[1] Energy subsidies reform in Jordan: Welfare implications of different scenarios

Contents

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Executive summary

Jordan initiated substantial energy reforms in 2012 to reduce the large and unsustainable fiscal burden. The Government of Jordan (GoJ) eliminated subsidies on gasoline (high quality), diesel and kerosene and partially cut the subsidies on Liquefied Petroleum Gas (LPG). Simultaneously, a large scale cash transfer program to households has been introduced covering about two-thirds of Jordanian households. Nevertheless, energy subsidies reforms were incomplete and the government continues to contemplate how to reduce electricity subsidies, which surpass the fiscal burdens imposed by the petroleum subsidies. This note estimates both the direct and indirect effects of 2012 fuel subsidies reform assuming full removal of subsidies on LPG. Moreover, it estimates the distributional and fiscal impacts of potential reform scenarios in the electricity sector.

Consistent with previous studies (Araar et al. 2013), wealthier households were the largest consumers of subsidized products and the largest beneficiaries of petroleum subsidies in Jordan. For example, the poorest quintile of population was spending on average 7 times less on subsidized petroleum products than the richest quintile based on estimates from the 2010 Household Expenditures and Income Survey. Expenditures on gasoline and diesel were particularly pro-rich, while expenditures on LPG and kerosene played a relatively more important role for the budget of less affluent households. Still, per capita subsidies were lower for poor households for all fuel products. In terms of electricity, however, the poorest quintile of the population spend about 3.5 percent of their budgets on electricity compared to 2.4 percent for the richest households. As a result, poor households can be highly vulnerable to higher tariffs on electricity.

The simulations reveals that full removal of subsidies on petroleum products will increase poverty by 1.6 percentage points accompanied by increasing both poverty gap and inequality. The overwhelming increase in poverty comes from LPG, which is not surprising given its high share in the budget of poorest households and the large increase in its price. The generous compensatory cash transfer program to Jordanian households with annual incomes below JD 10,000, if perfectly targeted, would fully offset the negative impact of higher prices of subsidized products for the bottom 40 percent of the population. Costs of cash programs are estimated to be lower than revenues /costs savings generates from households' use of petroleum products.

In terms of the indirect impact, economy-wide prices rise more after diesel subsidy elimination and any negative impact from higher diesel prices arrives indirectly through an increase in the price of the household consumption basket. In contrast, indirect impact from higher gasoline prices are about 14 percent of the total direct impact.

Different options are available to the GoJ to implement reforms in electricity tariffs. Full removal of subsidies can be achieved by setting a flat rate tariff equal to the cost recovery level of JD 0.164 per kWh for all consumers across the distribution. This implies a huge burden on the poorer households with the lowest electricity consumption levels and the lowest tariffs before the reform. As an alternative, the burden of subsidies elimination can disproportionately placed on the shoulders of the richest households by imposing higher increases in electricity tariffs on them. Poverty will increase by 2.4 or 1.7 percentage points depending on the way subsidies are removed.

The above scenarios are quite severe – leading to more than a doubling of prices for many brackets. A third more realistic scenario was also simulated. Under this scenario we assume a quasi-progressive increase in

tariffs for all consumers keeping tariffs on the first two blocks subsidized. The negative impact on consumers will be rather modest and relatively equal across the distribution: an average 1.2 percent reduction in per capita is expected leading to poverty increasing by 0.5 percentage points. Indirect effects of electricity prices changes under this scenario are about 26 percent of total direct impact.

The largest savings from electricity reform will come from the scenario assuming full elimination of subsidies. The government can save the largest amount (estimated at JD473 million) from full removal of subsidies under the scenario of flat tariffs. However, this reform will also have the largest impact on poverty. To get to the pre-reform poverty and poverty gap levels around JD319 million will be required in spending (assuming perfect targeting). Therefore, the net gain will be JD158 million. Under scenario with semi-progressive increase in tariffs, overall gain from higher tariffs will be JD 162 million. From this amount JD70 million will have to be transferred back (assuming universal transfer) to bring poverty to pre-reform levels leaving the government with JD 92 million in savings.

The simulations reveal that the current subsidy system provides valuable assistance to the poor, but at the same time are pro-rich and inefficient. Reforming subsidies is, however, a politically sensitive issue. Data from the MENA SPEAKS (Social Protection Evaluations of Attitudes, Knowledge and Support) Survey, indicates that about 56 percent of Jordanians were opposed to subsidy reform on any consumer item (Silva et al. 2013). Data suggests the opposition to reform in Jordan to be higher than in neighboring countries. Yet, the November 2012 petroleum reforms were carried out without any significant public unrest. Right timing and immediate compensation of losers appear to be important for successfully implementing reform. Successful electricity subsidy reform will require even stronger efforts because of the scale and importance of electricity in the budgets of households.

Introduction

As the Arab Spring unfolded and political unrest spread across the Arab world, Jordan faced an adverse economy as well. Fundamental to the economic challenge was high and rising energy prices, already heavily subsidized for consumers. With the government intent on staving off emerging political unrest through a series of measures, buffering consumers from increased energy prices being a key action, fiscal costs mounted. By 2012, subsidies on petroleum products alone were about 2.8 percent of GDP and 8.8 percent of government expenditures. At the same time, political unrest disrupted the supply of natural gas from Egypt and Jordan abruptly had to switch to using imported oil products (heavy fuel oil and diesel) to produce electricity. Consequently, the cost of producing electricity increased several folds. As the increased cost was not passed on to the consumers, National Electric Power company (NEPCO), bore all the increases in fuel prices and accumulate debt as a result. At approximately 17 percent of government expenditures and 5.5 percent of GDP in 2011, this was twice the amount of the petroleum subsidies.

Even for a country with a history of universal subsidies, the suddenness and immensity of the fiscal burden was remarkable. Facing strong fiscal pressures of the unsustainably large subsidies, in November 2012 the government decided to remove the subsidies for gasoline (high quality), diesel and kerosene and reduce the subsidies on Liquefied Petroleum Gas (LPG). To compensate households for these large price increases, the government decided to simultaneously introduce a large scale cash transfer program to households earning less than 10,000 JD a year, covering about two-thirds of Jordanian households. This was a major policy decision carried out in the middle of a volatile political atmosphere. All the same, reform efforts were incomplete and the government continues to contemplate how to reduce electricity subsidies, which surpass the fiscal burdens imposed by the petroleum subsidies. Much like the 2012 petroleum subsidies reform, the government could implement far reaching reforms by reducing electricity subsidies and combining it with a targeted cash transfer. Yet, it has been difficult for the government to put in place such a measure, despite only recently having removed petroleum subsidies quite successfully.

One of the reasons for the hesitation in further reforms is perhaps that the question of "who gets what, when, and how"[2] from reform has no clear answer; the costs and benefits of potential reforms are not well understood, especially for the case of electricity where the pricing may often appear opaque even to policymakers. This chapter attempts to shed light on the distributional and fiscal impacts of reform options, focusing on petroleum and electricity subsidy reforms. Moreover, understanding the impacts of the petroleum subsidy reforms can inform alternative reform options for electricity subsidies.

The chapter is organized as follows. Section 2 traces the evolution of subsidies in Jordan in recent times. The distributional impacts of reform would depend on how important the subsidized items are to consumers in terms of their expenditures on those items. Section 3 discusses this question from the perspective of richer and poorer households. The distributional impacts of reform would of course not only depend on how much consumers spend on the subsidized items but also on the extent of price changes. Sections 4 and 5 simulate direct and indirect impacts of potential reform scenarios across the income distribution. From this discussion, in section 6 the chapter moves onto considering how reforms are weighed down by vexing political economy constraints. In MENA countries, universal subsidies have been in place as part of the

[2] Quote taken from Harold Laswell's seminal work titled *Politics: Who Gets What, When, and How*.

government's role in ensuring stability in the lives of the people and doing away with them is not straightforward. Finally, Chapter 6 concludes.

