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A Comparative Analysis of Energy Subsidy in the MENA Region

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Abstract

This paper focuses on analyzing energy prices subsidies distribution in the MENA region among its seven components, according to the products that benefit from subsidized prices, and by per capita. As a nominal average of the years 2013, 2015, and 2017, both Iran and KSA had the higher nominal pre-tax subsidy averages estimated to $52.11 and $45.54 billion respectively, and also had higher post-tax subsidy averages estimated to $118.55 and $114.81 respectively. Global warming and local air pollution were the most important components after the pre-tax subsidies component in all MENA region countries. The "Congestion" component came after the level of the two environmental components averages in oil-exporting countries, while the "accidents" component in almost all the oil-importing countries came after the level of the two environmental components averages. By products, petroleum products were the main products that benefited from energy prices subsidies in almost all MENA countries. The reform process must take into account the specifics of each country with regard to the details of energy subsidies at its level, as energy subsidies vary from one country to another, whether in terms of its value, the weight of its components, and the subsidy share of each energy products.

Keywords: *energy; energy subsidy; economic policy; MENA region.*

JEL Classification: *E62; H20; Q40; Q43*.

Introduction

Energy is a vital resource in human life through its significant role in economic activity and the fulfillment of households needs (Fattouh and El-Katiri, 2013; Clements, et al., 2013; Jiang & Tan, 2013; El-Katiri, 2014; Parry et al, 2014; Barkhordar et al, 2018). Therefore, the energy subsidies policy became one of the main economic policy tools that used to support the purchasing power of low-income groups to alleviate energy poverty and promoting economic growth (Zeng and Chen, 2016; Acharya and Sadath, 2017). In this regard, Reddy (2002) showed that energy subsidies have played an important role in improving the living standard of the poor, while (Barnes and halpern, 2001) pointed that the achievement of that is conditioned by the subsidies policy assessment according to their relative efficacy, efficiency, and cost-effectiveness.

In developing countries, governments consider energy subsidies as an essential ingredient of macroeconomic policy (Jiang & Tan, 2013; Lin and Jiang, 2011), as a result of their low per capita energy consumption compared to the developed countries (Khalid and Salman, 2020). From a political economy view, (Van Asselt & Skovgaard, 2016; Victor, 2009; Pani and Perroni, 2018) clarified the idea that policymakers supporting the move towards subsidizing energy prices for what is called "populist" reasons. Energy subsidy policy is a main tool that political leaders use in order to stay in power by gaining the votes, as it is a policy that in a big part aims to transfer resources to interest groups that serve that mission with success by voting for the government continuity (Alderman, 2002; Barnett, 2014; Sarrakh et al; 2020). In both oil-exporting and importing countries in the MENA region[1], subsidizing energy seems like a major tool for social security to alleviate poverty (El-Katiri and Fattouh, 2017; Verme, 2016), and it is used by policymakers as a policy tool that aims to compensate the society groups for their exclusion from decision-making process that can create some political and also social tensions. (Krane and Monaldi, 2017). This type of policy was the main factor that explains why energy demand growth is highly observed in the MENA region in comparison to the other regions in the world (Menichetti, El Gharras, Duhamel, & Karbuz, 2018).

Subsidizing energy products prices in the MENA region countries as consumer subsidies is a part of the history of the MENA region (Verme, 2016), and also it is a controversial subject (McKitrick, 2017; Sovacool, 2017) among politicians, economists, social and workers unions due to its conflicting effects. High poverty rates and the decreasing purchasing power of citizens in the region put high pressures on the authorities to keep its commitment to subsidize energy prices to support low-income groups. But, energy subsidies also have been criticized because they are a drain on government budgets, and the allocation of these subsidies is heavily skewed towards the rich group characterized by high consumption of fuel and energy than the poor (Devarajan, et al., 2014).

In light of this debate, this paper provides a comprehensive, updated, and detailed picture of energy subsidies in the MENA region, which was not addressed yet by previous studies that had either focused on addressing energy prices subsidies in general or focused on studying its impact or its reform process impact on economic activity. In this context, our study tries to clarify how energy subsidies are distributed in the MENA region between oil-exporting and importing countries, first according to the seven components of the energy post-tax subsidies. Secondly, according to the four types of energy products which are included in the prices subsidies policy. Finally, according to pre-tax and post-tax subsidies per capita.

We used in our study energy subsidies statistics data that are available in the IMF databases for the years: 2013, 2015, and 2017, and we followed an analytical approach sustained by a comparison between the region's countries in order to get the whole picture of subsidizing energy prices in the MENA region that can help in the future the reform process that gets rising attention among politicians and economists. From a policy-making perspective, understanding how energy prices subsidies in MENA countries are distributed either by components and products can shed light on more details of subsidizing energy prices in each country, thereby providing useful insights into the reform of the subsidies policy in a right way.

The remainder of this paper is structured as follows: Section 2 gives some definitions and concepts in a literature background. Section 3 discusses how energy subsidies developed in the world, then it shows the fact of subsidizing energy prices in MENA countries by products and

[1] MENA countries are MENAP countries excluding Afghanistan and Pakistan. MENA oil-exporting countries are: Algeria, Bahrain, Iran, Iraq, Kuwait, Libya, Oman, Qatar, KSA (Kingdom of Saudi Arabia), UAE (United Arab Emirates) and Yemen. MENA oil-importing countries are: Djibouti, Egypt, Lebanon, Jordan, Mauritania, Morocco, Tunisia and Sudan. We excluded Syria because its data are unavailable at the IMF energy subsidies database.

components. Section 4 presents the most important policy implications for MENA countries, and Section 5 concludes.

Theoretical Background

Energy subsidy can be defined “any measure that keeps prices for consumers below the market level or keeps prices for producers above the market level or that reduces costs for consumers and producers by giving direct or indirect support”(El-katiri and Fattouh, 2017). In a similar way, the IEA defines energy subsidy as "any government action that concerns primarily the energy sector that lowers the cost of energy production, raises the price received by energy producers or lowers the price paid by energy consumers" (UNEP, 2008). Larsen and Shah, (1992) in their famous study used the concept of “fossil fuel subsidies” and defined it as the difference between domestic fossil fuel prices and their opportunity cost evaluated at end-user prices. The previous definitions are based on the “price-gap approach” which determines how to measure subsidies by comparing local energy prices with an international benchmark price (Stefanski, 2016), and the differences in defining energy subsidy reflect differences in their estimation (Sarrakh et al, 2020) and the IEA definition has been widely accepted (Zeng and Chen, 2016). Subsidizing energy products can be for the benefit of both consumers and producers (Whitley, 2013; Rentschler and Bazilian, 2017). According to (El-katiri and Fattouh, 2017), energy subsidies can be as explicit subsidies that are shown on the state's budget and constitute the government transformation of resources to the beneficiaries whether were consumers or producers, or can be as implicit subsidies where they aren't shown on the state's budget and thus can not be calculated and creat problems of weak transparency and corruption spread.

Coady et al (2015; 2019) suggested that “the efficient energy price” is a central concept in defining energy subsidy. It consists of three components: the first is the cost of supplying the energy product to the consumer and also reflects the opportunity cost. It represents the international price adjusted for transport and distribution costs if the product is traded internationally, or the cost-recovery price if the product is not traded internationally. the second is the corrective taxes that take their existence because of the external costs for societies that are generated from the consumption of energy products by firms or households, and finally, the consumption tax where the energy product must be taxed as the same thing as the other consumer products without exemptions to collect revenues that can help the government to finance its public spending. In this context, (Clements, et al., 2013), noted the necessity of distinguishing two different types of consumer subsidies. The first is pre-tax subsidy that is a narrow measure (Coady et al, 2019) calculated according to “the price-gap methodology” where it arises if the price paid by the consumer is below the benchmark price, which varies according to the energy product, either internationally tradable or not internationally tradable. The second is post-tax subsidy a broader measure (Coady et al, 2019) that is the pre-tax subsidy plus the efficient tax as the consumption of energy products leads to negative externalities that must be a subject of correction by taxes.

