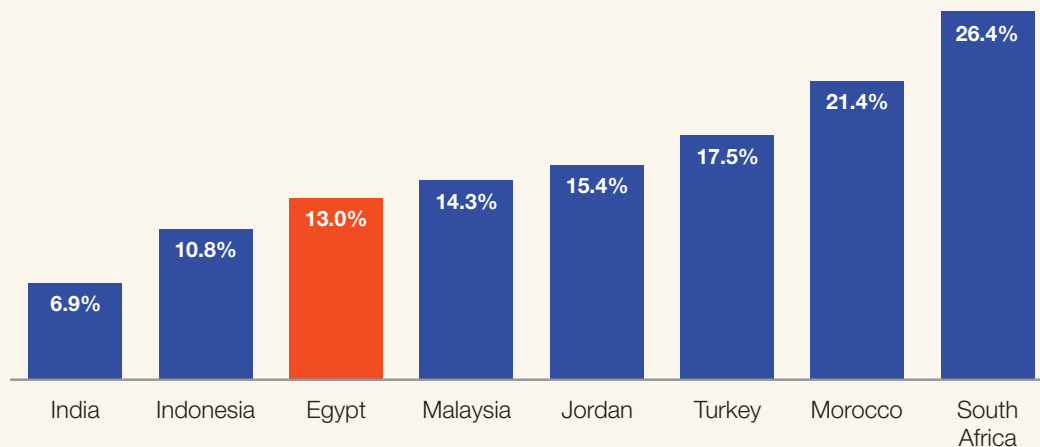
d Other taxes include an 8.3 EGP billion discrepancy in MoF accounts.

e Include grants from foreign governments (LE 24.9 billion), international organizations (LE 0.3 billion), and others.

At 13 percent in FY16,¹⁰⁰ Egypt's tax revenues as a percent of GDP (or tax ratio) could be higher. Compared to other lower-middle income economies, Egypt fairs better than India and Indonesia (figure 5.5), but lags behind Morocco (21.4 percent) and Jordan (15.4 percent)—countries with lower GDP per capita in 2016.¹⁰¹ Egypt suffers from a large informal economy that shrinks the tax base and makes tax collection efforts difficult. Tax implementation and collection processes are also not effectively enforced by the tax authority, making reaching the taxable base difficult.

To address some of these issues, Egypt moved from the GST to a VAT law in September 2016, and increased its rate from 13 to 14 percent in July 2017 compared to a GST that was 10 percent. This new law, like its predecessor, has many exemptions, including many food products such as dairy products, breads, meats, and fish. Health and education, insurance services, broadcasting services, some transportation services, butane and natural gas, and banking transactions are also exempt, causing an erosion of the tax base. In FY13 the effective tax rate on the GST was 7.1 percent.¹⁰²

Figure 5.5. Tax Revenues as a Percentage of GDP, Egypt and Comparison Countries



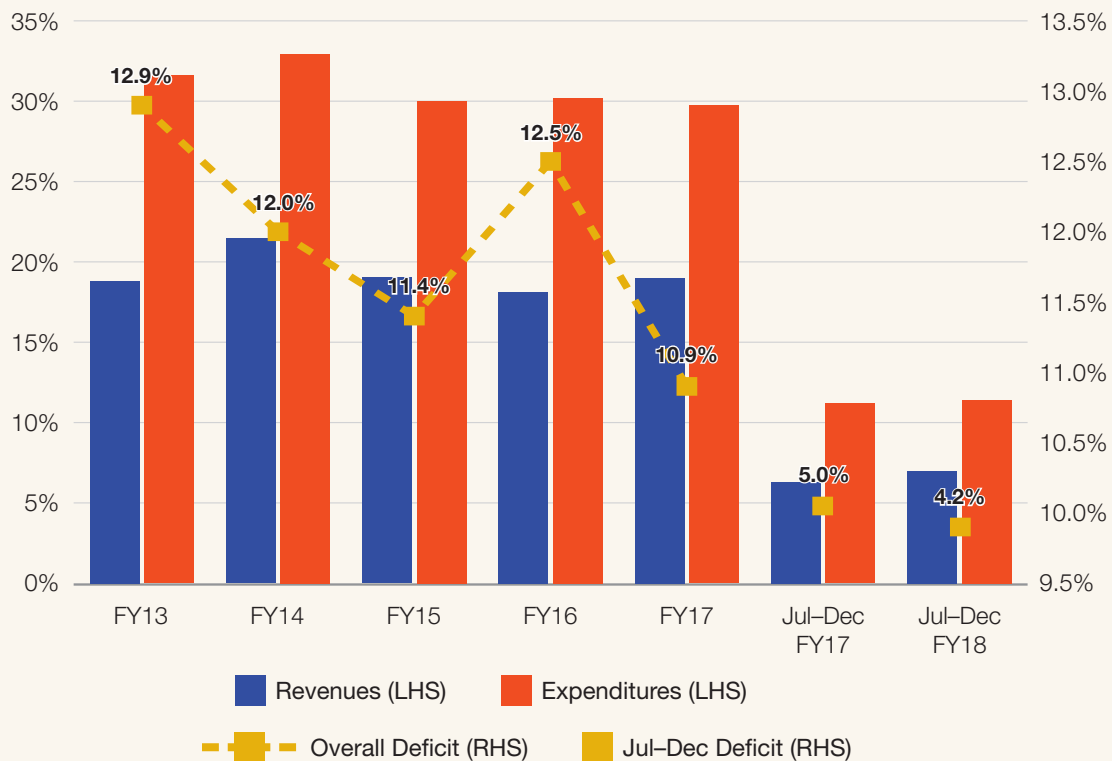
Source: IMF International Financial Statistics Database (<http://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B&slid=1390030341854>).

The income tax suffers from problems of its own. It is also affected by the informal sector and low tax collection. In 2015, the government implemented some reforms to the income tax, increasing the exemption threshold from LE 5,000 in annual income to LE 6,500 in annual income, while also increasing the number of tax brackets with the aim of encouraging individuals to formalize by somewhat decreasing the tax burden. However, tax revenues from the personal income tax remain low, averaging 1.4 percent of GDP from FY11 to FY16. The corporate income tax was decreased from 25 percent to 22.5 percent also in 2015 to help with higher tax collection but the base is limited, and taxes collected have been declining since FY10, reaching 3.8 percent of GDP in FY16 from 5.0 percent of GDP in FY10. Egypt recently implemented a property tax. However, very few tax revenues have been collected under the property tax due to very low compliance.

As part of the most recent wave of economic reforms, the personal income tax threshold was again increased in July 2017 to LE 7,200 and all brackets apart from the highest one now have tax breaks. This is not expected to continue in the medium term, as the government seeks to increase its revenues, and is only a short-term measure to alleviate the burden of the reforms aimed at macrostabilization. The medium-term goal of the government is also to encourage the formalization of small and medium enterprises to also widen the tax base; a law on the taxation of small and medium enterprises is on the government's agenda but has not yet been released.

This study covers the majority of indirect taxes and the personal income tax. The team was able to obtain information on Egypt's personal income tax. The property tax is not included in the study as it was not in effect in 2015. We now turn to the description of the CEQ methodology.

Figure 5.6. Total Revenues, Expenditures, and Overall Budget Deficit (percent of GDP)



Source: Based on data from Ministry of Finance.

Note: LHS = left-hand side; RHS = right-hand side.

There is one final point worth noting. The results obtained from the application of the CEQ methodology for Egypt in terms of inequality and poverty reduction follow closely the overall structure of expenditures and revenues of the government. In the Egyptian context, this means that the positive effects on inequality and poverty reduction of the fiscal policies are partly explained by the large deficit ran by the government. In fact, the overall budget deficit was 11.4 percent of GDP in FY15 (figure 5.6). This unsustainable imbalance should be kept in mind as a frame to interpret the long-term ability of Egypt's fiscal policies in addressing inequalities.

Methodology, Data, and Assumptions

Taxes, transfers, and fiscal policy more generally are powerful instruments the state has at its disposal for reducing extreme forms of material deprivation and narrowing the gap between economic elites and the rest of the populace. These policies can also help equalize opportunities, through public education for example, and thus increase social mobility and the productive potential of the underprivileged. To assess whether governments are using these tools effectively, it is important to be able to quantify how inequality and poverty change from before to after the application of these fiscal instruments. In this

study, the impact of fiscal policy on microlevel welfare indicators is estimated by allocating fiscal policy elements, programs, expenditures, or revenue collections to individuals and households appearing in the HIECS 2015. The framework for allocations and postallocation analysis follows the methodology developed by the CEQ Institute to assess fiscal policy (Lustig 2018).

Methodology

To quantify the impact that fiscal policies have on income (or purchasing power or welfare), the first step is to estimate a (counterfactual) income state that would be experienced *before* the transfers, benefits, and burdens generated by the fiscal system are received or imposed. As a proxy for this state, the concept of *prefiscal income* (I_h) is applied as the cumulative income received from wages and salaries (that is, from labor market transactions) plus the market value of consumption of own production; from capital (including real estate); and from private transfers (such as remittances from family members working abroad);¹⁰³ and finally from pensions (whether private or public). The h subscript indexes a set of households (but equally could index individuals).

To note is that government policies may appear to have greater or lesser impacts depending on what is included in the variable describing the prefiscal income state. Egypt provides a good test case as rental market regulations create two different—and plausible—valuations of the value of housing services consumed; therefore two different distributions of prefiscal income over which fiscal policy can then be allocated; and finally two different distributions of postfiscal income (at each postfiscal income concept).

Next, the set of taxes and transfers T_i to be examined is defined: for example, T_i in Egypt might include the sales tax and the Takaful and Karama social assistance programs. For each household h found in the microdata *shares* (S_{ih}) of each program, $i = 1, \dots, I$ in T_i are allocated.

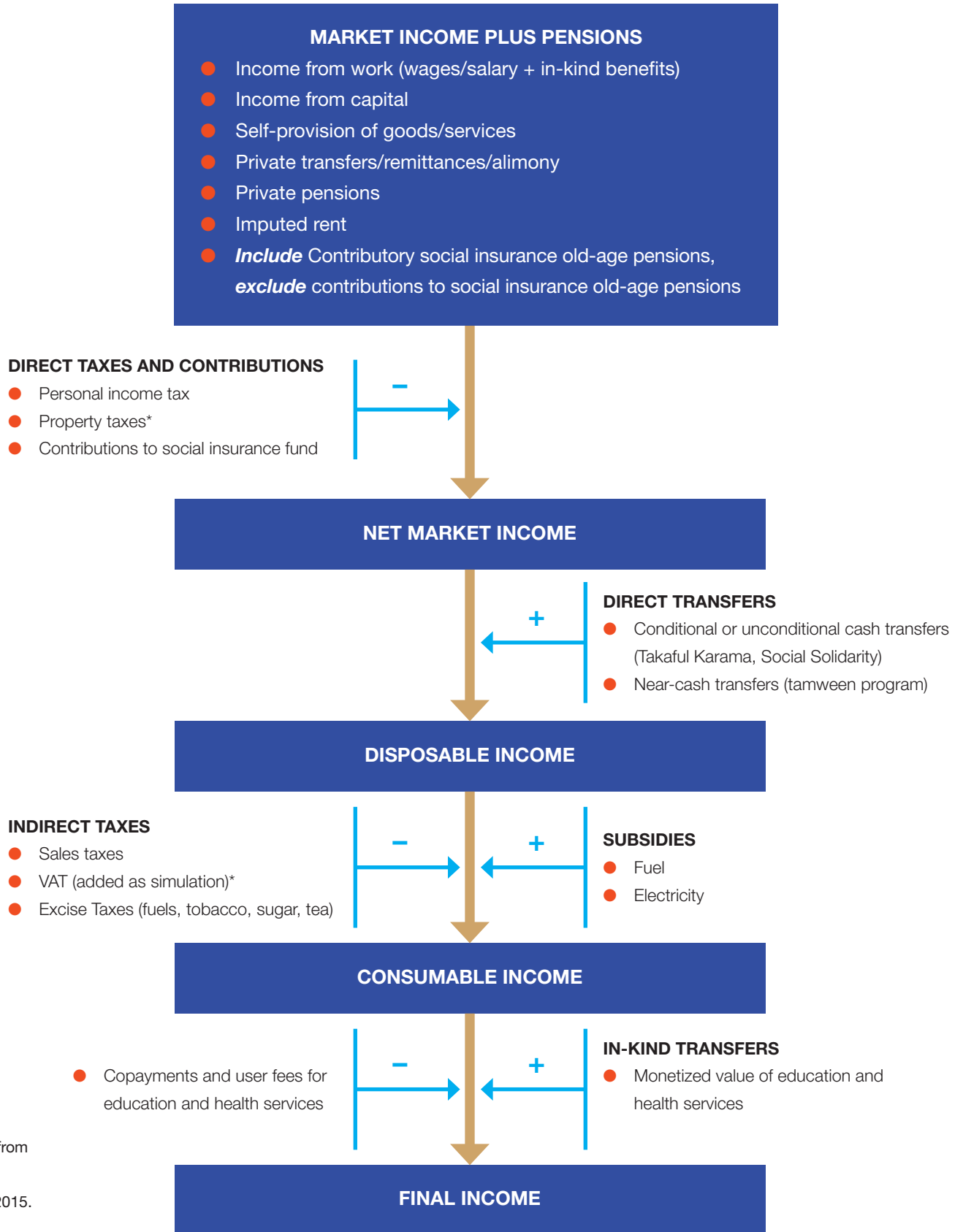
With the estimated shares, an estimate of postfiscal income is created at the household level Y_h such that

$$Y_h = I_h - \sum_i T_i S_{ih} \quad (1)$$

Figure 5.7 provides a schematic of the equation above. Figure 5.7 contains only one prefiscal income concept (market income) and several postfiscal income concepts (disposable income, consumable income, and final income).

To determine the impact of the fiscal system on either poverty or inequality, we estimate the difference between its preferred measures of poverty or inequality over the pre- and postfiscal distributions. Naturally, the extent of the fiscal system under consideration limits the team's choice of the postfiscal income concept. The impact of a fiscal system that includes only two elements must be estimated over a postfiscal income concept that includes only these two elements.

