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ENERGY SUBSIDY REFORM IN EGYPT: THE GENDER – "ENERGY" POVERTY NEXUS

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Abstracts

The purpose of this study is to quantify the effects of the current energy reform policy on household expenditures along gender and regional lines. Gender analysis helps to identify constraints such as transportation poverty faced by women to access economic opportunities like education and/or employment. Regional analysis is crucial as well. An energy reform policy on butane gas cylinders, for example, may have a greater effect on rural households compared to urban households since the majority of urban residents rely on natural gas as the main source of energy for electricity and heating water. Results of the study are summarized as follows: 1- the government is taking serious efforts to gradually remove energy subsidies. 2- The poor will pay a higher price than the rest of the population. 3- a comprehensive policy to ease the burden on the poor is to consider a spatially targeted plan in which public investment are weighted significantly in favor of Upper Egypt and rural areas at large. In particular, structural investments in education, health and employment must precede welfare compensatory policies.

JEL Classifications: C40, D31, D60, H20, I38, J16, R20

Keywords: energy prices, subsidies, welfare distribution, regional distribution, gender, household survey data.

ملخص

ولغرض من هذه الدراسة هو تحديد الآثار المترتبة على سياسة الإصلاح الحالية للطاقة في النفقات المنزلية جنبا إلى جنب بين الجنسين والخطوط الإقليمية. تحليل النوع الاجتماعي يساعد على تحديد المعوقات مثل الفقر والنقل التي تواجه المرأة للوصول إلى الفرص الاقتصادية مثل التعليم و / أو العمل. التحليل الإقليمي أمر بالغ الأهمية أيضا. سياسة إصلاح قطاع الطاقة على اسطوانات غاز البوتان، على سبيل المثال، قد يكون لها تأثير أكبر على الأسر الريفية مقارنة بالأسر في المناطق الحضرية حيث أن غالبية سكان الحضر تعتمد على الغاز الطبيعي كمصدر رئيسي للطاقة لتوليد الكهرباء وتسخين المياه. وتتلخص نتائج الدراسة على النحو التالي: 1- أن الحكومة تبذل جهودا جادة لإزالة دعم الطاقة تدريجيا. 2- الفقراء يدفعون ثمنا أعلى من بقية السكان. 3- السياسة الشاملة لتخفيف العبء على الفقراء هي النظر في الخطة المستهدفة مكانيا وهي المرجحة للاستثمار العام إلى حد كبير لصالح صعيد مصر والمناطق الريفية بشكل عام. ولا سيما يجب أن تسبق الاستثمارات الهيكلية في التعليم، والصحة والعمل السياسات التعويضية والرعاية الاجتماعية.

1. Introduction

Economic development models have linked economic growth to energy consumption. Early phases of industrialization in the west were driven by the discovery of the internal combustion engine paving the way to modern technological innovation and speed transportation. Developing countries, trailing the path of their predecessors, followed a similar path of development, with a twist. That is, development efforts in the latter are being financed by generous universal energy subsidies that have become impossible to sustain.

Energy subsidies in developed[1] and developing countries have been popular policy tools for several reasons. They have been used as an instrument to earn public support, means to distribute economic wealth, especially with frail institutional power, as well as a stimulant to maintain the import substitution industrialization policies during times of nation building. The history of subsidies in the Egyptian economy is no different. In fact, low levels of poverty in the 1980 to mid-1990s were, in part, courtesy of these "neither poor targeting, nor means-tested", universal subsidies.

The surge in oil prices in the new Millennium, coupled with increasing wasteful consumption of energy products in Egypt, rendered the existing trend untenable. Realizing the severity of the problem, the government has been implementing different policies to curb the rise in consumption. Many of these policies came out insufficiently prepared and inappropriate to the existing situation that ultimately made it worse than before the policy. For example, in an effort to collect added revenues in 2006, the Ministry of Finance imposed additional taxes on liquid fuel. Taxes on 92-octane, 95-octane, diesel and kerosene rose by 32%, 57%, 47% and 47% respectively. Taxes on 80-octane were left unchanged. This swift policy, which was "effective immediately", caused a severe shortage in 80-octane due to consumers' shift away from the more expensive alternatives. According to statistics issued by the Ministry of Petroleum, the consumption of 80-octane increased by 50 percent compared to the prior year, absorbing 45% of total gasoline consumption in Egypt. One month later, housing and utility costs rose 6%. Cement prices, a key ingredient in construction costs, increased 10-25% percent depending on the distance from producing factory (wikileaks, 2006).

The purpose of this study is to quantify the effects of the current energy reform policy on household expenditures along gender and regional lines. On the one hand, gender analysis helps to identify constraints such as transportation poverty faced by women to access economic opportunities like education and/or employment. On the other hand, regional analysis is crucial as well. An energy reform policy on butane gas cylinders, for example, may have a greater effect on rural households compared to urban households since the majority of urban residents rely on natural gas as the main source of energy for electricity and heating water. Similarly, reforming diesel subsidies may trigger higher food prices in some areas, while reforming electricity subsidies may trigger water heating costs in other areas. Hence, gender and regional analysis are necessary features when developing energy policies.

The rest of the paper is organized as follows: 1) contextual background on energy subsidies in Egypt and the newly implemented policy; 2) a short review of the literature and knowledge gap; 3) data used in the analysis; 4) background and descriptive analysis of the current system and its impact; 5) empirical analysis and findings; 5) conclusion and policy recommendations.

[1] In the United States, the Congress has been unable to increase the tax on gasoline, 18 cents per gallon since 1993.

2. Contextual Background

The Egyptian government has been diligent in the last few years to find ways to control the increasing cost of energy subsidies. Figure (1) records the upturn in energy consumption since the late 1990s. The problem is approaching a crisis in the near future when the Egyptian government would be unable to honor outstanding energy export contracts. After years on the energy exporting countries list, a net energy exporting country, Egypt is fast approaching to be a net energy importer (figure 2).

The rise in energy consumption is driven by two factors:

Population growth: between 2000 and 2010, Egypt's population grew by 21% (figure 3). Per capita energy consumption rose by a little over 10% between 2008 and 2012 alone, (figure 4). Part of the rise in energy consumption is due to generous "blanket" energy subsidies which encourage wasteful use.

High rates of energy subsidies: The Egyptian government allocates around one third[2] of its budget to subsidies and social welfare services, representing13% of its GDP in 2012-2013. According to 2012-2013 figures, the average rate of energy subsidy is 61%. The government has maintained the status quo for many years (figure 5), and does not plan to change it in the near future. The allotted budget for energy subsidies in FY 2014-2015 is about 13% higher[3], distributed as follows: Diesel (35%), LPG (29.2%), Fuel Oil (14%), Gasoline (13.3%), Natural Gas (8.1%), and Kerosene (0.4%)[4]. With almost universal access to electricity (99.6%), the main source of lighting, generating electricity consumes 90% of fossil fuel production (oil, natural gas, etc.), and households consume 43% of the generated electricity, (World Bank, 2014).

Recognizing the dimensions of the escalated problem, the Egyptian government pledges to reform the current policy and to phase out the current energy subsidy system in five years, implementing phase I in July of 2014. These reform policies are planned to affect fuel and electricity tariffs for consumers and industries at varying rates (see figure 6).

The impact of gradually lifting energy subsidies on consumers and producers are difficult to measure and evaluate. But the literature on energy subsidies in developing countries confirm the burdens accrued to the poor vis-a-vis the rich, especially with a policy that is not structured with a close attention to low income groups.

Two examples explain the flaws in the current policy structure:

1) Fuel subsidies: the price of diesel, mainly used for public transportation, is expected to rise by 64% (figure 7). The price of 80-octane gasoline, used by old vehicles[5] which represent 51% of total vehicle fleet on the roads, is expected to rise by 78%. On the other hand, the price of 92-octane gasoline, used by newer models, and 95-octane, used by luxury vehicles are rising by 41% and 7% respectively. Natural gas, consumed mainly by taxis, is slated to increase by 175% (Madamasr, 2014).

2) Electricity subsidies: Available information suggest that the current policy is regressive and skewed in favor of the rich (Figure 8). Households with low load use (<50 Kw/h) are faced with

[2] By contrast, expenditures on education and health care stand at 4.3 % and 2% respectively

[3] Although monetary values are lower in the new budget due to the drop in world oil prices

[4] Egypt FY 2012-2013 financial statement

[5] At least 17 years old. http://www.unece.org/fileadmin/DAM/energy/se/pdfs/gee21/projects/others/Egypt.pdf

50% increase in electricity tariffs, while customers at the other end of the load use encounter a minimal 10% rise in electricity tariffs.

The magnitude of the effect of energy subsidy reform policies depends on the extent of the reform and the relevant importance of the subsidy in household budget. And while conventional energy policies are gender neutral, energy subsidy policies are likely to affect men and women differently. For instance, women make decisions related to household energy consumption, therefore the burden of a price increase or shortages in natural gas, the main source for electricity generation, tend to fall disproportionately on women. Men, on the other hand, are more impacted by gas prices reflected in the cost of transportation.

3. A Review of the Literature and the Knowledge Gap

Energy subsidies as a distributive tool of social welfare have proved to be an inefficient and regressive way of transferring benefits to the poor in developing countries, and in Egypt. The literature is rich with mounting evidences on the many problems these subsidies have created when they were initiated to mitigate instead. The poorest quintile of the population in Egypt, Jordan, Lebanon, and Iran receive 1%-8% of energy subsidies, compared to 38%-86% accruing to the richest quintile (IMF, 2014). In Egypt, the poorest 40 percent of the population receive 3% of gasoline subsidies, 7% of natural gas subsidies, and 10% of diesel subsidies. In fact, the majority of studies on the welfare effects of energy subsidies have confirmed that upper middle and high income groups enjoy the lion's share in energy subsidies. These groups then create powerful constituency to maintain the current state of affairs. Besides, energy subsidies crowd out public spending on necessary social services such as health, education and infrastructure. In Pakistan for example, government spending on energy subsidies was over three times higher than spending on public health (Whitley, (2013)).

Household energy consumption decisions vary by access to different types as well as by attributes specific to each income/consumption group. In Madagascar, for example, energy products account for 3% of the household budget. However, the poorest 20% of the population spend a little over 3% of household budget on kerosene, compared with only 1% of the richest 20% of the population. Consumption of gas, by contrast, is negligible among the first category but accounts for 0.3% of expenditures among the richest 20% (Andriamihaja and Vecchi, (2007)). Similar patterns are observed in Malaysia (Murugasu (2013)), India (MSPI (2012)), and Sierra Leone ((King (1977)).

A recent World Bank report6 confirms that poor households spend as much as 10 percent of their incomes on energy (kerosene, LPG, gasoline and diesel, electricity and natural gas): 9.8% of the total in Thailand, 9% in Vietnam, and 7.2% in Indonesia. Most of the spending goes to cover basic necessities, such as heating water, with little room for cutting back.

Empirical studies also confirm a deterministic impact of household characteristics on the chosen type of energy. In Burkena Faso, household size has a significant effect on wood-energy preferences (Ouedraogo, (2006)). Education also is an important characteristic in demand for energy. Studies by Jiang and O'Neill (2004) and Mekonnen and Kohlin (2008) find education, urbanization and electrification contribute to the practice of energy choice in China and Ethiopia respectively.

Studies on household energy consumption in Egypt are still limited. Few studies evaluate the welfare impact of the current energy subsidy policy. Rohac (2013) offers some policy suggestions

[6] Expenditures of Low Income Households on Energy. Evidence from Africa and Asia. The World Bank, 2010.

on the way forward with a bold energy subsidy reform policy. El-Shennawy (2014), and Abo-El-Enein et al. (2009), applying I/O tables, CGE and IGE models, provide estimates of the costs of phasing out energy subsidies and assess the extent to which the burden of subsidy removal on the poor can be reduced through gradual reduction of the subsidy. While Cockburn et al. (2014) assess the equity effects of energy subsidy reforms on children by income and household consumption levels.

4. Data and Descriptive Statistics

The analysis employs two data sources:

1. Household, Income, Expenditure, and Consumption Survey (HIECS) for 2012-2013. The HIECS includes data from 24,000 households, representing 50% of the original sample collected by CAPMAS.

Because the cost of energy expenditures falls primarily on the head of the household, the analysis runs along the gender of the head (i.e. female-headed vs. male-headed households). Also, since households are heterogeneous in their budget allocations, rich households for example allocate higher share to education in comparison to average households, the analysis is further disaggregated by expenditure quintiles.

2. The ELMPS covers extensive information on transportation modes as well as the preferred type of energy used in the household. Therefore, comprehensive analysis of the behavioral aspects of energy choice and welfare distributional impact are better completed using ELMPS.

Egypt Labor Market Panel Survey (ELMPS) of 2012. ELMPS is a nationally representative sample of 12,060 households with a total number of 49,186 individuals. Data is made available by the ERF (www.erf.org.eg) data depository library.

4.1 Descriptive statistics

Characteristics of heads of households by gender are displayed in Appendix A. Because of significant differences in economic and societal development levels between rural and urban regions, as well as varying degrees of traditional familial underpinnings, the analysis distinguishes between 5 regions: 1- Metropolitan: (Cairo, Alex, Port Said, Suez Canal), 2- Urban Lower Egypt: (Damietta, Dakhalia, Sharkia, Kalyoubia, Kafr-Elsheikh, Gharbia, Menoufia, Behera and Kalyoubia), 3- Urban Upper: (Giza, Beni-Suef, Fayoum, Menia, Asyout, Suhag, Qena, Aswam, Luxur), 4- Rural Lower (Damietta, Dakhalia, Sharkia, Kalyoubia, Kafr-Elsheikh, Gharbia, Menoufia, Behera and Ismalia), 5- Rural Upper (Giza, Beni-Suef, Fayoum, Menia, Asyout, Suhag, Qena, Aswam, Luxur).

The ELMPS reports 18% of households are headed by women, and 82% are headed by men. This is an increase of 50% in female-headship in a span of 12 years (from 12% in 2000). Appendix A shows basic characteristics of heads of households by gender and region. Education (or lack of) is a dividing factor among FHH. (Figure A-1). In clear contrast to FHH in metro and urban lower Egypt, over 65% of FHH in rural regions and urban upper Egypt have no education.