The policy of energy prices subsidies contributes in reducing energy poverty and thus supporting social safety for the poor class (IEA, 2010; Lin and Ouyang, 2014; Rentschler and Bazilian, 2017) and also supporting industrialization by facilitating energy use for many industries that need energy as an intermediate factor in many industries (Victor, 2009; Bazilian and Onyeji, 2012). However, subsidizing energy prices has significant negative effects that can be bigger than its positive effects. *Economically*, the energy subsidies policy creates market distortions, especially in price signals (Lin and Jiang, 2011; Vageliasindi, 2012, Morgan, 2007), and its effects especially the resulting high energy consumption and its misallocation weakened also economic efficiency (UNEP, 2008; Clements, et al., 2013; Li,et al., 2017; Peltovuori, 2017; Bhattacharyya and Ganguly, 2017). It may therefore affect future generations through their

negative impact on capital accumulation, economic growth and hence on the welfare of individuals (Glomm and Jung, 2015). The negative impact on the welfare of individuals is reinforced by the inequality gap that widens as results from the energy subsidies policy on inequality (Del Granado et al, 2012; Coady et al, 2015). It imposes also large fiscal costs (Acharya and Sadath, 2017), which need to be financed by some fiscal policy tools that create financial burdens on future generations, and deteriorate their standard of living as government redirects part of revenues that should be allocated for developing education, health, and infrastructure sectors to the subsidy needs (Breisinger et al., 2019). Also, it discourages needed investments in energy efficiency and increases the vulnerability of countries to volatile international energy prices (Coady, Parry, Sears, & Shang, 2015; Rentschler and Bazilian, 2017). *Socially*, the no-exception feature of subsidizing energy prices means that all groups in society benefit from the low price of energy products. The big Beneficiaries are those of the rich group in society that have a high consumption of energy products, and these benefits are at the expense of the poor group because policymakers provide finance to subsidy energy prices by reducing revenues that should be allocated to improve the standard of living for poor people, especially in the education and health sectors. In This sense, (Koplow and Dernbach, 2001) suggested that large scale energy subsidies also compete for limited fiscal resources that could otherwise be transformed and used to deliver other essential services for the poor group in society such as medical care and education. *Environmentally*, energy subsidies policy lead to significant environmental costs associated with energy consumption especially the fuel ones (Peltovuori, 2017), like local air pollution mortality, broader costs associated with the use of fuels in road vehicles, and global warming that became one of the most debating and interesting subjects in the world as a result of its affects on the humanity future (Clements, et al., 2013; Coady et al, 2019). Energy prices subsidies accelerate the emission of greenhouse gases and atmospheric pollutants derived from burning fuels (Vageliasindi, 2012; Zeng & Chen, 2016; Skovgaard and Van Asselt, 2019). In this regard, the fossil fuel subsidies led to 36% of global carbon emissions between 1980 and 2010 (Stefanski, 2014). This is well clarified by the study of (Larsen and Shah, 1992) where it indicated that energy subsidies lead to more carbon emissions, and such a reform can reduce the emission in the world by about 9% if there is no change in world prices, and by about 5% if there is a change. Fuel subsidies policy as it eases energy access also creates obstacles in front of developing renewable and clean energy technologies (Clements, et al., 2013; Li et al, 2017, Pani and Perroni, 2018; Rentschler and Bazilian, 2017; Breisinger et al., 2019), that can't find as a result a fair situation to compete with fossil fuel industry.

Energy Prices in the World: An Overview

Fossil fuel prices

The gasoline and diesel prices have tracked movements in crude oil prices in the whole 2005-2018 period. As Figure 1 shows, the crude oil prices raised from 2005 until 2008 as a result of many factors (Khan, 2017), and have declined in a remarkable way in the second half of 2008 as a result of the 2008 global financial crisis (Fattouh, 2010; Bhar and Malliaris, 2011; Khan, 2017; Teti et al, 2020). After 2009, crude oil prices recovered widely until 2011 as a result of the global economic recovery (Fattouh, 2010; Ratti and Vespignani, 2013) and stabilized then with a slow decline as the oil market witnessed smaller demand and supply (Baumeister and Kilian, 2016). From June 2014, oil prices experienced a cumulative decrease of more than 70% until the late beginning of 2016 (prest, 2018). This fall according to (Khan, 2017) was mainly the result of a shift in trading, while other studies suggested the role weakening global economic conditions that led to a demand-side fall in oil market (prest, 2018), and other empirical studies suggested the important role of the supply shock (Arezki and Blanchard, 2014; Baumeister and Kilian, 2016). The involuntary supply cut that brought balance to the oil market led to a

recovery in oil prices (IMF, 2016) that have rallied to reach $78 in September 2018 (Bragoudakis et al, 2020).

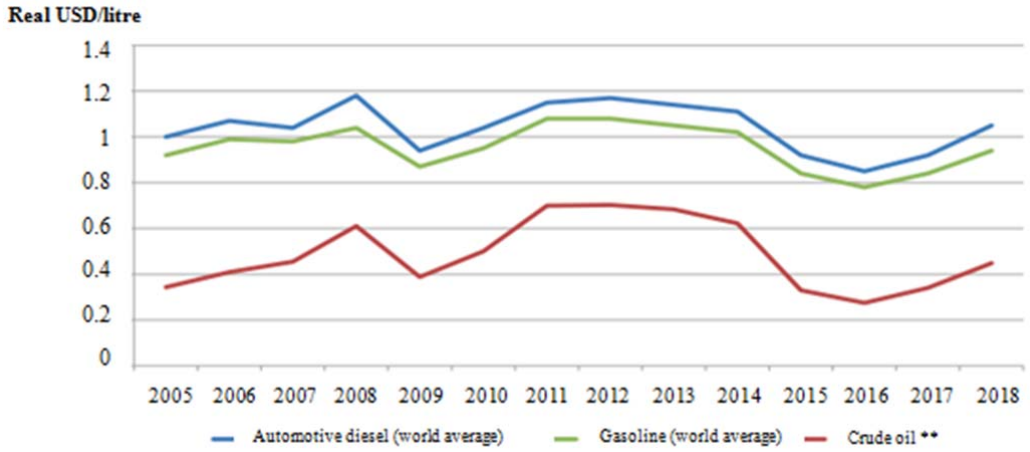

Fig.1. Global fuel price changes 2005-2018

Source: IEA. (2019). World Energy Prices: An overview, Paris.

The global pump prices on average are significantly higher than the underlying crude spot prices because of the included markups in the different market levels related to the converting crude oil into fuel (Blair et al, 2017). The global pump prices around the world indicate significant cross-country disparities that are the result of each country approach in what is called international fuel price pass-through to domestic fuel prices. The weak and the delay of fuel price pass-through represent the fuel subsidies (Kpodar and Imam, 2021). The question on how changes in international crude oil prices impact domestic retail fuel prices is a rich discussion in the economic literature. (Coady et al, 2010; Kpodar and Abdallah, 2017) confirmed the existence of a varying pass-through levels among countries and regions. the explaining factors have differed, we find the institutional factor where (Fattouh and El-Katiri, 2012; Cheon et al, 2013) studies suggested that the absence of fuel price adjustment mechanisms as a result of political reasons lead to a weak pass-through, while (Kpodar and Imam, 2021) indicated the role of inflation level and volatility of oil international prices that determine government decision about how must pass international fuel price changes to be passed through to domestic prices.