Figure 5.7. Definition of CEQ Income Concepts



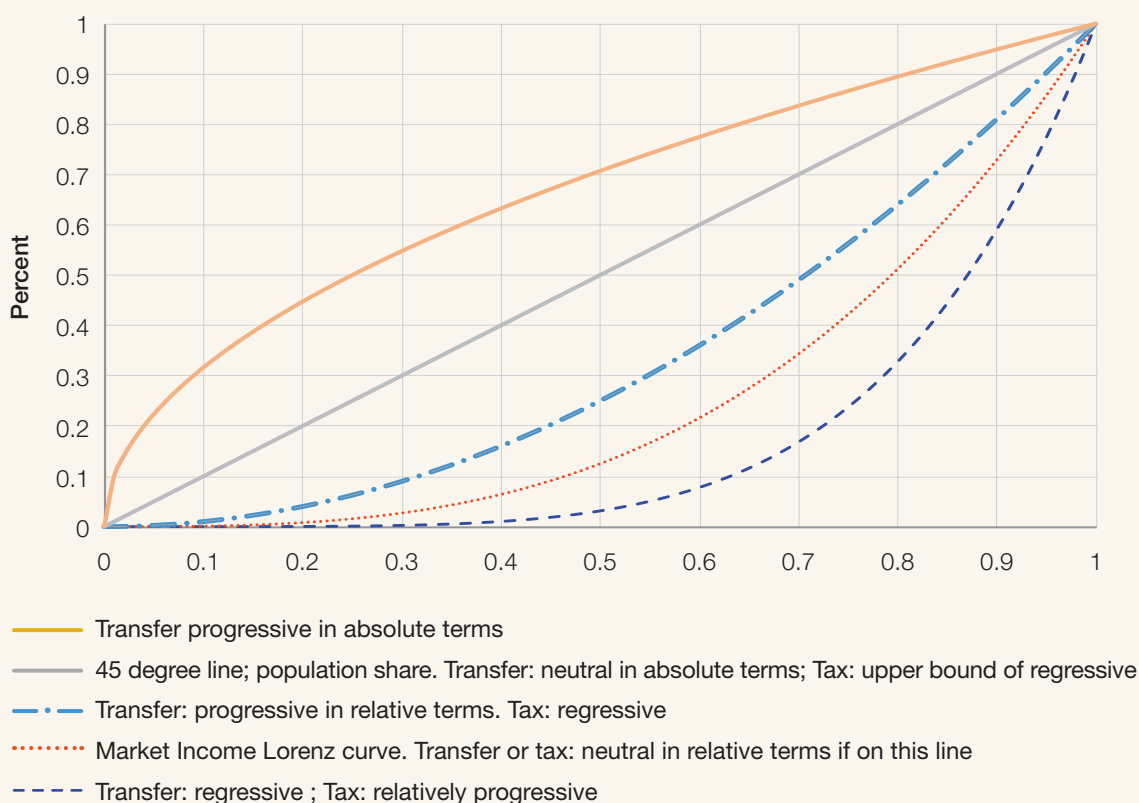
Source: Adapted from Lustig 2018.

* Not effective in 2015.

To determine the impact of single tax or transfer (or a subset of taxes and transfers), we take the difference in inequality (or poverty) at the postfiscal income concept *excluding* the item in question (but including everything else in the team’s fiscal system) and the postfiscal income concept including the item in question (and also including everything else in the team’s fiscal system).

A single tax or transfer (or a fiscal system) is *inequality reducing* when the addition of the fiscal item in question to an income concept reduces measured inequality. A transfer is *absolutely progressive* if, when households are ranked by prefiscal income levels, the cumulative household shares of the transfer are greater than cumulative population shares. In a Lorenz curve figure, an absolutely progressive transfer’s concentration curve would lie above and to the left of the 45 degree line (figure 5.8). A transfer (tax) is *relatively progressive* if, when households are ranked by prefiscal income levels, the cumulative household shares of the transfer (tax) are greater (less) than the cumulative household shares of prefiscal income. In a Lorenz curve figure, a relatively progressive transfer’s (tax’s) concentration curve would lie above and to the left (below and to the right) of the Lorenz curve for prefiscal income.

Figure 5.8. Diagram Representing the Progressivity of Taxes and Transfers



Source: Adapted from Lusting (2018).

A transfer is considered to be *pro-poor* when the transfers received, measured as a share or fraction of pretransfer income, decline with income. Notice that this definition of pro-poor includes cases in which the absolute transfer level declines with income. For example, if a transfer is targeted to poor households, and non-poor households do not receive the transfer, then, algebraically, transfers received are declining in income level. Because taxes always reduce purchasing power, we do not label taxes “pro-poor,” although when taxes paid (measured as a share of pretax income) increase with income levels, they are by definition progressive. In everyday usage, for example, a marginal income tax rate schedule that has increasing marginal rates by taxable income bracket will be considered a “progressive” income tax.

Two indicators we use to understand how a fiscal policy element is progressive or regressive are the *concentration shares* and the *incidence* of a fiscal policy. Concentration shares show the share of the value of fiscal policy captured by (or imposed on) a subset of the population such as the poorest 10 percent of individuals or the richest 10 percent of individuals. For example, if the richest 10 percent of Egyptians pay 75 percent of the total personal income taxes collected in a given year, then the richest decile’s concentration share of personal income taxes is 75 percent (and that, in turn, implies that the other 90 percent of Egyptians pay *no more than* 25 percent of total personal income tax revenues). The incidence of a fiscal policy element calculates the value of a benefit captured (or a tax imposed) *relative* to the value of income *before* the benefit was received or before the tax was imposed.

While a pro-poor transfer is always progressive, the reverse is not necessarily true. Likewise, in a fiscal system with more than one element, a pro-poor or progressive transfer (or a progressive tax) is not necessarily inequality reducing. This study incorporates every type of fiscal policy element listed in figure 5.7 using consumption expenditure recorded in HIECS as the measure of *primary* income. The team assumes that total consumption expenditures—including the value of imputed rent for those living in owner-occupied housing as well as the implied value of any auto-production/auto-consumption—are equal to the CEQ disposable income concept (approximately in the middle of the flowchart in figure 5.7). The team then works “backward” and “forward” from disposable income to other CEQ income concepts to arrive at pre- and postfiscal measures.¹⁰⁴

Egypt’s prefiscal income measure includes income received from the public pension system. Market income reflects income before any transfers (including public spending on health and education, fuel and energy subsidies, and unconditional cash transfers) or taxes (including personal income taxes and GST) have been added. In treating contributory pensions, the CEQ methodology treats pension contributions and pension income received as deferred income. Egypt’s contributory pension system functions much as a nonwage salary payment; therefore, the team’s prefiscal income measure becomes Market Income + Pensions (top box in figure 5.7).¹⁰⁵

Data sources

The primary data set providing the individual- and household-level information necessary to allocate fiscal policy elements is the HIECS 2015.¹⁰⁶ This survey includes modules covering health, education, economic and labor market activity, household consumption expenditure, agricultural production, and rent (or, for owner-occupied housing, imputed rent). HIECS also provides a roster per household that provides individual, demographic, and dwelling characteristics. HIECS 2015 uses an updated frame from the 2006 population census as its sampling frame and is representative at the national level, by urban and rural areas and by governorate. The survey was administered to approximately 24,000 households. For this analysis, the Central Agency for Public Mobilization and Statistics (CAPMAS) granted access to a representative 50 percent sample of the survey microdata covering 11,988 households and about 52,254 individuals.

The source for total revenues collected by the government from households—via the personal income tax and GST— during FY15 is the Ministry of Finance. To impute “effective” or actual prevailing rates (which may differ from statutory rates), we first scale down the expected tax take from HIECS households. Scaling is done so that the ratio of tax revenues in final or audited budget reports to Private Final Household Consumption Expenditure in Egypt National Accounts data are equivalent to the ratio of VAT collections from HIECS households to the value of cumulative HIECS household consumption expenditure.

Program administrative data from the Ministry of Social Solidarity on the Takaful and Karama programs was also used. The data included the total number of beneficiaries and benefits distributed by governorate. The estimated electricity and fuel subsidies received by households were generated directly within the HIECS using reference price and subsidy rate information provided by the Ministry of Petroleum and data from World Bank (2017).

Assumptions and allocation overview

When and where possible, the study allocates fiscal policy elements to individuals or households based on direct observation. For example, when an individual queried in a socioeconomic survey is asked to recall how much she has paid in sales taxes on all her purchases in the past seven days, or is asked to provide receipts detailing sales tax payments, we directly observe the total sales tax collection from her. These sales tax payments recorded by individuals then are assumed to be the same sales tax revenues listed in the executive, administrative, and other budget reporting for the same year.

In the HIECS 2015, however, very few fiscal policy elements could be allocated via direct observation.¹⁰⁷ Instead, we use *imputation* and simulation (sometimes in combination with direct observation). Imputation is used when a survey unit’s benefit recipient (taxpayer) status must be inferred (rather than directly identified), or the amount received (paid) is retrieved from administrative records or program

(tax) rules (rather than directly recorded in the survey), or both. *Simulation* is available when neither direct identification nor imputation can be used, so that the beneficiaries (taxpayers) and the amount received (paid) are simulated based on the program (tax).¹⁰⁸ The following subheadings provide a summary of allocation assumptions and decisions for various fiscal policy elements in this study.

We are allocating approximately 25 percent of public revenue and approximately 30 percent of public expenditures (table 5.1 and 5.3). In general, allocating fewer taxes and more expenditures might bias estimates of the impact of fiscal policy (and individual fiscal instruments) on poverty and inequality.¹⁰⁹ However, note that in Egypt (in 2015), total fiscal expenditures were approximately 10 percentage points higher (as share of GDP) than total public revenues, which gives us some confidence that we have not *willingly* biased our results away from the actual, on-the-ground impact of Egypt's unbalanced fiscal policy. CEQ Assessments typically allocate a larger share of total revenues and total expenditures, and we fully recognize this as a limitation of the present exercise as we cannot unambiguously sign the potential effects of the categories not analyzed. It is worth noting, however, that in the case of revenues approximately one-third is produced from non-tax revenues (such as the sale of goods and services) which are typically not allocated and thus limit the potential coverage of the exercise.

PERSONAL INCOME TAXES

Direct (personal income tax) taxpayer status is imputed based on an individual's participation in the social security system through contributions. For HIECS households with at least one individual identified as a taxpayer, total household income from wages and salaries is calculated and then divided up equally among all individuals who report earning income from wages.¹¹⁰ Then, for individuals imputed to be taxpayers, we take their wage income (which is assumed to be net wages, that is, after taxes), create *minimum* gross income by scaling up wage income by one plus the minimum marginal personal income tax rate, and then apply the statutory marginal rates to all gross income among all imputed taxpayers.

We then scale down the personal income tax burden for each individual by the ratio of cumulative personal income taxes we expect to allocate in HIECS divided by the cumulative estimated personal income tax taken from HIECS as estimated above. The cumulative personal income taxes we expect to allocate in HIECS is equivalent to LE 10.29 billion. This amount is obtained by multiplying the personal income tax total found in the 2015 budget for taxes on income from employment (approximately LE 26.8 billion) by the ratio of the value of cumulative household consumption expenditure in HIECS to total final household consumption expenditure in the national accounts (approximately 0.384). The goal in generating this scaling is that the total personal income tax burden allocated to HIECS households relative to the total value of consumption expenditure in the HIECS is made equivalent to cumulative total personal income tax collections in budget documents relative to the value of total final household consumption expenditure in the national accounts.

SOCIAL INSURANCE FUND CONTRIBUTIONS

Social Insurance Fund contributor status is directly observed in the HIECS (for all those individuals who answer the module capturing their labor market participation). We attribute to each individual making pension contributions a share of total household income from wages that is equivalent to total household income from wages divided by the total number of wage earners in the household. We create from each individual's wage income a “basic wage” variable equivalent to 25 percent of total wage income.¹¹¹ Basic wages (so defined) are then multiplied by statutory contribution rates (40 percent) to estimate individual pension contributions. The goal is to attribute the right magnitude of pension contributions to each household with at least one contributor.

Cumulative HIECS Social Insurance Fund contributions are then scaled down—individual by individual—by the same ratio of *cumulative personal income taxes* we expect to allocate in HIECS divided by the *cumulative estimated personal income tax* taken from HIECS as estimated above. Budgeted Social Insurance Fund contributions were not available, so we scaled total Social Insurance Fund contributions based on our overestimate of another revenue-side fiscal instrument. The goal in generating this scaling—as before, for personal income taxes—is to estimate a cumulative Social Insurance Fund contributions pool in HIECS that is commensurate with the amount of disposable income in HIECS (relative to national accounts).

DIRECT TRANSFERS

Takaful and Karama were pilot programs in 2015; HIECS 2015 does not directly identify beneficiaries of either program. Instead, the team implemented a proxy-means test based on a means function directly within HIECS 2015 that replicated as closely as possible the actual means function and proxy means test used in the field to identify Takaful and Karama beneficiaries.¹¹² The implementation of the proxy means test within HIECS was calibrated so that each governorate represented in HIECS absorbs the same number of beneficiaries and benefits as confirmed in administrative totals.¹¹³

TAMWEEN PROGRAM

Egypt's food ration program delivers to each beneficiary household a cash credit in the amount of LE 15 per person per month that can be used at family stores for the purchase of 21 basic food necessities. Food ration beneficiary status in the HIECS 2015 is directly observed through the module that records purchases using the food ration card made by households: any household purchasing any positive amount of any good available for purchase with the food ration card is assumed to receive a transfer in the amount of LE 15 per household member per month.

The food benefit received by the households is expanded to include an estimate of the value of the Baladi bread (and bread points for unconsumed bread) that the household receives. From the expenditure data in the HIECS 2015, we use a 5 piaster per loaf transformation to estimate the

number of loaves of Baladi bread consumed by the households. Next, following Abdalla and Al-Shawarby (2018), we assume a 30 piaster per loaf of subsidy received by households. Finally, HIECS 2015 also provides information on the items purchased using bread points.¹¹⁴ Using an estimate of the value of the items purchased using a market reference price, we also impute such value as a transfer of the food program to the beneficiary household.

ENERGY SUBSIDIES AND INDIRECT TAXES

Energy subsidies for electricity and fuels and indirect taxes (sales taxes) are imputed based on household consumption expenditure records. In other words, when households record purchases of energy or goods or services that attract the sales tax, the subsidy or indirect tax payment implicit in this purchase is imputed based on the relevant subsidy or tax schedule. For example, if a household records US\$50 in kerosene expenditures over a month, and the known subsidy rate on kerosene is 10 percent, the household is imputed to have purchased US\$55.55 of kerosene, US\$5.55 of which was actually an expenditure made by the government (via its subsidy policy) on behalf of the household.

The electricity subsidy (and the electricity tariffs) in Egypt is worth describing in further detail. In FY15, electricity tariffs were based on seven consumption brackets (table 5.4). Using a cost-recovery rate estimate obtained from the Ministry of Petroleum, we first simulate for each bracket what would have been the corresponding “full recovery” or no subsidy tariff. The difference between the two provides an estimate of the per kilowatt hour (kWh) subsidy received by the household. Next, using HIECS 2015 data it is possible to estimate the electricity consumption volume from household expenditure records and the imposition of Egypt’s 2015-era block-tariff structure. For each household we have information on the bimonthly expenditure on electricity. After subtracting connection fees, we can estimate the corresponding volume that would be feasible based on the potential tariffs faced by households. Finally, we multiply the per-kWh subsidy to the corresponding estimated electricity consumption to get at the total benefits received by the households.

Table 5.4 Electricity Tariffs Faced by Households, by Consumption Bracket

Residential (PT/kWh)	FY15 tariffs
up to 50	7.5
51–100	14.5
0–200*	16
201–350	24
351–650	34
651–1,000	60
above 1,000	74

Source: FY15 Ministry of Petroleum.

Note: Tariffs in piasters per kWh (PT/kWh) of monthly consumption. For instance, a household consuming 80 kWh would pay 50 kWh at a rate of 7.5 piasters and 30 kWh at 14.5 piasters.

* This tariff applies to all kWh consumed when households consume more than 100 kWh and less than 200 kWh.

Rates of sales taxation are taken directly from the statutory rate schedule.¹¹⁵ Rates of subsidization for energy products are taken from the Ministry of Petroleum and the World Bank (2017). When applied to purchases recorded in the HIECS, cumulative totals of energy subsidies and sales tax (on goods) allocated in HIECS reach 34 percent, 42 percent, or 56 percent of the scaled-down budget totals for those items, where the scaled-down budget totals are created by multiplying actual budget totals by the ratio of cumulative household consumption expenditure in HIECS to cumulative final household consumption expenditure in the national accounts.

