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The use of fuel surcharge to fund transport investments in Syria

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□ ABSTRACT □

The increase in economic activities and the size of population is usually associated with more demand on transport sector activities. Furthermore, maintaining, upgrading and modernising transport in an economy would eventually lead to reduce logistic and production costs, and more competitively priced products. However, financing the costs of maintaining and expanding the transport sector is increasingly becoming problematic, particularly when fiscal resources are limited. Introducing surcharge on fuel prices has been proven as a reliable option to mobilise funds necessary to finance transport sector investment. However, fuel surcharges normally lead to price inflation as transport sector outputs are inputs for most economic activities. This paper looks at possible impacts of introducing a fuel surcharge on transport investment financing and price inflation in Syrian economy . Findings show that a considerable part of fiscal funds would be generated from the 10% fuel price surcharge with very little impact on price inflation .

Key words : Transport sector – fuel subsidy- fuel surcharge- transport investment – and consumer price inflation .

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استخدام رسم استهلاك الوقود لتمويل استثمارات قطاع النقل في سورية

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□ ملخّص □

عادةً ما يترافق تزايد حجم الأنشطة الاقتصادية وعدد السكان بزيادة الطلب على أنشطة قطاع النقل. كما أنّ تحديث قطاع النقل ورفع سوية خدماته من شأنه أن يخفض التكاليف اللوجستية وتكاليف الانتاج مما يؤدي إلى أسعار تنافسية للمنتجات. لكن تمويل التكاليف اللازمة للمحافظة على سوية جيدة لأنشطة قطاع النقل وتوسيعها يصبح مشكلة مهمة خصوصاً في ظل ضعف موارد المالية العامة . بالتالي، تشير التجارب إلى ما يسمى (رسم استهلاك الوقود) للمساهمة في تأمين الموارد المالية اللازمة لتمويل استثمارات قطاع النقل هو خيار مجدٍ و يمكن الاعتماد عليه . لكن عادةً ما يؤدي فرض هذا الرسم إلى رفع مستوى تضخم الأسعار ، كون مخرجات قطاع النقل تدخل في معظم الأنشطة الاقتصادية. ندرس في هذه الورقة الآثار المحتملة لفرض رسم استهلاك الوقود على تمويل استثمارات قطاع النقل وعلى مستوى تضخم الأسعار في الاقتصاد السوري. حيث تبين النتائج أنّ فرض رسم استهلاك للوقود بنسبة 10%من أسعار الوقود سيؤدي إلى تأمين قسم مهم من الموارد المالية وسيكون أثره على مستوى الأسعار محدوداً .

الكلمات المفتاحية: قطاع النقل– دعم الوقود–رسم استهلاك الوقود– استثمارات قطاع النقل– وتضخم أسعار المستهلك.

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Introduction:

Transport sector activities have increasingly become important for trade enhancement, growth support, and development sustainability. Maintaining, upgrading and modernising the transport sector in an economy is eventually expected to lead to reduced logistic costs and therefore lower production costs, more competitively priced products and higher quality services. However, financing the costs of maintaining and expanding transport sector is increasingly becoming problematic, as the demand on the activities of this sector are steeply trending up on one hand and available sources for fiscal budgets are being tightened particularly in non- oil plenty countries on the other hand.

Syrian economy witnessed significant growth during the 10th five years plan period (2006-2010). Unpublished governmental report indicates that average growth rate of real GDP amounted at 5 % over 2006-2010[1]. This is in line with the projections of the International Monetary Fund (IMF) country report released in March 2010, which anticipated real GDP growth rate to equal 5% over (2006-2010). Large part of this growth attributed to services sector activities including trade, shipping, and transit. Although the 10th five years plan emphasised the importance of transport sector as an enabling sector for growth, our analysis using national accounts and fiscal budget data indicates that this sector did not keep up with the pace of growth and its contribution was less than planned. One reason of the lower than aimed contribution of transport sector was the limitation of available finance in the fiscal budget allocated to transport sector. This limitation restricted the expansion of transport sector activities in the past and is expected to do so in the near future unless allocated fund is increased or alternative sources of finance are explored. One option, which is used in many countries, is the introduction of a fuel surcharge that would generate revenues that can be used as a dedicated funding source for transport sector investment.

Research Aim

This paper is multipurpose : On one hand, it presents a picture of the transport sector role in Syrian economy by mirroring its shares and contributions to output, and it looks at the possible impact of introducing a fuel surcharge to fund transport investment and on the price inflation on the other hand. The paper is structured as follows: Section 2 presents the outcomes of studies that examined the impact of fuel and food price changes on the economy. Section 3 highlights the role of transport sector in Syrian economy. Section 4 examines the expected impact of the imposition of fuel surcharge on the fiscal revenues. Section 5 assess how would the fuel surcharge affect the price inflation in Syria. At last, concluding remarks and recommendations are presented in section 6.

Research Methodology

We will use an analytical and descriptive approach to examine the research topic, Where statistical data will be compiled, classified, and analysed using macro modelling to assess the role of transport sector to in Syrian economy and predict the impact of fuel surcharge on price inflation.