1. Evolution of subsidies

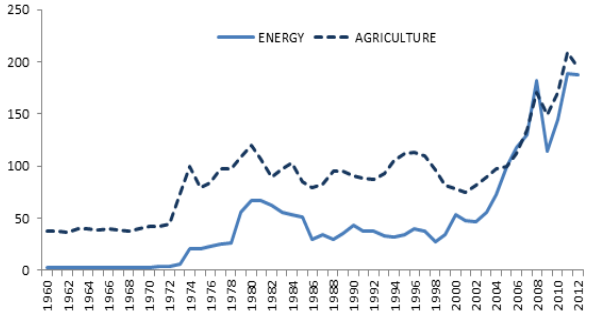
Like other countries in the MENA region, the Government of Jordan has traditionally provided universal subsidies to consumers and producers of petroleum products, electricity, water, and food. With the government continuing to insulate the population from the recent large spikes in global commodities and food prices, the subsidies experienced sharp increases. In 2005, the government was spending over JD 600 million on food and oil subsidies alone, about 17 percent of total government expenditures. While the magnitude of the subsidies rose and fell with international price changes, they continued to remain a challenge for the government.

Jordan's consumer subsidies have a long history with food price subsidies dating back to the 1960s. Starting with wheat and sugar, over time a host of food items were subsidized. By the early 1990s most food prices were liberalized with the exception of wheat that has continued to be subsidized despite occasional attempts at reform. The government's attempt at removing the wheat subsidies (with prices almost trebling from JD0.075 per kilogram to JD 0.25 per kilogram), resulted in widespread social discontent and erupted in 'bread riots' in 1996 (Lamis and Schwedler 1996). While the increase was scaled back, the retail price almost doubled in 1996, and was subsequently accompanied with a cash transfer program to compensate the poor. Since then, however, wheat prices have remained fixed in nominal terms. Consumers today receive water at subsidized rates as well. In this chapter, however, we focus on petroleum products and electricity because of their relative importance to Jordanian households and the government.

2.1 Subsidies on Petroleum Products

Before 2003, Jordan received oil from Iraq at below market prices and the government passed on (part of) these savings to consumers. After 2003, Jordan lost this source of cheap oil and this coincided with increases in international prices (World Bank 2009). Between 2002 and 2008 world energy prices increased by more than threefold while world food prices doubled (Figure 1). The government was forced to increase prices in 2005 and again in 2006, but it still kept prices below international levels. Consequently, in 2005, government spending on petroleum subsidies alone reached 5.8 percent of GDP (Coady *et al* 2006).

Figure 1. World Energy and Agriculture Price Trends (1960-2012)



Source: Araar *et al.* (2013) figures based on the World Bank Commodity Prices Database (Index, 2005=100)

Table 1. Jordan: Change in Petroleum Subsidies, 2007–12

	2007	2008	2009	2010	2011	2012
	(In million JD, unless otherwise specified)					
Budgetary petroleum subsidies	306	197.9	42.9	88.2	571	626
Nominal GDP at market prices	12,131	15,593	16,912	18,762	20,477	22,230
Petroleum subsidies *(% of GDP)*	2.5	1.3	0.3	0.5	2.8	2.8
Petroleum subsidies *(% of budget expenditures)*	6.8	3.8	0.9	1.6	8.4	8.8

Source: Araar *et al.* (2013).

In the face of serious fiscal strain, the government phased out cash subsidies on petroleum products between 2008 and 2010. This was the first time prices were at the international level (LPG was still subsidized partially) and a rapid drop in petroleum subsidies ensued – from 2.5 percent of GDP in 2007 to 0.3 percent in 2009. At the same time the government compensated households in the form of salary increases for public and private sector employees and military personnel. At the very end of 2010, however, the government discontinued the monthly petroleum price adjustments as oil prices reached US$90 a barrel and reintroduced petroleum subsidies. By 2012, petroleum subsidies were at 2.8 percent of GDP or close to 9 percent of the government budget.

Facing fiscal pressure again, in June 2012 the government increased the price of premium octane gasoline (octane-95) by about 13 percent. However, as octane-95 accounted for only about 10 percent of the gasoline consumption of Jordan's transport sector, this move proved inadequate in addressing the government's fiscal burdens. This led to the major reforms of November 2012, when subsidies on petroleum products were cut drastically and an extensive cash transfer program was instituted. This program has continued till the present (and is described in more detail in section 4).

2.2 Subsidies on Electricity

The production and distribution of electricity in Jordan is in the hands of the private sector while the transmission is in the hands of the public sector. Prior to 2006, the entire electricity system was under the public sector. In 2002, a new electricity law was passed to open the system to the private sector. In 2006 the privatization process was initiated and by 2008 two independent power producers entered the market. Today there are four major private (or almost private) production companies and three main private distribution companies (JEPCO, IDECO and EDCO). The transmission company NEPCO, a public shareholding company, purchases all energy from the producers and resells it to the distributors (see Verme 2011 for a more detailed discussion). The sale price from the production companies to NEPCO is established by bilateral contracts between NEPCO and the producers. These contracts specify that NEPCO is responsible for the purchase of the fuel necessary for the functioning of the power stations. The sale price from NEPCO to the distribution companies and the tariffs for consumers are established by the government's Energy and Minerals Regulatory Commission (EMRC).

The existing structure of the electricity system implies that all financial risks are borne by the public NEPCO. The four private producers companies are insulated from the risks associated to changes in fuel prices as the cost of fuel is paid for by NEPCO as stipulated in the NEPCO-production companies agreements. The three private distribution companies are insulated from price increases by the tariff system in place which guarantees a positive return to distribution companies.

In the 2000s, electricity generation in Jordan relied mostly on Egyptian gas and heavy oil, with the former accounting for 80-85 percent of inputs. Electricity is produced almost entirely with fuels, and alternative sources (such as hydro or solar power) of production are absent. While the price of heavy oil almost doubled in February 2008, Egyptian gas was heavily subsidized at about 50% below international market prices (World Bank 2009). Between 2008 and 2009, NEPCO managed to maintain positive balances but at the end of 2010 the company reported a debt of over 200 m. JD. However, due to disruptions of gas supply from Egypt in 2011, the cost of producing electricity in Jordan increased by several folds as producers had

to switch to the use of expensive diesel and heavy fuel oil, of which share in fuel for power mix reached 80 percent in 2012 (from 29 percent in 2010). As the increased costs were not passed onto the final consumers, NEPCO assumed all the costs of increases in fuel prices and began running monthly deficits of an estimated 100 m. JD, which amounted to JD 1.2 billion annually (5.5 percent of GDP in 2011). This in turn has placed an enormous fiscal burden on the government, and this is one of the main reasons the government has stated its intention to follow fiscal consolidation plans in the context of an IMF SBA (Stand-by-Arrangement) program.

2. Distribution of Subsidies

This section describes distribution of expenditures on subsidized products and the distribution of subsidies across households in Jordan based on the 2010 Household Expenditures and Income Survey (HEIS), the most recent flagship consumption survey conducted by the Department of Statistics (DOS) of Jordan. The survey being outdated, all expenditures were inflated to be in 2013 year prices using nominal GDP per capita growth rates.[3]

Petroleum products

Households in Jordan spent an estimated JD 856 million on subsidized petroleum products such as kerosene, LPG, gasoline[4] and diesel in 2013 (table 2). Expenditures on gasoline account for about two-thirds of this amount, followed by LPG (24 percent), kerosene (6 percent) and diesel (5 percent). Wealthier households spend much larger amounts on subsidized petroleum products.