Energy subsidies are also available to firms and industries using energy goods and services as inputs into production; other production inputs may attract sales taxes. Lower or higher input prices that result from subsidies or taxes, respectively, may be passed on to final prices for goods and services created using the subsidized or taxed inputs. This study estimates these indirect effects of energy subsidies and the sales tax regime and includes the indirect benefit (or burden) via the same imputation procedure based on consumption expenditure records described above.¹¹⁶

EXCISE TAXES

The GST was in effect in FY15 and includes provisions for the taxing of goods and services with a standard tax rate of 10 percent.¹¹⁷ Certain commodities were taxed at 5 percent, and selected services were taxed at 5 percent or 15 percent. Some particular commodities are exempted from the GST, and others are assigned a special tax rate. For the purposes of this exercise, we refer to excise taxes as those goods assigned a special tax rate according to the table 1 of GST law. Goods included in this category are tea, sugar, beer, tobacco, and petroleum products (gasoline, kerosene, and so forth).¹¹⁸ The CEQ exercise covers only a subset of these as the HIECS provided limited information for mapping them to households' expenditures (diesel, lubricating oils) or the products could not be identified in the data (wheelchairs and so on).

We include the following products as part of the estimation of excise taxes: tea (with a differential tax for that distributed by ration cards or not), sugar (with a differential tax for that distributed by ration cards or not),¹¹⁹ tobacco (assuming a 50 percent rate corresponding to molassed tobacco), and gasoline (assuming the highest quality is consumed).¹²⁰

IN-KIND TRANSFERS

Receipt of in-kind benefits is based on directly identified utilization of the public education or public health care systems. The HIECS 2015 records how many household members are enrolled in the public education system (and at what levels) and whether any household members recently visited a public health care facility. The monetized value of the in-kind transfer is based on the "government cost" approach. For example, total education expenditures are divided by the total number of users

(students) to get a uniform per-user cost of producing and delivering the service. This per-user cost then is defined as the value of the transfer received. This cost represents what the utilizing household would have to pay to acquire the service at the government's cost.

We used disaggregated administrative data (by facility type) to guide our estimation of the government cost of a health care or education service acquired. For health, we used budgetary data to allocate specific expenditures to hospital and clinical care providers. For example, the public expenditures transferred to public hospitals for personnel and medical goods (including medicines) is not equivalent overall or on a per-facility basis to public expenditures for the same items for public clinic-based health care.¹²¹ Off-budget, special fund expenditures for these services are known to be substantial.

Note that for both public health and education services, the estimate of the value of the benefit we allocate is limited by the information available. For example, we do not have complete information on the government's cost of a secondary school student-year or a primary/preparatory school student-year. We assumed the former was twice as expensive (for the government) as the latter two.¹²² With that assumption, and with the overall shares of publicly enrolled primary/preparatory and secondary students as taken from CAPMAS (2017), the actual government cost can be calibrated. That is, we let actual numbers of publicly enrolled students (by level) and our assumption that a public secondary school student costs the government twice as much as a primary school student determine the imputed government cost for a student at both the primary and secondary levels.

Similarly, in health, we can separate clinic-level visits from hospital visits in the microdata,¹²³ and we can separate clinic-level public expenditures from hospital-level expenditures, but we cannot further determine exactly which service was received at either clinic or hospital. So instead we assume that the amount by which the government cost of a per-inpatient day at a public hospital exceeds the government cost of providing per-patient outpatient services at a public hospital is 2.7. This ratio is equivalent to the amount by which the per-patient government cost at public hospitals exceeds the per-patient government costs at public clinics. We also cannot determine *precisely* how much less those without the National Health Insurance card pay at public hospitals and clinics than they pay at private health care providers. In consultation with those familiar with public health care service delivery in Egypt, we decided to assume those without a card who visit a public health care facility pay 90 percent of the *government cost* for the service they acquire. This gives us the factor by which the benefit that a patient without a card receives is *lower* than the benefit received by those with a card, which together with the data on which individuals have cards, can be used to generate the benefits provided to those without cards at public health care facilities.

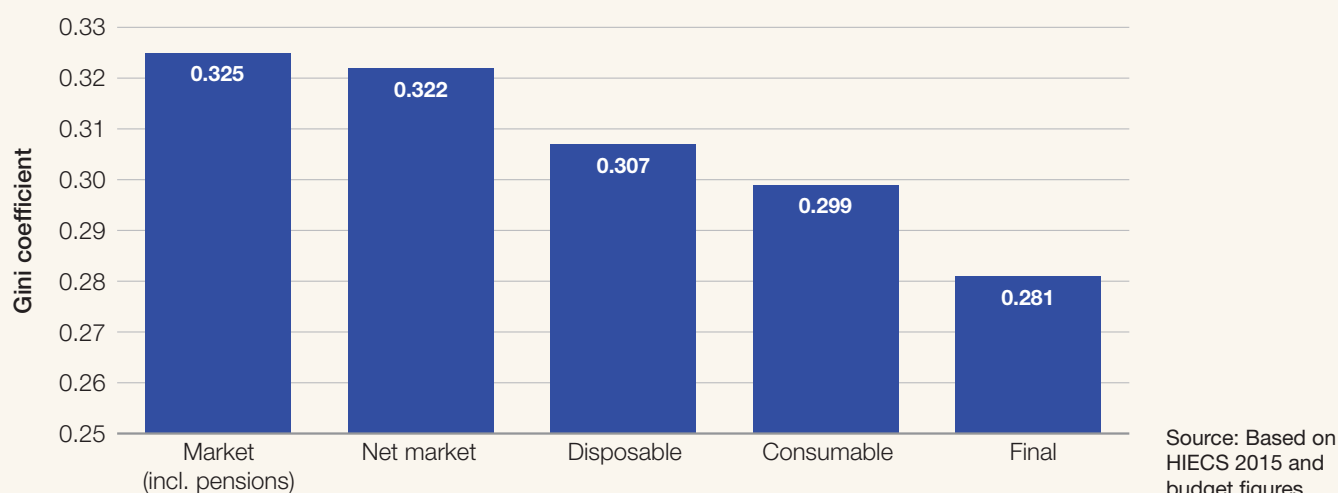
As we are unable to describe the variation in the value of the services provided at any level, we cannot estimate the distributional impact of higher expenditures for more complicated procedures (for example) at any level. A “public health care service, clinic-level” benefit can be considered an average value across all services provided at the clinic level

Results

Redistributive effects of Egypt's fiscal system

Egypt's fiscal system reduces inequality. figure 5.9 summarizes inequality at different income measures and demonstrates that inequality (as measured by the Gini coefficient) is reduced between market income plus pensions (henceforth market income)¹²⁴ and (the postfiscal) final income. Two significant reductions are observable: between net market and disposable income and between consumable and final income. This indicates that the instrument classes contributing the most to overall inequality reduction (from fiscal policy) are direct transfers, sometimes called “social assistance transfers,” and access to in-kind public services in health and education. Overall, the Gini coefficient falls from 0.33 at market income to 0.28 at final income.

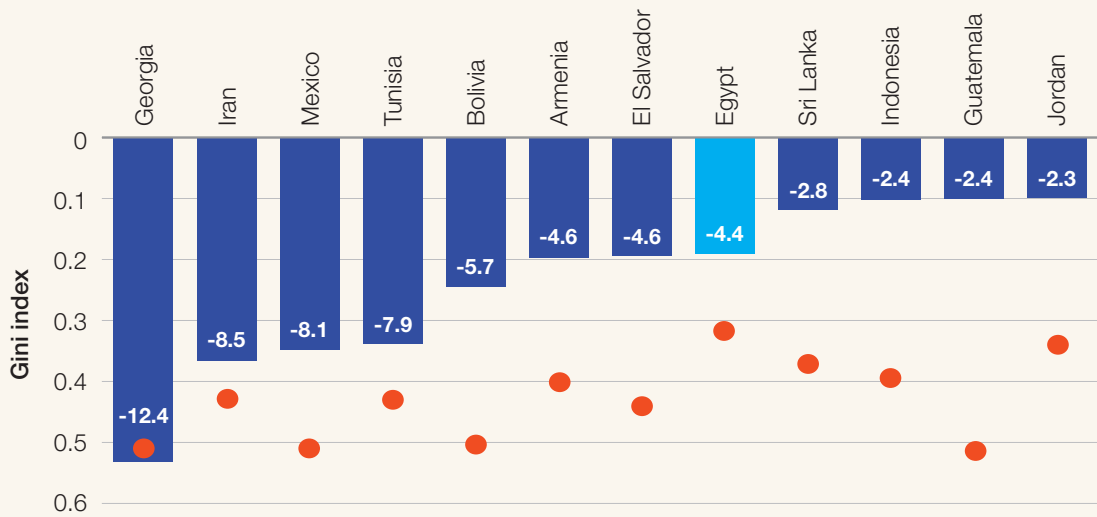
Figure 5.9. Fiscal Policy's Impact on Inequality, 2015



The redistributive effect¹²⁵ of fiscal policy in Egypt is about mid-range when compared to other countries in the region or those with similar levels of development (figure 5.10).¹²⁶ This is due primarily to a relatively low impact of direct transfer spending on inequality. Egypt's main cash transfer program, the food ration program, is approximately a universal transfer, so richer households receive the transfer approximately as frequently as poorer households; untargeted transfers often do not generate large impacts on inequality. figure 5.10 also demonstrates that prefiscal inequality in Egypt is quite low.¹²⁷

Fiscal policy is also poverty reducing. As discussed in Lustig (2018), to measure the impact of fiscal policy on poverty, the indicator of choice—usually the poverty headcount rate or the poverty gap—is calculated for market income, disposable income, and consumable income. Poverty statistics are not typically measured for final income, which includes the government-cost value of health and education services (see figure 5.7). Figure 5.11 indicates that in the absence of the taxes and expenditures in this

Figure 5.10. Fiscal Policy's Impact on Inequality (bars) and Prefiscal Inequality (dots and left axis), Select Countries/Years



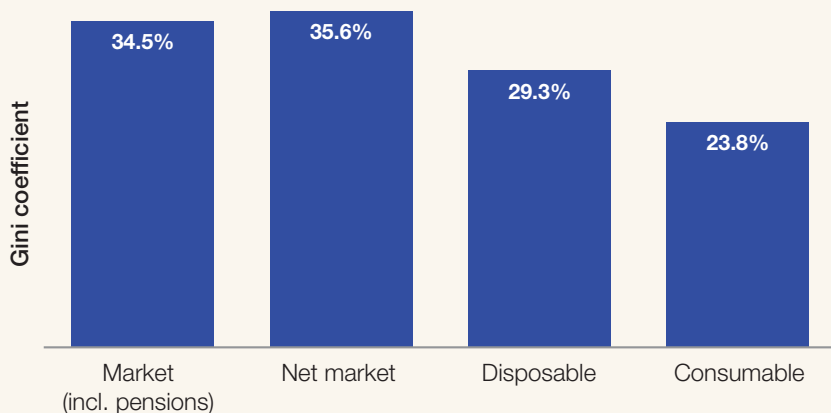
Source: Compilation of country studies as displayed in Lara Ibarra, Sinha, Fayez, and Jellema (2018).

Note: Initial inequality is measured as the Gini coefficient on the left-hand axis. Impact on inequality is plotted on the right-hand axis. A Gini coefficient close to 1 (close to 0) indicates high (low) inequality.

CEQ assessment, the poverty headcount rate at prefiscal income (market income including pensions) would be nearly 35 percent. At consumable income, after all taxes (direct and consumption taxes) and *cash or near-cash* transfers and subsidies have been accounted for, the estimated poverty headcount rate drops to just less than 24 percent.¹²⁸

Egyptian fiscal policy (in 2015) is nearly unique in that it has positive impacts on both inequality reduction and poverty reduction without an emphasis on targeted expenditures or revenue collections.¹²⁹ In other words, households at any rank in the income distribution can expect to pay some direct and indirect taxes, but they can also expect to receive an even greater amount (in absolute magnitude) in cash or near-cash transfers. Figure 5.12 shows the net cash position of poor, vulnerable, middle-class, and

Figure 5.11. Fiscal Policy's Impact on the Poverty Headcount Ratio



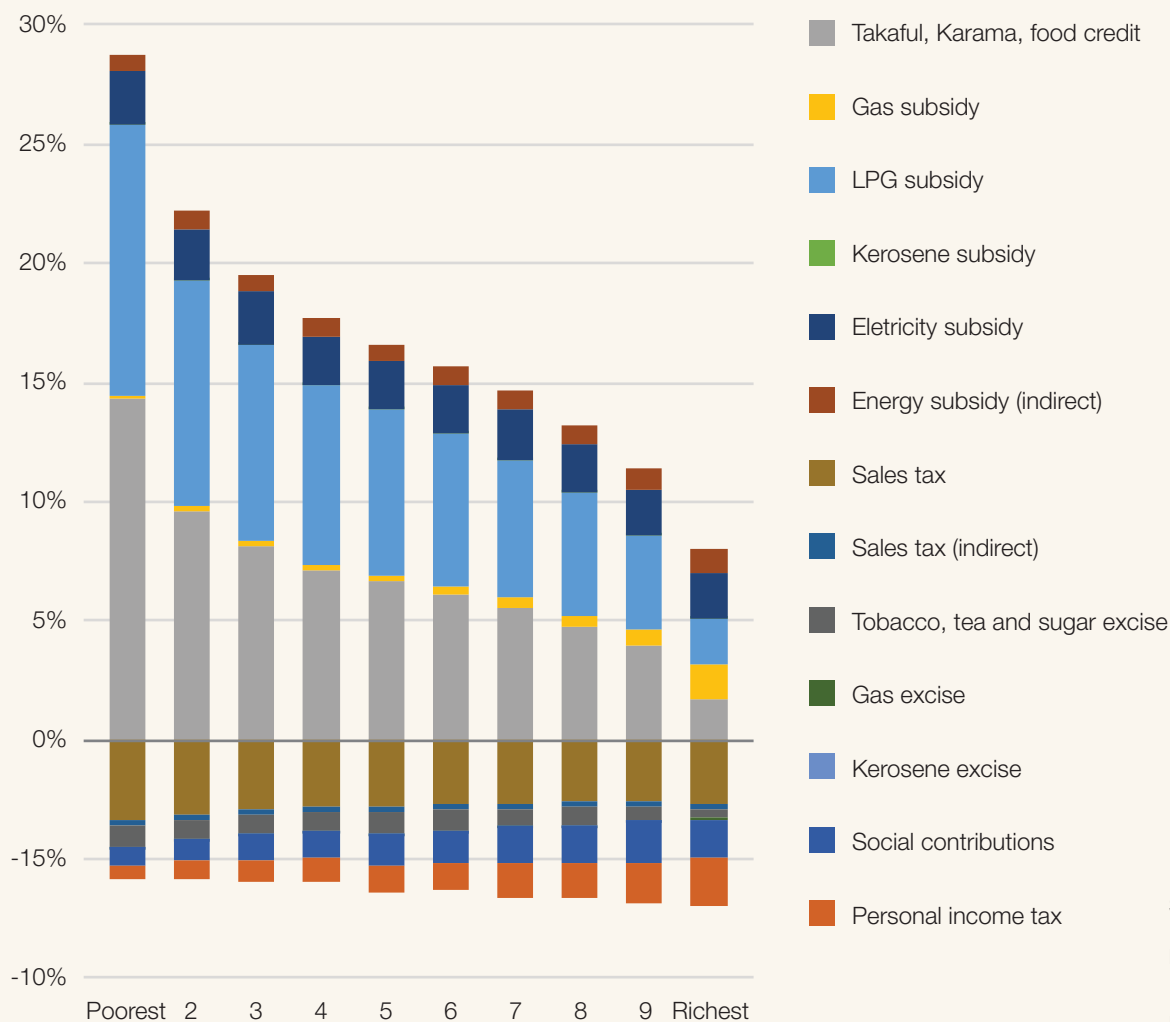
Source: Based on HIECS 2015 and budget figures.