Literature review

Overall, very few studies explicitly measured the impact of fuel surcharge on price inflation and transport investment fund. On the contrary, there exists considerable research

[1] **This report is a governmental document prepared by the technical economic team at the Prime Ministry of Syria to assess the implementation of the tenth-five years plan.**

that assesses the direct and indirect, implicit and explicit consequences of fuel and food price changes on the world economies. For example, El Said and Leigh (2006) examined the fiscal cost and distributional impact of fuel price subsidies in Gabon. Their findings indicate that the total fiscal cost of the implicit subsidies reached 3.2 percent of non-oil GDP in 2005, and that the fuel subsidies are strongly biased towards higher-income households: as the top 10 percentile of the income distribution benefits from one third of the total subsidy, while the bottom 30 percentiles of the distribution benefits from only 13 percent of the subsidy. Therefore, they concluded that the reform of fuel price subsidies in Gabon may be necessary to release resources for critical social services for the poor and to facilitate pro-poor economic growth. At the same time, the rise in prices of basic commodities such as lighting kerosene and butane cooking gas may be associated with real income losses for the poor. Thus, these effects need to be mitigated or eliminated by phasing out the subsidies gradually and reorienting expenditure towards targeted programs and infrastructure spending.

The IMF study (2008) shows that higher food and fuel prices adversely affect the global economy as growth will slow, prices will inflate, and large changes in the terms of trade would occur. The study concluded that the impact of food price changes on the overall inflation is larger than fuel price changes, particularly in low-income countries. The weight of food group in the consumer basket exceeds the one of the oil-related products and services: the 2006 average weight of food in the CPI (37 %) is more than five times higher than the one for fuel at (7%). Therefore, a one percent increase in food prices would lead to 0.37% increase in overall inflation, while the one percent increase in fuel prices would eventual lead to 0.07% increase in overall price inflation. However, the IMF study warned that this conclusion should be carefully interpreted for two reasons. First, the direct impact of fuel price changes understates the importance of fuel because it is an intermediate input into most other goods. Second, the weight of total food overstates the importance of food group that experienced rapid price increases during the studied period.

The World Bank report (2009) exhibits examples of countries that have used the fuel surcharge to finance transport investment. The experiences of these countries in the imposition of the fuel surcharge vary from using a fixed charge rate per liter (or per galloon) of fuel to using a percentage of the fuel price. For example, starting in the early 1970s, Argentina used the revenues of a fuel surcharge to fund investment in upgrading and expansion of national and urban roads, railways and urban transport. At the beginning, a fixed rate of about $5 cents per liter was imposed on fuel consumption then a percentage rate (20.2% of the pre-tax price fuel) was introduced in 2005. In addition, the federal Canadian government used the fuel tax to generate fiscal revenue; the amount varies from 4.0 Canadian cents per liter to 10.0 Canadian cents per liter depending on the type of fuel. Unlike Argentina, Canadian government did not specify a fixed allocation from the generated revenues for transport investment but, in most years, about 25% of the revenue is used for this purpose, split between highways and urban transport. Another example is the US Highway Trust Fund (HTF) that was created in 1956 to support constructing the highway system in US. Currently, the surcharge (gas tax) is set at 18.4 cents per galloon (equivalent to U$ 4.9 cents per liter) from which 2.86 cents (about $ 0.76 cents per liter) is allocated to Mass Transit Account (MTA) of the (HTF) and this is used to finance federal investments in public transportations. As this rate did not increase since 1993 recent evidences indicate that the MTA will be insolvent by 2012 unless surcharge percentage is increased.

Canning and Bennathan (2004) investigated the impact of transportation networks on growth. They concluded that investment in transport infrastructure implies growth effects but only in combination with other public and human capital. They also found that for some middle income countries infrastructure investment is at a sub-optimal level, leaving the countries with severe infrastructure shortages that affected economic activities in these countries**.**

Clements, Jung, and Gupta (2003) examined the impact of petroleum price increase on the welfare of household sector. They distinguished between the direct impact through the increasing cost of fuel in transport sector and other transport- related activities, and the indirect impact through the increase in the prices of commodities and services produced by other sectors, with the magnitude of indirect price increase in other sectors depending on the strength of production linkages with the petroleum sector. Their findings suggest that in the short run, petroleum price increase will result in an increase in the price level and a reduction in household consumption. Although petroleum production will be unaffected — assuming higher exports will replace falling domestic production—the output of other sectors declines, owing to falling incomes and higher prices spurred by the petroleum price increase. Surprisingly, the study ended up with the fact that higher-income groups lose the most from petroleum price increase (subsidy reduction). But the poor are also affected and therefore they should be protected by well-targeted social safety nets, using some of the revenues generated by petroleum price increase (subsidy reform). In particular, poor households in urban area are vulnerable to the petroleum subsidy reduction, owing to its effect on both prices and output therefore, special and timing initiative should be put in place in parallel even before the price increase decision is made.

