Is the elimination of food subsidies the right policy to address Lebanon's public finance crisis?

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Abstract

In this paper, we use a positional dominance approach to assess the desirability of eliminating food subsidies in Lebanon. The analysis is based on aggregate information from the 2004/2005 National Survey of Households Living Conditions. We use this aggregate information on expenditure patterns to reconstruct *rough* estimates of s-concentration curves and efficiency-cost ratio sets. Evidences suggest that the Lebanese government should probably find other avenues to reduce the fiscal deficit.

Keywords: Taxation, inequality, Lebanon
JEL Codes: H23, I31

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1 Introduction

Lebanon is currently facing its biggest fiscal crisis since its independence. Public debt now stands at more than 150% of GDP and will continue to rise if adjustment measures are not taken quickly. Until now, the government is in discussions with the International Monetary Fund to find a way out of this crisis and probably restructure its public debt. Among the suggested solutions, the elimination of certain consumer subsidies and some value-added tax (VAT) exemptions are considered.

Lebanon subsidizes flour, wheat, bread, and indirectly electricity.[1] There are VAT exemptions of non-processed food and diesel.[2] It is surprising that policies that would induce a sharp increase in the price of basic food items are even considered. Policymakers usually avoid such policies and typically look for policies that would mitigate the impact of increasing food prices. The rationale behind such hesitation can be found in Bellemare (2015). Using monthly data at the international level, Bellemare (2015) shows that rapid increases in food prices can explain the emergence of social conflict. This empirical evidence should be taken into account in the present policy discussions since ESCWA (2016) shows that a significant part of the Lebanese population suffers from food insecurity.[3]

In such a context, it is essential to look for alternative sources of public finance consolidation. The objective of this article is to propose some of these alternative avenues. We use partial information on surveys of consumer finances that we obtained from the Central Administration of Statistics of the Lebanese government and seek to identify indirect tax reforms that would improve any rank-dependent social welfare function that is averse to inequality. To do so, we adopt a positional dominance approach developed in Yitzhaki

[1] Allowing Électricité du Liban to run recurring deficits is akin to subsidize electricity.

[2] Health, real estate, educational, financial, insurance and banking services and the leasing of residential property are also exempt but we do not consider these expenditures in this short paper.

[3] ESCWA (2016) shows that 49% of the Lebanese reported being concerned about their ability to pay for enough food and 31% of the population reported not being able to eat enough nutritious food at all times.

and Slemrod (1991) and Makdissi and Mussard (2008). In addition, we adapt a method of Duclos, Makdissi and Wodon (2008) to this positional dominance framework, allowing for the identification of the maximum efficiency costs that would maintain the welfare increase of these reforms.

Our paper includes three contributions to the literature. The most important contribution of the paper is to provide a preliminary analysis of the potential redistributive impacts of eliminating food subsidies in Lebanon. In this regard, our paper relates to Salti and Chaaban (2010) who studied the impact on inequality and poverty of a rise in the VAT in Lebanon. Salti and Chaaban (2010) use an Almost Ideal Demand System as the econometric model for their analysis. In this paper, we offer a complementary type of analysis by not imposing any mathematical structure on the demand system. We also make a modest contribution to the methodological literature on two aspects. First, we propose a restricted dominance version of the positional dominance conditions of Makdissi and Mussard (2008). Second, we adopt the method of identifying sets of economic efficiency ratios proposed by Duclos, Makdissi and Wodon (2008) in a context of positional dominance.

The remaining of the paper is organized as follows. The next section describes the methodological framework. Section 3 presents the Lebanese fiscal context and some reforms that would increase social welfare in Lebanon. Finally, the last section presents a conclusion and avenues for future research.

2 Methodological framework

Assume that we have an economy with K consumer goods. Let q represent the vector of prices for these K goods and t represent the vector of taxes. In this framework, a subsidy on good k consists of a negative value of t_k. If we assume that producer prices are set to 1 and invariant to changes in taxes,[4] we have $q_k = 1 + t_k$. Assume that income, $y \in \Re^+$

[4]This assumption is reasonable in a small open economy.

is also invariant to changes in consumer prices. Since we are interested in price changing policies, the welfare indicator of interest will be real income $y^R = \rho(y, q, q^R)$ that gives the income required under a reference price vector q^R to yield the same consumer welfare than an income y under price vector q. We assume that this real income is distributed according to a cumulative distribution function F_Y.

When an analyst wants to assess the impact of a price changing policies on social welfare, there are three important measurement issues that needs to be overcome. First, one needs to estimate the impact of the price change on individual consumers. The second measurement challenge consists in choosing a social welfare function to measure the social impact of marginal tax reform. Finally, one needs to estimate the impact of a tax reform on government tax revenues. In addition to these usual issues, in the context of Lebanon, the raw survey data that researchers usually need to perform their analysis may not be accessible. In this section, we present and adapt methodologies developed by Yitzhaki and Slemrod (1991), Makdissi and Mussard (2008) and Duclos, Makdissi and Wodon (2008) to tackle the three measurement issues. In addition, we will explain how to use group data when the analyst does not have access to the survey data.