Note: The poverty headcount ratios in this figure are based on poverty lines based on the methodology described in chapter 1. The average value is LE 5,748 per person per year, or US\$3.98 per day in 2011 PPP.

rich households after direct transfers and subsidies are received and direct and indirect taxes are paid. While the pilot direct cash transfer programs (Takaful and Karama) are clearly targeted to poor and vulnerable households, the other expenditures (the food credit and energy subsidies) are universally available. The estimated net position of households is a result reflective of the GoE's documented gap between expenditures and revenues. This approach is not fiscally sustainable in the long run. In the short run, the GoE has financed it through the emission of bonds, typically held domestically.

In other fiscal settings, a lack of emphasis on targeted expenditures and revenue collections can mean that poor and vulnerable households do not capture the most valuable benefits (for example, because they buy few subsidized energy products directly) while remaining liable for some portion of the most significant tax instruments (or example, VAT). In such a setting, fiscal impoverishment, or the extent to

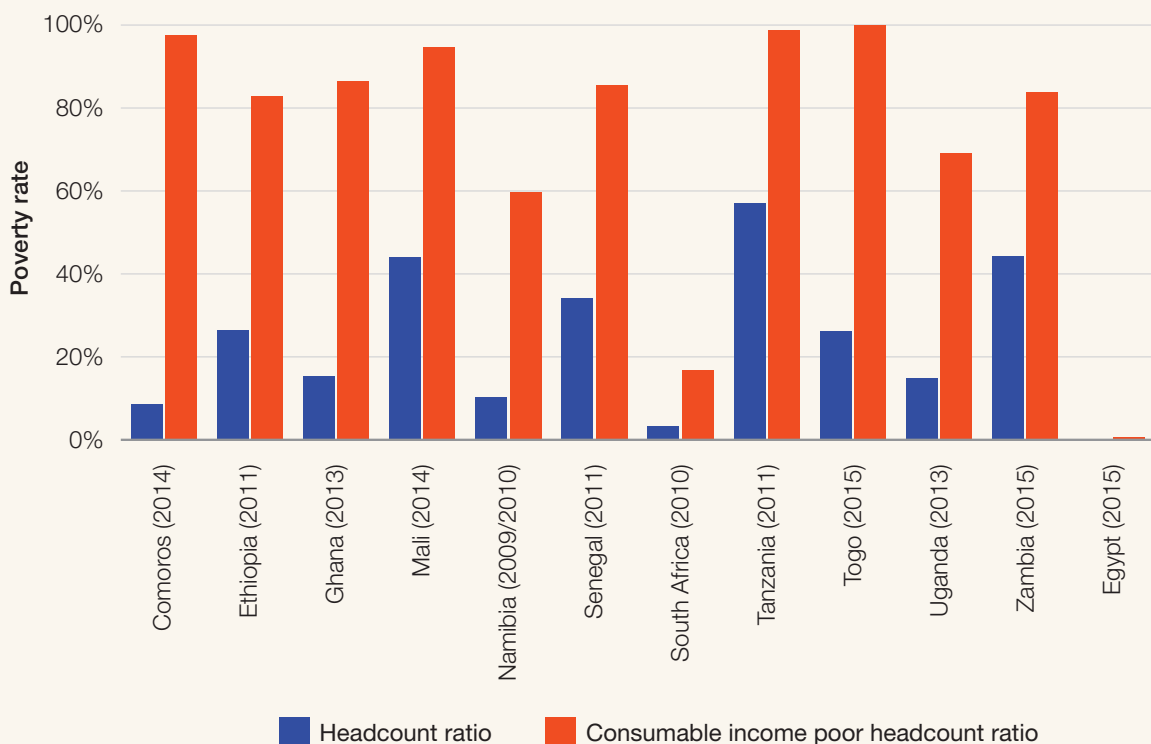
Figure 5.12. Net Cash Position (in Percent of Own Market Income Plus Pensions) through Consumable Income (by Market Income Plus Pensions Decile)



which poor and vulnerable households suffer *net losses* from the fiscal system, can be quite high.¹³⁰ Figure 5.13 shows the extent of fiscal impoverishment (at US\$1.90 per day [2011 PPP] international poverty line) in a set of 11 low- and middle-income African countries between the years 2010 and 2015 and Egypt in 2015: only South Africa and Namibia avoid egregious fiscal impoverishment among the populations at large. In Egypt, meanwhile, fiscal impoverishment is essentially zero.¹³¹

Egypt's fiscal profile—nontargeted expenditures that create cash or near-cash benefits that are larger (in absolute magnitude) for all individuals than the direct and indirect taxes collected from the same individuals—is rare. In other country and fiscal contexts, such a mismatch would be fiscally unsustainable. In Egypt (in 2015), however, the revenue shortfall was approximately 10 percent of GDP. The funding gap in FY15, as well it other years has been typically funded through government bonds.

Figure 5.13. Fiscal Impoverishment (at Consumable Income) in 11 African Countries and Egypt



Sources: Egypt: based on HIECS (2015) and budget figures from FY14/15 and FY15/16. All other countries: de la Fuente, Jellema, and Lustig 2018.

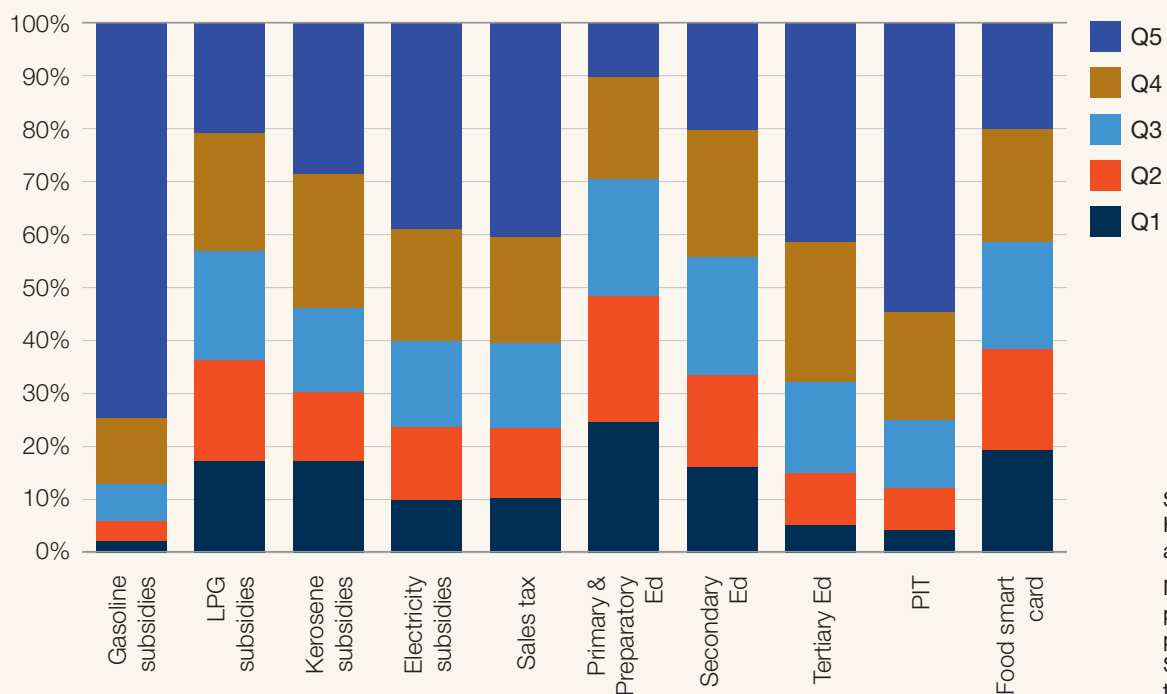
Notes: For a description of fiscal impoverishment see Higgins and Lustig (2016). The Fiscal Impoverishment (FI) headcount measures the proportion (out of the entire population) of individuals who were prefiscal poor and became poorer or prefiscal non-poor and become poor as a result of taxes and transfers. The FI consumable income poor headcount measures the proportion (out of the entire post-fiscal poor population of individuals who were prefiscal poor and became poorer or prefiscal non-poor and become poor as a result of taxes and transfers). Egypt fiscal impoverishment figures are calculated using the international poverty line of 1.90 US\$ per day (in 2011 PPP). The fiscal impoverishment–headcount ratio and fiscal impoverishment–consumable income poor headcount ratio are both zero (0.0 percent) in Egypt.

The incidence of different policy instruments helps us to better understand the capacity of each to attain the objectives of poverty reduction or equity. Figure 5.14 presents the incidence of government spending (or tax collection) across quintiles of a selection of the policies studied in the CEQ exercise. It is evident, for example, that the most equity-enhancing education expenditure is that devoted to primary and preparatory education. About a quarter of spending in this category is estimated to be received by the poorest quintile. In contrast, the spending on tertiary education appears to be regressive. About 40 percent of this spending is benefiting the richest quintile, whereas households in the poorest quintile receive only 5 percent of the benefits.

Finally, figure 5.14 provides evidence that the reforms recently implemented by the GoE tackled some components of subsidies spending that were benefiting the better off. Almost three-quarters of the subsidies to gasoline were received by the top 20 percent of households, while only 2 percent were received by the bottom 20 percent. Electricity and kerosene subsidies are also enjoyed by the richest quintile, while LPG subsidies tend to be more equitably distributed.

The concentration coefficients in figure 5.15—provide a summary indication of whether a fiscal instrument is more (or less) equally distributed than income itself.¹³² Intuitively, when a single expenditure (tax) instrument has a concentration coefficient smaller (larger) than the prefiscal income Gini coefficient, that instrument *potentially* reduces inequality.¹³³ Figure 5.15 indicates that the pilot direct transfer programs—Takaful and Karama—as well as public health care services and public education services at the primary and secondary levels, the kerosene and LPG subsidies, and the personal income tax

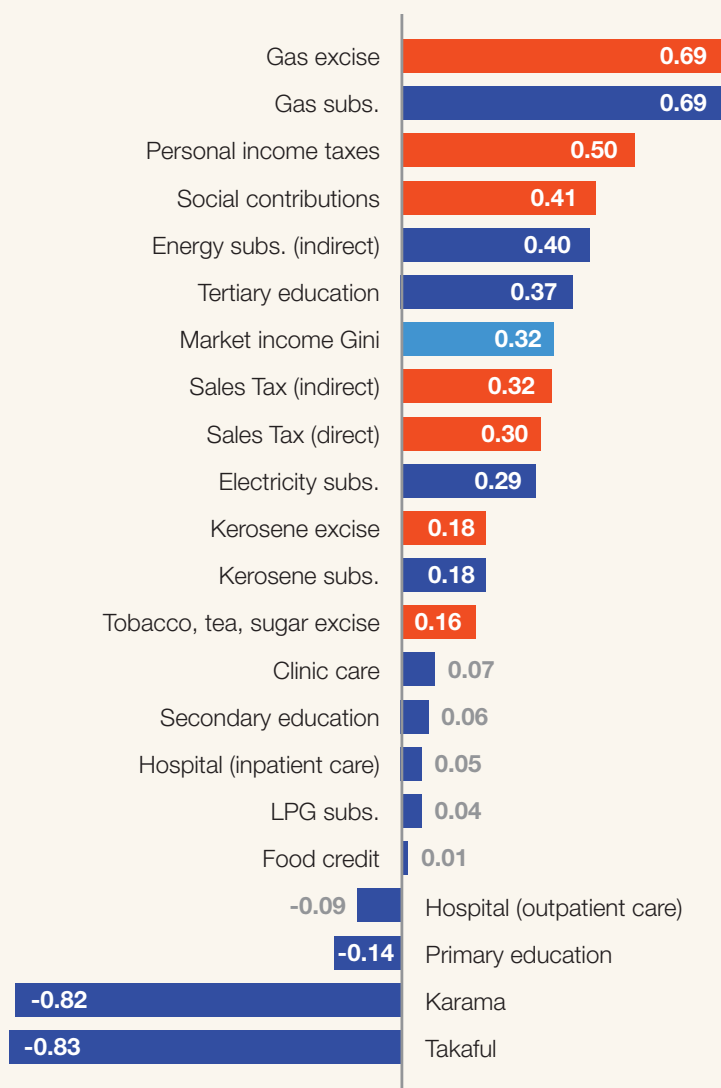
Figure 5.14. Concentration Shares of Benefits and Payments in Egypt, 2015, by Fiscal Policy and Market Income Quintile



and social contributions all could (in theory) reduce income *inequality*. The electricity subsidy and the sales tax, because they have concentration coefficients nearly equal to the income Gini, likely have little inequality-reducing potential. Meanwhile tertiary public education, the gas subsidy, and the indirect impacts of energy subsidies all could (in theory) actually contribute to an increase in inequality.

Egypt collects most of its revenues from the indirect tax system. The personal income tax (PIT) in Egypt is progressive in that shares of the PIT burden increase with income shares; it also protects poor households with a reasonably high tax threshold (the income amount below which an individual with that income is not liable for PIT). However, indirect taxes, provide a larger share of revenues to the Egyptian government and affect all households via consumption expenditure activity; even sales-tax-exempt goods and services may carry an implicit tax burden via taxes on inputs paid by producers and passed on to consumers in higher final prices.

Figure 5.15. Concentration Coefficients by Available Instruments in Egypt, 2015



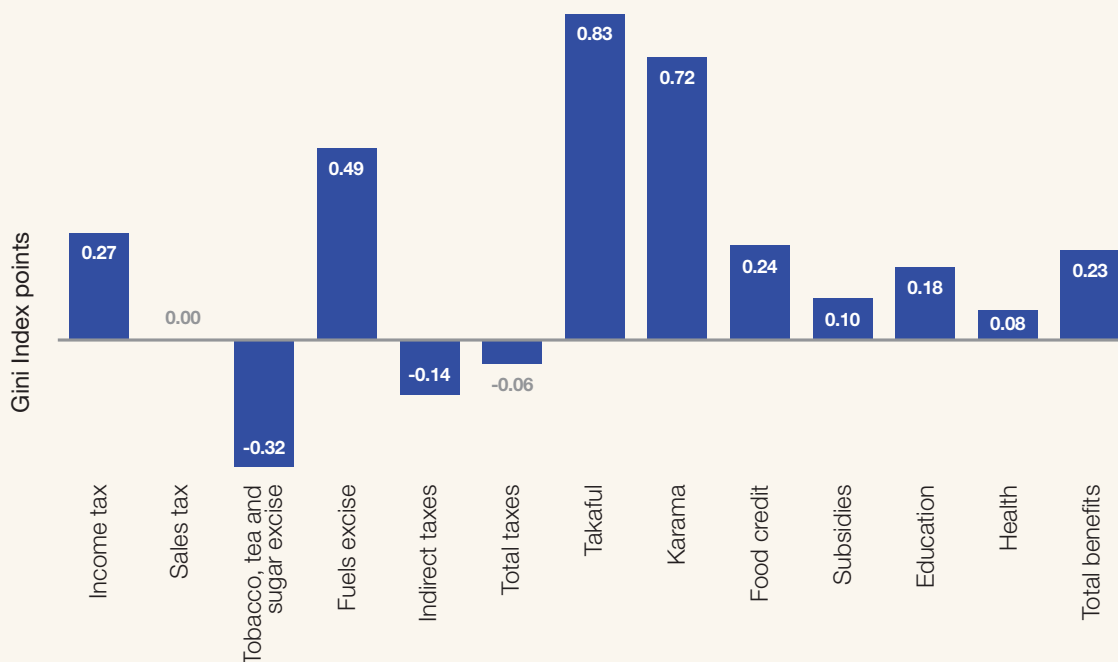
Source: Based on HIECS 2015 and administrative data.