According to GIZ 2019 International Fuel Prices Report, the gasoline prices range from virtually for free in Venezuela to $2.09 per litre in Hong Kong as the highest price with a world average of $1.14 per litre. Diesel prices differs and range also like gasoline from virtually for free in Venezuela to $1.93 per litre in Norway as the highest price with a world average of $1.07 per litre (GIZ, 2019). The important remark is that the lower fossil fuel prices are in the countries of the MENA region which is characterized by a lower pass-through compared to the other regions (Coady et al, 2015).

Electricity prices

Residential electricity prices were distinguished from those for business by their high value and also their big variation across countries (IEA, 2019). Figure 2 shows the distribution of residential and industry electricity prices around the world Based on a scale of equal price categories of 30 USD/MWh for each category. According to that scale, the residential electricity prices in the world in 2017 were divided into 12 price categories which mean that it had a big dispersion degree. The highest price for residential use was only for one country in the highest category of 330 to 360 USD/MWh, while 2 countries were in the lowest category of less 30 USD/MWh, noting that 26 out of 68 countries included in Figure 2 had a price of residential

electricity between 60 and 120 USD/MWh. For industry electricity prices, they were divided into only 8 price categories with less dispersion degree. The highest level was for a country in the category of 210 to 240 USD/MWh which is lower compared to the residential electricity prices. Another country was in the lowest category of less 30 USD/MWh, noting that 34 out of 68 countries had a price of industry electricity between 60 and 120 USD/MWh

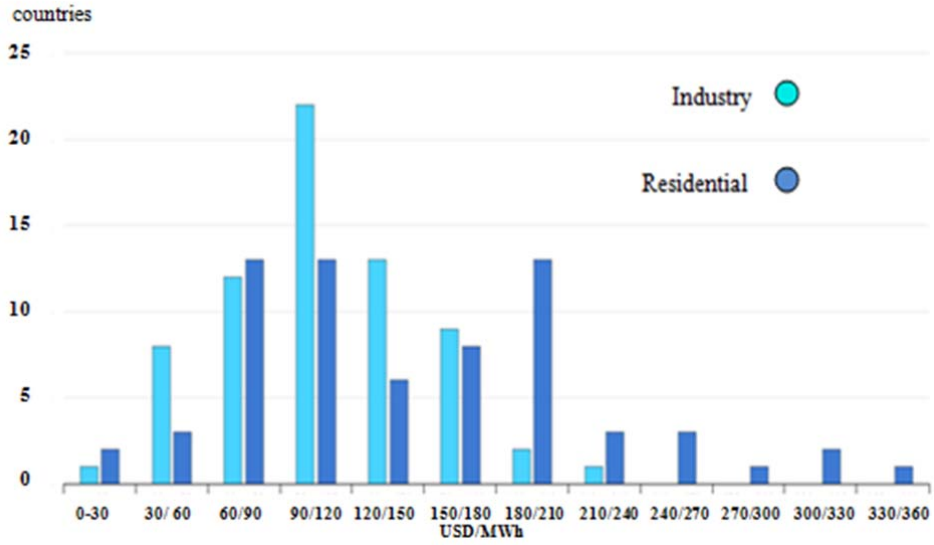

Fig.2. Distribution of residential and industry electricity prices, 2017

Source: IEA.2019. (https://www.iea.org/data-and-statistics/charts/distribution-of-residential-and-industry-electricity-prices-2017

The Size of Global Energy Prices Subsidies

Subsidizing energy prices is a policy that is widely applied around the world (Zeng and Chen, 2016; Skovgaard and Van Asselt, 2018), but it differs across countries due to the nature of the economic system (Verme and Araar, 2017) and the economic policy priorities (Van Asselt & Skovgaard, 2016; Sarrakh et al; 2020).

Pre-tax and post-tax global energy subsidies

The world bank study of Larsen and Shah (1992) was the first study that focused on the estimation of the whole world energy subsidies, and found its value around $230 billion. The other previous studies of energy subsidies that tried to focus on its size presented different estimates for just limited countries, and didn't present either its full size in the world economy nor its components statistics (Lin and Jiang, 2011). Also, it is important to clarify that the different definitions of energy subsidies was the main reason for diverging estimates of the size of subsidies at the global level (McKitrick, 2017; Sovacool, 2017; Skovgaard and Van Asselt, 2018). although the IEA has been tracking energy subsidies by providing an updated database (Sovacool, 2017), The turning point in energy subsidies estimates started from the study of (Clements et al, 2013) that measured energy subsidies in 176 countries using “the price-gap approach” as a base, and dividing the energy subsidies for consumers into pre-tax subsidies and post-tax subsidies. The study estimated the global pre-tax subsidies on 2011 to $492 billion which was about 0.7 percent of global GDP, while the post-tax subsidies in the same year was estimated to $2.0 trillion which was about 2.9 percent of global GDP. Later, Parry et al (2014) study presented country-level estimates of environmental costs that was very helpful for (Coady et al ,2015; 2019) to present more sophisticated estimate of global energy subsidies.

According to (Coady et al ,2019), the global pre-tax subsidies increased from 2010 to 2012 in both relative and absolute terms to up 0.77% of global GDP with a value of $572 billion, but it declined substantially from 2012 until 2016 to 0.36% of global GDP with a value of $269 billion. This decrease primarily reflected the declining trend of international fuel prices especially in the period 2014-2016 (Prest, 2018) that lowered the gap with domestic prices, and also a result of the continuous efforts of many countries particularly oil-exporting countries to reform fuel pricing (Verme and Araar, 2017). International prices rebounded in 2017, implying larger absolute price gaps in countries retaining price controls, and caused a slightly rise in the pre-tax subsidies in absolute terms to $296 billion (about 0.37% of GDP).

Unlike to pre-tax subsidies, the value of post-tax subsidies is in a high levels and increased over the 2010-2017 period, it varied between 5.4% of global GDP with a value of $4 trillion in 2010 and 6.5% of global GDP with a value of $5.2 trillion in 2017 (Coady et al, 2019). The explanation of this increase is the result of the increase in the efficient level of "Pegouvian tax" that should be applied as a corrective tax to reflect the external damages resulting from the growing consumption of energy products (pollution, congestion, and global warming).

The global energy prices subsidies by product

Concerning energy prices subsidies by product, the decrease of global pre-tax subsidies as clarified previously was mainly due to the decline in the pre-tax share of petroleum products and natural gas between 2013 and 2017, as a result of the decline of oil and natural gas prices in the international markets which are the base to calculate the pre-tax subsidies of both products. Petroleum products share declined between 2013 and 2017 by more than a half (from 0.33 to 0.11 percent of GDP) while it was represented the largest share of pre-tax subsidies as a share of global GDP in 2013, and the natural gas share declined also from 1.6 percent of GDP in 2013 to 0.08 percent of GDP in 2017. The coal share of pre-tax subsidies is negligible as a result of subsidies lack for its price in few countries that use it with low levels, and the electricity pre-tax share declined slightly from 0.2% of GDP in 2013 to 0.17% of GDP in 2017 (Coady et al, 2019).

On the other side, the post-tax subsidies are based on the cost of external damage of using each energy product that is not constituted in its consumer price. According to (Coady et al, 2019), the coal had the largest share of post-tax subsidies since 2013 with a slightly rise to 3% of GDP in 2017 and reflected undercharging for its large local air pollution costs. Petroleum products also so close with a slightly increase of its post-tax subsidies share during the period 2013-2017 that up to 2.8% of GDP which reflects also undercharging for its external damage such as; air pollution, congestion, accidents and global warming, while natural gas and electricity shares account about 0.4% and 0.1% of GDP respectively in 2017, noting that environmental costs in the electricity sector are attributed to the fuel inputs rather than the electricity output.