Table 2. Household expenditures on subsidized petroleum products, mln. JD

	kerosene	LPG	gasoline	Diesel	Total
Quintile 1	7	27	21	0	55
Quintile 2	9	33	55	0	98
Quintile 3	12	38	91	1	141
Quintile 4	12	45	139	2	199
Quintile 5	14	63	251	35	363
Total	55	206	557	38	856

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on spatially adjusted consumption per capita before the reform.

Expenditures on gasoline and diesel are relatively more important for wealthier households, while LPG and kerosene are relatively more important for less affluent households (table 3). For example, households in the wealthiest quintile spend an estimated 4.4 percent of their total expenditures on gasoline, while the bottom quintile spends only 1.9 percent. Conversely, the bottom quintile households spend 2.4 percent of their expenditures on LPG, while the wealthiest quintile spends 1.1 percent. Budget shares of each product can be clearly seen in figure 2 plotted over population percentiles ranked by consumption per capita. The positive slope means higher shares of the product in the total budget of the wealthier population. Petroleum products as whole account for an estimated 6.4 percent of total household expenditures; with the bottom

[3] Wbopendata Stata ado (Azevedo, 2013) was used to retrieve information on GDP per capita from the WDI database as of 3 September 2014.
[4] Gasoline here refers to Octane-90 only.

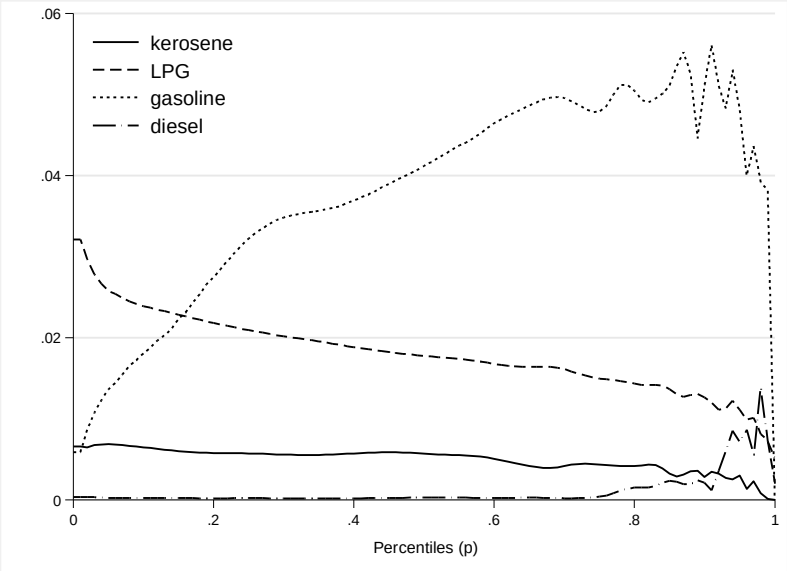
quintile households spending 5 percent of their total expenditures on these products and the richest quintile spending 6.4 percent.

Table 3. Expenditure on subsidized petroleum products relative to total expenditures (%)

	kerosene	LPG	gasoline	diesel	Total
Quintile 1	0.7	2.4	1.9	0.0	5.0
Quintile 2	0.6	2.0	3.4	0.0	6.0
Quintile 3	0.6	1.8	4.3	0.0	6.6
Quintile 4	0.4	1.6	4.8	0.1	6.9
Quintile 5	0.2	1.1	4.4	0.6	6.4
Total	0.4	1.5	4.1	0.3	6.4

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on spatially adjusted consumption per capita before the reform.

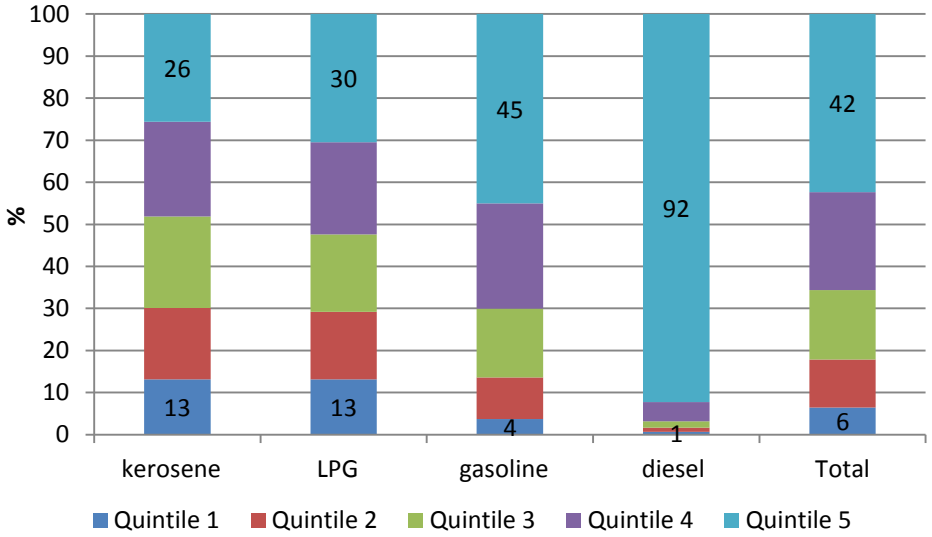
Figure 2. Expenditure on subsidized petroleum products relative to total expenditures (%)



Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population percentiles based on spatially adjusted consumption per capita before the reform.

In terms of actual amounts spent on subsidized products, richer households far outspend poorer ones. For example, the poorest quintile was spending 7 times less on subsidized petroleum products than the richest quintile (6 percent of total national expenditures versus 42 percent as shown in figure 3). This quite directly indicates that wealthier households received higher per capita subsidies than poorer households. Table A1 shows that for all products, per capita subsidies are lower for poor households and this is especially pronounced for gasoline and diesel.

Figure 3. Shares of total expenditures on subsidized petroleum products by quintiles, %



Source: Authors' calculations based on extrapolated HEIS 2010 data.
Note: Population quintiles based on spatially adjusted consumption per capita before the reform.

Electricity

There are seven electricity tariff brackets in Jordan. According to the latest revision made in August 2013, electricity tariffs range from 0.033 JD/kWh for the lowest consumption bracket (1-160 kWh/month) to 0.259 JD/kWh for the highest consumption bracket (1,000 plus kWh/month), with households paying progressively higher amounts only on the incremental consumption of the higher brackets.

Table 4 contains a list of tariffs, mean annual expenditures on electricity and the number of households for each tariff bracket. As can be seen, more than half of all households in Jordan consume electricity between 301-500 kWh per month. These households spend an estimated JD 270 on electricity per year. Hardly any households consume in the lowest tariff bracket (of less than 160 kWh per month), and the same is true for the highest tariff bracket (of more than 1000 kWh per month).