Note: LPG = liquefied petroleum gas. LPG subsidies only reflect only the direct effects.

A majority of Egypt's fiscal instruments have the *potential* to reduce inequality. To illustrate how much of that potential was actually achieved in 2015, figure 5.16 presents inequality impact effectiveness indicators for expenditures and taxes. These indicate the size of the actual marginal impact a fiscal instrument had on inequality relative to its potential maximum impact in Egypt in 2015 if the fiscal intervention would have been designed in such a way to maximize its inequality-reduction impact, keeping the amount collected or spent fixed. Figure 5.16 demonstrates that the PIT system in Egypt achieved approximately 27 percent of its maximum potential inequality reduction, while all energy-subsidy spending achieved slightly less than 20 percent of its maximum potential inequality reduction. Therefore, based on this estimated potential, the PIT system was more effective at equalizing incomes than was the subsidy program. Notice also that the inequality impact of individual indirect taxes in Egypt can be highly negative (the tobacco excise), highly positive (the fuels excise), or neutral (the general sales tax). Overall, indirect taxes *increase* inequality in Egypt as the direct burden (for the household) for poorer households of the tobacco excise, measured as a share of pretax income, far exceeds the direct burden of the fuels excise.

Figure 5.16 also demonstrates that direct taxes and direct transfers are more effective at reducing inequality than are, for example, subsidies, in-kind services, or indirect taxes. This is not uncommon—see figure 5.17, which presents the range and mean of the Inequality Impact Effectiveness Indicator for different classes of instruments in 11 African countries between 2010 and 2015 as well as the value of the same indicator in Egypt in 2015. Egypt's inequality impact effectiveness indicators for

Figure 5.16. Impact Effectiveness Indicator: Inequality

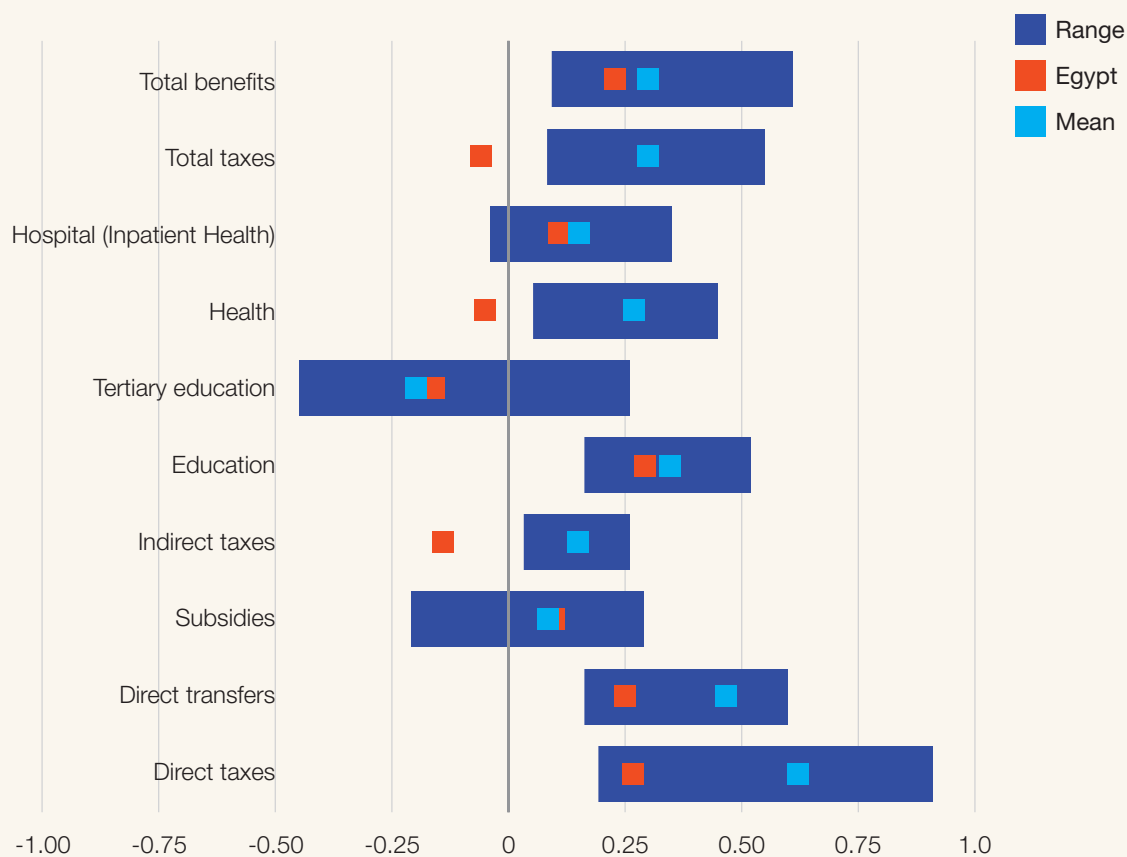


Source: Based on HIECS 2015 and budget figures.

direct transfers and direct taxes are below the mean, but still within the range shown in figure 5.17. Subsidy spending is approximately at mean effectiveness, while indirect taxes (and also total taxes) are outside the range and actually contribute to an *increase in inequality*. This is due to the steep excises on alcohol and, especially, tobacco.¹³⁴ Figure 5.17 also presents Egypt's fiscal quandary: while fiscal policy (circa 2015) was indeed reducing inequality as well as poverty, most Egyptian expenditures are not targeted and are therefore *larger* than they need to be in order to have positive welfare impacts. That in turn indicates that the 2015-era profile of expenditures and revenue collections is likely not sustainable (see also tables 5.1 and 5.3).

The fiscal gains to the poor effectiveness indicator (figure 5.18) provides a similarly intuitive statistic for the effectiveness of direct and indirect transfers in protecting poor and vulnerable households from further impoverishment. In other words, the Karama direct cash transfer was the most effective at protecting poor households *specifically* because it was targeted to households in the poorest 20 percent of the population. The Takaful program, meanwhile, delivered far greater amounts through

Figure 5.17. Inequality Impact Effectiveness Indicator and 11 Low- and Middle-Income African Countries

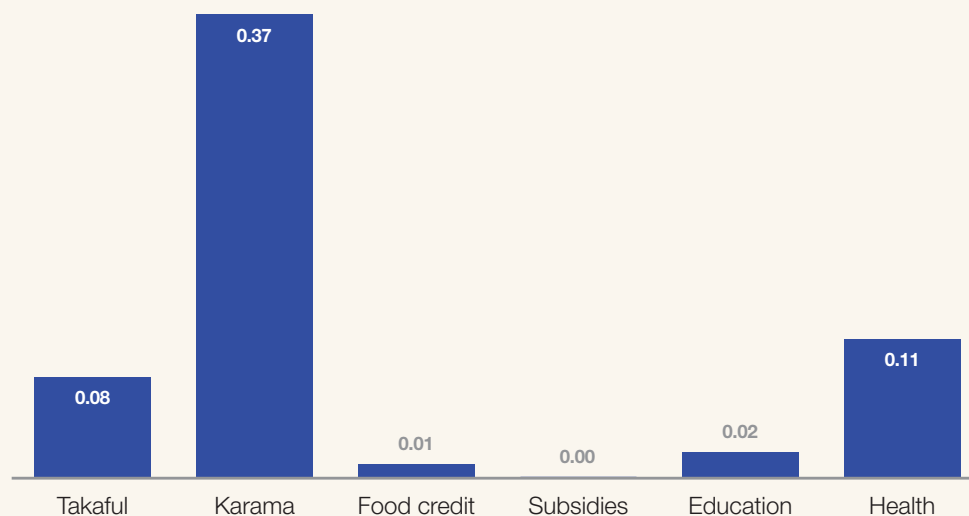


Source: Egypt: based on HIECS 2015 and budget figures. All others: de la Fuente, Jellema, and Lustig 2018.

Note: Hospital/inpatient health in Egypt includes outpatient services at public hospitals.

direct transfers, but it delivered those amounts to poor and non-poor households. Therefore, the Takaful program was relatively less “effective” and less efficient (given the Takaful program’s budget) at protecting poor and vulnerable households than the Karama program (given the Karama program’s budget). The food credit program, energy subsidy expenditures, and public education expenditures reach a very small proportion of their potential to reduce inequality; this is due primarily to the large amounts spent on those programs combined with their near-universal coverage.

Figure 5.18. Effectiveness Indicator of Fiscal Gains to the Poor



Source: Based on HIECS 2015 and budget data.

Simulations using CEQ framework

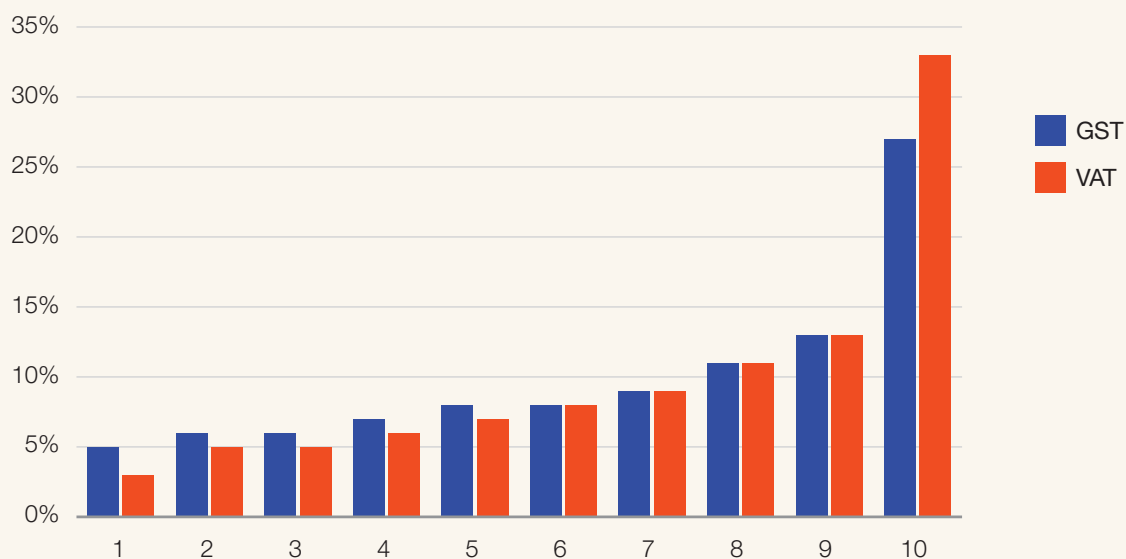
IS VAT LESS REGRESSIVE THAN GST? IS THE VAT BURDEN ON POOR HOUSEHOLDS REDUCED RELATIVE TO GST?

In 2015, the majority of Egypt’s indirect tax revenues came from the GST. Soon after, the GST instrument was transformed into a VAT. With a VAT, there are fewer pathways for taxes paid (on inputs into production, for example) to “cascade,” or to multiply at each stage of production and be passed on to final prices. Figure 5.19 summarizes the concentration shares for the GST regime and the VAT regime that replaced it.

Figure 5.19 demonstrates that, although the differences between the GST and VAT regimes are small for most households,¹³⁵ the VAT regime is likely to be progressive relative to the GST regime. For all households except for the very richest, their shares of total VAT revenues are smaller than

their shares of total GST revenues. The VAT regime creates smaller burdens (relative to own incomes) for all households when compared to the GST regime, but the reductions in incidence are greater for poorer households.

Figure 5.19. Percent of GST and VAT Total Payments by Market Income Decile

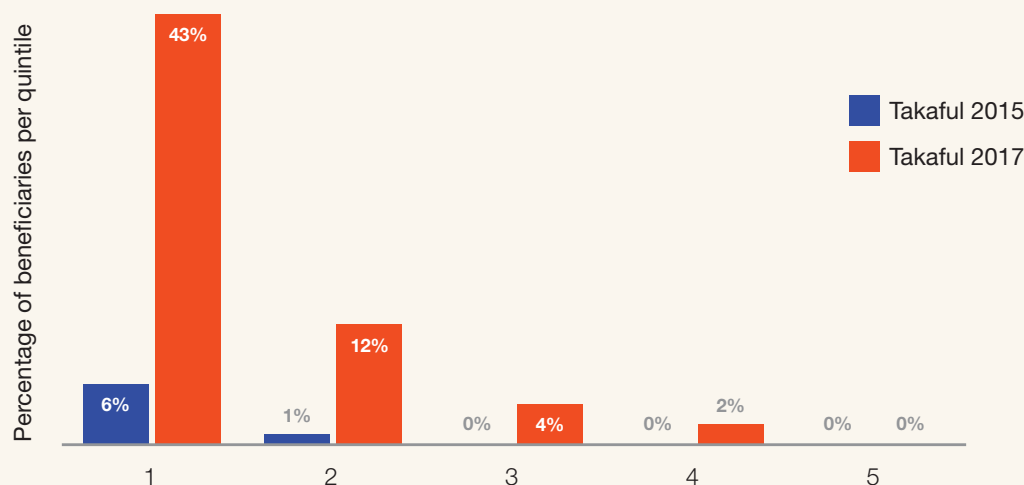


Source: Based on HIECS (2015); budget figures from FY14/15 and FY15/16; and statutory rate schedules for GST (2015) and VAT (2017).

EXPANSION OF TAKAFUL

By using the known geographical expansion pattern and large increase in the number of beneficiaries of Takaful, we simulate the distribution of the incidence of the program by using the elements that the Ministry of Social Solidarity observed for the eligibility criteria and map it to the HIECS 2015 data. It is evident that the application of a *proxy means* test holds vast potential for the targeting of Takaful, and that the expansion undertaken by GoE most likely led to increased protection for the poor. Using the market income quintiles among households with children as a guideline,¹³⁶ figure 5.20 shows that in 2015, about 6 percent of households in the poorest quintile were receiving Takaful benefits.¹³⁷ Assuming no further changes to the population or its consumption, our simulations show that by 2017, the expansion had led to a substantial increase in the incidence of the program, especially among the vulnerable populations. Around 43 percent of those in the bottom 20 percent are estimated to be a beneficiary of the program. The corresponding number for the second quintile is 12 percent.

Figure 5.20. Simulated Incidence of Takaful in 2015 and 2017, Based on Market Income Quintile



Source: Based on HIECS 2015 and budget figures from FY14/15 and FY15/16.

Note: Market income purges all government interventions (taxes or benefits) from households' income. In calculating the quintiles, only households with children under 18 years are included, as they are potential beneficiaries of Takaful.

Conclusions

This study implements the CEQ methodology for the case of Egypt. Having unprecedented access to the administrative data of the GoE, this study is able to map several of the country's main policies and assess their impact on poverty and inequality. From the expenditure side, the exercise accounts for social spending (including pension fund contributions, social solidarity pensions, the food subsidy program, the Baladi bread program, and the recently implemented Takaful and Karama programs); we also account for education and health spending, as well as expenditures on fuel and electricity subsidies. For the revenue side, the exercise includes the direct personal income tax, the alcohol and tobacco excise, the fuels excise, and the direct and indirect burdens created by the GST.