Energy Subsidies Growth in MENA Countries; Analysis by Components and Products

Consumer subsidies policy is a part of the history of the MENA region (Verme, 2016). In this context, subsidizing energy prices in MENA countries is a main tool that almost all the region countries use to improve the standard of living in their societies as a result of the malfunction in their social safety systems (El-Katiri and Fattouh, 2017; Verme, 2016), and to use it as a policy to avoid the social instability and compensate the people for their exclusion in participating into the decision-making process (Krane and Monaldi, 2017), that is normally available through many mechanisms which is not the case in the MENA region. According to (Sdralevich et al, 2014), the energy consumption elasticity to growth was about 1.080 in the MENA region over the period 1980-2011, which is a significant level higher than the world average which was

about 0.764 in the same period. The subsidies policy of energy prices is the main factor that explains the difference that is reflected clearly between oil exporters and importers countries in the MENA region, where the oil exporters had high energy consumption elasticity to growth estimated to 1.293 compared to its value of 0.924 in the other region oil importers.

As an average of the 2013, 2015 and 2017 energy subsidies data, both Iran and KSA for oil-exporting countries were in the first level as they have the highest nominal averages of pre-tax subsidies by a very big margin with the other countries by $52.11 and $45.54 billion respectively (Figure 3). UAE and Algeria came in the second level by $11.38 and $10.68 billion then the other countries came in the lowest level where they didn't pass the average threshold of $6.66 billion that was in Kuwait and the lowest average that was in Yemen (in a war situation) by $0.80 billion and Bahrain by $1.65 billion. For post-tax subsidies average, also Iran and KSA had the highest levels estimated to $118.55 and $114.81 respectively and were much 4 times higher compared to the closest countries that were UAE and Algeria with $26.36 and $25.78 billion respectively, while the lowest post-tax average was in Yemen and Iraq by $1.58 and $5.65 billion respectively. As a percent of GDP, Libya had the highest average percentage of pre-tax subsidies by 16.33% although its pre-tax nominal average was ten times less than its value in Iran that had an average percent estimated to 13.61%. The other countries had lower shares where they didn't pass the threshold of 6.47% that was in KSA and the lowest average percents that were in Iraq and Qatar by 1.29% and 2% respectively. For post-tax subsidies, Libya also had the highest average percentage of GDP by 34.93% followed by Iran with 30.37%, while the lowest average percent were in Iraq by 2.99%.

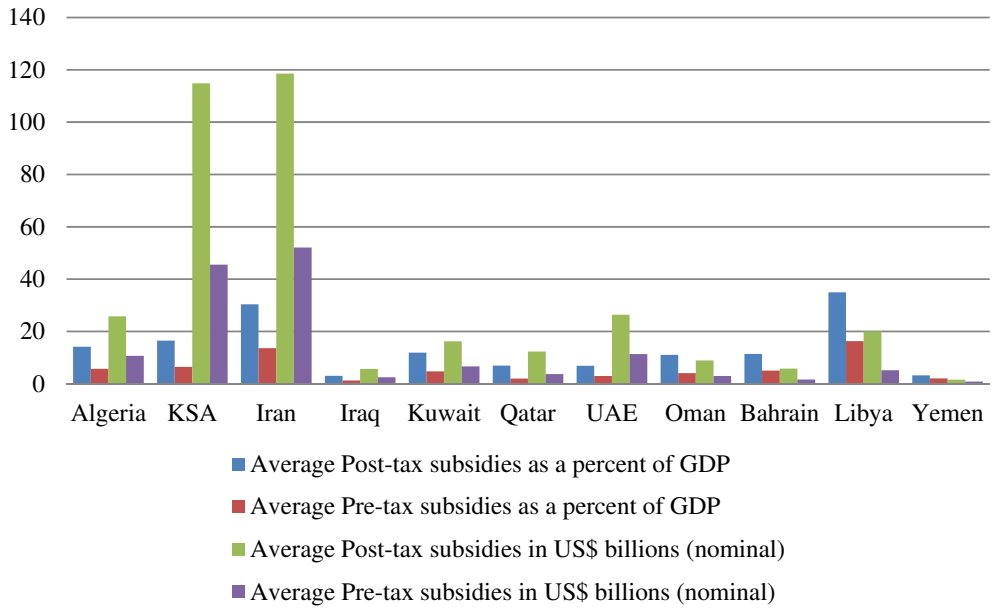

Fig.3. Post-tax and pre-tax energy subsidies averages in Oil-exporting countries (2013, 2015 and 2017) (USD billions)

Source: Author's calculation based on IMF Country-level Subsidies Estimates, 2015 and 2018 databases.

In oil-importing countries, Egypt had the highest nominal average of pre-tax subsidies by $19.91 billion as the third in the MENA region at the whole after Iran and KSA (Figure 4). The post-tax subsidies value declined in Egypt between 2013 and 2015 as a result of the decrease in pre-tax subsidies by almost a half of its value because of the fuel prices subsidies reform that Egypt started in 2014 (James, 2015). The other countries had lower nominal averages that didn't pass $2.34 billion at most that was in Lebanon, while the lowest averages were in Djibouti and Morocco by $0.1 and $0.25 billion respectively. For post-tax subsidies, Egypt with a nominal

average of $40.82 billion was the highest among the oil-importing countries and also the third in the MENA region. The other countries didn't pass the threshold of $6.74 billion that was in Lebanon, while the lowest averages were in Djibouti and Mauritania by $0.21 and $0.49 billion. The remarkable thing is although that Morocco had low pre-tax subsidies, its post-tax subsidies average was higher than other countries as a result of the high subsidies value for coal that had significant negative effects on the environment.

As a percent of GDP, Egypt also had the highest average of pre-tax subsidies by 7.26% and was the third in the MENA region even before KSA. The difference with the other oil-importing countries was small unlike the difference among the nominal averages, where we find Lebanon with 4.73% then Jordan by 3.43%. For post-tax subsidies, Lebanon had the highest average by 13.16% followed by Egypt by 12.66%, both countries according to their post-tax averages as a percent of GDP were at the fourth and fifth rank respectively in the MENA region as the whole.

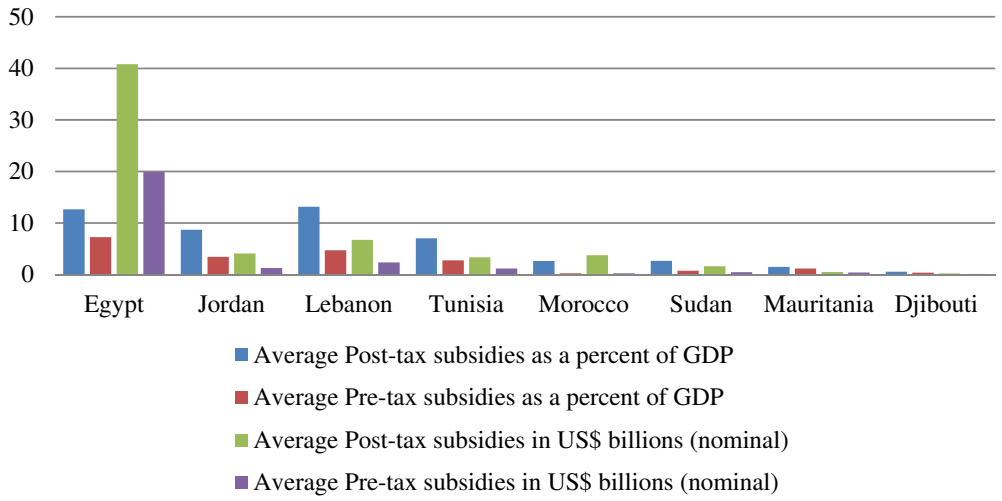

Fig.4. Post-tax and pre-tax energy subsidies averages in Oil-importing countries (2013, 2015 and 2017) (USD billions)

Source: Author's calculation based on IMF Country-level Subsidies Estimates, 2015 and 2018 databases.