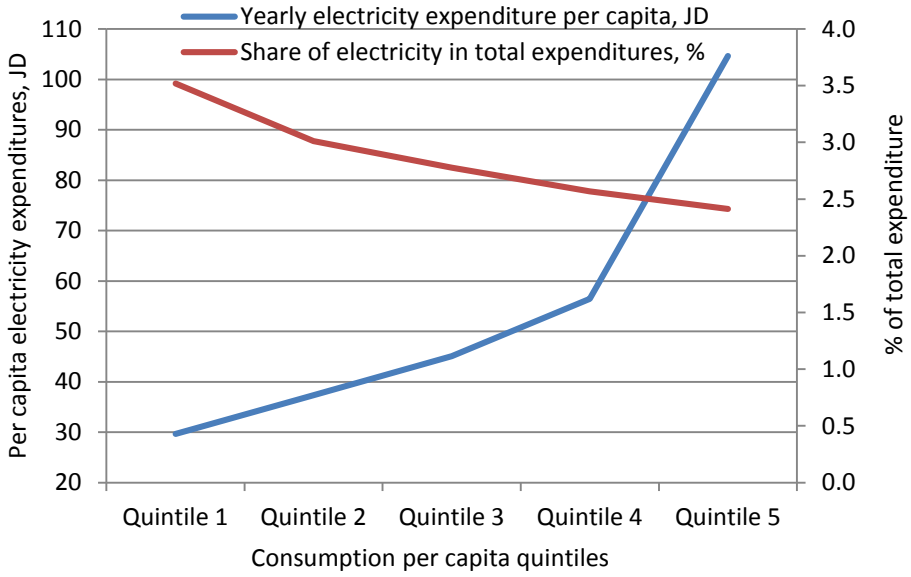
Table 4. Parameters to calculate electricity consumption in Jordan

Brackets: KWh/Month	2014 tariff, JD	Upper bound consumption, yearly (JD)	Mean annual consumption on electricity, JD	N of households	% of HH
1-160	0.033	63	54	8,967	1
161-300	0.072	184	136	355,443	29
301-500	0.086	391	270	620,619	51
501-600	0.114	528	448	127,452	10
601-750	0.152	801	631	80,494	7
751-1000	0.181	1344	986	26,901	2
>1000	0.259		1828	4,673	0

Source: Authors' calculations based on extrapolated HEIS 2010 data and official information.

Household expenditures on electricity in Jordan are substantial being more important for poor households from the standpoint of budget shares. Households spent an estimated 359 million JD on electricity in 2013 (using extrapolated data from HEIS 2010), an amount higher than that spent on LPG, diesel and kerosene put together, but lower than expenditures on gasoline. Households from the lowest quintiles spend less on electricity in absolute terms. For instance, households from the poorest quintile spend about a little less than a third on electricity than do the wealthiest quintile (annually about JD 30 per capita compared to JD 105 of the wealthiest quintile). However, the budget shares of electricity are higher among the poorest households; the poorest households spend about 3.5 percent of their budgets on electricity compared to 2.4 percent for the richest households (figure 4). Consequently, poor households can be highly vulnerable to higher tariffs on electricity.

Figure 4. Annual expenditure on electricity in JD and budget share in %



Source: Authors' calculations based on extrapolated HEIS 2010 data.
Note: Population quintiles based on spatially adjusted consumption per capita before the reform.

The distribution of households with different electricity consumption across quintiles is presented in table 5. Poor households consume less electricity and as a result pay lower tariffs. For instance, 41 percent of the poorest households consume between 161-300 kWh/month compared to 15 percent among the wealthiest households from the top quintile. Nevertheless, the relationship between electricity consumption and welfare is not perfect. There are rich households with low electricity consumption as well as poor households with high electricity consumption, although this may be partially attributed to richer households having smaller household size.

Table 5. Distribution of households by tariff brackets and consumption per capita across quintiles

	consumption per capita quintiles					
Brackets: KWh/Month	bottom	2	3	4	Top	Total
1-160	1	0	0	1	1	1
161-300	41	35	29	25	15	29
301-500	52	55	55	51	40	51
501-600	5	6	10	14	17	10
601-750	1	3	4	7	17	7
751-1000	0	0	1	2	8	2
>1000	0	0	0	0	2	0
Total	100	100	100	100	100	100

Source: Authors' calculations based on extrapolated HEIS 2010 data and official information.
Notes: Household quintiles based on spatially adjusted consumption per capita before the reform.

3. Simulation of subsidies reform, direct impact

All simulations in this paper are based on Jordan's most recent Household Expenditures and Income Survey from 2010, a nationally representative survey which is used by the Department of Statistics (DOS) to produce official welfare aggregates and poverty estimates. Even though the reforms chosen for simulation were implemented in 2012, the analysis here refers to 2013.[5] Extrapolations between 2010 and 2013 are based on adjustments for economic growth (GDP per capita nominal) and inflation (CPI); also, household and population weights were updated to reflect population size in 2013.[6]

Estimates of demand elasticity with respect to price are necessary in order to model consumer responses to price change. Given limitations of having only cross sectional household data with no variation in individual petroleum product prices across households, we used an own-price elasticity of -0.3 to simulate changes in quantities consumed.

Petroleum products

Simulations for petroleum products are based on price changes largely mimicking the real reform that occurred in November 2012. The price of gasoline (Octane-90) rose by 14 percent, and diesel and kerosene prices increased by 33 percent. The price increases were meant to fully eliminate subsidies on these items. The highest increase in price was for LPG gas cylinders, whose unit price rose from JD6.5 to JD10, or by 53.8 percent. However, despite this large increase, LPG continued to be subsidized. In this chapter, we decided to simulate the full removal of petroleum subsidies and hence simulated for the full removal of LPG subsidies as well. This is the only difference of our simulation from real subsidies reform introduced in November 2012.

[5] SUBSIM simulates short-term effects and November 2012 reforms were expected to kick in early in 2013.
[6] GDP per capita growth and population size are taken from World Development Indicators (WDI), while CPI is based on official country numbers if different from WDI numbers. GDP per capita growth is used to inflate consumption, while CPI to inflate the poverty line. This procedure gives a poverty incidence of 13 percent for 2013 (lower than the official poverty estimate of 14.4 percent for 2010). Exact numbers used are shown in the annex.

Using historical data from Saudi Aramco's contract price on butane and propane, World Bank energy specialists estimated the 'efficient' LPG price to be about USD 1,428 per ton. This implies JD 15.3 per cylinder to be the final LPG unit price without any subsidy (Masami Kojima[7], personal communication August 28, 2014).

Two scenarios are used for simulation. In the first scenario, we simulate the full removal of subsidies without any compensating measures by the government. In the second scenario, subsidies reform is combined with the actual cash transfer program that accompanied the petroleum price increases. The cash transfer targets resident Jordanian households (with the households being the unit of reference) with yearly incomes not exceeding JD10,000. The transfer amounts to JD70 per person per year, for up to a maximum of 6 individuals per household (Araar et al., 2013).

Table 6. Pre and post reform prices of petroleum products

	Pre-reform prices[1]	Unit subsidy	New prices[2] after removal of subsidies	Increase, %
Gasoline (Octane-90)	0.7	0.1	0.8	14
Kerosene	0.52	0.170	0.685	33
Diesel	0.52	0.170	0.685	33
LPG	6.5	8.8	15.3	135

Source: Araar et al. (2013).
Notes: [1] As of October 2012; [2] As of November 2012 *except* LPG.

Scenario 1: Subsidy cuts without cash transfers

The simulation reveals that the full removal of subsidies on petroleum products would on average lead to an estimated 2.9 percent drop in consumption per capita of households (table 7). For the poorest quintiles, the drop will be higher (3.8 percent). The adverse impact on the poor results mainly from increased LPG prices. The increases in gasoline and kerosene prices have tiny impacts while the increase in diesel price has no impact on consumption. When all households are considered, LPG and gasoline are the two main products to affect household consumption.