Fiscal policy in Egypt reduces inequality and poverty through a series of fiscal policy elements. The flagship, nearly universal program of the food smartcard and Baladi bread allowances of the Tamween program has a relatively low contribution to the equity efforts of the GoE. Instead, poorer households tend to receive larger benefits from education spending in basic education and were well targeted by the recently introduced Takaful and Karama programs. Direct taxes are also found to be slightly progressive, with richer households liable for larger shares of the tax than their estimated market income share. Subsidy spending is not equality enhancing, as a large share of the benefits end up among the richest households—probably linked to the consumption patterns and ownership of assets, such as cars. Overall, Egyptian fiscal policy in 2015 achieves inequality reduction around the median of its comparator group but, since its prefiscal inequality is rather low, Egypt ranks lower among the same set of countries in terms of the total impact of fiscal policy on inequality.

The direct and indirect benefits from energy subsidies, however, contribute nearly as much to total poverty reduction (from fiscal policy) as total direct transfers. As the food credit transfer made up nearly 100 percent of total direct transfer expenditures in 2015, the largest poverty reductions are produced by universal or nearly universal transfers, making poverty reduction an expensive proposition. Fiscal policy reduces the poverty headcount ratio and does not impoverish the poor, but it could achieve more if transfers and subsidies were switched from universal to more targeted.

Results of the exercise suggest that recent GoE policy directions have been progressive and led to important impacts on inequality and poverty. The continuous elimination of subsidies that the government launched in 2014, with the corresponding increase in social spending, change the balance of GoE's spending toward a more equitable distribution. The tenfold expansion of the Takaful and Karama programs between 2015 and 2017 is also an important step in the right direction. Using a means-tested approach, these programs have strong potential to benefit the most vulnerable in the Egyptian population. Finally, the measures to increase administrative efficiency and clean the beneficiary list of the food program to exclude those ineligible may have also positively affected the equitable angle of the government spending. Being a quasi-universal program, shifting the resources of the food subsidy program toward those on the bottom of the distribution will surely contribute to a more equity-enhancing distribution of expenditures.

The findings in this exercise should be taken as a solid starting point to promote evidence on the impact of policy levers in Egypt. The simulations run here are simple examples of the changes in policy that can be modeled. While the results shown here do not incorporate changes in behavior, further work could allow for this possibility. Going forward, the structure of the exercise could be easily updated to reflect new data as soon as it becomes available. The recent launch of the new HIECS in October 2017 holds great potential for updating of the results, as long as it can be complemented with administrative data.

ANNEX A. ESTIMATING THE INDIRECT IMPACT OF INDIRECT TAXES OR PRODUCTION SUBSIDIES

In order to model the price impact and indirect benefit or burden for consumers of either production subsidies or indirect taxes, respectively, we utilize household survey data, administrative revenue and expenditure data, current or proposed tax and subsidy schedules, an input-output (IO) table or social accounting matrix (SAM), and microsimulation.

A Cost-Push” Model of Indirect Tax or Production Subsidy Incidence

The assumption underlying the analysis here is that (nonrefundable or net) indirect taxes¹³⁸ on inputs into production or subsidies on production are “pushed” forward onto the prices paid by purchasers of products.¹³⁹ Because this price-shifting model refers to a macroeconomic structure at a point in time and does not specify or generate any behavioral changes (by either households or firms) that result in changes to that macroeconomic structure, it is a static model. We therefore take results generated as an upper-bound estimate of the impact of any change in government-administered price policy on household welfare.

Under cost-push assumptions, any net taxes paid on inputs into production or net production subsidies received (via input purchases) are embedded in the final purchase price of goods and services. If a good purchased by a firm as an input into production already has embedded taxes or subsidies, then those too would be reflected in the prices that firm must charge on top of any indirect taxes levied on, or subsidies accruing to, their own output. It is through this “taxes on top of taxes,” or cascading of indirect taxes, along the chain of production that the purchaser of a taxable product may face an additional implicit indirect tax burden on top of the tax paid explicitly by the consumer for the good or service in question.

To account for these effects, we use IO tables, which reflect the structure of production—including the structure of intermediate inputs—across different economic sectors and build on a method originally developed by Ahmad and Stern (1984), and developed in Coady (2008) and Inchauste and Jellema (2018). Essentially, the effective rate of tax or subsidy on any product in a household’s consumption basket is a function of the rate of tax or subsidy on that product plus the (nonrefunded) taxes paid (or subsidies received by) each of the inputs used in its production (summarized by the Leontief coefficient matrices from the IO table).

The model's solution provides IO-sector by IO-sector changes in producer prices as a result of a subsidy received or indirect tax paid somewhere in the production side of the economy. Therefore, the level of detail or disaggregation in the estimated solution corresponds to the level of detail in the IO matrix used,¹⁴⁰ and calculating the indirect welfare losses (gains) from indirect taxes (subsidies) requires knowledge of the household budget shares for purchased goods or services at the IO-sector level.

Our estimates for the accumulated taxes or subsidies that implicitly form part of the final price paid by consumers involve the following steps:

1. Prepare the IO matrix or SAM.
2. Map household consumption expenditures to IO production sectors.
3. Calculate the subsidy (tax) as a percentage of the market or reference price and map the subsidy (tax) schedule to IO sectors.
4. Determine which (if any) IO sectors would continue to have regulated or nonmarket prices if the price policy under consideration were revised.
5. Read in the IO matrix or the SAM.
6. Enter exogenous price shocks and designate sectors with fixed prices.
7. Solve the model.¹⁴¹

Example Calculation of Steps 1, 6, and 7

Suppose we received the following IO matrix describing the production sectors in some country-level economy producing food, fuel, and widgets, in any year:

Sector/commodity	1	2	3	Household consumption
1 = Food	40	5	7	34
2 = Fuel	15	35	7	243
3 = Widgets	2	22	10	120
Output	120	75	80	560

This IO matrix describes the value of the inputs used in production in all sectors (the columns) and the uses (or destinations) of all sectoral outputs (the rows) in a double-accounting framework. Step 1 above indicates that we need a technology coefficients matrix A , which looks like the following:

Sector/commodity	1	2	3	Household consumption
1 = Food	0.3333	0.0667	0.0875	34
2 = Fuel	0.1250	0.4670	0.0875	243
3 = Widgets	0.0167	0.2930	0.1250	120

The technology coefficients in any sector's column do not sum to 1; we are taking the value of intermediate inputs over the total value of output, but the total value of output also includes payments made to factors (labor, land, capital) in addition to payments made for intermediate inputs.

Suppose we know that fuel prices are kept 10 percent below the market or reference price through government operations. In other words, the government uses fiscal expenditures to provide fuel at prices that are 10 percent below the price that would occur if government were not making those expenditures. Suppose also that the government would keep the price of fuels at the reference price even if there were no direct subsidy. We are interested in the effect of the current subsidy on prices in the food and widget sectors under the cost-push model described, and so for steps 3, 4, and 6 we would enter a 10 percent price change for fuel as well as designate fuel as a "fixed price" sector.

Step 7 asks us to solve the cost-push model of sector prices given the 10 percent shock introduced (representing the no-subsidy counterfactual) in fixed-price fuels; to do so we first calculate the matrix $K = (I - \alpha A)^{-1}$, where A represents the Leontief coefficients version of the IO matrix. The typical element of K captures the combined direct and indirect expenditure on cost-push sector i used to produce one expenditure unit's worth of cost-push sector j , and the scalar α demarcates cost-push sectors 1 (food) and 3 (widgets) in our model from the controlled sector 2 (fuel in our example). For our example, $K =$

	s1	s2	s3
s1	1.504	0.1444	0.1504
s2	0	1	0
s3	0.0286	0.3380	1.146

We can then create the indirect price changes for each sector (arising as a result of the exogenous shock or shocks, here named Δt^c) by multiplying the exogenous shock by α postmultiplied by K . Since the fuel sector (2) is controlled, only food (sector 1) and widgets (sector 3) will have indirect price changes. We end up with $\Delta t^c \cdot \alpha \cdot A \cdot K + \Delta \tilde{p} \cdot (1 - \alpha) \cdot A \cdot K =$

	s1	s2	s3
Indirect price changes	0.0191	0.0	0.0119

In other words, prices are expected to increase in sector 1 (food) by approximately 1.9 percent and in sector 3 (widgets) by approximately 1.2 percent if the 10 percent fuel subsidy were to be removed. Notice that food's use of fuel (as represented by the technology coefficient in cell [2,1] in the IO matrix A) is greater than the widget sector's use of fuel (as represented by the technology coefficient in cell [2,3] in the IO matrix), so it makes sense that the indirect effect is greater for food than for widgets.

We know that fuel was a "fixed price" sector and that the only exogenous shock was in fuel, so we can also list the total (direct plus indirect) price changes for all three sectors. That is,

$$\Delta t^c + \Delta t^c \cdot \alpha AK + \Delta \tilde{p} (1 - \alpha)A =$$

	s1 = Food	s2 = Fuel	s3 = Widgets
Total price changes	0.0191	0.10	0.0119

Once the household consumption expenditure survey module is recategorized according to IO sectors (see step 2), all consumption expenditure in that IO sector can be revalued according to new prices in that sector by either the "inelastic demand" or "homothetic preferences" scenarios listed in the discussion of the direct effects of indirect taxes and subsidies.

The example makes it clear that a single tax (subsidy) can have both direct and indirect impacts. A fuel subsidy, for example, lowers the price of fuel that a household purchases for vehicles and cooking, but it also lowers the price of agricultural goods and public transport. Under the price-shifting model, households receive the full magnitude of the direct and indirect benefits (burdens) created by a subsidy (tax).

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ENDNOTES

- 1 Based on World Bank World Development Indicators GDP per capita in 2011 purchasing power parity (accessed on 7/7/2017), and final consumption expenditure in constant 2010 US dollars.
- 2 The CBN approach was first defined in 2000. The methodology was updated to accommodate changes in the household survey in 2005 and to allow the reference baskets to reflect changes in consumption patterns following the Egyptian pound devaluation (World Bank 2007b).
- 3 In some countries, a similar approach is applied, as they base their poverty calculations on a relative poverty line. Under this definition, the minimum threshold of living standards is actually a function of the current consumption distribution. For instance, a relative poverty line could be defined as the equivalent to half of the median consumption per capita in a country. This approach allows incorporating the level of development in the country into the definition of deprivation and is most commonly applied in developed contexts. Monitoring the reduction of poverty over time, however, requires an absolute approach.
- 4 The analysis over time follows a method developed in World Bank (2015).
- 5 The team thanks CAPMAS for making representative samples of several HIECS rounds available for this work. CAPMAS has made progress on its open data agenda recently. There is still, however, scope for improvement, such as a access to full samples of the data collected, providing more disaggregated expenditure information on households' consumption, or improving access to non-Arabic data users.
- 6 The welfare aggregate is used as opposed to income-based aggregates used in other countries.
- 7 Two other adjustments to the welfare aggregate could be considered: spatial and temporal adjustments (Deaton and Zaidi 2002). Spatial adjustments are needed to address the potential differential living costs faced by households. The region-specific poverty lines used here address this issue. Temporal adjustments were unfortunately not possible due to the unavailability of the survey month in the data. A sensitivity analysis using data from the HIECS 2012/13 (a survey where the data collection period experienced similar inflation to the data collection period of HIECS 2015) showed that temporal adjustments led to more qualitatively similar results than without the adjustment (once spatial cost of living differences were taken into account).

- 8 Ration card holders also had a monthly quota of bread. If the quota was not fully consumed, households received “points” the following month that could be exchanged for items in the ration card list.
- 9 For the Japan and Turkish cases in 2016, respectively (OECD Stat “Household housing consumption, percentage of households net adjusted disposable income”).
- 10 These steps are a compilation from information obtained in El-Laithy, Lokshin, and Banerji (2003) and World Bank (2002; 2007a; 2007b; 2010) as well as documentation kindly provided by CAPMAS and Heba El-Laithy. The approach described captures well the methodology used in producing CAPMAS’s official poverty numbers. A detailed explanation of the CBN approach can be found in Ravallion (1998), and a discussion of poverty measures in the household survey context can be found in Deaton (1997).
- 11 WHO’s daily allowances are differentiated by weight and activity. General assumptions were made to keep the calculations simple, and because of lack of data on individuals’ weight, activity, or BMR in the HIECS.
- 12 Food calorie information was originally taken from FAO (1982). Starting in 2010/11, the calories were obtained from National Nutrition Institute in Cairo (2006). Further adjustments were made to the table as per discussions with experts.
- 13 Food expenditures include both food to consume at home and food purchased and consumed away from home.
- 14 Having region-specific parameters implicitly allows for a differentiation in the cost of living (and hence values of poverty lines) that are used to classify households residing in different regions as being in poverty or not according to their estimated welfare. This approach addresses the differences behind the spatial adjustment suggested in Deaton and Zaidi (2002). Alternatively, one could use a spatial deflator to take into account cost of living differences and use it to normalize the households’ welfare aggregate, create one national poverty line, and estimate the poverty status based on these. Joliffe, Datt, and Sharma (2004) use region-specific poverty lines to create this index.

- 15 The increase in educational attainment need not be perfectly correlated with quality of actual learning. Unfortunately, some evidence suggests that there is a gap between the schooling and learning in Egypt. Egypt participated in the 2007 and 2015 Trends in International Mathematics and Science Study. In 2007 Egypt ranked 38th out of 48 countries, while in 2015 it ranked 33rd out of 37 (in the 8th grade mathematics achievement test). Using the 2015 data, World Bank (2018) found that among people 25–29 the average years of schooling was 10, but after adjusting for quality, learning was only equivalent to 6.4 years of education. Global rankings such as the quality of primary education from the Global Competitiveness Index placed Egypt in the bottom of the distribution in 2014–15. Finally, a UNDP (2015) suggested that about a third of students in preparatory stage could not read and write.
- 16 These findings from HIECS are consistent with the results reported in Narayan et al. (2018) using the Egypt Labor Market Panel Survey data.
- 17 Krishnan et al. (2016) show that location is also an important predictor of lower educational attainment among Egyptian children, as measured by completion of primary school on time.
- 18 These rates follow in spirit the intergenerational poverty rate and the poverty-to-privilege rate described in Narayan et al. (2018).
- 19 As in other contexts, inequality estimates based on household surveys may be underestimated due to the higher likelihood of nonresponse among (relatively) rich households. For the Egyptian case, Van der Weide, Lakner, and Ianchovichina (2016) use real-estate housing prices to estimate the top tail of the income distribution and reestimate the urban Gini (based on income per capita and without controlling for the dual rental market in Egypt). They find the Gini index increases from 36 to 47. Alvaredo, Assouad, and Picketty (2018) combine household surveys, national accounts, fiscal and wealth data to estimate the income concentration in the Middle East region. Based on their estimates for the adult population and using harmonized corrections from countries in the region, Egypt's Gini index was 54 in 2015, barely moving from 56 in 1999.
- 20 The official poverty rates at the national level were as follows: 25.2 percent (2010/11), 26.3 percent (2012/13), and 27.8 percent (2015).
- 21 The final hedonic model was also used to correct for some abnormal values reported by owners and in-kind dwellers. In these groups, respondents reported hypothetical rents that were above what a rental predictive model would suggest. We apply a correction for these groups of households as well.