Post-tax energy prices subsidies by component for MENA oil exporting countries

The pre-tax subsidies were the main component of post-tax energy prices subsidies in all MENA oil-exporting countries except in Qatar. As Figure 5 shows, due to the high population and their prodigious consumption of fuel (Victor, 2009; Barkhordar et al, 2018), Iran had the highest nominal average of pre-tax subsidies in the region at the whole with $52.11 billion, followed very closely by KSA with an average of $45.54 billion, then the other oil-exporting countries came with low averages compared to both Iran and KSA. The pre-tax subsidies value of energy products declined in almost all MENA oil-exporting countries as a result of the decline in the international price of oil between 2014 and 2016 (Prest, 2018), that determines the value of subsidizing oil products prices that have the highest share of energy prices subsidies, and also as a result of such subsidies reforms that were implemented in many oil-exporting countries (Verme and Araar, 2017). The significant drops of the pre-tax subsidies were in Iran where its value declined from $76.22 billion in 2013 to $43.33 billion in 2015 then to $36.78 billion in 2017, and also KSA from $65.40 billion in 2013 to $43.69 billion in 2015 then to $27.55 billion in 2017. The decrease of pre-tax subsidies value in the other oil-exporting countries was small and remarkable in UAE from $18.17 billion in 2013 to $08.97 billion in 2015 then to $07.01 billion in 2017, and Algeria from $15.64 billion in 2013 to $09.68 billion in

2015 then to $06.74 billion in 2017. Major drop in the pre-tax subsidies also was significant in Yemen, where in addition to its low pre-tax subsidies value, its decrease in 2015 estimated to 81% compared to its initial value in 2013 as a result of the July 2014 reform (Verme and Araar, 2017).

For the rest components of post-tax energy prices subsidies, their importance for oil-exporting countries varies from one country to another. Global warming as an average of 2013, 2015 and 2017 years data seems like the second most important component after the pre-tax subsidies component in all concerned countries except KSA. Its highest value was in Iran by an average of $22.03 billion, then in KSA by an average of $15.2 billion. In both Oman and Bahrain, the averages of global warming were so close to the average of the pre-tax subsidies unlike the other oil-exporting countries. Local air pollution also is an important component as its value in almost all concerned countries is significant. Its highest value was in KSA by an average of $23.34 billion as the second most important component of KSA energy post-tax subsidies, higher than in Iran with an average of $16.26 billion despite Iran was the highest pre-tax subsidizer compared to KSA. The high value of both two components confirmed the high cost of subsidizing energy prices on the environment in the MENA oil-exporting countries.

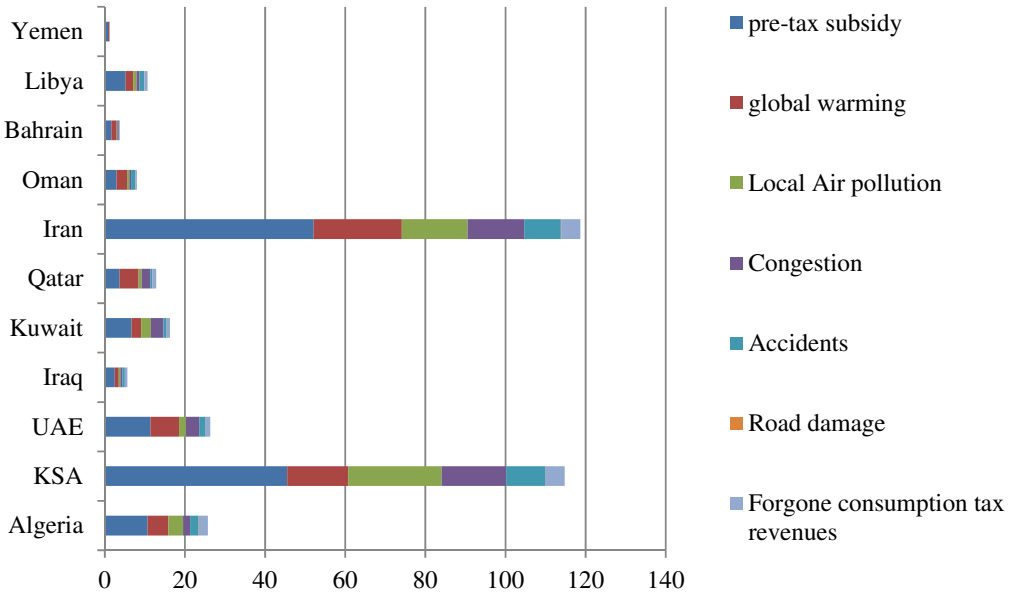

Fig.5. Post-tax energy subsidies averages by component in MENA oil exporting countries (2013, 2015 and 2017) (USD billions)

Source: Author's calculation based on IMF Country-level Subsidies Estimates, 2015 and 2018 databases.

The two environmental components (global warming and local air pollution) are not the only components that policymakers should be concerned with. “Congestion” is a remarkable component of post-tax energy prices subsidies. Its highest average was in KSA by $16.11 billion followed by Iran with $14.14 billion. In the countries of KSA, Iraq, UAE, and Qatar, its value is higher than one of the two environmental components, while in Kuwait it was higher than the average of both the environmental components. This situation gives us another dimension of subsidizing energy prices that should be taken into account as it reflects an indirect but significant cost whether economic or social. Also, the “Accidents” component should not be neglected as it constitutes about twenty percent of the post-tax subsidies value in almost all oil-exporting countries, where the highest values were in KSA and Iran by $9.81 billion and $9.13 billion respectively. The remarkable average of the “accidents” component

was in Oman where it was estimated to $1.07 billion that represented about 36.4% of the pre-tax subsidies average in Oman and higher than the average of "local air pollution" component. For "Forgone consumption tax" component also is important. Its average value in Iraq, Qatar, Bahrain, and Yemen was higher than one of the two environmental components, while in Algeria it was just behind both. "Road damage" also as a component of the post-tax subsidies for energy prices had its importance as it reflects additional costs for local and central authorities with a decline in the welfare of society and hence raises public spending as a result of the financial allocations to fix the deterioration of the roads.

Post-tax energy prices subsidies by component for MENA oil-importing countries

For oil-importing countries, pre-tax subsidies value in Egypt as an average was estimated to $19.91 US billion dollars (Figure 6), as the third-highest value in the MENA region on the whole despite the decline in the value of the subsidies in 2015 to a level that was less than its former level in 2013 by about 50%. The decline is a result of the substantial reforms of fuel prices that Egypt have taken on July 5, 2014 where the authorities announced the increase in prices of Gasoline, diesel, and also of natural gas and electricity both for residential and commercial uses (Verme and Araar, 2017). Lebanon as an oil-importer economy came after Egypt with a smaller average that was less by about 8 times and it was estimated at about $2.34 billion, while the other oil-importer countries came with much lower pre-tax subsidies averages that range between $1.26 billion in Jordan and $0.10 billion in Djibouti, which reflects the policy of decreasing energy subsidies in these countries where they bear high import costs for energy products.