Table 7. Jordan: The impact on the per capita well-being of removing petroleum subsidies

Quintiles, consumption per capita	Pre-reform, JD	Post-reform impact on per capita wellbeing, JD					Change in per capita consumption, %
	Total expenditures per capita	kerosene	LPG	gasoline	diesel	Total	
Quintile 1	843	-2	-28	-2	0	-32	-3.8
Quintile 2	1,240	-2	-34	-6	0	-42	-3.4
Quintile 3	1,624	-3	-39	-10	0	-52	-3.2
Quintile 4	2,198	-3	-47	-15	0	-65	-3.0
Quintile 5	4,336	-4	-65	-27	-9	-104	-2.5
Total	2,048	-3	-42	-12	-2	-59	-2.9

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on spatially adjusted consumption per capita before the reform.

[7] Masami Kojima is a lead energy specialist at the World Bank.

Poverty would be expected to increase by 1.6 percentage points – from 13 percent in 2013 to 14.6 percent after subsidy removal – accompanied by increases in the poverty gap and in inequality. The overwhelming increase in poverty comes from LPG, which is not surprising given its high share in the budget of poorest households and the large increase in its price (figure 2 and table 8). Poverty gap, measuring how far poor are from the poverty line on average or depth of poverty, would have increased as well, with LPG being the main contributor. Finally, inequality is expected to increase modestly, as reflected by a slightly higher Gini coefficient.

Table 8. The impact of petroleum subsidies removal on poverty, poverty gap and inequality

	Poverty headcount, %		**Poverty gap**		**Gini**	
	Level	The change	Level	The change	Level	The change
Pre reform	13.0	.	2.44	.	33.66	.
kerosene	13.0	0.0	2.47	0.02	33.68	0.03
LPG	14.3	1.3	2.83	0.39	34.00	0.35
gasoline	13.1	0.1	2.47	0.02	33.61	-0.04
Diesel	13.0	0.0	2.44	0.00	33.61	-0.05
Post reform	14.6	1.6	2.89	0.45	33.94	0.28

Source: Authors' calculations based on extrapolated HEIS 2010 data.

Scenario 2: Subsidy cuts with cash transfers

In the second scenario we simulate the impact of petroleum price increases on well-being followed by compensatory cash transfer program to Jordanian households with annual incomes below JD10,000.

Table 9. The impact of petroleum subsidy reform and cash transfer on per capita well-being

	Pre-reform	Post-reform		
	Total expenditures per capita	Total expenditures per capita	Impact on per capita wellbeing, JD	Change in per capita consumption, %
Quintile 1	843	857	14	1.6
Quintile 2	1,240	1244	3	0.3
Quintile 3	1,624	1611	-13	-0.8
Quintile 4	2,198	2166	-32	-1.5
Quintile 5	4,336	4253	-83	-1.9
Total	2,048	2026	-22	-1.1

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on consumption per capita before the reform.

As can be seen in tables 9 and 10, if perfectly targeted, the cash transfer offsets the negative impact of higher prices of subsidized products for the bottom 40 percent of the population. Consumption per capita would in fact grow by 1.6 percent for the bottom quintile, though on average consumption per capita would

decline by 1.1 percent. Poverty would be expected to fall by 0.6 percentage points from 13 to 12.4 percent. The depth of poverty would decline as well by an impressive 0.2 percentage points. Finally, inequality, as measured by Gini coefficient, would fall as well by 1.7 percent.

Table 10. The impact of petroleum subsidy reform and cash transfer on poverty and inequality

	Poverty level, %	Change in poverty, pp	Poverty gap, %	Change in poverty gap, pp	Gini coefficient	Change in Gini coefficient, %
Pre-reform	13		2.4		33.66	
Post-reform: no cash transfers	14.6	1.6	2.9	0.4	33.94	0.8
Post-reform: cash transfer perfectly targeted	12.4	-0.6	2.2	-0.2	33.08	-1.7

Source: Authors' calculations based on extrapolated HEIS 2010 data.

The impact of the petroleum products reform on government revenues

Removing subsidies on petroleum products without compensation would generate an increase in government revenues by JD 389 million per year (table 11). More than 70 percent of the increased revenues come from higher LPG prices and 20 percent come from gasoline. Higher revenues from LPG are associated with the much higher increase in prices for LPG compared with that for gasoline (135 percent versus 14 percent). The removal of kerosene and diesel subsidies will generate only modest increase in revenues. As the subsidies were pro-rich in nature, with their removal, richer households would contribute proportionally more to the increased revenues: the poorest quintile accounts only for an estimated 11 percent of the increase in revenues, compared to 35 percent by the top quintile.

Table 11: The impact of petroleum subsidy elimination on the government revenue, mln. JD

	kerosene	LPG	Gasoline	diesel	Total
Quintile 1	2	37	3	0	42
Quintile 2	3	45	8	0	56
Quintile 3	4	51	13	0	68
Quintile 4	4	61	20	1	86
Quintile 5	5	85	36	12	137
Total	18	279	80	13	389

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on consumption per capita before the reform.

The cost of the cash transfer program launched by the Government was about JD320 million per year. This was in fact higher than the revenues generated to the government *from households* from the actual reforms the government had carried out in November 2012. Though additional savings to the government were generated from consumers other than households, the cash transfer program appeared costly in the sense that it over-compensated a majority (almost 70 percent) of Jordanian households. (Araar et al 2013). The reform option we simulated in this chapter estimates the revenues/cost savings generated from households' use of petroleum products (JD 389 mln.) to be higher than the cash transfer cost but still appears to be quite generous as it over-compensates almost half the population. To put matters in perspective, only 206 million

of Jordanian dinars are needed to have the pre-reform poverty rate if transfers are universal. If transfers are perfectly targeted to the bottom quintile, only JD 41 million would be needed to bring poverty to its pre-reform level. The design of the cash transfer program that was implemented in November 2012 along with a detailed discussion of options for improvement can be found in Araar et al (2013).

Electricity

Three scenarios for electricity tariffs reforms

Three scenarios are explored in simulating the impact of reforms in electricity tariffs (table 12). The first scenario assumes no change in the tariff policy and simply applies tariffs planned for implementation in 2015. According to this scenario, tariffs will increase slightly for consumers from the top fifth, six and seventh blocks. The second scenario is the most radical reform scenario, implying a full removal of subsidies. Within this scenario we present two reform options. According to the first one – labelled as "flat" reform, – tariffs for all consumers become flat, i.e., equal to the cost recovery level at JD 0.164 per kWh. This implies a huge burden on the poorer households with the lowest electricity consumption because the prices they faced were the lowest. The second sub-scenario -- labelled "progressive" reform – mimics the first sub-scenario in terms of the *average* impact on wellbeing, but uses a completely different approach to tariff increase.[8] Under this sub-scenario, the burden of subsidies elimination is disproportionately placed on the shoulders of the richest households who experience the highest increase in electricity tariffs. Given that scenario two is quite severe – leading to more than a doubling of prices for many brackets – and likely very difficult to implement, we simulate a third scenario with quasi progressive increase in tariffs for all consumers keeping tariffs on the first two blocks subsidized[9]. This scenario, however, does not fully eliminate the electricity subsidies.

Table 12. Different scenarios for electricity tariff reforms

KWh per month	Current tariff 2014	subsidy	**Scenario 1** 2015 tariffs		**Scenario 2** full elimination of subsidies				**Scenario 3** Semi-progressive increase in tariffs	
					I flat		II progressive			
			final	%	final	%	final	%	final	%
1-160	0.033	0.113	0.033	0.0	0.146	341.5	0.056	70.0	0.036	10
161-300	0.072	0.074	0.072	0.0	0.146	102.3	0.144	100.0	0.09	25
301-500	0.086	0.06	0.086	0.0	0.146	69.4	0.232	170.0	0.146	69
501-600	0.114	0.032	0.114	0.0	0.146	27.8	0.365	220.0	0.228	100
601-750	0.152	0	0.175	15.1	0.146	-3.9	0.502	230.0	0.304	100
751-1000	0.181	0	0.209	15.5	0.146	-19.3	0.615	240.0	0.362	100
>1000	0.259	0	0.285	10.0	0.146	-43.6	0.907	250.0	0.518	100

Source: Official tariff instructions replacing electricity tariff instructions 17/6/2012.
Notes: Subsidies are calculated based on 2012 cost recovery tariff from National Electricity Report (NEPCO, 2012).