- 22 In fact, we allow for the value to reflect an item of relatively low quality. For each of the subsidized items, we calculate the price distribution of the item from all the households that purchased a similar item at the market price. We then take the median price from the bottom 40 percent of the distribution.
- 23 See annex 1B for the implications of changes to the methodology.
- 24 The CPI used to deflate across years is a region-specific yearly average. There are eight CPI regions in the country: Cairo, Alexandria, Canal Governorates, Frontier Governorates, Urban Lower, Urban Upper, Rural Lower, and Rural Upper. CPI data were kindly provided by CAPMAS.
- 25 Other approaches to adjust for prices were tested and provided similar qualitative results. For instance, inflating the food and nonfood components of the welfare aggregate separately using a food and nonfood CPI yielded similar results. Using an inverse approach in which the estimated poverty line (in 2015 prices) was deflated to each corresponding HIECS year produced results close to those shown here.
- 26 This information can be found at the Economic Research Forum portal <http://www.erfdataportal.com/index.php/catalog/48/overview>, accessed December 17, 2015.
- 27 Both governorates were later abolished and the later rounds of HIECS no longer included this differentiation.
- 28 This means that these households had been interviewed in previous rounds of the HIECS as well.
- 29 Harmonized versions of the microdata sometimes exclude sections of the HIECS questionnaire or present expenditure or income data at the aggregate level and not per item. See <http://www.erfdataportal.com/index.php/catalog>, accessed August 1, 2018.
- 30 GIC is a graph that shows annual growth rates in welfare for all individuals (or households) in the country. The GIC calculates for each percentile of the per capita consumption distribution the observed annual growth rate between two time periods of interest. To make this comparison informative, the per capita consumption distribution in all years has to be expressed in the same prices. This adjustment helps purge any changes in observed consumption that are entirely due to changes in prices—which by themselves do not lead to a change in welfare. All measures were based on 2015 prices using a region-specific CPI.
- 31 The threshold for the upper poverty line is higher than for the poverty rate. The upper line is identified by the level of expenditure of households that have a food expenditure level that allows to cover for all their caloric requirements, as well as nonfood expenditure. This threshold requires that households do not “sacrifice” expenditures required to cover their food needs so they can buy nonfood items.

- 32 A back of the envelope calculation suggests that transfers from smartcards also became more important in card holders' expenditures in rural Egypt. In 2010/11, food cards represented 4.7 percent (7 percent) of households' food expenditures in Rural Lower (Upper) Egypt. In 2012/13, this share had increased to 6.4 percent (9.6 percent).
- 33 Following World Bank methodology, the poverty line is based on a normative food bundle set by the HIECS 2015, which ensures that nutritional requirements are met with a diet that is consistent with Egyptian tastes of the poorest two quintiles, in 2015. This bundle is valued at regional-specific prices. The food component of the poverty line is augmented with an allowance for nonfood goods, consistent with the nonfood spending of those households whose food spending is no more than adequate to afford the food component of the poverty line. We followed parametric estimation for the nonfood poverty line where Engel's regressions were estimated for each region. Regional calorie costs and parameters for Angel's regressions were applied to households in all surveys, taking into account differences in age and gender composition of households.
- 34 Note that such individuals may benefit, but they do not contribute to the system.
- 35 World Bank national accounts data and OECD national accounts data files, <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=EG>.
- 36 The most recent HIECS 2015 was not used as the number of households that were followed and re-interviewed was substantially reduced with respect to previous HIECS rounds rendering the panel sample non-representative of the country.
- 37 This is estimated as follows. According to WB data base, in 2005, 2005 PPP conversion factor, private consumption (LCU per international \$) is 2.0224. We multiply this by the inflation accumulated between 2005 and 2015 $=2.334$) to obtain the final adjustment factor of 4.72.
- 38 Estimates based on Egypt's Labor Force Survey (OAMDI 2018). "Out of labor force" are those that are not enrolled in school and not searching for a job. Predictions from Mincerian wage regressions suggest that total wages could rise from LE 27 billion to LE 98 billion (2016 values) if it were possible for the entire working-age population (59 million) to be sufficiently educated and for everyone to be employed in a quality formal sector job that matches their skill set based on the average wages of workers. These estimates are very rough, and identifying how changes to demand or increases in education would affect total wages necessitated moving to a general equilibrium framework, since investments in education and skills affect both labor supply and demand of the different skill and education groups.
- 39 It is difficult to sustain both politically and financially a quality welfare system where only a small share of the population pays in and a much larger share requires government outlays.

- 40 While these papers place an upper bound on potential jobs that could be destroyed, a more balanced view is presented by Autor (2015), which acknowledges that automation is causing tasks to change more rapidly, placing more emphasis on workers that have the ability to adapt and learn new skills. As a result, there are winners and losers from automation, requiring governments to think about policies that can help provide a safety for these workers that have trouble adapting. Developing countries additionally face the challenge that many are still in the process of structural transformation that shifts workers out of agriculture and into industry and services (see, for example, McMillan and Rodrik 2011).
- 41 The so-called credentialist model predicts that there will be overinvestment in credentials that are ill suited for private sector employment that emphasizes skills and result in unemployment and low labor market participation. This is considered an equilibrium outcome in a world where public sector employment pays above market wages (see Assaad 2014). This is further confirmed by Rizk (2016), who finds that there are strong returns to education in Egypt compared to three other Arab countries due to the heavy emphasis of public sector employment on credentials as opposed to skills.
- 42 In 2016, the net enrollment rate (NER) in Egypt was 97 percent and the gross enrollment rate (GER) 103 percent. The NER/GER has roughly hovered above 90/100 at least since 2005. These statistics, however, are potentially an imperfect proxy for evaluating access to education since those who enroll might attend school or complete schooling. Therefore, labor market statistics that evaluate and document actual completion of education levels may better reflect actual uptake than the NER/GER. As a result, this chapter argues that access to primary education remains a problem.
- 43 In trying to understand how to improve efficiency and promote broader welfare and poverty reduction in developing countries, examining the quality of labor market match outcomes can provide better insights than studies that focus only on unemployment or wage outcomes. In Egypt, a large proportion of the population is informally employed, making it difficult to assess job outcomes, due to missing wages. Moreover, unemployment is a status skewed disproportionately by those with the wealth and means to stay unemployed, and therefore labor market interventions that target this population set likely will have more limited impacts on poverty reduction.
- 44 Data were obtained for the years 2011–14, but the short span made it difficult to observe trends over time.
- 45 Indices for tasks were obtained from STEP microdata and then aggregated over the six Asian economies and renormalized to have mean 0 and standard deviation of 1 over the weighted population. Aggregation occurred at the one-digit occupation, one-digit industry code level that was then mapped to the Egypt LFS data.

- 46 Ideally, comparisons would be based on countries in the Middle East. However, data availability on countries in the Middle East/North Africa plus time constraints resulted in opting to use these countries as a comparison instead. The six Asian economies in STEP that were referenced are Armenia, China (Yunnan province), Georgia, Lao PDR, Sri Lanka, and Vietnam.
- 47 This ignores causality on returns to education due to the difficulty of finding a proper instrument, and because skill is a major omitted variable and most people that obtain higher education also tend to have higher levels of skills, these returns may be overestimated. However, as relationships and socioeconomic status may play a strong role, there is also a chance bias can run in the opposite direction.
- 48 Workers with technical degrees (engineering and health) in the United States have similar rates of employment in occupations outside of their main technical degree and rates of overqualification at 50 percent and less than 22 percent, respectively, based on the American Community Surveys 2014. However, unemployment among those with technical degrees is much lower, at less than 1 percent.
- 49 Sattinger (2005) suggests that as the ratio of workers to firms increases, unemployed workers shift from searching for vacancies to queuing for jobs meaning they stop searching and wait for specific jobs to open. Queuing or waiting for certain types of jobs to open up reduces the time that a firm has a vacant position, while for individuals it can reduce expected time of unemployment. Queuing may be the optimal choice in the case of Egypt because there are few quality jobs in the private sector, making search and application costs appear high relative to queuing for public sector.
- 50 For the underlying code used to scrape this data, see “Egypt Job Data,” GitHub.com, www.github.com/natc79/EgyptJobData. Current data are only cross-sectional in nature. OLX.com requires about three days to scrape all of the job ads. The responsiveness of the server appears to be limiting factor. Wuzzuf.net takes about two hours to scrape five job ads. Programs are designed to grab only one page per second at most to prevent overloading the websites.
- 51 Page data were downloaded at a different time than the job ad counts. The statistics reported should be viewed as preliminary, as it was not possible to scrape all of the job ads at the time of the submission.
- 52 This data are based on aggregate data on job ad counts downloaded at the end of August 2017.
- 53 Ideally we would have more recent employment data, as certain industries such as tourism and hospitality could be more volatile and exposed to shocks in Egypt.
- 54 Based on August 2017 data.

- 55 Initial data were checked on number of applications, number seen, number shortlisted, and number rejected over time. Most job roles have similar numbers of applicants during the January–March 2018 period. This was different than results from cross-sectional data downloaded in August and could be due to changes in algorithm. However, this needs to be checked further. Shortlisted rates appear to hover around 7–8 percent of all applicants, while rejection rates are between 10–16 percent of all applicants for various job roles.
- 56 Tables provided upon request.
- 57 Deep learning has resulted in state-of-the-art improvements for learning relationships and inferring semantic value from text-type data to images as well as translation. Deep learning is largely considered unsupervised or semisupervised compared to supervised learning that requires someone with significant training to develop coherent metrics and infer relationships. Recommendation, search, and predictive algorithms are increasingly built upon deep learning methods by top tech firms (Google, Microsoft, and so forth) due to its power, and there are small startups that have made it possible to implement these models out of the box with limited knowledge of the underlying framework. A summary of some of the recent papers in the area can be found at Marek Rei, “57 Summaries of Machine Learning and NLP Research,” Marek Rei blog, January 17, 2018, <http://www.marekrei.com/blog/paper-summaries>.
- 58 For impact evaluation methodology, see Khandker, Koolwal, and Samad (2009).
- 59 The higher education allocation is estimated to be LE 35.8 billion (US\$2.02 billion) based on news reports (DNE 2017).
- 60 Ministry of Manpower, Egypt. <http://www.manpower.gov.eg/>
- 61 In 2016 the question on whether a person was registered with a government ministry was eliminated from the questionnaire.
- 62 Find the World Bank’s Systems Approach for Better Education Results (SABER) at <http://saber.worldbank.org/index.cfm?indx=2&ctn=EG>.
- 63 For example, El-Hamidi (2009) documented qualification mismatches using a relative measure at the one-digit occupation level for the years 1998 and 2006. It was found that overqualification dropped from 37 percent to 5 percent, while underqualification rose from 0 to 32 in elementary occupations.
- 64 For a detailed discussion on various measures of mismatch and their pitfalls, see Leuven and Oosterbeek (2011).
- 65 This study did not examine the interaction between unemployment and grievances or unemployment and political participation.

- 66 The fiscal year of the government of Egypt begins 1 July.
- 67 The program is supported by the International Monetary Fund (IMF), which in November 2016 approved a three-year extended fund facility for Egypt of US\$12 billion.
- 68 The Central Bank of Egypt (CBE) announced the floating of the Egyptian pound in November 2016. The Egyptian pound fell sharply from US\$1.0 (8.8 EGP) prior to the floatation to 17.7 EGP in early 2018. See the history of the exchange rate at <http://www.cbe.org.eg/ar/EconomicResearch/Statistics/Pages/ExchangeRateshistorical.aspx>.
- 69 Experience from other countries showed that protecting the poor during economic reform processes is critical for success. Mexico in the 1990s, for example, followed a similar approach to that of Egypt. See <https://vimeo.com/208634558>.
- 70 According to the IMF (2018), the government plans to achieve 100 percent cost recovery by the end of the 2018/19 fiscal year for all fuel items, excluding liquefied petroleum gas (LPG).
- 71 The VAT law was enacted in September 2016 to replace the general sales tax (GST) that was in place since 1991. The tax base is widened under the new VAT system, as it includes more products and services that were previously exempted under the GST. The tax rate was not unified under the GST—each group of products had its own tax rate, but on average it was around 10 percent (Lotfi 2016). The GST was imposed on both domestic and imported goods but was applied to only 17 services. It was added on the final price of goods and services and was paid by the final consumers, whereas the VAT is a unified tax rate for all items, hence reducing the distortionary effects of the previous GST system. Starting from July 2017, the VAT has increased from 13 percent to 14 percent for FY 2017/18 (MoF 2017). However, there are still many exempted sectors under the new VAT, including basic food and agriculture products, financial services and the banking sector, health and education services, and transportation (except transportation for internal and foreign tourism) (VAT law no.67 for 2016). Previous studies showed that applying the VAT system leads to an increase in the CPI only once during the first year of implementation—FY2017 in the case of Egypt. The VAT is also expected to lead to an increase in government revenues by 1 percent of GDP in FY2017 (WB 2016).
- 72 The GOE announced a scheduled program to phase out energy subsidies in 2014. The domestic prices of fuel products had been kept constant until 2004, when the government started to increase the prices of some products (Abouleinein, El-Laithy, and Kheir-El-Din 2009). Partial attempts to phase out fuel subsidies were implemented in 2012 and 2013: a 220 percent increase in the price of LPG and full cost recovery prices for gasoline 95, respectively. Natural gas prices increased also for residential and industrial uses and there were small increases in the prices of gasoline 80/92 and diesel (IISD 2014). However, the subsidy-to-cost ratio remained particularly high for LPG (around 81 percent), followed by diesel (about 58 percent) and gasoline (44 percent) (MoF 2012).

- 73 As a result of the fuel price hikes, the inflation rate went from 10.1 percent in 2013/14 to 11.8 percent in October 2014. However, the inflation rate decreased to 10.1 percent in December 2014 due to interest rate action by the CBE (IMF 2015).
- 74 The fiscal reform has also included the implementation of the VAT. About 1 percent of GDP as fiscal savings have been directed to increase food subsidies and cash transfers to vulnerable groups.
- 75 The main sources of price changes of the energy commodities (2014–17) were calculated based on information from different sources that included several decrees of the Ministry of Petroleum (MoP 2014), reports of the Ministry of Electricity (MoEE, various years), IMF reports, and several issues of *Egypt Oil & Gas* newsletters.
- 76 In the model, hired labor is differentiated by three skill categories (unskilled, semiskilled, and skilled) and two regions (urban and rural).
- 77 These trade elasticities reflect the change in relative demand or supply from/for the domestic and world market as a result of changes in relative prices for domestically produced goods and traded goods of the same product category. Thus the high import substitution and identical export transformation elasticity of 5.05 implies that a 1 percent increase in the world market price for wheat compared to the price on the domestic market would, ceteris paribus, lead to a 5.05 percent increase in imported/exported wheat relative to demand/supply from/to the world market. By contrast, trade elasticities below 1 imply relative weak quantity changes as a result of relative price changes.
- 78 The poverty and social impact assessment reported in World Bank (2017) estimates direct welfare losses of -2.45 percent for all households and -2.97 for the bottom quintile with zero price elasticities. These results can be interpreted as upper bounds because the price elasticity of consumption is assumed to be zero. Applying a price elasticity of electricity (gasoline) consumption equal to -0.33 (-0.21) would lead to an average total direct effect of -1.92 percent, with the bottom quintile experiencing a loss of -2.43 percent. >
- 79 Household expenditures for energy (natural gas, fuels, and electricity) make up 11.3 percent of total household consumption, with energy shares ranging from 0.3 percent for kerosene or gasoline 95 to 3 percent for natural gas, and household budget shares ranging from 7.6 percent for rural households in the second lowest quintile to 13.3 percent for urban households in the highest quintile. Moreover, expenditure shares for energy goods differ within households.
- 80 The simulation period covers the years 2012 to 2025, and we report results for two periods: (i) 2014 to 2017, both short term and long term depending on labor market adjustments; and (ii) 2012 to 2025 for the long-term impacts of the phasing out of energy subsidies.