A striking difference between MHH and FHH appears in the main economic activity (Figure A-2). Because the majority of FHH are widowed, a sizeable share across all regions are pensioners, compared to typical employed status of MHH. Employed FHH are self-employed in rural Egypt, working mainly in the informal agriculture sector, and wage workers in urban Egypt enjoying a government/public sector employment in professional occupations in female dominated sectors such as education and health (Figures A-3 through A-6).

Figure (9) displays the distribution of Female Headed Households (FHH) and Male Headed Households (MHH) by region. The figure shows a greater concentration of people in rural areas, reflecting the actual distribution of population.

A World Bank study reports that 67% of the poor (83% of extreme poor) live in Upper Egypt, mainly in Minya, Suhag and Qena (World Bank, 2011). In fact, the distribution of the poorest 40% of heads of households differ between rural and urban upper governorates (see figures 12 and 13). Where most of poorest 40% of heads of households reside in Giza, an urban upper governorate, there is a concentration of FHH in rural upper Egypt in three governorates: Asyout, Sohag and Qena. These governorates represent a little less than 14% of total population, but is home to over one third of poor population. This regional differences between FHH in aspects of economic empowerments (i.e. education and employment) extends to spending habits on electricity and transportation.

4.2 Do FHH and MHH have similar or different expenditure patterns on electricity and transportation?

To account for varying household sizes as well as the age structure of the household, per capita expenditures are adjusted using the OECD "Adult Equivalence Scale" parameters. Accordingly, household members below 14 years of age are weighted as 0.5 of an adult[7]. Therefore, a household with two parents, three kids under 14 years of age, and a yearly expenditure of $10,000 would be scaled to (1+1+.5+.5+.5=3.5 adults). Per capita expenditures for this household would be= $10,000/3.5= $2857. Alternatively, non-adjusted per capita expenditures would be =$10,000/5= $2000.This method better accounts for families with large number of kids and allows for economies of scale adjustments.

A distribution of regional differences in the share of electricity and transportation in family budget is shown in figure (14). The figure reveals different patterns of spending between the two groups. Transportation constitutes a higher share of household expenditures for MHH compared to FHH, especially in Metropolitan and urban regions. Conversely, the share of electricity in household budget is higher for FHH vs. MHH. A distribution by governorate and gender of head of household is available in the appendix (Figure B)

These differences in spending on electricity and transportation are more pronounced according to standards of living. Figure (15) distributes the allocated share of expenditures on transportation and electricity by expenditure quintiles and broad regional distributions. Once more, the figure shows the share of spending on electricity for FHH is greater than that of MHH. The opposite is true for expenditures on transportation.

What is interesting to note is the negative relationship between the share of the budget allocated to electricity and the standards of living. The richest 20% of the population allocate the least share to electricity. This is clearly observed in figures (17 and 18). It is also true regardless of region of residence or gender of the head of the household. This observation confirms many of the claims that electricity subsidy favors the rich. The figure also reflects wider gender differences in transportation expenditures across expenditure quintiles, especially in rural regions. This is not surprising, since socially and culturally, women face greater restrictions on their education and employment in rural areas. The share of transportation expenditures models a positive association with standards of living for MHH. In particular, the richest 20% of MHH may allocate close to

[7] For simplicity, the analysis does not consider scaling the second adult as 0.7 of the first.

twofold of what the poorest 20% of MHH allocate for transportation. (see figures 19 and 20) for broad regional distributions, and (B-2) and (B-3) in Appendix B, for the distribution by governorate).

5. The Welfare Impact of the Proposed Energy Reform Policy

The literature distinguishes between direct and indirect effects of energy subsidy reform policies. The direct effects of a price increase show directly in the household budget through a rise in the price of energy products they consume directly, (such as kerosene for lighting and gasoline for private transport, etc.). The indirect effects are realized through higher prices of goods and services that indirectly use this type of energy product. For example, an increase in the cost of transporting goods and services in the event of an increase in prices of liquid fuel. Research finds that the indirect impact of energy subsidy reforms is noticed in higher food prices for poor household, and in higher transportation related prices for middle income people. The focus in this study is the direct effects of changes in energy prices. The indirect effects are estimated via a system of Input-Output Matrix, which are beyond the scope of this study.

Measuring the direct effect of a change in energy prices on household budget requires:

1. Identifying the energy product directly consumed by households.
2. Identifying the price increase for each energy product.

The effect of the price change on the household budget is constructed by multiplying the budget share of each energy product by its percentage price increase. Behavioral adjustments in the economy are not accounted for in this analysis, so energy consumption is assumed to be fixed[8]. Specifically, the Direct Effect (DE) is a first-order estimate of the real income effect of the price rise, is:

$$DE = \sum_{j=1}^{j} B_J^{energy} \; X \; \Delta P_J^{energy} \qquad (1)$$

Where, B_J^{energy} is the budget share of the jth energy product, and ΔP_J^{energy} is the percentage change in price of the energy product.

The DE expresses the percentage of total household expenditure.

5.1 The effect of the new energy policy on the share of electricity expenditures:

The distributional impact on welfare from a price increase is viewed as progressive if the percentage of welfare loss increases with household consumption[9]. Therefore, a progressive (regressive) distribution of the welfare loss means that the share of higher income groups in the aggregate welfare loss is greater (less) than their share in aggregate consumption.

Table (1) records the expected change in electricity tariffs that is planned to be phased out over five years, starting July 2014. Using equation (1), figure (12) simulates the effect of tariff changes on per capita expenditures by quintiles. The graph reflects a regressive pattern of spending on electricity, with the bottom quintile allocating up to 1.5 times of their budget compared with the top quintile. The figure confirms the disadvantage imposed on FHH compared to their MHH counterparts.

[8] This method may overestimates the real income effect since household may reduce this effect by substituting away towards relatively cheaper alternatives. The estimates therefore provide a short run effect on household budget or an upper long run limit.

[9] Table (C-1) in the Appendix shows the average per capita consumption of electricity by expenditure quintiles.

5.2. The effect of the new energy policy on the share of transportation in household expenditures:

Whether fuel subsidies are seen as an effective approach to protecting the welfare of low-income households depends on the size of the benefit that accrues to lower-income households from low fuel prices. Figure (22) illustrates modes of transportation used by expenditure quintiles and gender of the head of the household. More or less, the share of FHH who don't use any type of transportation (i.e. walk to school or work) is almost twice those of MHH at all levels. But clearly, FHH frequent public transportation (bus, mini bus, tuc tuc,…etc.) at greater rates than MHH. Table (2) shows current and proposed prices by type of fuel as well as the percentage change in prices. A detailed table is available in Appendix C (Table C-1).

Figure (22) reflects a similar conclusion in case of change in electricity tariffs. There is a regressive pattern of the share of transportation in household budget by expenditure quintiles, although the impact is not as strong as that of the electricity case. Poor cohorts of the population bear larger burden of the higher transportation costs than upper middle and rich cohorts.

6. Concluding Remarks and Policy Options

Three points emerge from the previous analysis: 1- the government is taking serious efforts to gradually remove energy subsidies. 2- The poor will pay a higher price than the rest of the population. 3- a comprehensive policy to ease the burden on the poor is to consider a spatially targeted plan in which public investment are weighted significantly in favor of Upper Egypt and rural areas at large[10]. In particular, structural investments in education, health and employment must precede welfare compensatory policies.

The literature on successful energy policies point to two important elements: 1- a strong and effective public relations and information campaign to persuade the public of the extent of the problem and the long term benefits; 2- a government commitment to protect the most vulnerable and ensure compensating mechanism that commences along with the implementation of the policy.

When it comes to an effective information and public relations campaign, reality is far from ideal. A survey conducted in April 2014 covering energy use practices of over 2000 households revealed a divergent gap between the public and government policies. For example, two thirds of respondents thought current energy prices are too high, and a similar proportion were not aware of the significant size of the subsidy. Two fifths of the respondents have very serious doubts about the government's ability to manage the reform policy efficiently. That is, the public lacks the confidence in the government's allocation of budgetary gains to the advantage of the poor.

Second, targeted cash transfers are favorable policies to protect the vulnerable. They give consumers the ability to make their own choices about energy consumption. The experience of Egypt in targeted cash transfers is still young, with smart cards being utilized in some food subsidy allowances recently. The problem with these programs is that they depend on an efficient system of identifying the targeted groups. Identification is derived from household income level and/ or employment status. With the majority of FHH uneducated and working in the informal agriculture sector, it proves hard to verify.

[10] While the literature on spatial budgeting and planning is scarce, a recent evaluation by Velez et al (2011) reports the Egyptian government shifted its allocation of public investment from Upper and Lower Egypt in favor of Metropolitan and Frontier governorates since 2008.

A successful energy policy would consider both short term and long term goals. Short run policies should operate on efforts to protect the poor from the adverse consequences of energy subsidy reduction and at finding alternative sustainable energy sources with a longer term goal of monitoring and nurturing an efficient energy market.

The literature recommends successful initiatives towards the long term goad. For example, designing the policy around the leading economic sector of each region: transportation needs fuels and less electricity, services need more electricity, industry relies on natural gas the most, and agriculture uses fewer fuel. Another is to offer a subsidized rate of electricity for a minimal level of consumption to encourage rationing.

A third is to implement a transparent policy by making the list of cash transfer recipients by locality publicly available on the internet to deter those who falsely claim eligibility for the program.

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Figures 1 and 2: Egypt Primary Energy Production and Energy Imports

Figure 1

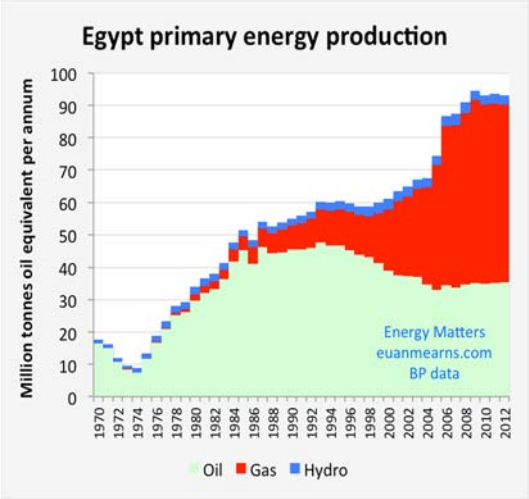
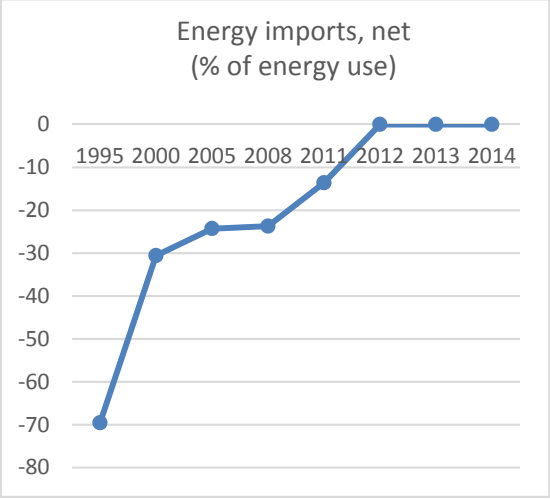
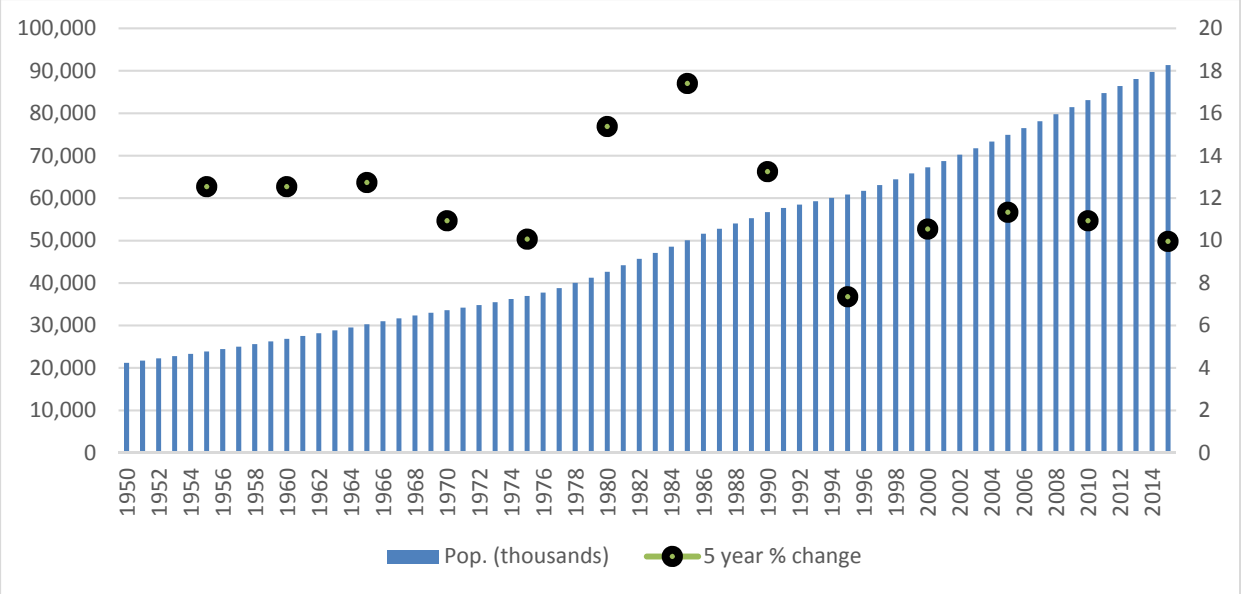