Schürenberg-Frosch (2012) conducted a pooled OLS model to assess the determinants of transport costs and the impacts of transport sector spending on the economy using a sample of industrial and developing and transition countries. He conclude that investment in transport infrastructure can have highly positive effects especially on agricultural production and the efficient marketing of agricultural products. However, this is conditional on low levels of corruption and efficient planning and use of the infrastructure as well as on the climatic circumstances. Also, he found that investments in longer and better roads have the potential to significantly reduce the transport spending. However, this result is of particular importance for agricultural production and transportation of agricultural goods.

Rodrigue and Notteboom (2013) argues that the transport sector is an important component of the economy as it has critical impacts on the development and the welfare of populations. They concluded that when transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multipliers effects such as better accessibility to markets, employment and additional investments. In contradiction, when transport systems are inefficient- in terms of capacity or reliability- they can have an economic cost. Additionally, Rodrigue and Notteboom warn that transport sector also carries an important social and environmental load, which cannot be neglected.

The contribution of transport sector in Syrian economy

In this section, we will assess the role of transport sector by measuring its contribution to the GDP growth and fiscal budget.

Share of transport sector output in total GDP:

Table (1) presents the contribution of transport sector to the GDP of Syria; it indicates that the share of transport sector in total GDP (in constant values) declined from about 9.7 % in 2002 to about 7.5% in 2010, this contradicts what has been set in the 10th Five Years Plan reaching 16% by 2010. Here it is worth noting that this conclusion should be carefully and cautiously considered as the decreasing share of the transport sector in the GDP of Syria might happened because the output of other sectors increased more than that of the transport sector. Therefore, assessing the contribution of transport sector GDP growth in total GDP growth rate over the studied period is a good exercise that helps to capture better the size of transport sector. Figures in table (1) show high degrees of volatility in yearly growth rate of the transport sector output and accordingly in the share of this output growth in total GDP growth. Furthermore, we could observe that the share of the growth of transport sector output in total GDP growth correlates with its share in total GDP. For example, in 2003, transport sector output growth contributed by 60.8% of the total GDP growth; this led to 10.2% share of transport sector output in total GDP. In comparison, the share of transport sector in the growth rate of 2008 was negative (-18.3%), this led to a low share of transport sector in the total output of Syria in 2008 (6%). In conclusion, it seems that growth rate of the transport sector that determines the magnitude of this sector in the GDP of Syria.

Table (1): Contribution of transport sector to the GDP of Syria (million SYP)

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total GDP	1,006	1,017	1,086	1,152	1,211	1,284	1,339	1421	1470
Transport sector GDP	97.5	104.2	78.3	79.4	81.4	90.6	80. 0	97	110
Share of transport sector in total GDP (%)	9.7	10.2	7.2	6.9	6.7	7.1	6.0	6.8	7.5
Growth rate of transport sector GDP (%)	1.3	6.9	-24.9	1.4	2.5	11.3	-11.6	21.2	13.5
Share of transport sector in GDP growth rate (%)	2.3	60.8	-29.5	2.3	3.3	12.4	-18.3	20.8	23.2
Growth rate of total GDP	5.9	1.1	8.6	4.5	5.2	6.1	4.5	6.1	3.5

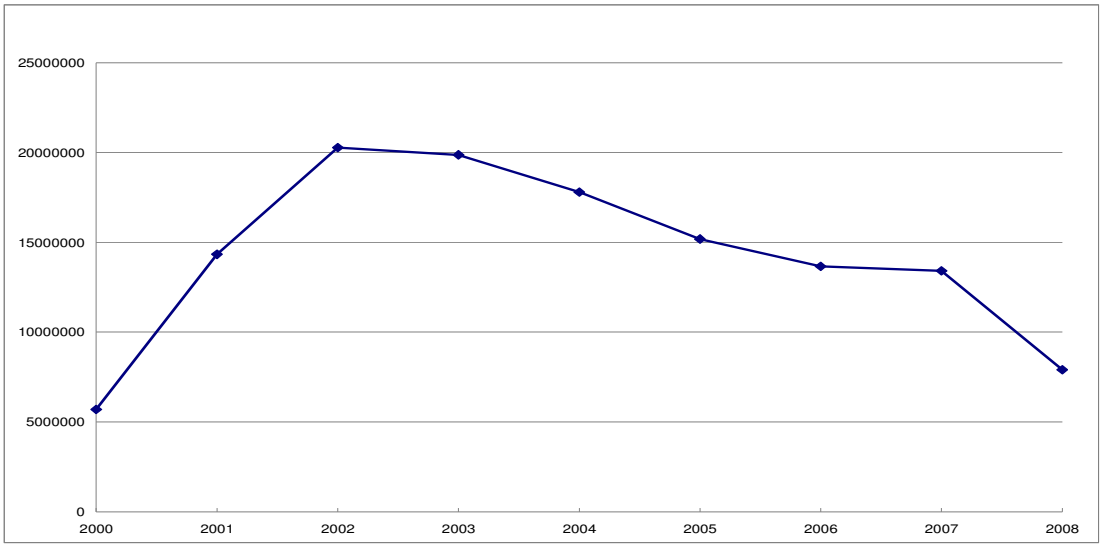
Source: Author calculations based on Central Bureau of Statistics (CBS) database.