"Global warming" and "local air pollution" components were so close in their values in almost all oil-importing countries. Their highest averages were in Egypt as a result of high energy consumption that resulted from low energy prices and was estimated to $6.62 and $7.48 billion respectively as the third higher averages in the MENA region after Iran and KSA concerning both components. An important remark about the two environmental components in Morocco deserves to take attention, as the pre-tax subsidies average was too small to explain the average values of "global warming" and "local air pollution" that are higher compared to the other oil-importing countries except for Egypt. The explanation had a relation to the product type that benefited from the subsidies policy that we will present in the next section. "Accidents" were also an important component of post-tax subsidies in oil-importing countries, where it came in its averages level after the level of both the two environmental components averages in all countries except for Jordan where it was almost the last rank and Sudan where it was higher than local air pollution. Its highest average was in Egypt by $2.28 billion. For the "congestion" component, its averages values were low except for Sudan where its average was even higher than the average of local air pollution, and Jordan where it was also higher than the averages of both local air pollution and accidents averages. The "Forgone consumption tax" component average value was the highest average value after the pre-tax subsidies in Jordan and higher than one of the environmental components in Sudan and Djibouti. In Lebanon and Tunisia, its average value was higher than the average value of both congestion and accidents, while in Egypt and Morocco, and Sudan it was higher than the average value of congestion.

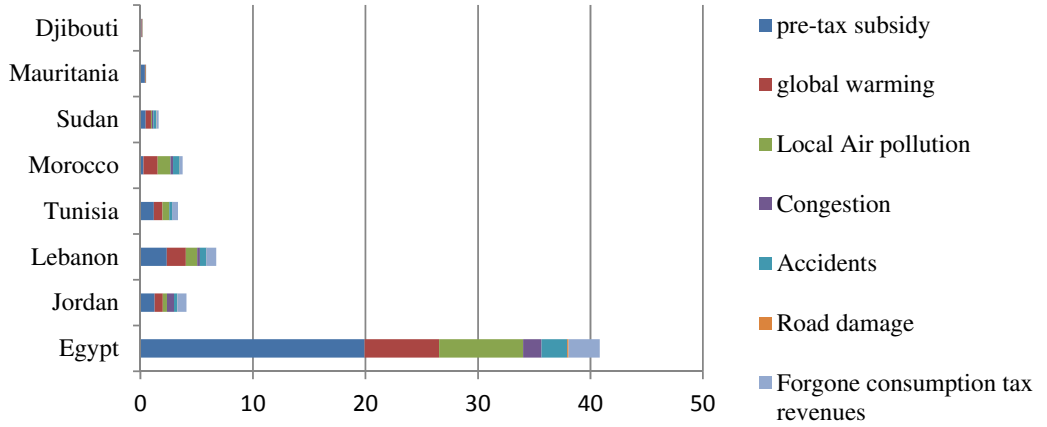

Fig.6. Post-tax energy subsidies averages by component in MENA oil importing countries (2013, 2015 and 2017) (USD billions)

Source: Author's calculation based on IMF Country-level Subsidies Estimates, 2015 and 2018 databases.

Post tax energy prices subsidies by product for MENA oil-exporting countries

Petroleum products as Figure 7 shows were the main products that benefited from energy prices subsidies in all MENA oil-exporting countries as an average except for UAE where it was in the second place and Bahrain where it was in the third place. Its highest value was in KSA by $91.36 billion followed by Iran with $69.63 billion. This is a logic result of the difference between the two countries consumption of Petroleum and other liquids, where KSA had an average for the years 2013, 2015, and 2017[2] of 3.1 Mb/d while Iran had an average of 1.85 Mb/d (EIA, 2021). This consumption disparity for KSA side didn't reflect the difference in population size between the two countries where Iran's population was 80.6 million in 2017 compared to 33.1 million for KSA (World bank, 2021). As a percent of GDP for each economy, the highest average share of petroleum products was in Libya by 30.15% followed by Iran with 17.70% then Saudi Arabia by 13.11%. Natural Gas as an average had the highest value among the other products in UAE and came in second place after petroleum products in Iran, Qatar, Algeria, Bahrain and Oman, while it was in third place in Kuwait, Iraq, KSA, Libya, and Yemen. Its highest value as an average was in Iran by $36.64 billion as it was the highest consumer of natural gas by an average of 6.4 billion cubic feet (bcf) (EIA, 2021), followed by UAE with an average of $14.32 billion then KSA by an average of $10.81, despite UAE average consumption of natural gas estimated by 2.5 bcf lower than KSA average that was estimated to 3.6 bcf (EIA, 2021). As a percent of GDP for each economy, the highest share of natural gas was in Iran by 9.42% followed by Oman with a share of 4.36% then Bahrain with a share of 3.9%.

For electricity, it was the highest subsidized product as an average in Bahrain, came in second place as the highest subsidized product in Kuwait, Iraq, KSA, Bahrain, Libya, and Yemen, while it was in the third place in Iran, Qatar, Algeria, and Oman. Its highest value as an average was in KSA by $12.62 billion as it was the highest consumer of electricity with an average of 300 billion KWh (EIA, 2021), followed by Iran with $11.89 billion as the second-highest consumer of electricity with an average of 225 billion KWh (EIA, 2021). As a percent of GDP for each economy, the highest share was in Bahrain by average percent of 4.04% then Iran by an

[2] We focused on the average of years: 2013, 2015 and 2017 when talking about the consumption of energy products to create homogeneity with the averages of energy subsidies that are calculated through the IMF energy subsidies databases that are available only for the years: 2013, 2015 and 2017.

average percent of 3.13%. For coal, the value of its subsidies was too low close to zero in almost all oil-exporting countries because it is no longer considered a source of energy in modern societies. Its highest value of subsidy as an average was in UAE by $0.5 billion, followed by Iran with a subsidy average of $0.37 billion as both were the second and the fourth highest countries in MENA region that consumed coal by an average of 2982 and 1444 million short tons respectively (EIA, 2021).

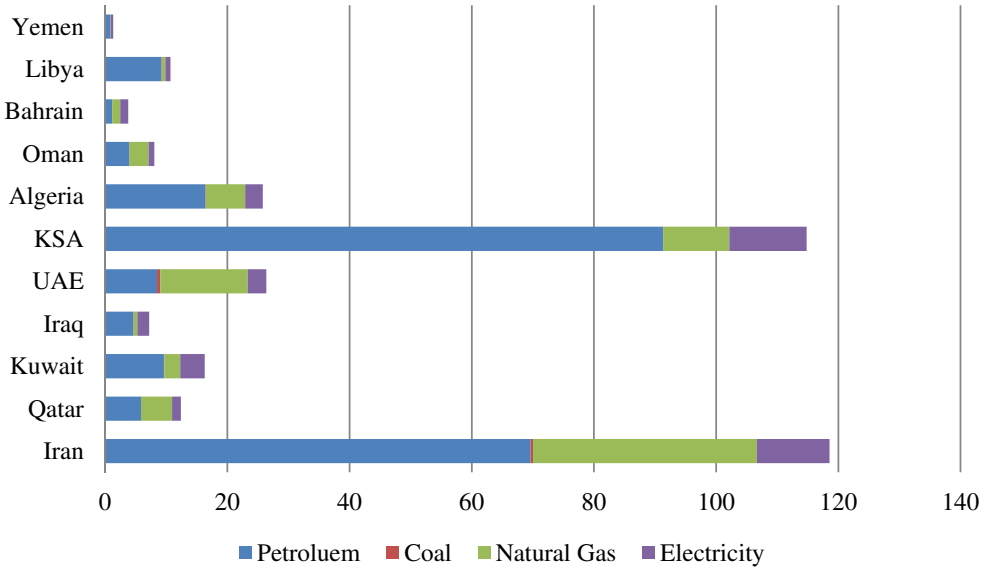

Fig.7. Post-tax energy subsidies averages by product for MENA oil-exporting countries (2013, 2015 and 2017) (USD billions)

Source: Author's calculation based on IMF Country-level Subsidies Estimates, 2015 and 2018 databases.