Figure 2



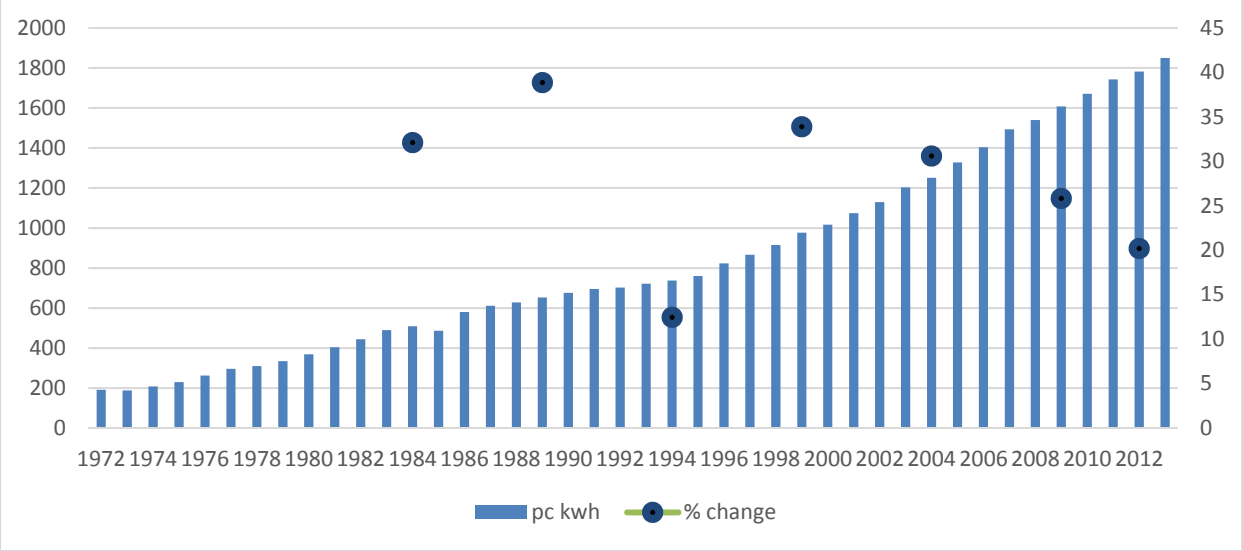
Note: Net energy is calculated as energy consumption minus energy production. Negative values imply net energy exporter.
Source: The World Bank, World Development Indicators

Figure 3: Egypt- Population in Millions and Percentage Change (Five-Year Interval)



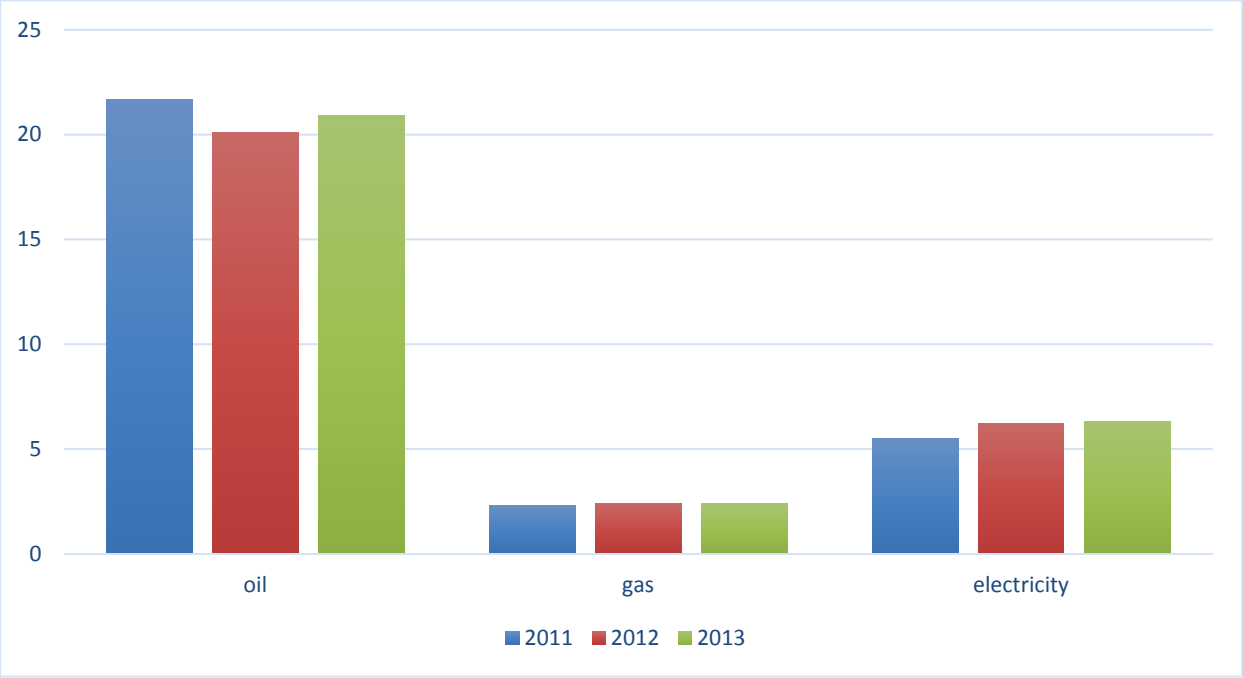
Source: The Conference Board. 2015. The Conference Board Total Economy Database™, May 2015, http://www.conference-board.org/data/economydatabase/

Figure 4: Per Capita Energy Consumption (kwh), and Percentage Change (Five-Year Interval)



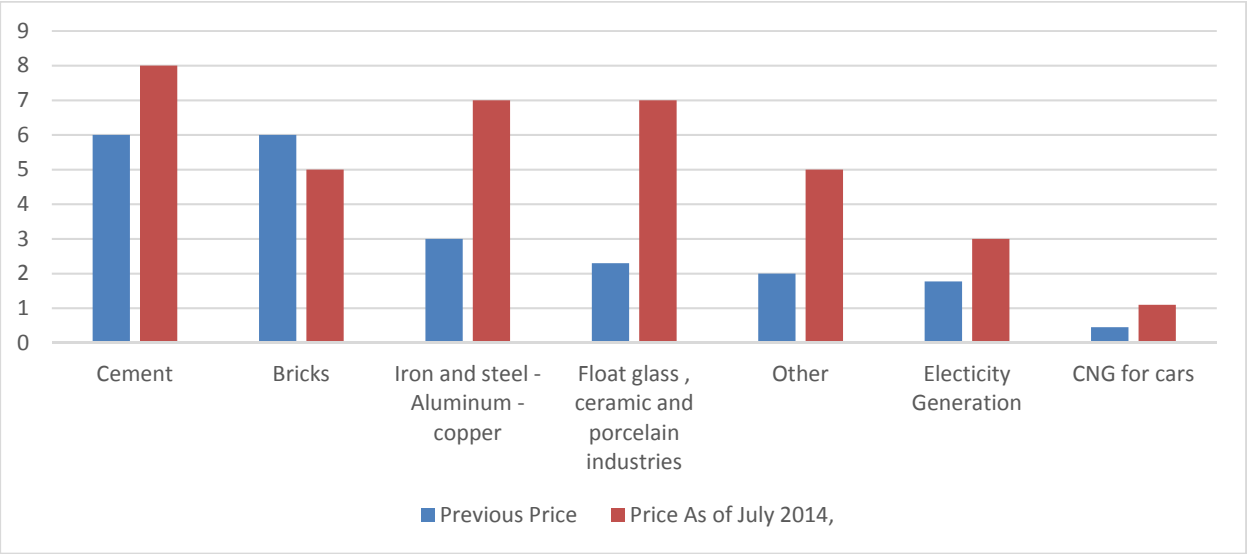
Source:https://data.un.org/Data.aspx?q=Egypt+kwh&d=WDI&f=Indicator_Code%3aEG.USE.ELEC.KH.PC%3bCountry_Code%3aEGY.
http://www.moee.gov.eg/english_new/ST_consumption.aspx

Figure 5: Energy Subsidy in Billions of $$ Dollars (in 2013 Prices)-Egypt



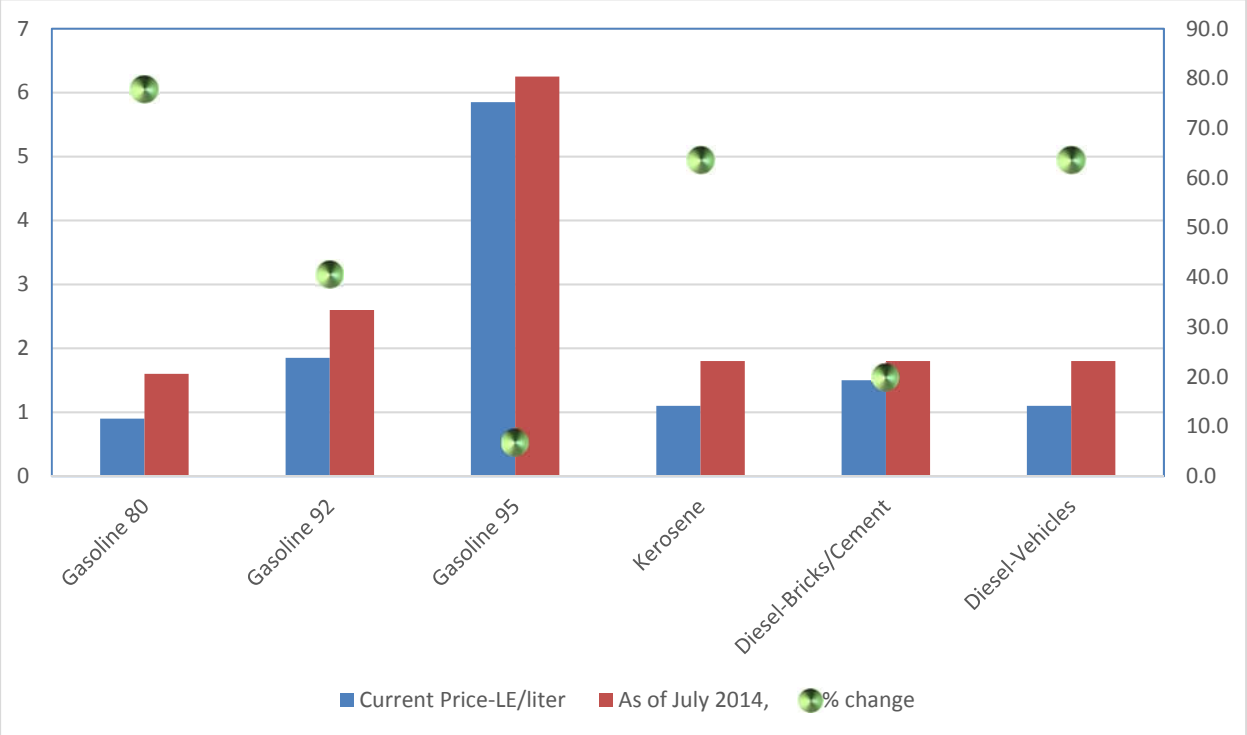
Source: http://instituteforenergyresearch.org/analysis/the-imfs-outlandish-claims-about-energy-subsidies/

Figure 6: Recommended Commercial Energy Price Changes, 2014 US $/Million BTU--(except for CNG: LE/M3)



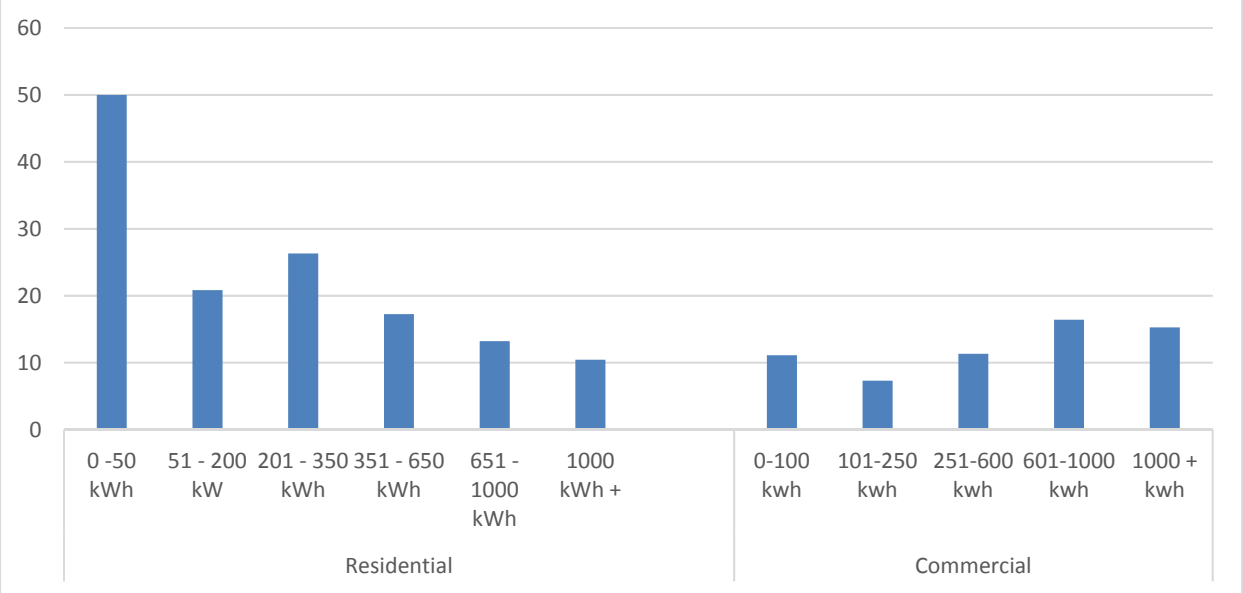
Source: Energy Subsidy Country Update: Assessing Egypt's Subsidy Reforms. Kieran Clarke | IISD-GSI; 2014