- 81 We use the year 2021 as a target year for complete subsidies abolishment based on the most recent comments of Electricity Minister of Egypt Mohamed Shaker regarding the phasing out of electricity subsidies. Source: Reuters. <https://www.reuters.com/article/egypt-electricity/update-1-egypt-hikes-electricity-prices-but-extends-subsidies-three-more-years-idUSL8N1JX2C4>
- 82 As noted in the scenario descriptions, we assume that both total (private and public) consumption and investment shares of absorption are held constant.
- 83 Besides construction services (65 percent of investment demand), the manufacture of basic metals; fabricated metal products, except machinery and equipment; computer, electronic, and optical products; electrical equipment; and other machinery and equipment, which are all very import intensive, are important investment goods.
- 84 We measure household welfare by the so-called Hicksian equivalent variation, which takes into account price changes.
- 85 As the model is run annually and the devaluation happened at the end of 2016, we introduce the changes in world market prices in 2017.
- 86 Official rates follow an adjusted cost-of-basic-needs approach, producing household-specific poverty lines based on the caloric requirements of the household members and region-specific cost per calorie and Engel regressions. The average national poverty line is LE 5,788 per person per year and is equivalent to about US\$4 per day in 2011 purchasing power parity (PPP). As a comparison, poverty rates based on the international poverty line of US\$1.90/day at 2011 PPP was 1.35 percent.
- 87 Estimate refers to the consumption per capita distribution, while official figures use consumption at the household level. It is important to note that distributions estimated using household surveys are typically truncated, as surveys do not adequately cover rich households. For Egypt, “correcting” for this truncation using real estate housing prices (Van der Weid, Lakner, and Ianchovichina 2016) or regional information on wealth, national accounts, and taxes (Alvaredo et al. 2018) suggest the Gini may be higher.
- 88 Postfiscal income concepts include net market income, disposable income, consumable income, and final income. See figure 5.7 and accompanying text .
- 89 The primary microdata source used for this study is the 2015 Household Income, Expenditure, and Consumption Survey. Administrative and budgetary data is used to determine the magnitude of the fiscal policies allocated.
- 90 A new VAT system was adopted in 2016 to replace the GST.

- 91 Egypt's fiscal year runs from July 1 to June 30. A similar distribution for FY16 was used to complement the exercise and estimate expenditures for calendar year 2015 (see Assumptions and allocation section). Table 5.1 presents government expenditures so that a clearer mapping to the CEQ exercise can be done. Thus, some classifications are not perfectly aligned with GoE typical categorizations. These differences are clarified in the table note.
- 92 The monthly allowance was increased to LE 18 in April 2016 to LE 21 in December 2016 and finally to LE 50 in July 2017. The food commodities have been increased from 20 to currently above 50 commodities.
- 93 The list of governorates included Assuit, Qena, Sohag, Aswan, Giza, Luxor, and Cairo. Except for Giza and Cairo, these governorates had an estimated poverty rate of 45 percent or more in 2015.
- 94 We use quotes here to highlight that the program does not resemble a "pension system" as this concept is commonly used: where workers receive a stipend upon retirement and after having contributed to the system during their working life.
- 95 And stands at 18 MW as of July 2017.
- 96 When calculating the allocation to the sector, the government will use the two years prior GDP and not the expected GDP of the concerned fiscal year. This naturally lowers the amounts allocated. However, even with this accounting adjustment, the allocations are still not what the constitution mandates. This is also the case for health expenditures.
- 97 These expenditures encompass all levels of education: preprimary, primary, preparatory, secondary (general and vocational), tertiary, assistance services, education at unspecified level, and research and development activities.
- 98 The spending figures relate to both contributory (for employees whose employers contribute to the health system) and noncontributory health systems.
- 99 The program is affiliated with and operated by the Ministry of Health and Population, though not completely autonomous as the Health Insurance Organization and of a smaller scale (1.9 million in 2008/09). A special discretionary fund, the program constitutes a safety net to cover the uninsured (and poor) population and help pay for a certain package of services (with services provided in Egypt or abroad).
- 100 And 12.5 percent in FY15.
- 101 Measured in PPP (constant 2011 international \$). Source: WDI, accessed August 9, 2018.
- 102 Due to limited data, this is the most recent estimate.

- 103 A CEQ assessment typically includes two scenarios for contributions to, and income received from, the public contributory pension system. The first, which we call the Pensions as Deferred Income (PDI) scenario, treats contributions to and income from the public contributory pension system as compulsory savings and deferred income (respectively). The alternative, which we call the Pensions as Government Transfer (PGT) scenario, treats contributions and income as a tax and a transfer (from the fisc) respectively. We could not identify public contributory pension income received in the HIECS 2015 nor did we have access to budget or administrative reporting that summarized total public contributory pension income distributed, so we did not estimate the PGT scenario.
- 104 Consumption expenditure is the team's primary income measure. Moreover, all other income concepts, including market income, are derived from consumption expenditure. For these reasons, the team does not create a taxable income concept. Other CEQ assessments do produce this income concept when relevant. Creating a *taxable income* concept requires knowledge of the composition of market income. An Egyptian household's expenditure profile in the HIECS cannot provide any information on the composition of its income. For the same reason, the team is unable to say anything about the savings or current asset profiles of HIECS households: a current consumption expenditure profile provides no information on either investment spending or on the returns accruing to any household assets.
- 105 While a CEQ Assessment typically includes an alternative scenario where public contributory pensions are treated as a government transfer (rather than deferred income), information regarding total pension payouts (in 2015) was not available while the HEICS (2015) survey data did not allow us to identify public contributory pension recipients.
- 106 The allocations—including the assumptions and choices implicit in them—are described in the following section.
- 107 Access to publicly delivered health and education services is observed directly, as is the purchase of subsidized fuels and electricity. However, the subsidy received for transactions in these services and goods must be imputed or simulated.
- 108 For a detailed description of these and other allocation methods, see Lustig, ed. 2018.
- 109 The direction of the potential bias cannot be determined a priori, as each instrument's welfare impact depends on the set of instruments included (Lambert 2001).
- 110 Due to data limitations, we can identify only the total annual wages and salaries by household and the number of household members who are working for a wage. We assign individual wages by dividing the former by the latter. No further corrections are made.

- 111 The estimate was obtained from discussions with the Ministry of Finance. There is no other data available that could allow estimating a basic wage share of total wages at further disaggregated levels.
- 112 Following the programs' application form, the predictive eligibility model in the HIECS used the following predictors of household consumption: number of members, number of rooms in the residence and dwelling characteristics (access to water, sanitation, construction materials, and so forth); ownership of food smart card; access to electricity; and ownership of assets (cars, smartphone, internet access, refrigerator, and so forth).
- 113 Takaful and Karama Program Progress Summary June 17, 2017
- 114 The unconsumed allotment of bread is transformed into points that can be used to purchase items in family stores.
- 115 Note that by applying *statutory* rather than *effective* sales tax rates to purchases recorded in the HIECS 2015, this CEQ assessment does not take a stance on indirect tax evasion or, for example, actual rates of taxation in informal markets.
- 116 This study follows the methodology developed described in the *Commitment to Equity Handbook* (Lustig 2018), chapter 7, to allocate the *indirect impact* of indirect taxes on the prices of goods and services acquired in the private market. The handbook suggests solving a price-shifting model—with an input-output matrix as the empirical description of price determination in the production side of the economy—assuming inelastic demand for all goods and services and fixed technologies of production. That is, producers “push” any input taxes paid (subsidies received) onto the final price of the goods and services, thereby raising prices (lowering prices) relative to a no-tax (no subsidy) counterfactual. A more detailed description on the application of this approach to indirect taxes and subsidies is included in annex A.
- 117 Law No 11 of 1991 and subsequent amendments.
- 118 Other items listed in the law are automatic wheel chairs, artificial human organs, vegetable oils, and hydraulic cement.
- 119 For households' consumption of tea and sugar not distributed by ration cards, we apply the lowest GST rate: *gomhoria* tea and unsubsidized crystallized sugar.
- 120 The gasoline is labeled “super” in the law. Furthermore, we use a weighted excise tax rate where 1/3 of the weight is based on the rate for imported products and 2/3 for the local products. This, using as guidance the energy balance table by the International Energy Agency, noting that Egypt's net imports of oil products account for 32.6 percent of the country's total consumption in 2015 (including industry own use during the refinery process and use for electricity production).

- 121 Anecdotally, the Ministry of Health's budget is perhaps only 50 percent of total public expenditure on the delivery of health care services. Therefore, we are allocating a total, as well as a per-patient cost and a per-patient benefit, that is too low. Our baseline values assume the missing special funds are allocated to services and regions in exactly the same proportions as the on-budget expenditures.
- 122 We recognize the arbitrariness of this assumption. Other CEQ exercises have shown that the ratio of the cost of a secondary level student to a primary level one can fall in the range of 1.5 and 10.
- 123 It should be noted that the method for allocation of health spending implies that households who received medical attention (due to a certain illness) were "better off" than households that did not. We recognize this as a caveat of the approach.
- 124 A CEQ assessment usually estimates two "extreme" scenarios: contributory pensions as pure deferred or replacement income or as a pure government transfer. In the first scenario, income from contributory pensions is counted as part of the prefiscal income by which households are ranked while in the latter not. For more details, see Lustig, ed. (2018).
- 125 The redistributive effect is measured as the absolute difference between the Gini for market income, including pensions and the Gini for consumable income. The CEQ Institute's data archive, from which figure 5.10 is drawn, uses the 2005 PPP conversion factor and the \$1.25 PPP per-capita, per-day poverty expenditure level as those were conventional standards when earlier CEQ country case study results were generated. The Data Archive is currently being updated to reflect the newer 2011 PPP conversion factors and the \$1.90 US\$ per-capita, per-day poverty expenditure level.
- 126 Based on the lower-middle income economies of the World Bank. See World Bank, World Bank Country and Lending Groups, database, Washington, DC, accessed May 25, 2018. <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>,
- 127 The estimated low Gini in Egypt has been studied extensively. See, for example, Verme et al. (2014), Van Der Weede and Ianchovichina (2016), Lara Ibarra et al. (2017), or Alvaredo et al. (2018).
- 128 When the government-cost value of in-kind services is added to Consumable Income, the poverty headcount rate drops to approximately 12 percent. However, a monetized value of an in-kind service received does not *directly* produce an increase in purchasing power (over all goods and services).
- 129 See Enami, Lustig, and Tafqiri (2017) for the Iranian example of the same poverty- and inequality-reduction impacts.

- 130 The measure of fiscal impoverishment was first proposed by Higgins and Lustig (2016).
- 131 Fiscal impoverishment–headcount ratio and Fiscal Impoverishment–consumable income poor headcount ratio are both zero (0.0 percent) in Egypt using the 1.90 US\$ per day (2011 PPP) international poverty line or Egypt’s national poverty line; and are 0.0 and 2.0 percent (respectively) in Egypt using the \$PPP 3.20 per day (2011) international poverty line.
- 132 A concentration coefficient is calculated in a way analogous to the Gini coefficient, but with households ordered or ranked according to prebenefit or pretax (or prefiscal) income. That is, if p is the cumulative proportion of the total population when individuals are ordered according to increasing prefiscal income values, and $C(p)$ is the concentration curve, that is, the cumulative proportion of total program benefits (of a particular program or aggregate category) received by the poorest p percent of the population, then the concentration coefficient of that program or category is defined as the integration (from 0 to 1) of $2 \int (p - C(p)) dp$.
- 133 Lambert (2001) shows that in a many-fiscal-instrument world, a concentration coefficient smaller (larger) than the prefiscal income Gini coefficient is neither necessary nor sufficient for an expenditure (tax) to have an inequality-reducing impact. For that reason, a CEQ assessment also generates *marginal contributions* to inequality or poverty reduction for each fiscal instrument allocated. The marginal contribution is the impact of the instrument in question in the presence of all other instruments considered. For Egypt’s case, hospital-inpatient health care, clinic health care, and the kerosene subsidy are all expenditures with concentration coefficients smaller than the Gini coefficient for market income but zero or negative marginal contributions to inequality reduction; all revenues with concentration coefficients larger than the Gini coefficient for market income have positive marginal contributions to inequality reduction.
- 134 With such “sin taxes” Egypt may create incentives for better long-term public health outcomes and therefore long-term increases in human capital and incomes in all households and thereby also long-term reductions in income inequality (see for example Fuchs, Hasbun, and Mukong 2018). Such long-term dynamics are not captured here.
- 135 Standard-rated VAT goods and services produce no indirect impacts of the type generated by the GST, for example. Intuitively, in a functioning VAT system, all VAT payments (for standard-rated goods and services inputs) are refunded to the producer and the final consumer pays a nonrefundable VAT on total value added. Therefore, producers have no net input taxes to “pass on” to final prices. In our simulation of the 2017-era VAT regime in the HIECS (2015) consumption expenditures, we have assumed all goods and services purchased are standard-rated or zero-rated goods and services.
- 136 Focusing on the market income allows one to identify those at the bottom in the absence of any government intervention (a “prefiscal” instance). We restrict the distribution to only households with children as only they are potential beneficiaries of the program.

- 137 The simulations allow for inclusion and exclusion errors linked to fact that consumption levels are estimated and not directly observed. The simulations also assume that all households would be filling up the “application form” to the program, and thus have a positive probability of being included in the program if they are below the eligibility threshold. Our analysis does not incorporate any of the conditionality elements of the Takaful program such as school attendance and health visits.
- 138 More precisely, we model a price impact of nonrefundable or net taxes, or net subsidies only. In a VAT system, for example, many taxes paid on inputs (by a producer) are later refunded through the VAT reclamation system. Analogously, if production subsidies are offset by nonrefundable taxes, we would not assume a final price impact from a zero net subsidy received.
- 139 The cost-push assumption is consistent with either perfectly elastic supply or completely inelastic demand for each product. It may be unlikely that all product markets can be so characterized, but studies suggest that the incidence of VAT, for example, is largely on consumers (Benzarti et al. 2017; Carbonnier 2007). These studies come from very different contexts than Egypt, and it may be that the presence of large informal sectors in Egypt, for example, has implications for the incidence of indirect taxes or production subsidies. The assumption of full incidence on consumers, meanwhile, simplifies the modeling of the distributional effects of these fiscal instruments. If the incidence of indirect taxes or production subsidies were partly (or fully) on capital, land, or labor, then more information on the production side of the economy—including who works where and who owns what land and capital—would be required.
- 140 IO matrices do not typically distinguish between, for example, high- and low-quality types of a good or between informally produced groceries and formally produced groceries.
- 141 The International Monetary Fund (IMF) has developed a set of Stata .do files that estimate the indirect effects of indirect taxes (and production subsidies) using the price-shifting model described above. The IMF .do files and instructions are found at <http://www.imf.org/external/np/fad/subsidies/index.htm>. The SUBSIM Stata package (www.subsim.org), a World Bank project designed by Paolo Verme and Abdelkrim Araar, also provides a set of tools with graphic interfaces and drop-down menus for rapid distributional analyses of subsidies and simulations of subsidy reforms. Also, SimSIP SAM (simsip.org/IOs__SAMs.html) is a Microsoft Excel-based application with MATLAB running in the background, which can be used to analyze input-output tables and social accounting matrixes. All three software options produce identical estimates (when analogous model options are specified); the estimates in this report are from Stata code based on the IMF.do files.



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