[8] Strictly speaking second sub-scenario does not fully eliminate subsidies since consumers from the first block still continue to be subsidized and tariffs on others are not raised by enough to offset this subsidy.
[9] People in the third bracket also may be subsidized if their consumption in the third bracket is low.

Applying 2015 tariffs has little negative impact on the per capita wellbeing of households. Given small increases in tariffs that are focused mostly on rich consumers, expenditures per capita are expected to decline on average by JD0.6 or about 0.03 percent (table 13). This would bring no changes in poverty and poverty gap measures.

Table 13. The impact of 2015 tariffs on economic wellbeing

Quintiles	Impact, JD	Impact, %
Quintile 1	-0.02	0.00
Quintile 2	-0.05	0.00
Quintile 3	-0.15	-0.01
Quintile 4	-0.31	-0.01
Quintile 5	-2.48	-0.06
Total	-0.60	-0.03

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on consumption per capita before the reform.

Full removal of subsidies, in contrast, will have a considerable impact on economic wellbeing. Fully removing subsidies with a flat tariff rate is expected to reduce consumption per capita on average by JD 72.5 or by 3.6 percent. The negative impact is expected to be the strongest for the poorest households, with the bottom quintile experiencing on average a 5.7 percent reduction in per capita consumption. The negative burden on the poorest households can be reduced if a progressive increase of tariffs is applied. In this case, the negative impact would be less pronounced for the poor even though the average household consumption would drop by the same amount. Nevertheless, both sub-scenarios are quite severe and would be difficult to implement. A semi-progressive increase in tariffs leading to a smaller reduction in subsidies, as depicted in scenario 3, is perhaps more realistic; the relative impact on households across the distribution would be almost equal, with a 1.2 percent reduction in per capita on average (table 14).

Table 14. Different scenario for electricity tariff reforms

Quintiles	Total consumption per capita	**Scenario 2** full elimination of subsidies				**Scenario 3** semi-progressive increase in tariffs	
		flat		Progressive			
		Impact, JD	Impact, %	Impact, JD	Impact, %	Impact, JD	Impact, %
Quintile 1	843	-49	-5.8	-33	-3.9	-10	-1.1
Quintile 2	1,240	-59	-4.7	-42	-3.4	-13	-1.0
Quintile 3	1,624	-66	-4.1	-54	-3.4	-18	-1.1
Quintile 4	2,198	-78	-3.5	-71	-3.2	-24	-1.1
Quintile 5	4,336	-109	-2.5	-157	-3.6	-58	-1.3
Total	2,048	-72	-3.5	-72	-3.5	-24	-1.2

Source: Official tariff instructions replacing electricity tariff instructions 17/6/2012.
Notes: Population quintiles based on consumption per capita before the reform.

Full elimination of subsidies has the strongest negative impact on poverty and inequality. In particular, poverty is expected to increase by 2.4 percentage points, poverty gap by 0.7 percentage points and inequality by 1.9 percent (table 15). Planned tariffs for 2015 year will not have negative impact, while semi-progressive increase in tariffs will lead to a moderate increase in poverty, with poverty increasing by 0.5 percentage points. This reform will, however, have a rather equalizing impact on distribution reducing the Gini coefficient by 0.2 percent.

Table 15. The impact of electricity subsidy reform and cash transfer on poverty and inequality

	Poverty level, %	Change, pp	Poverty gap, %	Change, pp	Gini coefficient	Change, %
Pre-reform	13.0	.	2.4	.	33.66	.
Post-reform:						
Scenario 1: 2015 tariffs	13.0	0.0	2.4	0.0	33.64	-0.04
Post-reform: Scenario 2:						
full elimination of electricity subsidies, flat	15.4	2.4	3.2	0.7	34.28	1.9
full elimination of electricity subsidies progressive	14.7	1.7	2.9	0.5	33.66	0.0
Post-reform: Scenario 3:						
semi- progressive increase in tariffs	13.5	0.5	2.6	0.1	33.59	-0.2

Source: Authors' calculations based on extrapolated HEIS 2010 data.

The impact of the electricity reform on government revenues

The largest savings from electricity reform will come from the second scenario assuming full elimination of subsidies. The government can save the largest amount (estimated at JD473 million) from full removal of subsidies under the scenario of flat tariffs (table 16). However, this reform will also have the largest impact on poverty as shown in table 15. To get to the pre-reform poverty and poverty gap levels around JD319 million will be required. Therefore, the net gain will be JD158 million. Under progressive sub-scenario, the costs of the transfer to compensate the poor will be smaller and the government will save about JD174 million. In the third scenario with semi-progressive increase in tariffs, overall gain from higher tariffs will be JD 162 million. From this amount JD70 million have to be transferred back (assuming universal transfer) to bring poverty to pre-reform level leaving the government with JD92 million (table 17).

Table 16: The impact of the electricity subsidy reform on the government expenditures, mln. JD

Quintiles	Scenario 1, 2015 tariffs	Scenario 2, full elimination of subsidies		Scenario 3, semi-progressive
		flat	progressive	
Quintile 1	-0	-64	-44	-14
Quintile 2	-0	-77	-55	-19
Quintile 3	-0	-87	-66	-25
Quintile 4	-0	-102	-82	-33
Quintile 5	-3	-143	-144	-71
Total	-4	-473	-391	-162

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on consumption per capita before the reform.

Table 17: The impact of the electricity subsidy reform on the government expenditures correcting for measures, mln. JD

		Post-Reform				Change (negative values mean reduction in government expenditures or savings)			
	Pre-Reform	Scenario 1	Scenario 2 flat	Scenario 2 prog.	Scenario 3	Scenario 1	Scenario 2 flat	Scenario 2 prog.	Scenario 3
Subsidies	477	473	3	86	315	-4	-473	-391	-162
Transfers *	0	1	316	217	70	1	316	217	70
Total budget	477	473	319	303	385	-3	-158	-174	-92

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on consumption per capita before the reform. * Universal transfers assumed.

4. Simulation of subsidies reform, indirect impact

Petroleum products

We now turn to the simulation of indirect effects of the rise in petroleum product prices combining a Jordanian Input-Output (I/O) table with HIES data. The baseline data for the producer price shocks are in table 18 below. The Jordan I/O table (2010) does not have disaggregated-by-type petroleum product statistics. Therefore, to capture the likely impact on economy-wide prices (of petroleum product subsidy removal), we use disaggregated production figures from the state-owned refinery as expectation proxy of the industry-wide petroleum-product mix. The gasoline shock to the petroleum sector is a price increase of 2.9 percent, which is equal to the change in price in gasoline (from table 6 above) multiplied by gasoline's expected share (20.6 percent) in industry's total petroleum product usage. Similarly, the diesel shock – at 10.5 percent – is equal to the change in price in diesel multiplied by diesel's expected share in industry's fuel mix.[10]

Table 18: Expected producer price increase in the Jordan fuel sector

Petroleum Product	Price increase, pre- to post-reform period (%, from table 6)	Expected share in total industry fuel consumption (%)	Expected magnitude of producer price increase in fuel sector
Gasoline	14	21	2.9
Diesel	33	32	10.5

Source: Araar et al. (2013), Jordan Petroleum Co. LTD. annual report 2012, authors' calculations.