Figure 7: Proposed Change in Fuel Prices and Percentage Change--As of July 2014



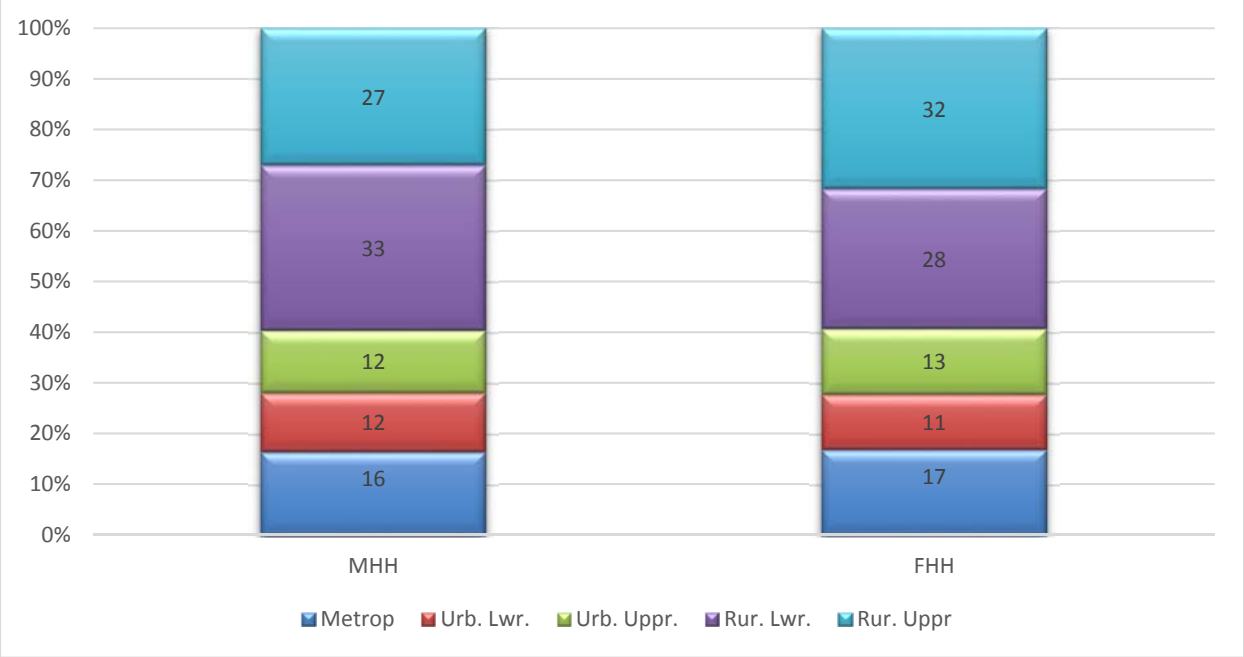
Source: Energy Subsidy Country Update: Assessing Egypt's Subsidy Reforms. Kieran Clarke ; IISD-GSI; 2014

Figure 8: Percentage Change in Electricity Price as of July 2014, Residential and Commercial - Egypt



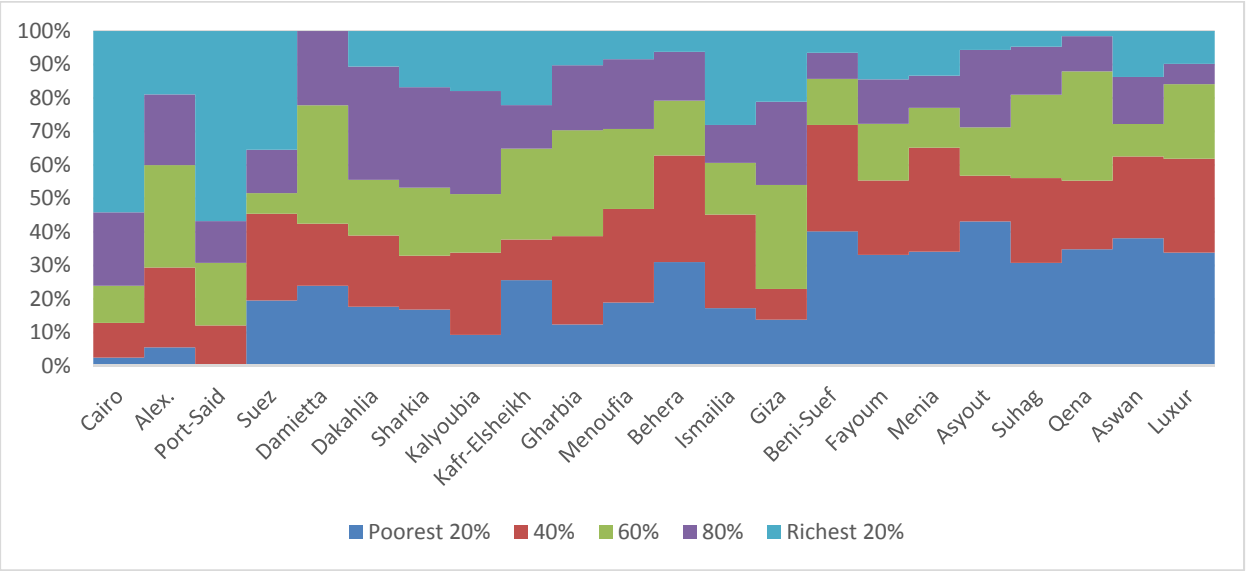
Source: MOEE Annual Report 2011/2012; Prime Minister Decree 37/11/11/4, year 2011

Figure 9: Regional Distribution of Heads of Households by Gender



Author's own calculations: HIECS and ELMPS.

Figure 10: Distribution of Female Headed Households by Governorate and Expenditure Quintiles

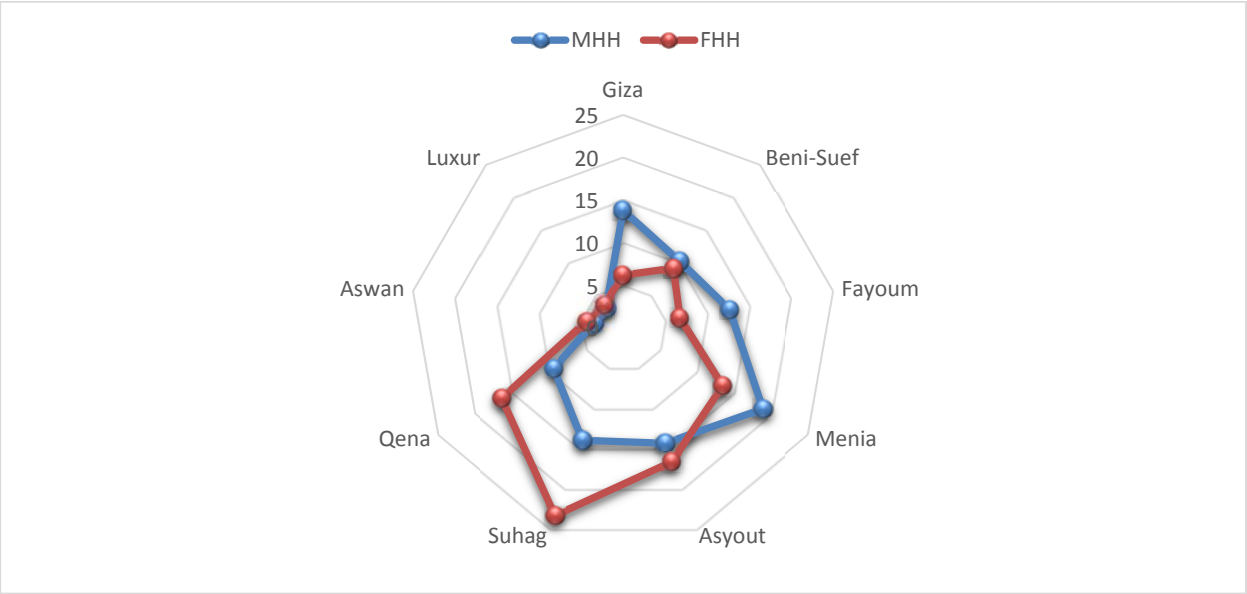


Author's own calculations: HIECS and ELMPS.

Figure 11: Distribution of Male Headed Households by Governorate and Expenditure Quintiles

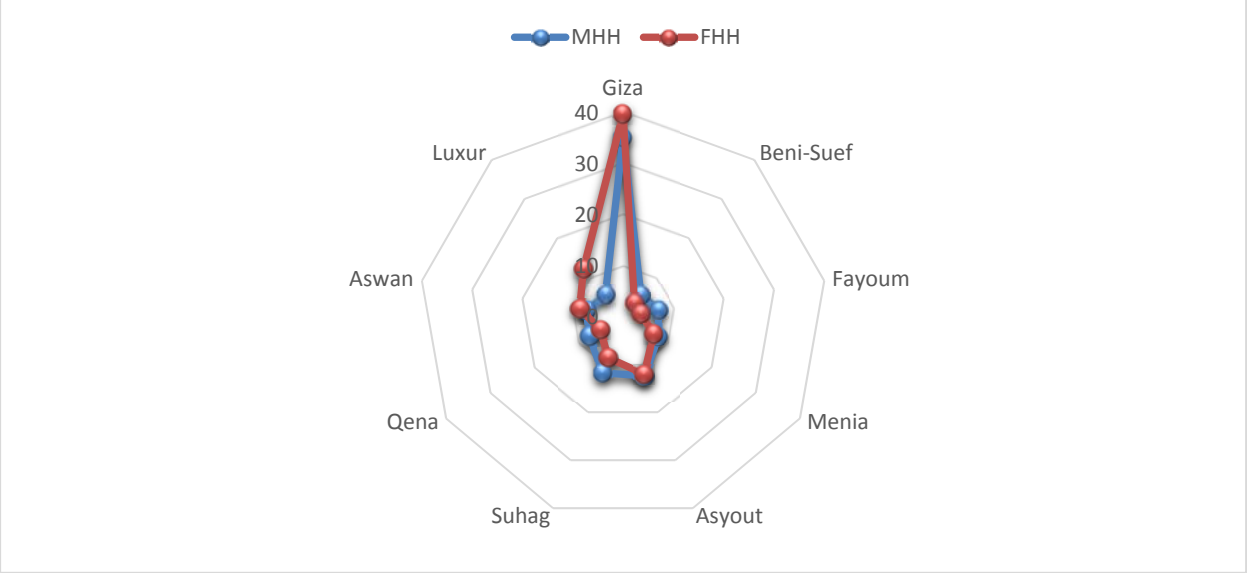
Author's own calculations: HIECS and ELMPS.

Figure 12: Distribution of the Poorest 40% of Heads of Households Across Rural Upper Egypt



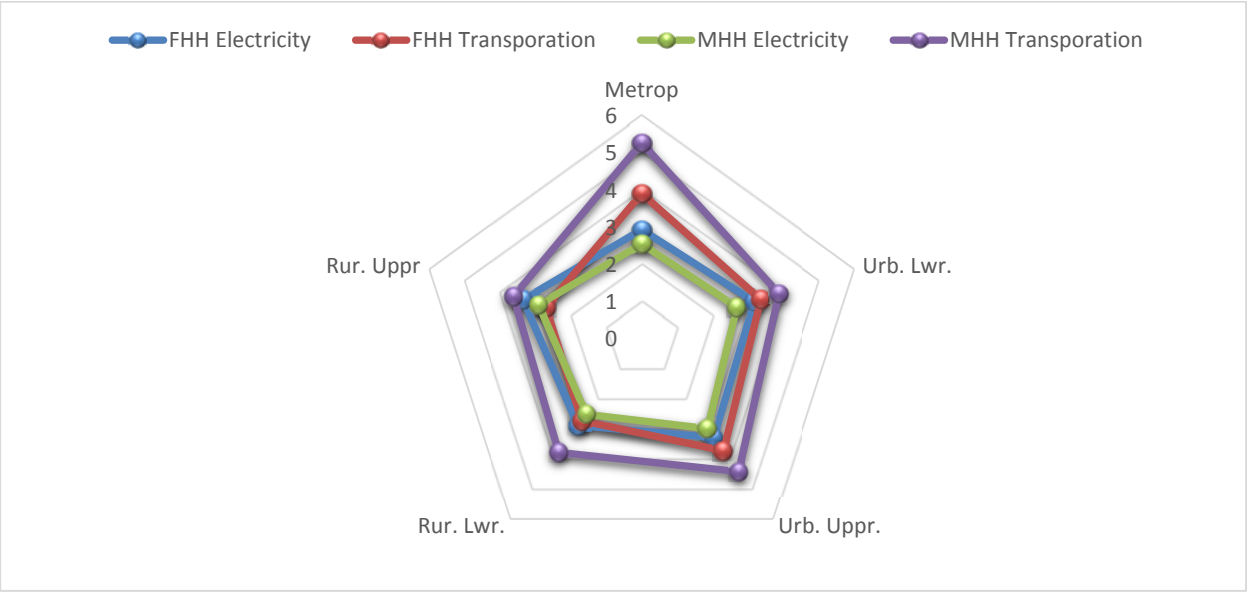
Author's own calculations: HIECS and ELMPS.