The impact of transport sector on government fiscal budget:

Fiscal budget database indicates that public investment in transport sector (measured in constant prices of 2000) is in a declining trend since 2002, it reached the lowest value in 2008 (7.9 billion SYP) (Graph 1). In addition, statistics from fiscal database shows that the ratio of public investment to the output of transport sector has noticeably declined from 21% in 2004 to 10% in 2008 however, it slightly increased to 13.6% in 2009 (table 2). It also, shows that the ratio of public investment to the total budget revenues and the total public investment significantly declined between 2002 and 2008, whereas a slight increase took place in 2009 (note that public investment term refers to the capital expenditure or

development expenditure in the annual government fiscal budget, whereas public investment in transport sector measures capital expenditure allocated to transport sector).

Looking at the detailed fiscal budget of the Syrian government, we conclude that the share of the total transport-related revenues to the total budget revenues is averaged about 3.4% over 2005-2009(table 3). The transport sector-related revenues originate from five sources; car registration fees; transit fees, traffic-related revenues, Baghdad- Damascus transit fees, and a very small fuel tax. The small size of fuel tax supports the argument for surcharge introduction, as it would enlarge the volume of transport revenues that could be used to finance transport sector projects.



Graph (1): Public investment in transport sector (contact prices)
Source: Ministry of Finance database.

Table (2): Ratios of Public investment in transport sector to total transport sector output, total revenues and total public investment (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Public investment in transport sector / transport sector output	6	15	20	21	21	18	16	15	10	13.6
Public investment in transport sector/ total revenues	2	5	7	7	6	5	4	4	2	2.5
Public investment in transport sector / total public investment	6	13	15	14	13	12	10	10	6	7.1

Source: CBS, and Ministry of Finance database

Table (3): Transport sector-related revenues (million SYP)

	2003	2004	2005	2006	2007	2008	2009
Total budget revenues	322	342.5	356.2	434.9	458.8	490.9	600.8
Transport sector-related revenues	6.08	8.2	10.6	13.82	18.81	17.0	24.4
Transport sector-related revenues/total revenues	2%	2%	3%	3%	4%	3%	4.1%

Source: Ministry of Finance database.

It seems that although transport sector services are increasingly becoming more important for Syrian economy since the beginning of the open- door policy in 2004-2005 as it facilitates trade and other activities and generates considerable fiscal revenues for the government budget however, it is evident that less credit is being allocated out of the annual fiscal budget to this sector. Therefore, for transport sector to meet the increasing demand on its services and to utilize the geographical location of Syria as a connecting point in international trade, expansion in the credit line available to this sector is vital. Experiences of other countries indicate that introducing the user fees (fuel consumption surcharge) proved to be a practical option as the revenues generated could be used, partially or fully, to maintain and/or expand transport sector activities. However, experiences also shows that introducing fuel consumption surcharge is usually associated with overall price increase which might cause inflationary pressure including rising production costs and undermining the living standards of vulnerable groups particularly the rural and the low-income groups. The following section assesses the possible revenues that could be mobilised from the introduction of a percentage surcharge on fuel consumption.

Estimating the impact of fuel consumption surcharge on fiscal revenues

To measure the fiscal revenues expected from the introduction of percentage surcharge (10%) we will forecast the total demand on fuel (Mazout and Benzine) first, then we will measure the expected size of Mazout and Benzine consumption in transport sector, and finally we will calculate the size of the fiscal revenues associated with the fuel surcharge (10% per liter).

The total demand of Mazout and Benzine:

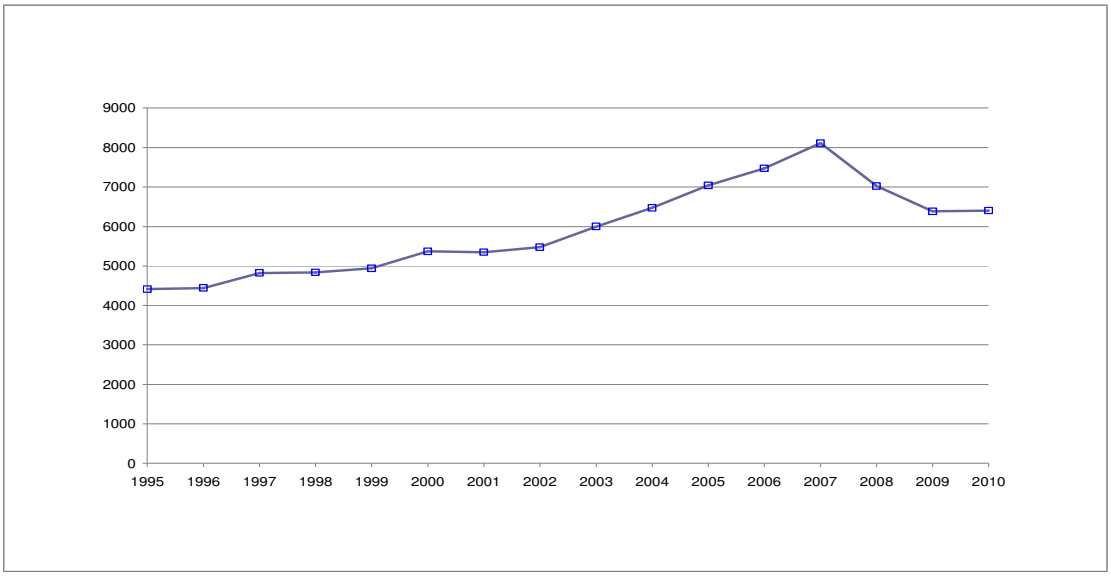
We will divide fuel into two groups " Mazout" which is mainly used as a fuel for tracks and lorries in transport sector and some industrial and agricultural activities, and the second group is " Benzine" which is widely used as a fuel for automobiles.