Post tax energy prices subsidies by product for MENA oil-importing countries

Also in oil-importing countries, petroleum products were the highest subsidized type of products in all countries except for Tunisia (Figure 8). Its highest value as an average was in Egypt by $28.54 billion as the third-highest value in the MENA region on the whole as it's one of the highest consumers of petroleum and other liquids by an average of 832 Mb/d. In the other oil-importing countries, its value was too low compared to Egypt as the highest value as an average was in Lebanon by $3.50 billion. as a percent of GDP for each economy, the highest share of petroleum products was in Egypt by 10.39% followed by Lebanon with a share of 7.02%. Electricity was the second most subsidized product in oil-importing countries except in Tunisia where it was the first. Its highest value as an average was in Egypt by $6.82 billion as it was the highest oil-importing country that consumed electricity with an average of 133.33 kWh, followed by Lebanon with an average of subsidy was estimated to $2.10 billion as it had an average of consumption that was estimated to 17 kWh. Despite the low population in Lebanon and low electricity consumption compared to Egypt, the subsidy averages in both countries didn't reflect that differences, which means that Lebanon's subsidy for the unit of electricity is too high than in Egypt. As a percent of GDP for each economy, the highest share of electricity was in Jordan by 4.28% followed by Lebanon by a share of 4.25%. Both in Morocco and Sudan, there were no electricity prices subsidies in the years 2013, 2015, and 2017.

Natural Gas average subsidies value was high in Egypt and estimated by $5.32 billion as it had an average of natural gas consumption estimated to 1833 bcf (EIA, 2021), while it was low in the other countries where the highest value was in Lebanon by $1.05 billion. Finally, the average value of coal post-tax prices subsidies was very low close to zero in almost all oil-

importing countries. Morocco was the highest consumer of coal in the MENA region with an average of 6600 Mst (EIA, 2021), and had the highest average value of coal post-tax prices subsidies in the MENA region with $0.94 billion. This fact explains why "Global warming" and "local air pollution" components in Morocco were higher than its pre-tax subsidy average and even higher compared to other countries that their pre-tax subsidies average were higher than in Morocco. Egypt came after Morroco with a lower average estimated to $0.13 billion as the fourth-highest subsidizer of coal in the MENA region as it was consumed coal by an average of 2069 Mst as the third consumer in the MENA region (EIA, 2021).

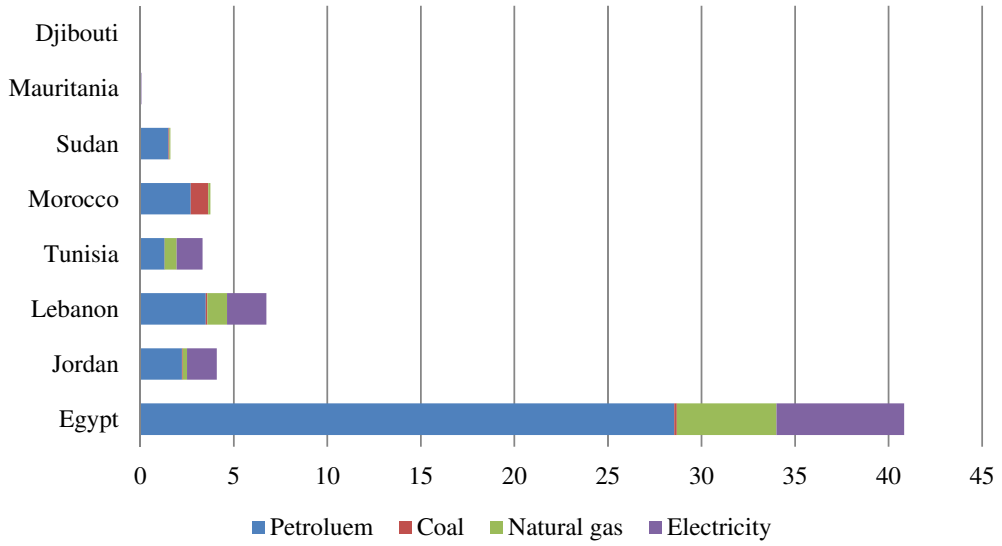

Fig.8. Post-tax energy subsidies averages by product for MENA oil-importing countries (2013, 2015 and 2017) (USD billions)

Source: Author's calculation based on IMF Country-level Subsidies Estimates, 2015 and 2018 databases.

Average post-tax and pre-tax subsidies per capita (nominal) for oil-exporting

When comparing the post-tax and pre-tax energy prices subsidies per capita averages, we also find different results. As Figure 9 shows for oil-exporting countries, Kuwait had the highest average pre-tax subsidies per capita by $1683, followed by Qatar with $1679. The remarkable thing is that all the GCC countries had an average value of pre-tax subsidies per capita that passed the threshold of $1000 except for Oman. For post-tax subsidies per capita, the highest average was in Qatar by $5266.26 followed by Kuwait with $4098.83. All the GCC countries had a post-tax subsidy per capita average that was at least $2000. These results indicate how energy prices subsidies were high in those countries where the population is low, as the sum of the population in all the GCC countries doesn't pass at most 50 million people. In the other oil-exporting countries, Iran the country that had the highest average of post and pre-tax subsidies had an average pre-tax and post-tax subsidies per capita estimated respectively by $663.12 and $1497.46 which were in low levels compared to the GCC countries as a result of its high population (78.55 million people). Libya the country that had the highest averages of post and pre-tax subsidies as a percent of GDP had an average pre-tax and post-tax subsidies per capita estimated to $831.38 and $1707.91 higher than in Iran as a result of its low population (6.4 Million), although its nominal averages were about 10 times less than in Iran. In Algeria, although it had the fourth higher nominal averages, both pre-tax and post-tax subsidies per capita were lower compared to the other countries. The very lowest averages of pre-tax and post-tax subsidies per capita were in Iraq and Yemen especially because of the lower value of the average pre-tax and post-tax subsidies in both countries.

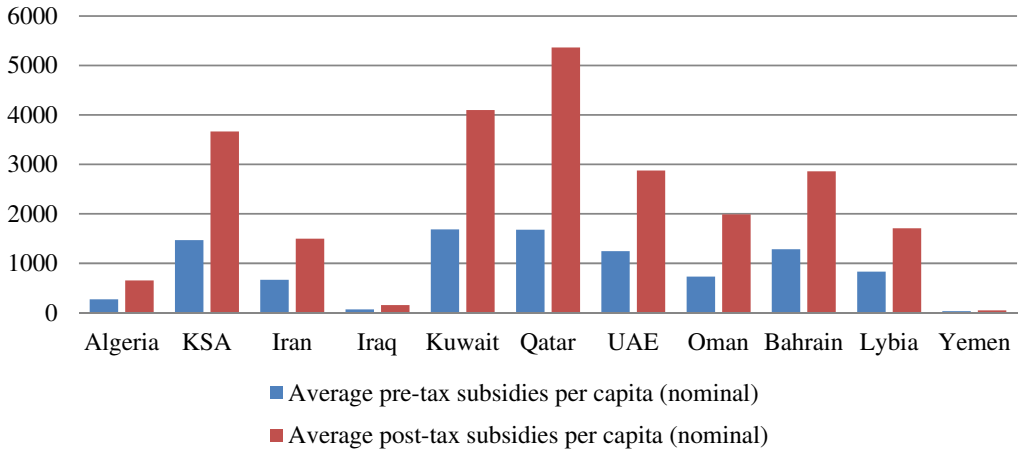

Fig.9. Post-tax and pre-tax energy subsidies averages per capita for oil-exporting countries (2013, 2015 and 2017) (USD)

Source: Author's calculation based on IMF Country-level Subsidies Estimates, 2015 and 2018 databases.