Figure 13: Distribution of the Poorest 40% of Heads of Households Across Urban Upper Egypt



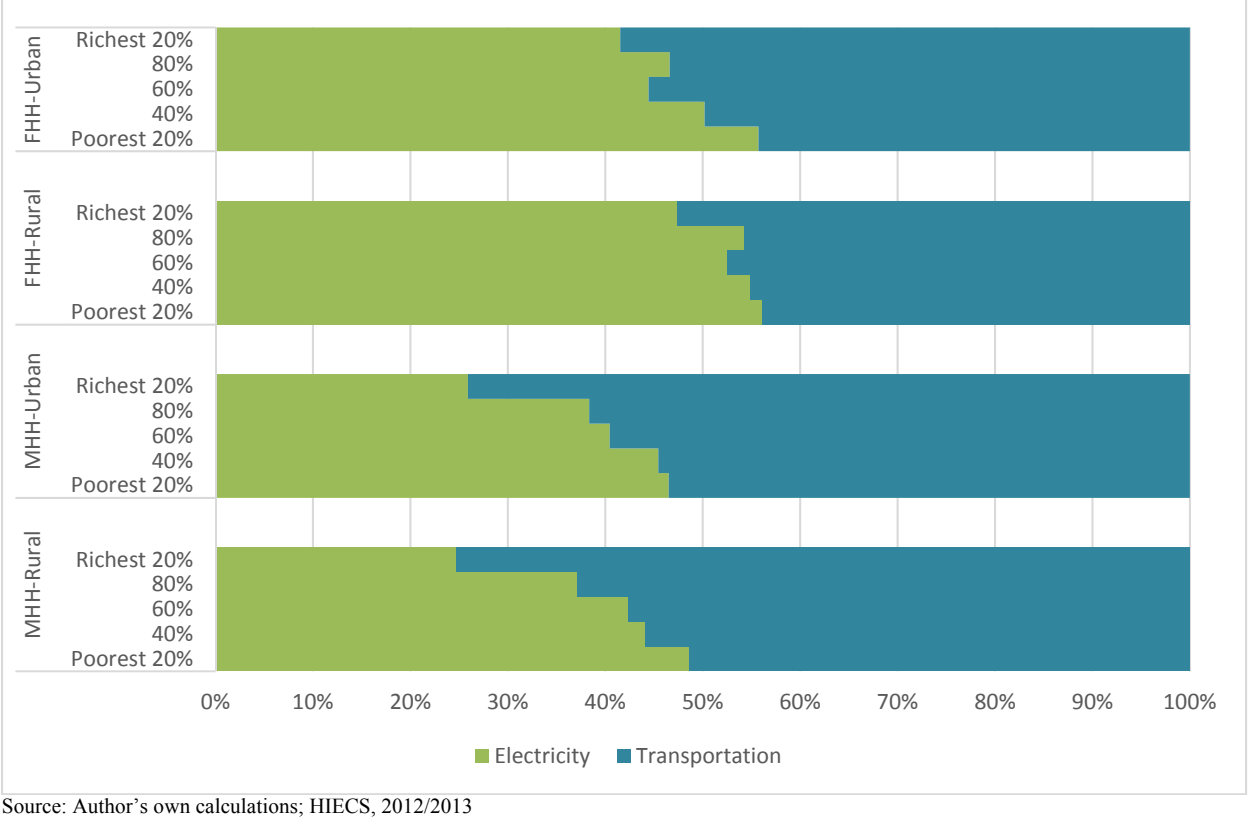
Author's own calculations: HIECS and ELMPS

Figure 14: Per Capita Expenditures on Electricity and Transportation by Region and Gender of Heads of Households



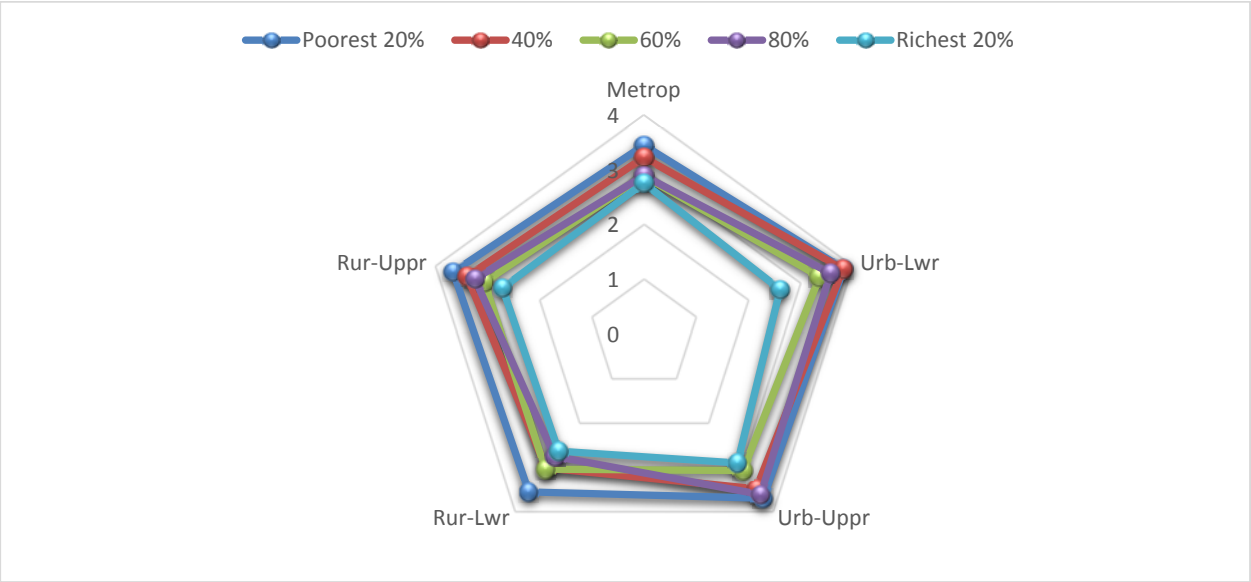
Notes: 1) transportation expenditures are net of the value of own vehicle.
Source: Author's own calculations; HIECS, 2012/2013

Figure 15: Expenditures on Electricity and Transportation by Region and Expenditure Quintiles



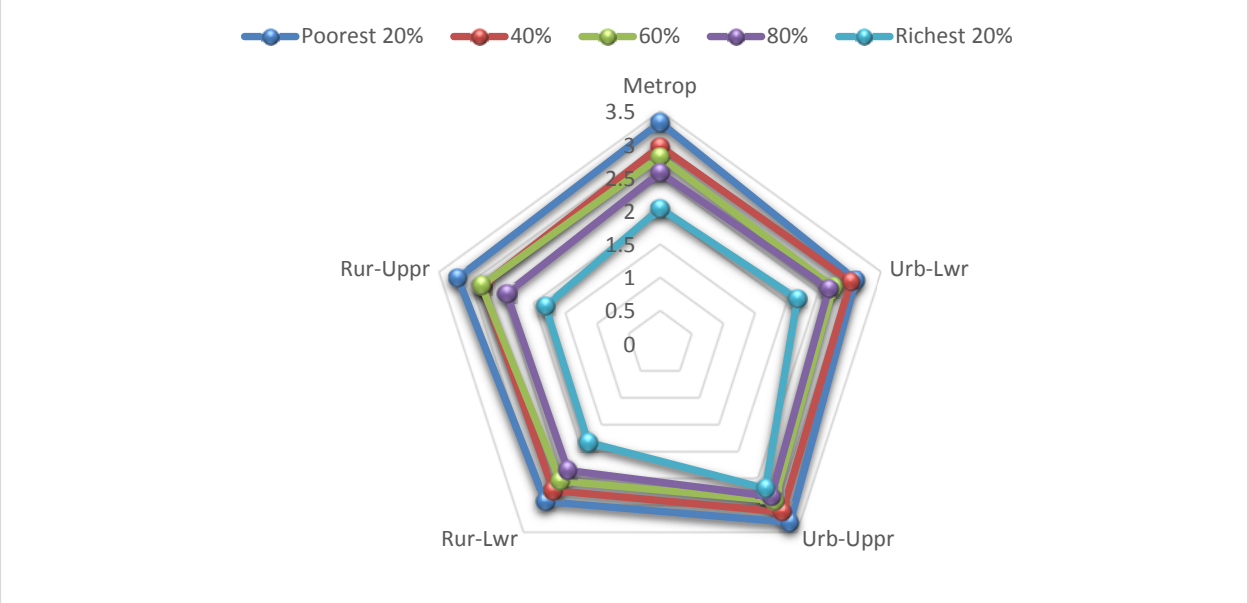
Source: Author's own calculations; HIECS, 2012/2013

Figure 16: Share of Electricity in Total Expenditures of Female Heads of Households by Quintile and Regional Distribution



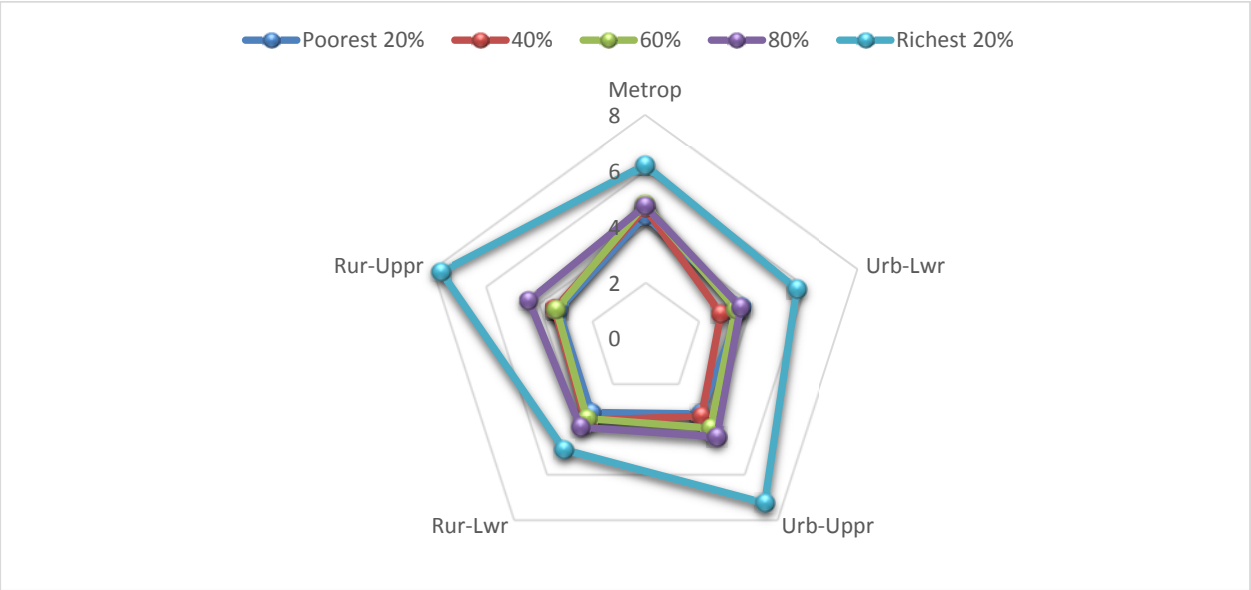
Source: Author's own calculations. HIECS, 2012/2013.

Figure 17: Share of Electricity in Total Expenditures of Male Heads of Household by Quintile and Regional Distribution



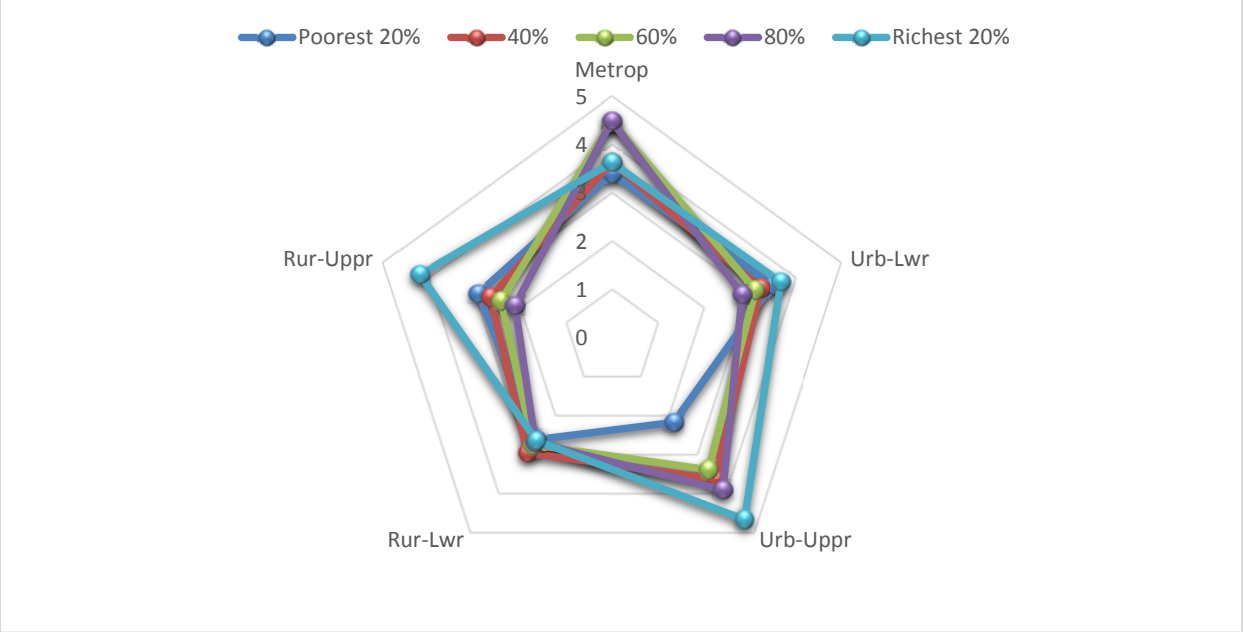
Source: Author's own calculations. HIECS, 2012/2013.

Figure 18: The Share of Transportation in Total Expenditures of Male Heads of Households by Quintile and Regional Distribution



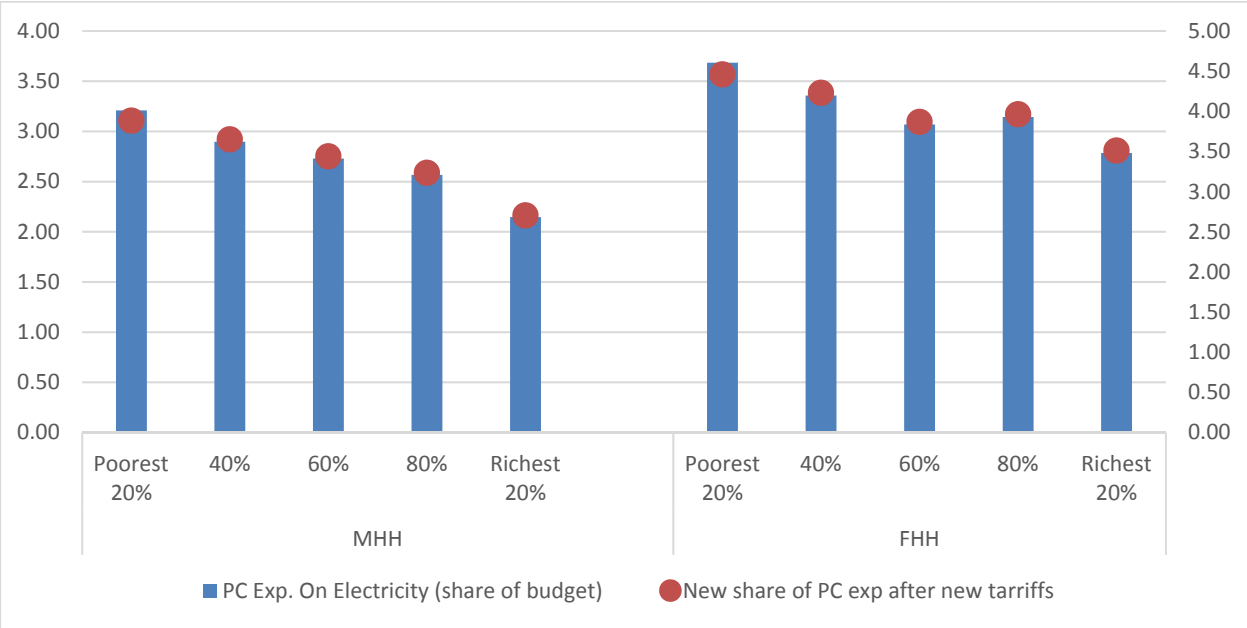
Source: Author's own calculations. HIECS, 2012/2013.