The economy of Syria experienced significant expansion in industrial, trade and transport activities over the period (2002-2007). In parallel, total demand of Mazout has increased over that period (Graph 2), and so does domestic demand on Benzine (graph 3), which associated the unprecedented increase in number of Automobiles in Syrian; the number of automobiles registered at ministry of transport increased 3 times over (2002-2008)[2].

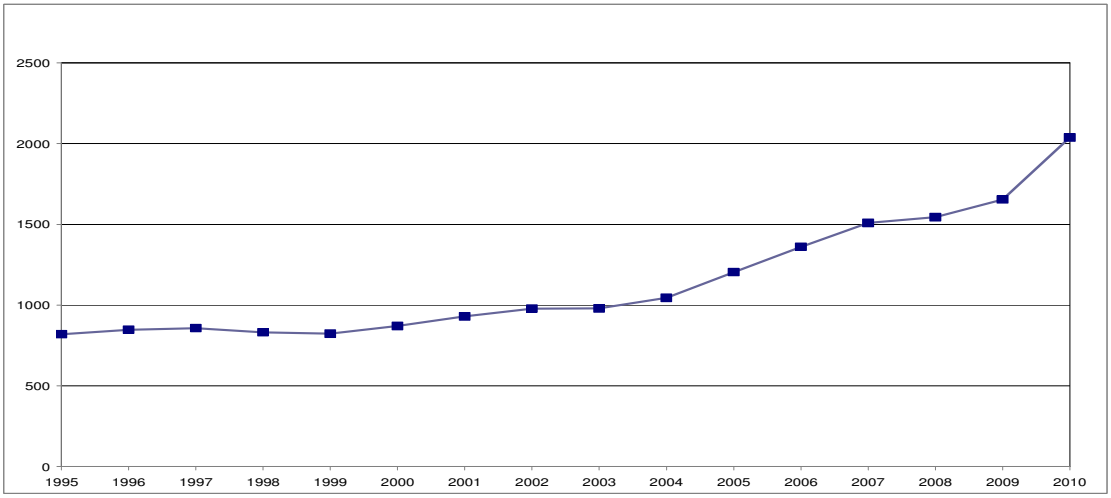
It is worth mentioning that considerable part of the purchased Mazout have being smuggled to neighbour countries like Lebanon, Jordan and Turkey because of the price differential: estimates indicate the size of the smuggling activities amounted at 30-40 percent of the total Mazout consumption of over (2004-2007).

[2] **According to Central Bureau of Statistics (CBS).**

In 2008 and 2009, consumption of Mazout fell by an astonishing 25 percent thanks to price reform policy (subsidy removal policy); price of Mazout increased from 7 SYP per Liter to 25 SYP per Liter in May 2008 but it was reversed back to 20 SYP per Liter at the end of 2008. According to the IMF 2009 Article IV Consultation—Staff Report for Syria, total energy subsidy ratio to GDP significantly decreased from 12.9 to 4.9% between 2008 and 2009 because of domestic energy price increase. Nevertheless, we should be careful in relating the decline in Mazout consumption to price change only as 2008-2009 was the period of the financial crises, which undoubtedly affected the real economy in Syria as it does for the rest of the world economies. Another reason that might contribute to the decline in Mazout consumption in 2008 and 2009 is the unprecedented deterioration in agricultural sector, which largely uses Mazout for irrigation.