Results of the simulations (table 19) show that the relation between direct and indirect effects varies significantly across products and across quintiles. Indirect effects are approximately 77 percent of the total for diesel but only 14 percent for gasoline.[11] The difference is directly attributable to household consumption patterns. Even though the diesel price increase is over 3 times larger than the gasoline price increase and economy-wide prices rise more after the diesel subsidy is eliminated, households purchase so

[10] The indirect impacts on households of these two producer price changes are calculated separately and independently and holding all other controlled producer prices – including those of the other petroleum products – fixed. Industry is not expected to use significant amounts of LPG or kerosene.
[11] The most accurate estimates for direct effects remain those provided in the previous section and we will disregard estimates of direct effects using I/O data. What is of interest here is the relative share of indirect effects over total effects.

little diesel that they are virtually unaffected directly. Any impact from higher diesel prices arrives indirectly through an increase in the price of the household consumption basket.

Within gasoline, the relative weight of indirect effects is also different across quintiles. The total indirect effect of the gasoline subsidy removal falls from about a third of total effects in the first quintile to about 12 percent for the upper quintile. This is understandable as the upper quintile spends over 10 times as much on gasoline directly as does the poorest quintile (see figure 3 above).

Table 19. Jordan: Direct and indirect impacts on well-being of removing petroleum subsidies.

Quintiles	Diesel			Gasoline		
	total direct (JD)	total indirect (JD)	share of indirect in total	total direct (JD)	total indirect (JD)	share of indirect in total
Quintile 1	0	3	100%	2	0.9	30%
Quintile 2	0	5	100%	6	1	17%
Quintile 3	0	6	100%	10	2	14%
Quintile 4	0	8	100%	15	2	12%
Quintile 5	9	13	60%	27	4	12%
Total	2	7	77%	12	2	14%

Source: Authors' calculations based on extrapolated HEIS 2010 data and the Jordan 2010 Input/Output table.

Electricity

The simulations for indirect effects of electricity subsidy removal, similar to the petroleum product subsidy reform, were carried out by linking the Jordanian I/O table to the HIES data.[12] In average magnitude, the producer price shocks in the electricity sector are equivalent to a household-consumption-weighted average of the household price shocks (table 12).[13]

Simulation results indicate that the indirect effects of electricity price changes varies significantly by household rank (table 20). In absolute magnitude (i.e., in terms of JDs), the indirect effects are approximately 5 times greater for the upper quintile than for the poorest quintile. This is primarily because richer households have consumption baskets weighted more heavily with non-food goods and services, production of which is electricity-intensive. Poorer households, in contrast, have consumption baskets weighted towards food, the production of which is not as electricity-intensive.

Results also indicate that the relation between direct and indirect effects varies significantly by the electricity subsidy elimination scenario. For example, in Scenario 2.I, indirect effects are about a third of the total for the poorest households and close to half of the total for the richest households. In Scenario 2.I, households consuming the highest electricity volumes see the smallest relative post-reform electricity price increases so it makes sense that the direct effect rises slowly across expenditure quintiles. In Scenario 3 price increases are higher for higher volume users (upper quintiles), so the quintile-wise relationship between direct and indirect effects is reversed: direct effects rise more quickly across expenditure levels

[12] The indirect impacts on households of these price changes are calculated holding all other controlled producer prices fixed.

[13] See Table A3 and accompanying text in the box 1 in the appendix for more details on the construction of the block- and consumption-weighted average electricity tariffs.

than do indirect effects. In Scenario 3, indirect effect shares are smaller for the upper quintile than for the poorest quintile.

Table 20. Jordan: Direct and indirect impacts on well-being of removing electricity subsidies

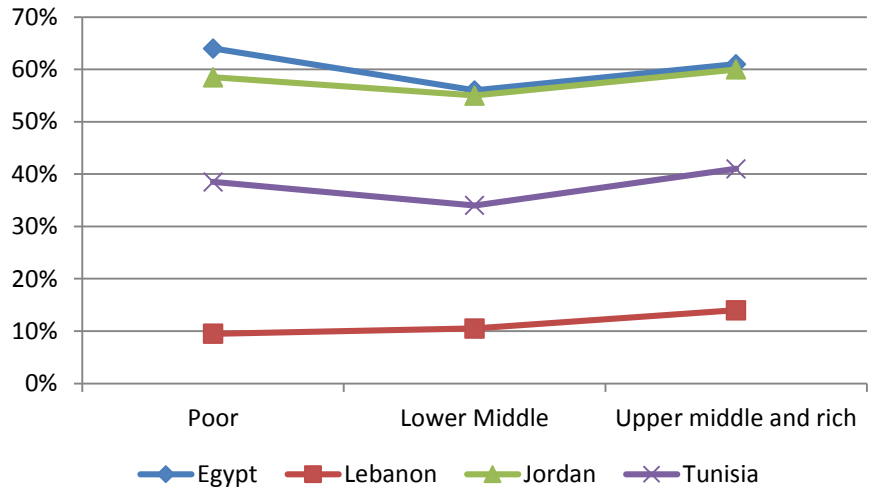
Quintiles, consumption per capita	Scenario 2.I, flat			Scenario 3		
	total direct (JD)	total indirect (JD)	share of indirect in total	total direct (JD)	total indirect (JD)	share of indirect in total
Quintile 1	49	21	30%	10	4	26%
Quintile 2	59	31	34%	13	5	29%
Quintile 3	66	41	38%	18	7	28%
Quintile 4	78	54	41%	24	9	28%
Quintile 5	109	102	48%	58	17	23%
Total	72	50	41%	24	8	26%

Source: Authors' calculations based on extrapolated HEIS 2010 data and the Jordan 2010 Input/Output table.

5. The Political Economy of Reforms

The simulations indicate that the current subsidy system provides valuable assistance to the poor, but at the same time are pro-rich and inefficient. Eliminating subsidies and compensating the poor and vulnerable with a direct cash transfer would be a more effective form of social protection. Subsidy reform, however, is a politically sensitive issue. A major reform of the bread subsidy in 1996 involving the complete elimination of the price support and its replacement by a cash transfer was rapidly overturned following widespread social unrest (and what came to be known as 'food riots'). Thus, even as the government is burdened by high subsidy costs, reform efforts are hampered by political economy considerations.

Figure 5: Opposition to reform consumption subsidy on any product



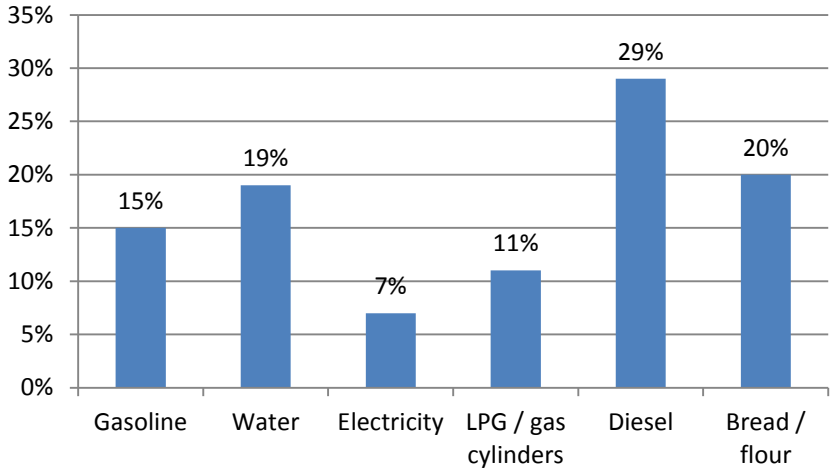
Source: Silva et al. (2013) calculations using the MENA SPEAKS survey

The opposition to subsidy reform appears particularly strong in Jordan, especially when compared with neighboring countries (figure 5). Data from the MENA SPEAKS (Social Protection Evaluations of Attitudes, Knowledge and Support) Survey, indicates that about 56 percent of Jordanians were opposed to

subsidy reform on any consumer item, be it electricity, food, petroleum products or water (Silva et al. 2013). Interestingly, in all countries, the (self-identified) lower middle income group is slightly less likely to oppose subsidy reform than the upper middle and wealthy group, and in three out of four countries the lower middle income group is slightly more willing to consider subsidy reform than the self-identified poor.