Figure 19: The Share of Transportation in Total Expenditures of Female Heads of Households by Quintile and Regional Distribution



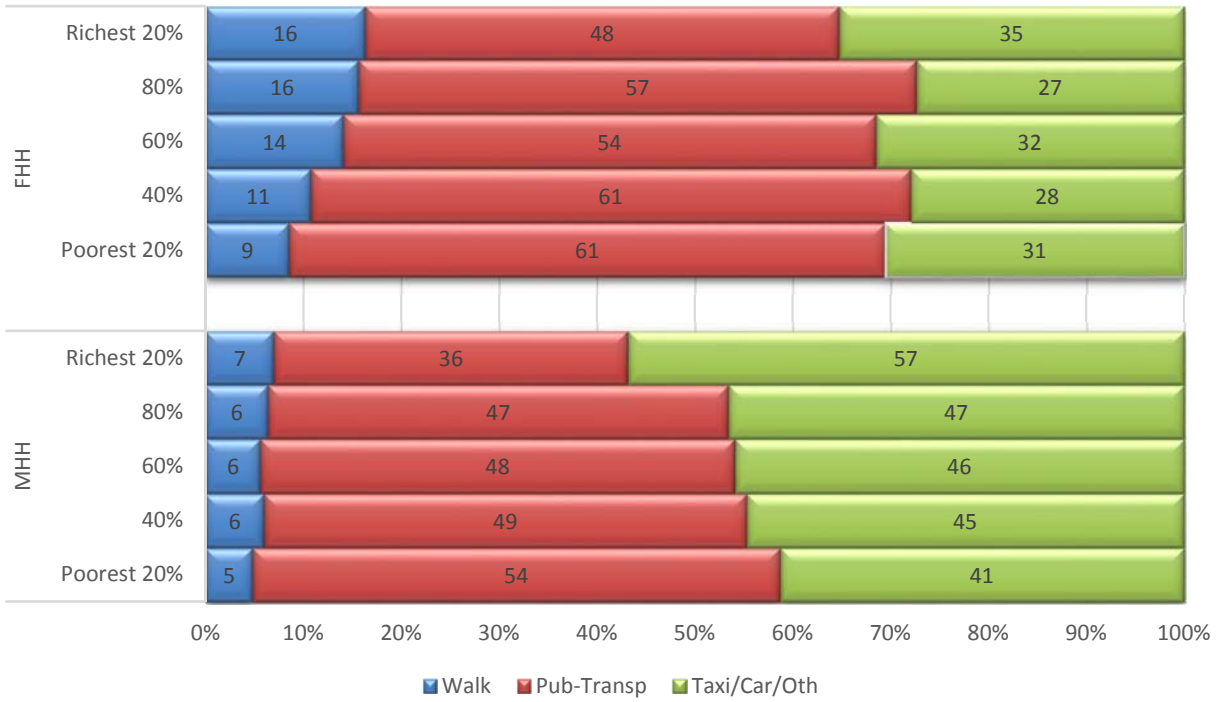
Source: Author's own calculations. HIECS, 2012/2013.

Figure 20: PC Expenditures on Electricity (Share of Budget) Before and After Increase in Electricity Tariffs



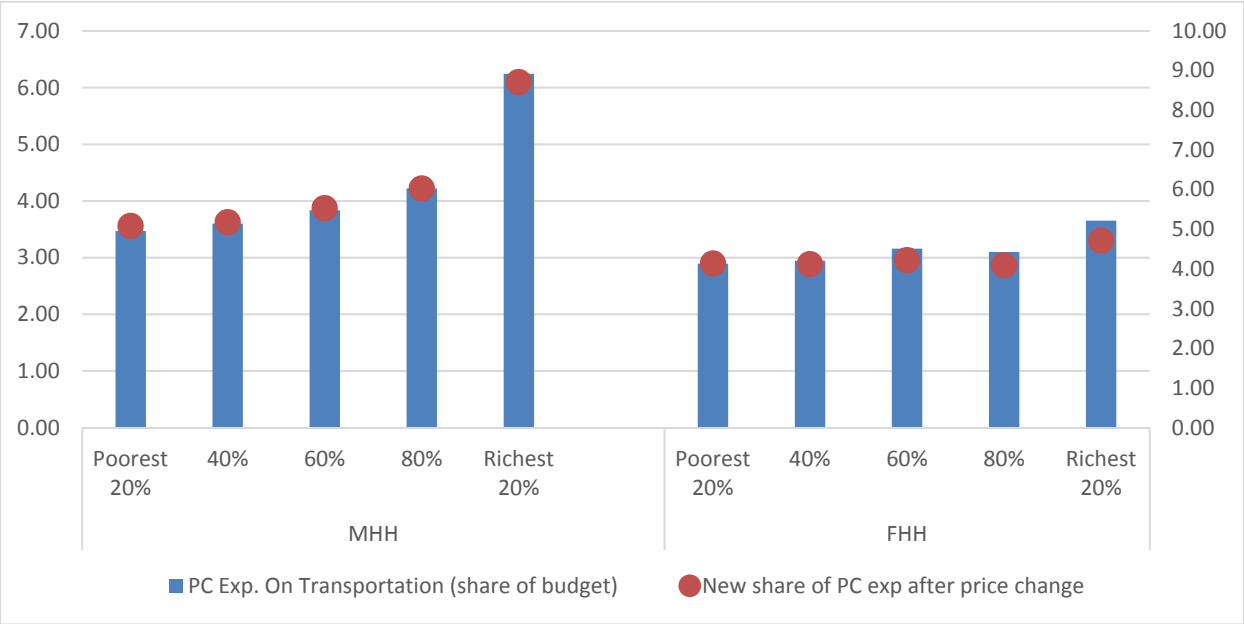
Author's own calculations: HIECS and ELMPS.

Figure 21: Mode of Transportation by Quintiles



Author's own calculations: HIECS and ELMPS.

Figure 22: PC Expenditures on Transportation (Share of Budget) Before and After Increase in Cost of Transportation



Author's own calculations: HIECS and ELMPS.

Table 1: Expected Change in Electricity Tariffs

Consumption Category	0 -50 kwh	51 - 200 kwh	201 - 350 kwh	351 - 650 kwh	651 - 1000 kWh	1000 kWh +
% Change in Tariffs	50%	21%	26%	17%	13%	10%

Source: Energy Subsidy Country Update: Assessing Egypt's Subsidy Reforms. Kieran Clarke; IISD-GSI; 2014

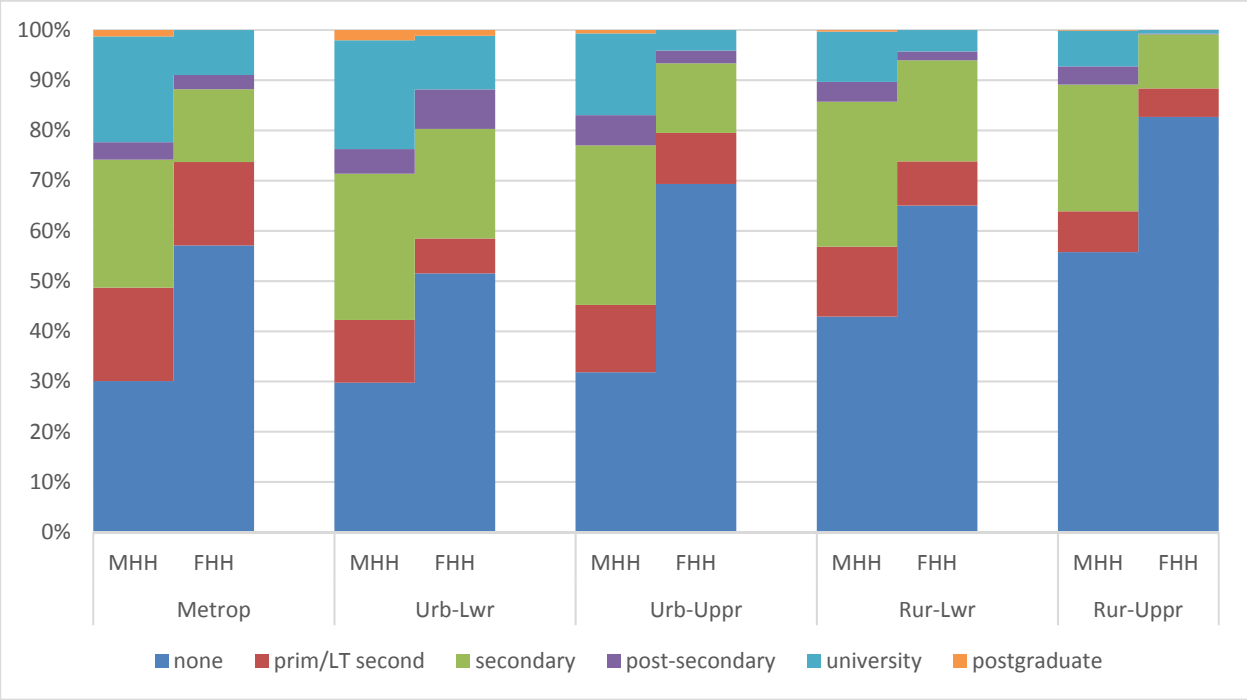
Table 2: Current and Proposed Prices by Type of Fuel

Fuel Type	Mostly Used in/for	Current Price-LE/liter	Proposed prices as of July 2014	% change in price
Gasoline 80	Old vehicles	0.9	1.6	77.8
Gasoline 92	Most vehicles	1.85	2.6	40.5
Gasoline 95	Luxury vehicles	5.85	6.25	6.8
Diesel-Bricks/Cement	Industry	1.5	1.8	20
Diesel-Vehicles	Pub. Transp	1.1	1.8	63.6
Natural Gas	Taxis			175%

Source: http://www.reuters.com/article/2014/07/04/us-egypt-energy-idUSKBN0F91YG20140704

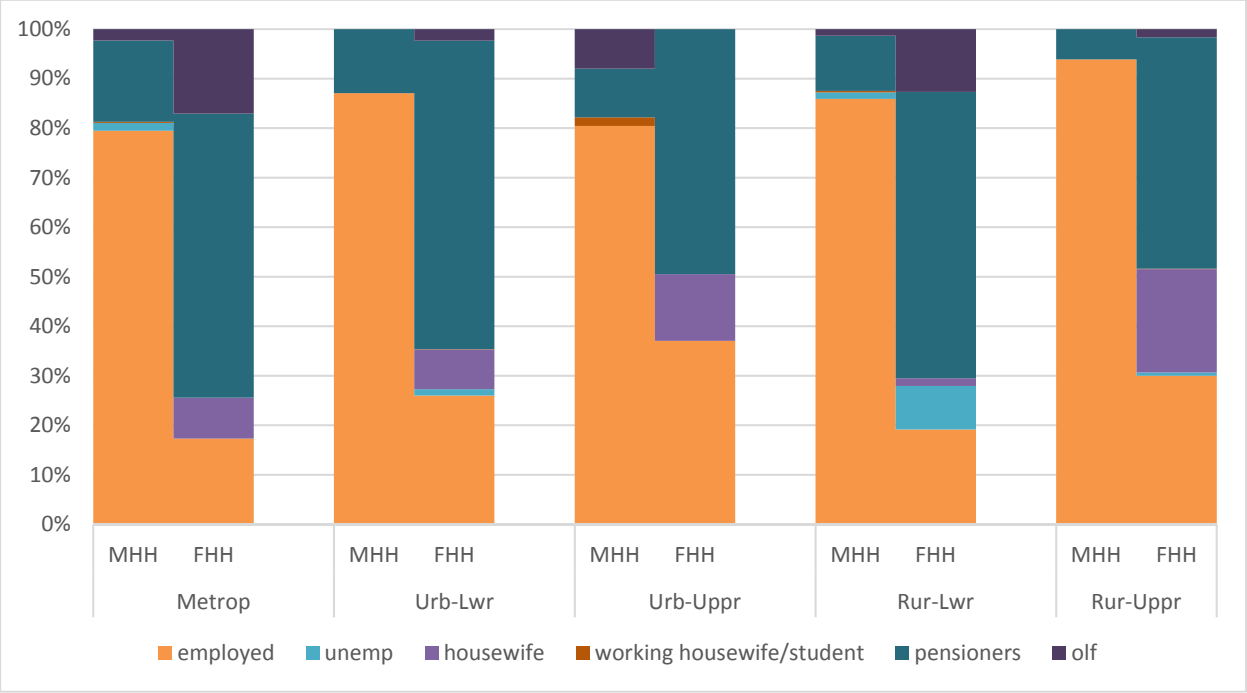
Appendix A: Characteristics of Heads of Households