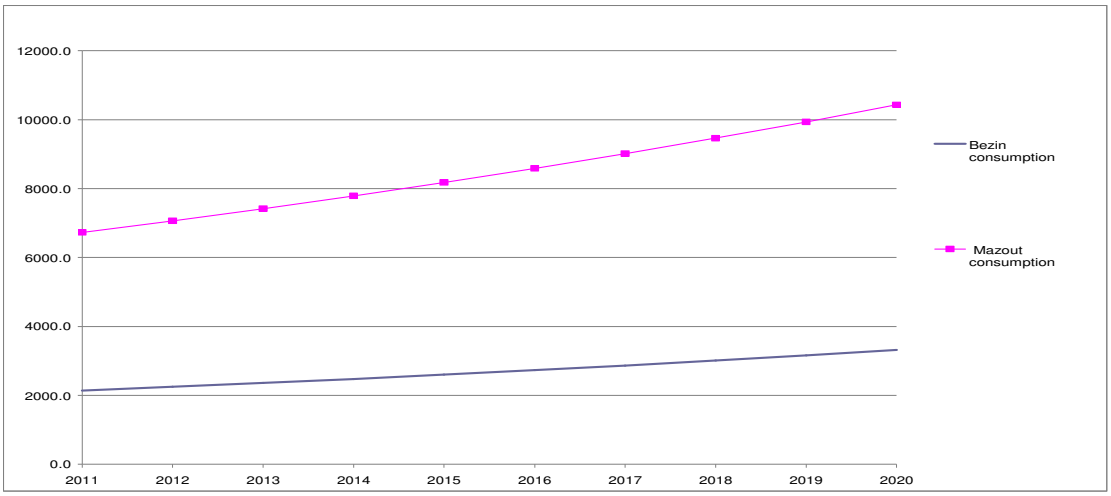
Graph (2): Mazout consumption (Millions of Liters)
Source: General establishment for fuel distribution in Syria (Mahrouqat)



Graph (3): Benzine Consumption (Millions of Litres)
Source: General establishment for fuel distribution in Syria (Mahrouqat).

In fact, the early decision to increase the fuel price in May 2008 was very controversial at first place. It created political and economical unrest as many factions of the Syrian population including business community, farmers and even some prominent political figures objected the decision. The background of the objection was that Syrian economy is not yet prepared for such huge lift of fuel subsidy and it might lead to regrettable consequences. This creates a considerable political pressure on Syrian government which responded by reducing the fuel price at the end of 2008 justifying the decision by world oil price fall

Graph (4) shows the forecasted consumption of Mazout and Benzine over the period 2011-2020 assuming that the demand of both would increase on a yearly average of 5%. This assumption is in line with the recommendation of (Mahrouqat) as it reflects the trend of demand on fuel in normal circumstances. It is also supported by the observations that agricultural sector activities in 2010 improved thanks to the weather conditions improvement and the activities of Agricultural Subsidy Fund (ASF) which started in 2010. This would eventually lead to higher demand on Mazout which is largely used for irrigation in agriculture sector[3]**.** In any case, our assumptions with regard to the future demand of Mazout and Benzine are made for simplification purposes and to facilitate the examination of the magnitude of revenues originated from fuel surcharge.



Graph (4): Forecasted consumptions of Mazout and Benzine (Millions of Litres)
Source: General establishment for fuel distribution in Syria (Mahrouqat).

Mazout and Benzine consumption in transport sector:

Estimating the total amount of fuel consumption in transport sector is a complex task as transport services are inputs for mostly all other economic activities. Unpublished reports from Mahrouqat estimate that 50% of total "Mazout" consumption is in transport sector (it is used to fill buses, tracks and lorries;), the other 50% is used in industry and agriculture sectors. Additionally, Mahrouqat estimates that 95% of the total Benzine

[3] **The political unrest that stormed Syria at the beginning of 2011 was expected to alter these forecasts however, the decision of the government in March 2011 to reduce the price of Mazout to 15 SYP per liter pushed up the consumption of Mazout according to the observations of " Mahrouqat".**

consumption is in transport sector; used as a fuel for taxies and other transport means such as motorbikes, the remaining 5% is used for different purposes in different sectors[4].

Applying the assumptions mentioned above on the forecasted figures of Mazout and Benzine we came out with table 4.

Table (4): Forecasted Mazout and Benzine consumption in transport sector (Million Liter)

Year	Mazout	Benzine
2011	3.363	2.033
2012	3.531	2.135
2013	3.707	2.241
2014	3.893	2.353
2015	4.087	2.471
2016	4.292	2.595
2017	4.506	2.724
2018	4.731	2.861
2019	4.968	3.004
2020	5.217	3.145

Source: Author's calculation based on "Mahrouqat" data.

Now, we need to calculate the expected revenues gained from imposing a surcharge of 10% on fuel prices. To do that we multiply the forecasted figures of fuel consumption (Mazout and Benzine) mentioned above with prices of one Litre of Mazout and Benzine after introducing the 10% increase. The recent price of non-subsided Mazout in 2011 is 15 SYP per litre, and the price of Benzine is 44 SYP per litre. So, if we assume that Syrian government imposed a surcharge of 10% on the price of both Mazout and Benzine (1.5 SYP per litre of Mazout and 4.4 SYP per litre on Benzine), then we will end up with table (5) that shows the total accumulated revenues expected from the 10% surcharge on fuel prices over the period 2011-2020 would be about 176 billion Syrian Pounds (column 4 of table 5). This amount account for about (33%) of the total accumulated capital expenditure (public sector gross fixed capital formation) (527 billion) needed to be allocated to transport sector over the same period. The figures in last column of table (5) are calculated based on the assumptions that overall real GDP (measured in 2008 prices) will grow at 7% yearly rate over 2011-2020 and public sector gross fixed capital formation accounts to 14% of the real GDP, 20% of which should be directed to fund transport sector investment activities[5] .