However, out of those willing to consider subsidy reform (in the MENA SPEAKS survey's Jordan sample), diesel was the most frequently cited candidate for reform, followed by subsidy on bread (figure 6). Electricity and LPG subsidies, which are much larger, appear to be even more politically sensitive than bread subsidies (removals of which have led to riots in the past): only 11 percent of respondents were open to LPG subsidy removals and a paltry 7% were willing to consider electricity reforms. These figures underscore the challenges the government faces. In fact, the government appears to be sensitive to such concerns as the November 2012 reforms did not fully eliminate LPG subsidies while eliminating the subsidies on other petroleum products. It is interesting that the opposition to reforming expensive and regressive energy subsidies is stronger than opposition to food subsidies (which tend to be less regressive). A likely explanation for this is the relative importance of these energy products in the consumption baskets of people.

Figure 6: Preferred product for subsidy removal (assuming reform is inevitable)



Source: Silva et al. (2013) calculations using the MENA SPEAKS survey

These numbers beg the question as to how the November 2012 petroleum reforms went into effect without any significant public unrest. Silva et al. (2013) synthesize the vast literature in social protection to summarize the strategies that underscore successful reforms. First and foremost they mention right timing to be key to the success and failure of reforms. More specifically, they argue that it is easier to generate support behind a reform during a crisis, a situation aptly characterizing Jordan. The population in Jordan appeared to sense that the country was in fiscal crisis and petroleum subsidy removals were inevitable. Moreover, from initial episodes of hope, the Arab Spring eventually generated fear of unrest and violence, all the more so given the experiences of neighboring Egypt and Syria. The subsidy reforms were likely aided by the strong aversion to the political and social instability that vocal opposition had the potential to generate.

Compensation of losers from reform also played a role in the reform's apparent success. While fiscal constraints often make it challenging for a government to provide direct compensation, the November 2012 reforms were accompanied by a generous cash transfer that was designed to fully compensate the bottom 70 percent of Jordanians from the losses due to the removal of subsidies. The cash transfer in fact appeared to over-compensate a large swathe of the population (Araar et al. 2013). The speed with which the transfer took place is also a factor in the reform's apparent success. While the petroleum price hikes were announced on November 12, within the next few weeks a large number of people started receiving the cash compensation.

In enacting future reforms the government can learn from its own experience. There have been concerns regarding the targeting efficiency of the cash program accompanying the 2012 subsidy reforms (see, e.g., Araar et al. 2013). The government itself has taken measures to improve the targeting, specifically by setting up a National Unified Registry (NUR) database to better target beneficiaries for future cash compensation programs. Nevertheless, tackling electricity subsidy reform appears to be daunting for the government because of its sheer scale.

6. Conclusions

This chapter examined the distributional and fiscal implications of petroleum and electricity subsidy reforms. Both subsidies are pro-rich in nature, and in absolute monetary terms, richer households benefit more than poorer households as their consumption levels are higher. Thus, these universal subsidies are costly and inefficient as a majority portion of the total subsidies 'leak' to the non-poor households, and significant amounts actually leak to the top quintile households. However, the analysis also suggests that the poorer segments of the population benefit quite substantially from the subsidies and removal of subsidies would impose economic hardship on these groups.

Nevertheless, as the government wishes to strike a balance between protecting its population from price increases and ensuring fiscal prudence, a move away from the universal subsidies system appears imperative. This move, however, would require a considered analysis of both technical and political economy considerations. A generous cash transfer can be put in place to help build broad based public support for reforming universal subsidies, but the government needs to target these transfers well through developing a sound social protection system.

Finally, it is important to note that while this paper has presented several findings, the scope of analysis was necessarily constrained by time and data availability. The focus was limited to microanalysis of household level impacts. A more comprehensive analysis would involve broader sectors of the economy (such as non-household users of petroleum products and electricity), as well as involve a political economy and stakeholder analysis to identify who would gain and who would lose from reform and how.

Annex

Table A1. The per capita benefit through subsidies (in currency)

	kerosene	LPG	gasoline	diesel	Total
Quintile 1	2	28	2	0	32
Quintile 2	2	34	6	0	42
Quintile 3	3	39	10	0	52
Quintile 4	3	47	15	0	65
Quintile 5	4	65	27	9	104
Total	3	42	12	2	59

Source: Authors' calculations based on extrapolated HEIS 2010 data.
Notes: Population quintiles based on consumption per capita before the reform.

Table A2. Parameters used for extrapolation of expenditures, poverty line and weights to reflect 2013 year

year	CPI index, base 2010	GDP per capita growth index, 2010 base	Population, mln.
2010	1.00	1.00	6.05
2011	1.04	1.07	6.18
2012	1.09	1.12	6.32
2013	1.15	1.19	6.46

Source: WDI and Jordanian Department of Statistics.

Box. 1. Construction of weighted price increase on electricity

Construction of KwH-weighted price increases (Table A3 below) are calculated by multiplying the price increases for a particular bracket (available from Table 13 above) by the kilowatt-hour electricity consumption in that bracket (available from Table 3) and then taking a weighted average of those by-bracket price increases. So under Scenario 2.I, for example, a household consuming in the third bracket (at 301 to 500 Kilowatt Hours per month) would see its expenditure go up by 160*342% for its first 160 KwH; by 140*102% for its next 140 KwH consumed; and by 138*69% for its next 138 KwH consumed, where 138 KwH is the mean consumption in the third bracket (according to the Jordan HIES 2010) for a household in which total monthly electricity consumption falls into the third bracket range. Taking a KwH-weighted average of those three price increases yields a total price increase of 180 percent for such a household.

Consumption-weighted price increases (Table A3) are calculated by multiplying the KwH-weighted price increases for a particular bracket by the share of households whose monthly electricity consumption falls into that bracket's range (available from Table 4). So under Scenario 2.I, for example, the share of households whose monthly consumption falls in the third bracket is 51 percent; multiplying that share by the total KwH-weighted price increase for consumption in the third bracket yields .91, or a 91 percentage-point contribution to the total KwH-weighted, consumption-weighted price change.

Total price increases in electricity are a simple sum of the consumption-weighted price increases. As such, total electricity price increases are a KwH-weighted, consumption-weighted average of by-bracket price increases, where the by-bracket price increases are those stated in Table 13.

Table A3. Construction of electricity price increases under subsidy reduction scenarios

	Scenario 2.I		**Scenario 3**	
Brackets, KwH/month	KwH-weighted price increase	Consumption-weighted price increase	KwH-weighted price increase	Consumption-weighted price increase
1-160	3.4	0.02	0.10	0.00
161-300	2.5	0.72	0.16	0.05
301-500	1.8	0.91	0.33	0.17
501-600	1.5	0.15	0.47	0.05
601-750	1.2	0.08	0.57	0.04
751-1000	0.87	0.02	0.67	0.01
>1000	0.65	0.00	0.73	0.00
Total		**1.89**		**0.32**

Source: WDI and Jordanian Department of Statistics.

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