Figure A1: Education Levels of Heads of Households by Gender and Region



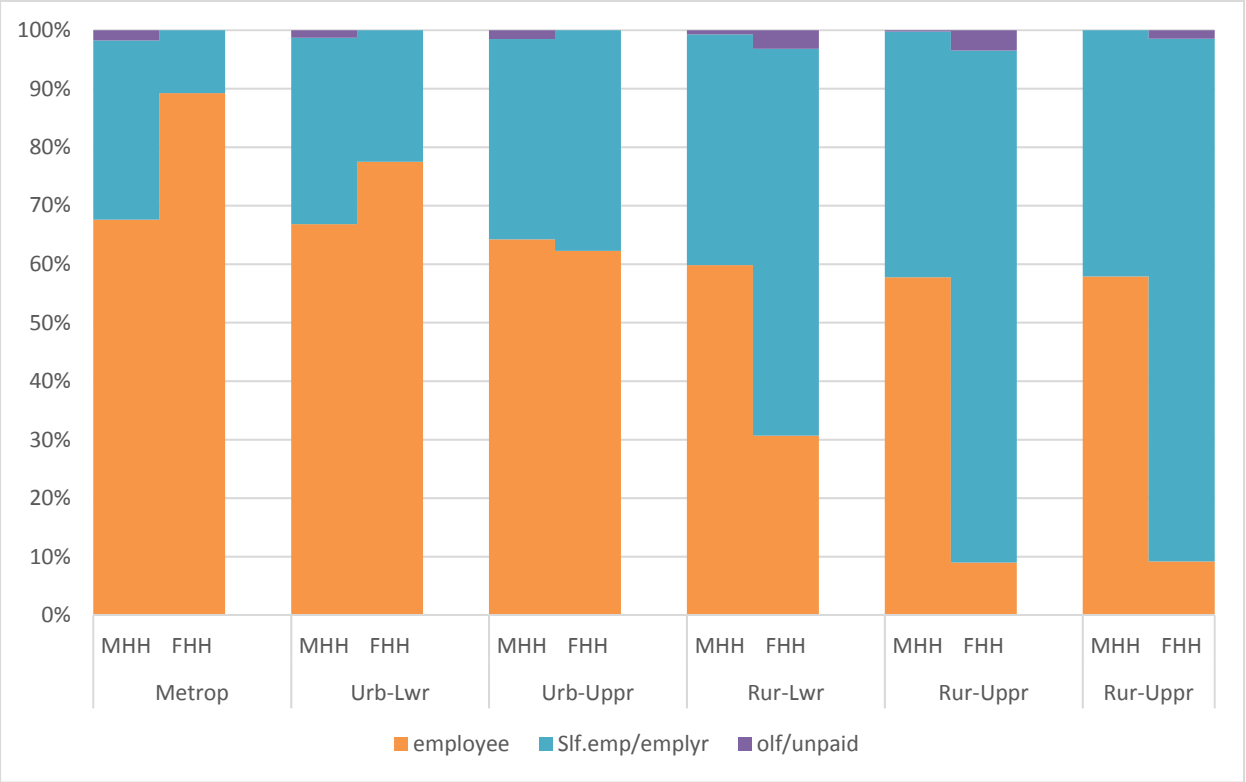
Author's own calculations: HIECS and ELMPS.

Figure A2: Main Economic Activity of Heads of Households by Gender and Region



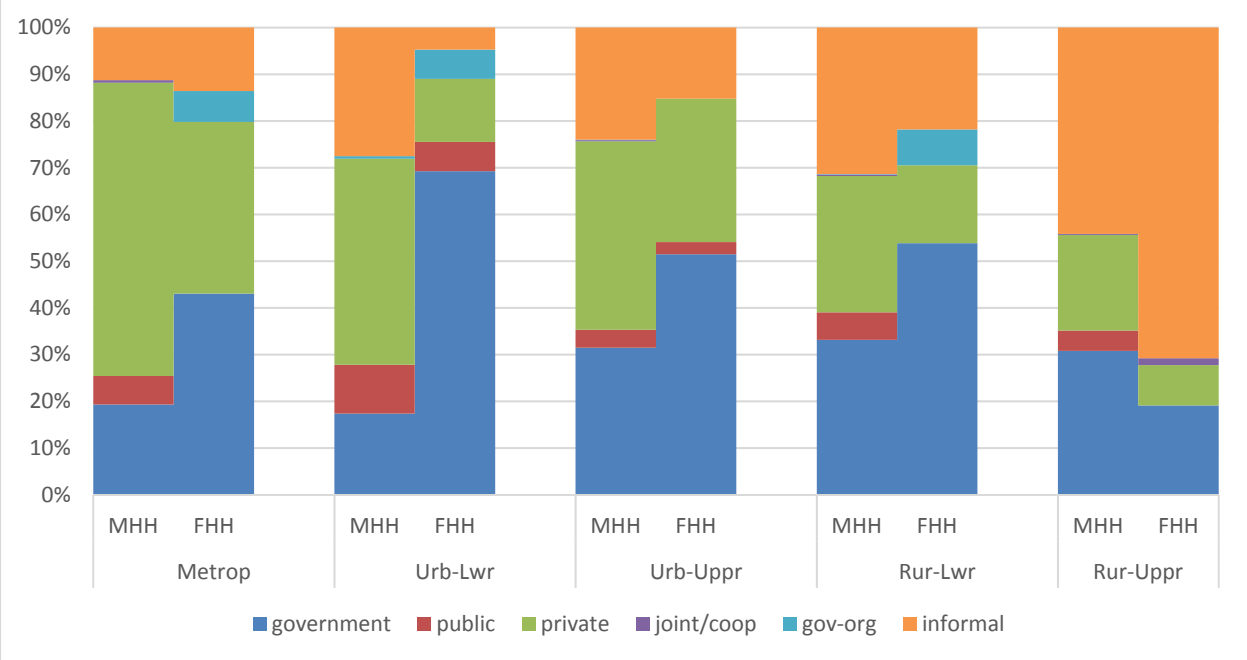
Author's own calculations: HIECS and ELMPS.

Figure A3: Employment Type of Heads of Households by Gender and Region



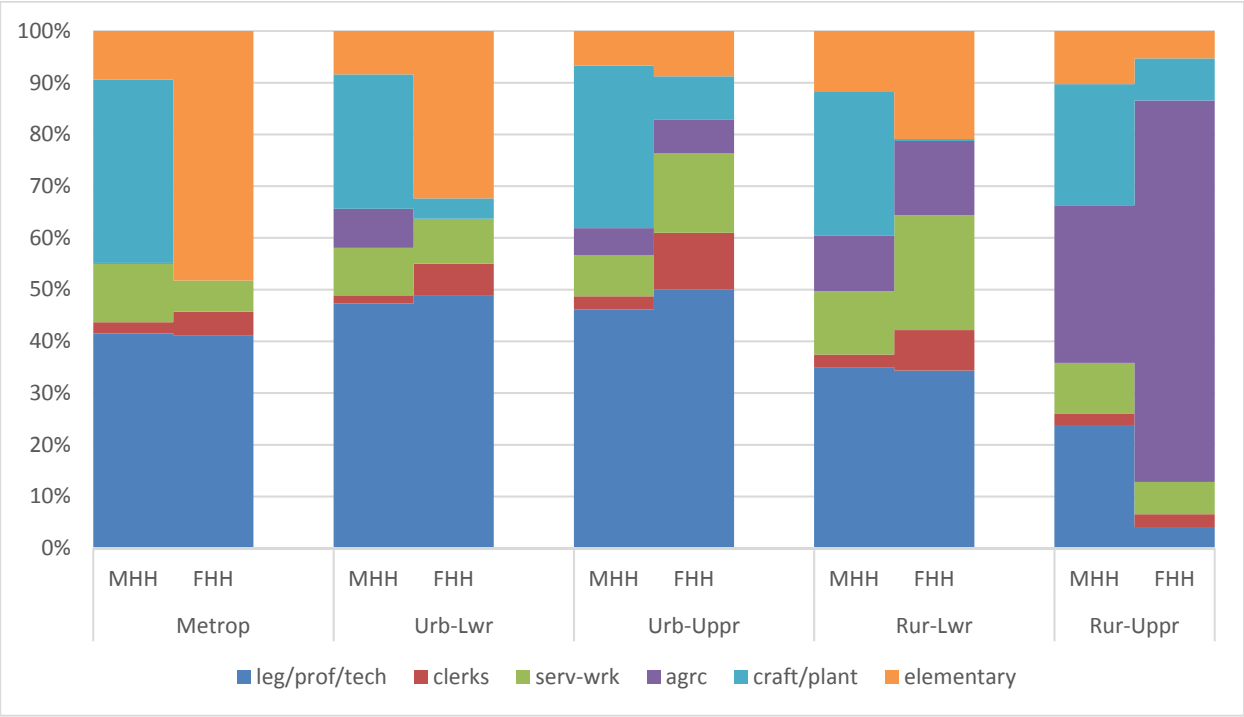
Author's own calculations: HIECS and ELMPS.

Figure A4: Sector of Employment of Employed Heads of Households by Gender and Region



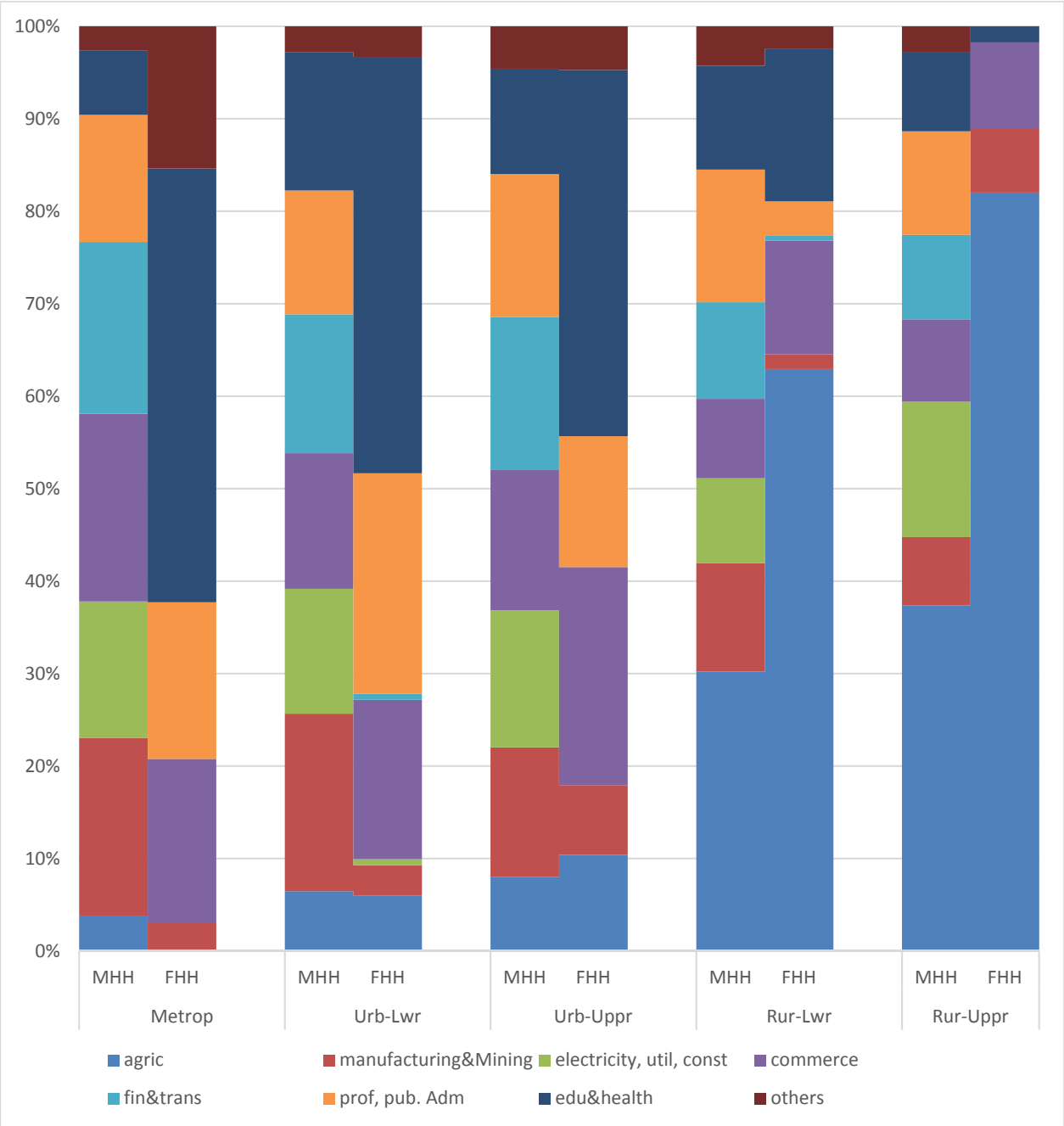
Author's own calculations: HIECS and ELMPS.

Figure A5: Occupational Distribution of Employed Heads of Households by Gender and Region



Author's own calculations: HIECS and ELMPS.