[4] For clarity and assurance purpose, we discussed these estimates with relevant stakeholders from public and private sectors including members of commerce and industry chambers, shipping and freighting experts, and an in-depth discussion with representatives Ministry of Transport. The outcomes of the consultation and discussion were in line with Mahrouqat assumptions.

[5] The assumptions and the results are abstracted from the World Bank unpublished mission report conducted in 2009 in cooperation with Ministry of Transport in Syria to help in upgrading the road network in Syria.

Table (5): Expected revenues from fuel surcharge on Mazout and Benzine consumption in Syria, (million SYP).

	Revenues from the surcharge on Mazout consumption	Revenues from the surcharge on Benzine consumption	Total revenues from the surcharge on fuel consumption	public sector gross fixed capital formation at transport sector
2011	5.044	8.945	13.989	38.146
2012	5.296	9.392	14.688	40. 817
2013	5.561	9.862	15.423	43. 674
2014	5.839	10.355	16.194	46.731
2015	6.131	10.872	17.003	50.002
2016	6.437	11.416	17.854	53.502
2017	6.759	11.987	18.746	57.247
2018	7.097	12.586	19.684	61.255
2019	7.452	13.216	20.668	65.543
2020	7.825	13.6876	21.701	70.131
total	63.442	112.507	175.949	527.047

Source: Author's calculation based on "Mahrouqat" data.

The impact of fuel consumption surcharge on Consumer Price Index (CPI)

This section aims to assess the expected impact of imposing a percentage surcharge on fuel consumption (10%) on the consumer price level in Syria.

Introducing a tax on fuel consumption usually has two impacts on prices level: the first impact is direct; a tax on fuel consumption would lead to higher transport costs, which is part of the consumer basket. The second impact is indirect; the increase of transport costs would normally result in an increase of production costs of other economic activities and in the prices of the products of these economic activities.

The direct and indirect impacts of the change of transport costs (through fuel consumption surcharge) on CPI can be measured by the following formula:

$$\Delta CPI = (\Delta TC \times WC_T \times (1 + \delta C/\delta P)) + (\Delta TC \times WP_T \times (1 + \delta CS/\delta P) \times WC_{NTI}) \quad (1)$$

where:

ΔCPI is the change in the Consumer Price Index

ΔTC is the change in transport costs

WC_T is the weight of the transportation in the consumption basket

$\delta C/\delta P$ is the elasticity of consumption of fuel to the change in the price of fuel

$\delta CS/\delta P$ is the elasticity of the cost structure of an economic sector to the change in the price of fuel

WP_T is the weight of transportation in the production cost of non-transportation sectors

WC_{NTI} is the weight of the non-transportation items in the consumption basket

As measuring elasticity of consumption of fuel to price change is a complex issue, we will use the following assumptions that will simplify the implementation of formula (1):

- The fuel consumption/price elasticity is zero; this is usually true, particularly when the price increase is small. Therefore, the weight of transportation costs in the CPI does not change;
- the income/fuel price elasticity is zero;
- the weight of transport costs in the output costs of each economic sector does not change with a relatively small increase in transport fuel prices;
- the impact of an increase in fuel prices in each economic sector is proportional to the importance of the sector in the Consumer Price Index
- the impact of fuel price increases is equal to the percentage increase in production costs consequent to the price increase, that is manufacturers do not use the fuel price increase as an excuse to make any additional price increases for their own products.

Applying the simplified assumptions to formula (1) leads to the following formula:

$$\Delta CPI = (\Delta TC \times WC_T) + (\Delta TC \times WP_T \times WC_{NTI}) \qquad (2)$$

As formula (2) shows, increasing fuel surcharge will have two impacts on CPI; the first one is direct and reflects the change in transport sector; the second one is indirect and reflects the impact of increasing fuel surcharge on the other sectors of economy.

To implement formula (2), we need to know the weights of economic sectors in the consumer basket in Syria; those are shown in Table 6. Additionally, we need to know the weight of transport costs in the total production costs of non - transport sectors.

Table (6): Contribution of economic sectors to the Consumer Price Index

Commodities	Weights
Food, beverages, and tobacco	44%
Cloths and shoes	8.5%
Housing inc: rent, utilities	22%
Furnishing, textile, and household appliances	6.1%
Health	6.2%
Transport	3.2%
Communication	2.7%
Leisure include recreation, culture, and restaurants	3.5%
Education	1%
Personal care and other products	2.7%

Source: Central Bureau of Statistics

As we know, the level of transport costs is significantly different across economic sectors therefore, we divide the economy into 6 sectors: **services** including education and health; **agriculture and fishing** including food, beverages and tobacco; **Construction** including housing and utilities; **Manufacturin**g including furnishing and cloth and shoes; **Communication**; and **wholesale and retail** including leisure, personal care and other items. Assessing the exact share of transport costs in total production costs in non-transport sectors is proven to be a hard task as there are differences across countries in cost

structure , and for Syria there is no reliable data available[6]. As such, we estimated the share of transport costs in production costs in six transport-intensive sectors including: agriculture and fishing, construction; wholesale and retail activities those are increasingly becoming transport dependent as production and consumption are separated; manufacturing, services and communications. [7] (see table 7).