Average post-tax and pre-tax subsidies per capita (nominal) for oil-importing

The comparison based on post-tax and pre-tax subsidies per capita for oil-importing countries also gives us different results (Figure 10). Lebanon had the highest pre-tax subsidies per capita average estimated to $435.5 as a result of its low population (6.8 million in 2017) more than many oil-exporting countries like Algeria, Iraq, and Yemen, and so close to Iran that was the higher subsidizer in nominal value of energy prices in the MENA region. Egypt the country that was the highest subsidizer in nominal value as an oil-importer economy and the third highest in the MENA region on the whole as we saw previously had a low pre-tax per capita average estimated to $221.5 US dollars as a result of its high population (96.4 million people on 2017), followed in the third rank by Jordan with an average of $154.6 which is not considered far from what was estimated in Egypt due also to its low population (9.7 million on 2017). For post-tax subsidies per capita, Lebanon had the highest post-tax subsidies per capita average estimated to $1224.9 with a big difference from Jordan and Egypt that had so close averages estimated to $490.1 and $447.2 respectively, then Tunisia by an average of $296.3.

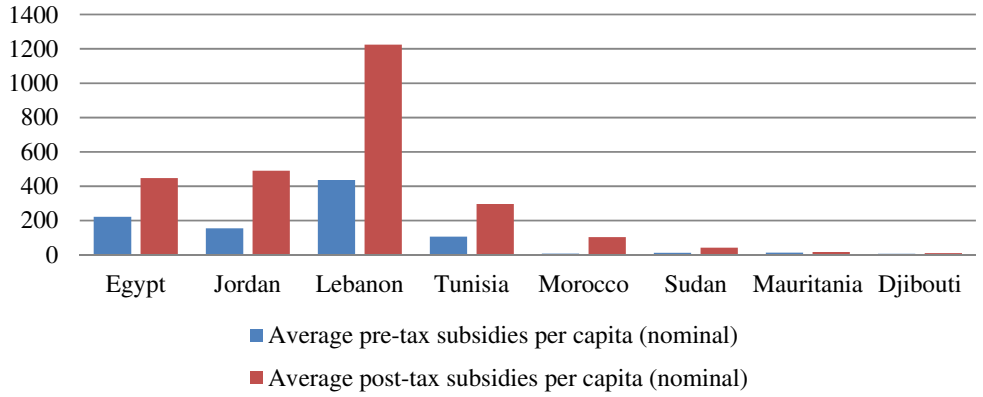

Fig. 10. Post-tax and pre-tax energy subsidies averages per capita for oil-importing countries (2013, 2015 and 2017) (USD)

Source: Author's calculation based on IMF Country-level Subsidies Estimates, 2015 and 2018 databases.

Conclusions and Policy Implications

Energy prices subsidies policy in MENA region is a crucial factor of economic policy especially for both social and political goals. Against the backdrop of the limited studies of the energy prices subsidies analysis, this paper attempts to shed light on the fact of subsidizing energy prices by components, by products and by per capita across the MENA region in both exporting and importing countries. Our analysis of energy prices subsidies in the MENA region showed that the real value of energy prices subsidies is higher than it limited only on the pre-tax concept. The wide concept of energy prices subsidies that is the post-tax subsidies gave us another picture of the real cost of subsidizing energy prices in the MENA region, and increases the necessity of a real revaluation of this policy that although it aims to help poor and low-income groups, its negative effects economically, socially, and environmentally are high, and require a real reform that can be in the benefit of all parts whether it is the poor group, the state, the environment, or the economy. Secondly, energy prices subsidies vary from one country to another, whether in terms of its value, the weight of its components, and the subsidy share of each energy product. Therefore, the reform process cannot be typical, but rather it must take into account the specifics of each country with regard to the details of energy subsidies at its level.

Generally, per capita subsidies analysis suggests for the GCC countries the importance of urgent reduction of their energy prices subsidies as the lowest post-tax subsidies per capita average for the available data for the years 2013, 2015, and 2017 in those countries was at the level of $2000 in Oman. In more details, both Iran and KSA should move forward with serious reforms to reduce energy prices subsidies as its real cost that is post-tax subsidies in both countries is too high, especially petroleum products that have the highest share among the other products. The high cost of global warming in Iran and the high cost of local air pollution in KSA are the main factors that must push both countries to run energy subsidies reforms. Also, Oman and Bahrain have the same reason to think about a reform policy as the global warming cost in both countries is too close to the pre-tax subsidies. Libya which is the highest subsidizer of energy prices as a percent of GDP whether for pre-tax or post-tax, should make a step towards reforming the policy of subsidizing energy prices especially the petroleum products that represent about 86.2% of the global energy subsidies as the highest share in the MENA region.

In Kuwait, policymakers must make a priority to reform energy prices subsidies especially for petroleum products that represent an average of 58.88% for the post-tax subsidies, which is also responsible for the high cost of “congestion” in the country that passed the cost of each environmental component. This policy recommendation is reinforced by the fact that Kuwait also had the highest pre-tax energy subsidies per capita average that is a strong evidence to explain the high congestion cost in Kuwait especially since Kuwait is characterized by a high level of per capita national income. Also in this context, policymakers in countries of KSA, Iraq, Qatar, and UAE should give attention to the importance of “congestion” negative effects as its cost in those countries is higher than one of the environmental components cost.

For Oman, it is highly recommended to start a reform strategy of energy prices subsidies policy especially the petroleum products because of the high cost of “accidents” component that passed the cost of one of the environmental components, and explains the high accidents rate that is remarkable and significant in Oman in the last years. In other countries like Iraq, Qatar, Bahrain, and Yemen, the foregone consumption tax cost is higher than the environmental cost, which shows how the budget in those countries lost important revenues that can be used in another beneficial spending. In this context, the concerned countries must reconsider the consumption tax on energy products to reduce the foregone revenues and thus affecting positively in reducing the other costs that resulted from the high consumption of energy products due to the low consumption taxes.

For oil-importing countries, Egypt should keep its efforts in reforming subsidies policy due to its heavy effects especially on the environment where global warming and local air pollution

costs are the third highest in the region even before many oil-exporting countries. Jordan also needs to reconsider its subsidies policy for petroleum products as a result of the high congestion cost that passed the cost of local air pollution and accidents. This reconsideration is reinforced also by the high foregone revenues of consumption tax that was higher than any other components of post-tax subsidies except the pre-tax component. The high averages of both two components in Jordan are related and present strong evidence to the Jordanian authorities to put subsidies policy for energy products under revision.

In Lebanon, the country as an oil-importer is the highest post-tax subsidizer of energy prices as a percent of GDP and the fourth in the MENA region, and also it is the highest subsidizer of post-tax and pre-tax subsidies per capita. These facts require policymakers in Lebanon to give more attention to this situation and rethinking subsidies policy for energy products to make it fit and consistent with the country's financial ability, especially as an oil importer. In this context, Lebanon should reduce the value of subsidizing energy prices that is higher than any other oil-importing country except Egypt. The reduction must touch petroleum products and electricity that both represent an average of 51.92% and 31.15% of the total post-tax subsidies average respectively. Also, the consumption tax on energy products must be reconsidered as its foregone revenues were higher than the cost of congestion and accidents, it must be in line with the taxes of the other products especially in light of the low financial resources for Lebanon.

We recognize that our study suffered from the limitation of that the analyzed available data were not so enough. We believe that perhaps data of missed years were able to describe some important changes that could affect our analysis. If we were to carry out this study again, we would make some changes where Most importantly is that we would go for a longer time period to be able to capture. In this context also, we would seek to choose a case study methodology by focusing on a MENA country to make a detailed analysis of its subsidizing energy policy, and hence discuss the effective way to reform this kind of policy, which is a key challenge for almost all MENA countries.

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