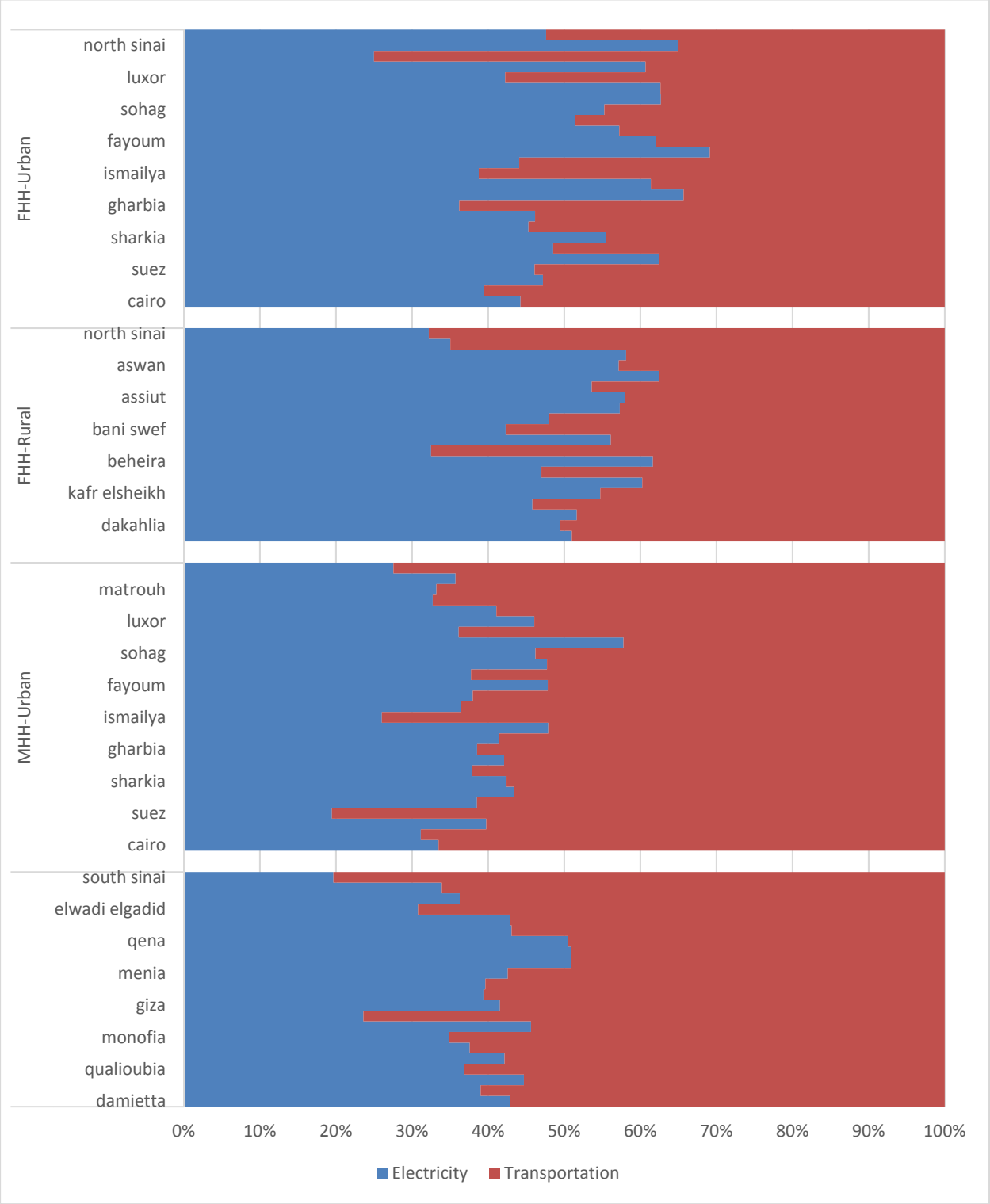
Figure A6: Industrial Distribution of Employed Heads of Households by Gender and Region



Author's own calculations: HIECS and ELMPS.

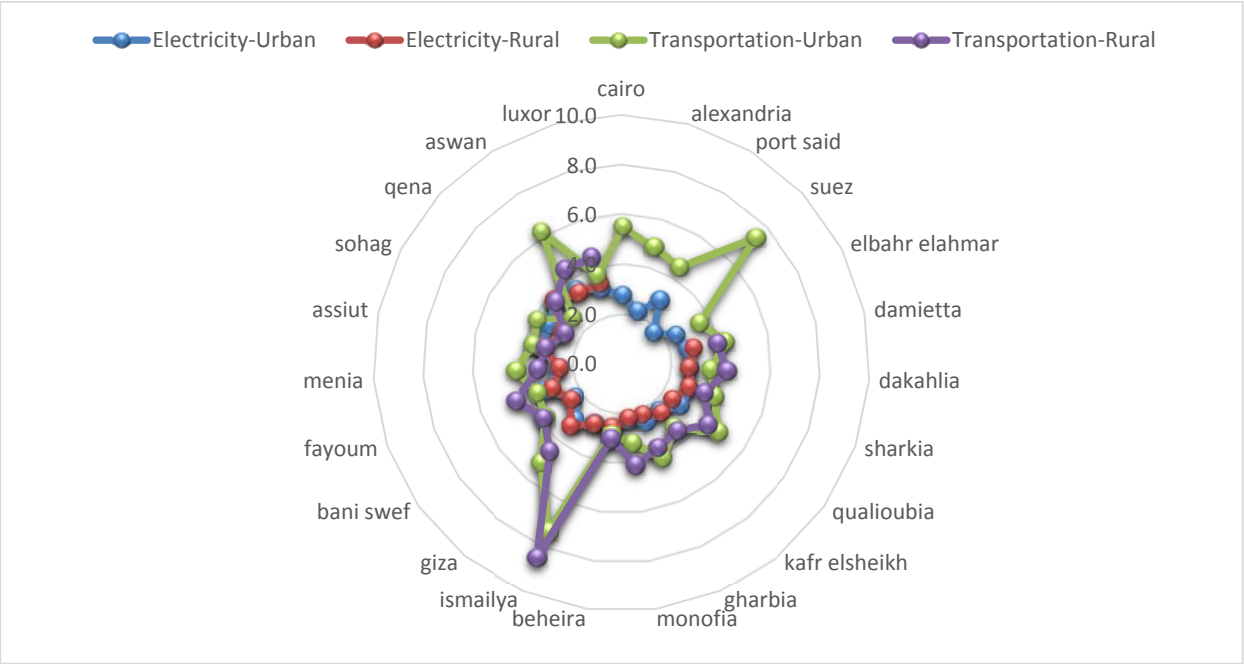
Appendix B

Figure B1: Distribution of Per Capita Expenditures on Electricity and Transportation by Governorate



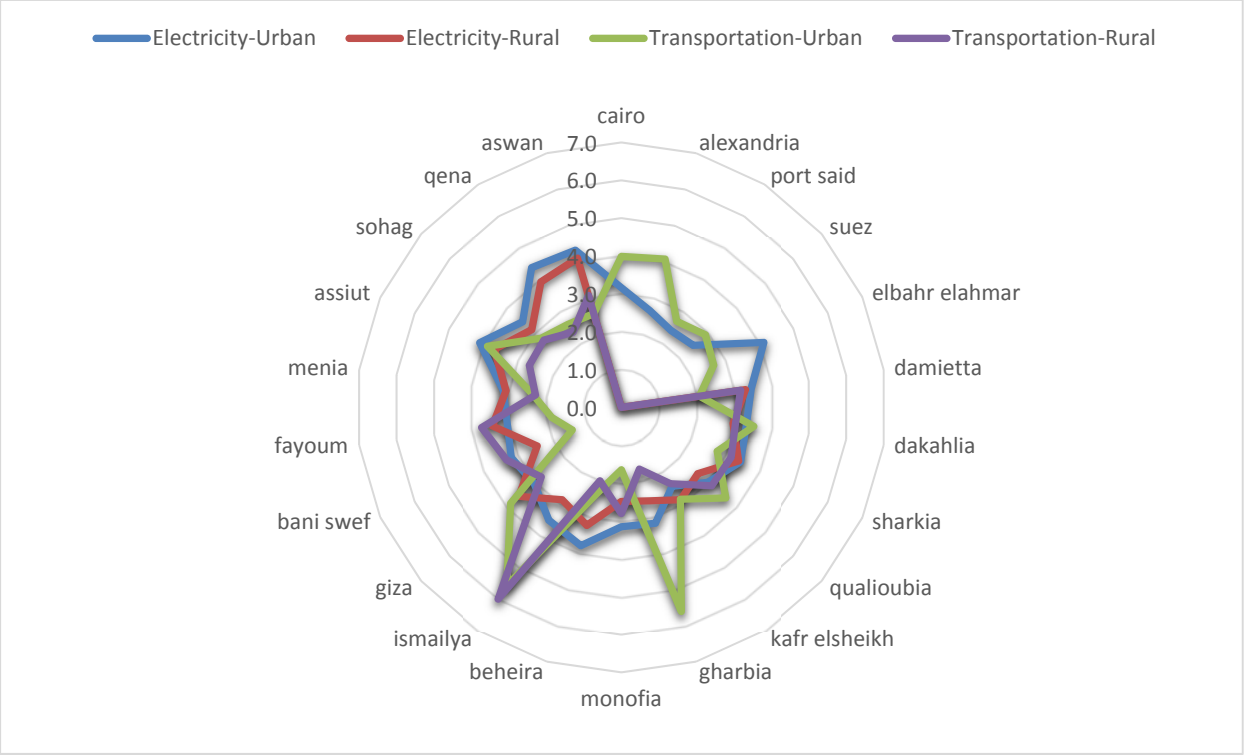
Author's own calculations: HIECS and ELMPS.

Figure B2: Expenditures on Electricity and Transportation across Governorates, by Region, MHH



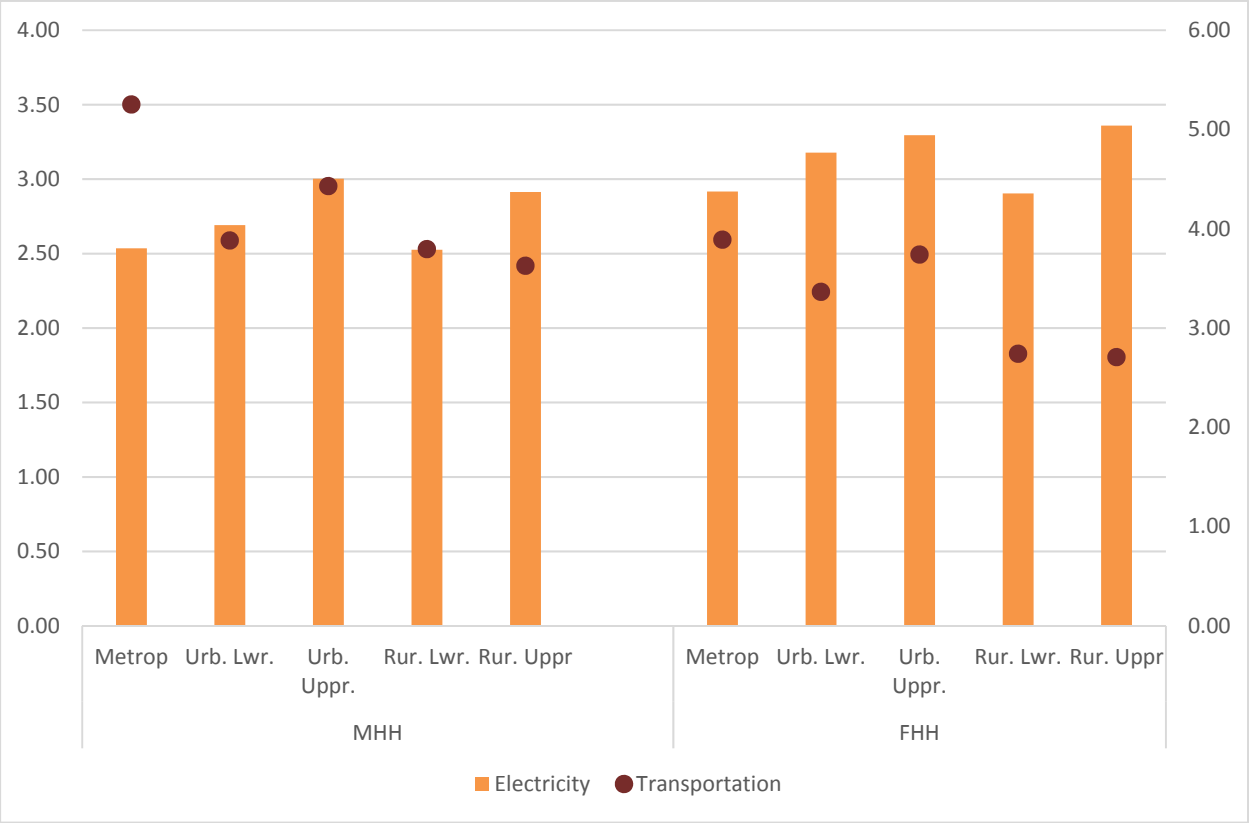
Author's own calculations: HIECS and ELMPS.

Figure B3: Expenditures on Electricity and Transportation across Governorates, by Region, FHH



Author's own calculations: HIECS and ELMPS.

Figure B4: Per Capita Expenditures on Electricity and Transportation by Region



Author's own calculations: HIECS and ELMPS.

Appendix C

Table C1: Average Consumption Levels of Electricity by Quintiles of Per Capita Expenditures

Poorest 20%	40%	60%	80%	Upper 20%
195	210	215	230	324

Source: Egypt - Toward a More Effective Social Policy: Subsidies and Social Safety Net. The World Bank, 2005

Table C2

		Share of mode of transportation				Expected change= pc expend on transp X		Increase in pc expnditures		The weighted share of the increase		
		Walk	Pub-Transp	Taxi/Car/Oth	PC Exp. on transp (share of budget)	Pub-Transp: Price change by 64%	Taxi/Car/Oth: Price change by 41%	Pub-Transp	Taxi/Car/Oth	Pub-Transp	Taxi/Car/Oth	New share of pc expend after price change (weighted)
Male-Headed Households	Lowest 20%	4.8	53.9	41.3	**3.47**	=(3.47)*(64%)=2.2'	=(3.47)*(41%)=1.4'	=2.2+3.47=5.7'	=1.4+3.47=4.9'	=(53.9%)*(5.7)=3.1'	=(41.3)*4.9=2.02'	**3.06+2.02=5.1'**
	40%	6.0	49.3	44.7	**3.60**	2.3	1.5	5.9	5.1	2.91	2.27	**5.18**
	60%	5.6	48.5	45.9	**3.83**	2.5	1.6	6.3	5.4	3.05	2.48	**5.53**
	80%	6.4	47.0	46.6	**4.22**	2.7	1.7	6.9	5.9	3.25	2.77	**6.02**
	Richest 20%	7.0	36.2	56.8	**6.24**	4.0	2.6	10.2	8.8	3.71	5.00	**8.71**
Female-Headed Households	Lowest 20%	8.6	60.9	30.5	**2.89**	1.9	1.2	4.7	4.1	2.89	1.24	**4.13**
	40%	10.8	61.3	28.0	**2.94**	1.9	1.2	4.8	4.1	2.96	1.16	**4.12**
	60%	14.1	54.4	31.5	**3.16**	2.0	1.3	5.2	4.5	2.82	1.40	**4.22**
	80%	15.7	57.0	27.3	**3.10**	2.0	1.3	5.1	4.4	2.90	1.19	**4.09**
	Richest 20%	16.3	48.4	35.2	**3.65**	6.0	5.1	2.90	1.81	4.71	1.81	**4.71**

source: Author's own calculations: HIECS and ELMPS; Price change data: http://www.reuters.com/article/2014/07/04/us-egypt-energy-idUSKBN0F91YG20140704