Table (7) transport cost share to total production costs

Economic activity	Transportation cost	Weights in consumer basket
Agriculture and Fishing (AF)	15%	44%
Construction (C)	8%	22%
Manufacturing (M)	5%	14.6%
Communication (C)	2%	2.7%
Services (S)	3%	7.2%
Wholesale and Retail (WR)	6%	6.2%

Source: Author calcul

After deciding the weights and the percentages of transport costs, we calculate the impact of transport costs increase, assumed to be 10%, on the consumer price index, using formula (2), we first calculate the direct impact:

$$\Delta CPI = \Delta TC \times WC_T = 10\% \times 3.2\% = 0.32\% \qquad (3)$$

This means that the 10% increase in transport costs that results from imposing fuel consumption surcharge is expected to result in 0.32% increase in the CPI of Syria. Now, we calculate the indirect impact on CPI by using the following formula:

$$\Delta CPI = \Delta TC \times ((WP_T^{AF} \times WC_{AF}) + (WP_T^{C} \times WC_C) + (WP_T^{M} \times WC_M) + (WP_T^{C} \times WC_C) + (WP_T^{S} \times WC_S) + (WP_T^{WR} \times WC_{WR}))$$

$$\Delta CPI = 10\% (6.6\% + 1.76\% + 0.73\% + 0.054\% + 0.22\% + 0.37\%) = 10\% \times 9.74\% = 0.97\%. \qquad (4)$$

The total impact is (0.32%+0.97%) = 1.29%.

In conclusion, it seems that a ten per cent increase in transport costs through the imposition of 10% surcharge on fuel prices is expected to lead to 1.29% increase in the Consumer Price Index in Syria. This impact is modest as it does not create inflationary pressure on consumer basket prices on one hand and it generate revenues that may be allocated to enhance transport infrastructure on the other hang as it is discussed in previous section.

[6] This is a potential filed that worth further consideration by relevant agencies in Syria such as Ministries of Transport and Energy, and statistical and developmental agencies.

[7] These assumptions were discussed with public sector officials including Ministry of Transport and Mahrouqat and other agencies, and private sector representatives in chamber of commerce and industry. Overall, we received a positive feedbacks on the assumptions nevertheless, the possibility of bias does exits!

Conclusion and recommendation

Indeed, geographical location of Syria provides it with comparative advantages over its competitors. However, it seems that this location is not fully utilised yet. To do so, more attention to the transport sector should be paid by Syrian government; more capital should be allocated to improve and modernise the infrastructure of this sector. Outputs of transport sector are major inputs for other economic sectors. Therefore, we suggest that improving the quality of the services of this sector should be a focus point for modernising and expanding Syrian economy.

The concept of fuel surcharge on road users is proved to be a useful and efficient tool for mobilising necessary fund for road expansion and maintenance. International practices indicate that countries implemented the surcharge concept succeeded in mobilising sufficient capital to improve road networks. Syrian road network is deteriorating; heavy use of this network by car passengers and shipping Lorries and trucks took place in recent years. A huge fund is needed to maintain the current road network, and more funds are needed to expand and improve it. Taking into account the fact that sources of government budget in Syria are limited and constrained, establishing a road fund might be an option to generate revenues that can be used to finance road networks in Syria. This research concludes that imposing a 10% surcharge on fuel prices would generate incomes- about 176 billion Syrian Pounds over 10 years – equivalent to 33% of the public investment necessary for transport sector over the period span of 10 years.

Moreover, the outcomes of the paper suggest that the introduction of a 10% surcharge on fuel consumption would have a very little impact on the price level (1.29%). Nevertheless, we should be careful in interpreting our findings as they are based on simplified assumptions with regard to demand and supply price elasticity ratios and economic agents behaviour. Whereas in real world, factors such as the speculative behaviour of economic agents who overreact in response to policy and market changes, and the greediness of some of economic agents, in particular the producers and suppliers, who always attempt to transfer the burden of all prices changes into final consumers. All of that might alter our findings about the real effect of fuel price surcharge on overall prices. This alteration of results is particularly true in economies where market mechanism is by far immature and mostly characterised by monopolistic or oligopolistic behaviour. In these economies, any change in fuel prices, even it is tiny, would be interpreted in much bigger impact on final consumer prices as producers and suppliers of services and commodities have powerful influence on the market and they can easily transfer price changes burden into consumers. This would eventually harm the vulnerable groups of the society mostly the rural population and the low-income groups. Therefore, a carful assessment of the social, political and economical impacts of any fuel price changes is critical before implementing the changes so social and political distribution could be avoided. Experiences in many parts of the world particularly in developing countries indicate that fuel prices changes caused turbulences and instability because these changes harmfully affected vulnerable groups of the society as no social safety measures put in place to protect them in parallel with prices increase.

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