2.1 Estimating the impact of a price change on individual consumers

Estimating the impact of a tax reform on consumer welfare may be sensitive to a number of theoretical and econometric assumptions. This issue is very salient when one aims at finding a globally optimal tax system. However, as pointed out by Woodrow Wilson, "We shall deal with our economic system as it is and as it may be modified, not as it might be if we had a clean sheet of paper to write upon; and step by step we shall make it what it should be."[5] For this reason, in this paper, we follow Feldstein's (1976) suggestion and focus on marginal tax reforms. In such context, estimating the impact of a tax reform

[5]Quote from Feldstein (1976).

on an individual consumer does not require any assumption on the functional form of the Walrasian demands or utility function. It can be assessed from the observed data alone. Yitzhaki and Slemrod (1991) point out that, if one uses the actual price vector as a reference price vector, Roy's identity implies that

$$\left.\frac{\partial \rho(y,q,q^R)}{\partial t_k}\right|_{q=q^R} = -x_k\left(F_Y(y),q\right), \tag{1}$$

where $x_k(p,q) = \mathrm{E}[X_k|Y = F_Y^{-1}(p),q]$ is the expected consumption of good k at the income level corresponding to the pth quantile of the distribution of real income. In this context, the marginal average welfare cost of increasing the tax on good k on consumer is given by

$$X_k(q) = \int_0^1 x_k(p,q)\mathrm{d}p. \tag{2}$$

2.2 Choosing a social welfare function to measure of social impact of marginal tax reform

We assume a social planner with a rank-dependent social welfare function that is a functional of the marginal cumulative distribution of real income (or real total expenditures), F_Y:

$$W(F_Y) = \int_0^1 \omega(p)Q(p)\mathrm{d}p, \tag{3}$$

where $Q(p) = F_Y^{-1}(p)$ is the quantile function associated with F_Y and $\omega(p) \in \Re_+$ is a social weight function such as $\int_0^1 \omega(p)dp = 1$. In this context, $W(F_Y)$ can be seen as a weighted average of income levels. Since $\omega(p)$ is non-negative, this social welfare function obeys the ethical principle of *monotonicity* that stipulates that an increase of income of one person, everything being hold constant, should not be viewed negatively by the social planner. If in addition, we impose $\omega'(p) \leq 0$, the social welfare function obeys the *Pigou-Dalton transfer principle* that stipulates that a transfer from a richer to a poorer person, everything else being held constant, should not decrease social welfare. This principle is also referred to as *inequality aversion*. The widest class of rank-dependent social welfare functions, Ω^2, can

thus be defined as the set of all rank-dependent social welfare function obeying monotonicity and the Pigou-Dalton transfer principle.[6]

It is possible to impose more structure on the class of admissible social welfare functions. One additional restriction that we consider in this paper is the *principle of dual diminishing transfers* that stipulates that a progressive transfer is more valuable if it happens at lower socioeconomic ranks (see Mehran, 1976; Kakwani, 1980; Chateauneuf, Gajdos and Wilthien, 2002; and Makdissi and Mussard, 2008). This additional restriction implies that $\omega''(p) \geq 0$. The class of rank-dependent social welfare function obeying monotonicity, the Pigou-Dalton transfer principle and the principle of dual diminishing transfers is denoted by $\Omega^3 \subset \Omega^2$. This additional restriction may be useful when a tax reforms cannot be identified for all rank-dependent social welfare functions belonging to Ω^2.[7]

2.3 The impact of a marginal tax reform on government budget

Let us assume that we want the reform to be budget neutral. Alternatively, one may see this as a reallocation exercice of taxes once a government has decided on the size of per capita indirect tax revenue. Let $R(q) = \sum_{k=1}^{K} t_k X_k(q)$ be the actual indirect tax revenue. The impact of changing taxe rates on good j and ℓ is given by

$$dR(q) = \left[X_j(q) + \sum_{k=1}^{K} t_k \frac{\partial X_k(q)}{\partial t_j} \right] dt_j + \left[X_\ell(q) + \sum_{k=1}^{K} t_k \frac{\partial X_k(q)}{\partial t_\ell} \right] dt_\ell. \tag{4}$$

Assume that a policymaker wants to increase (decrease) the tax (subsidy) on good j in order to finance a decrease (increase) of the tax (subsidy) of good ℓ in a budget neutral framework. Budget neutrality implies $dR(q) = 0$. Under this assumption, reorganization of equation (4) yields

$$dt_j = -\gamma_{\ell j} \left(\frac{X_\ell(q)}{X_j(q)} \right) dt_\ell, \tag{5}$$

[6] Makdissi and Mussard (2008) give a formal definition of Ω^2. In addition to a non-positive first order derivative of the social weight function, they assume that this social weight function vanishes at $p = 1$, or mathematically, that $\omega(1) = 0$.

[7] In their formal definition of Ω^3, Makdissi and Mussard (2008) also assume that the derivative of the social weight function vanishes at $p = 1$, or mathematically, that $\omega'(1) = 0$.

where

$$\gamma_{\ell j} = \left(\frac{X_\ell(q) + \sum_{k=1}^{K} t_k \frac{\partial X_k(q)}{\partial t_\ell}}{X_\ell(q)} \right) \Bigg/ \left(\frac{X_j(q) + \sum_{k=1}^{K} t_k \frac{\partial X_k(q)}{\partial t_j}}{X_j(q)} \right). \tag{6}$$

The numerator in equation (7) gives the marginal tax revenue of a marginal increase of the tax on good ℓ per unit of average welfare cost of this price increase on consumers. Equivalently, it is the inverse of the marginal efficiency cost of public funds generated by taxing ℓ, $MEFC_\ell$. Similarly, the denominator represents the inverse of the marginal efficiency cost of public funds generated by taxing j, $MEFC_j$. The economic interpretation of $\gamma_{\ell j}$ is then the economic efficiency cost of taxing j relative to the economic cost of taxing ℓ:

$$\gamma_{\ell j} = \frac{MECF_j}{MECF_\ell}. \tag{7}$$

2.4 Identifying socially improving tax reforms

The identification of socially improving tax reforms can be achieved through comparisons of concentration curves. The canonical concentration curve of good k, also referred as the second order concentration curve, is defined as

$$C_k^2(p) = \int_0^p x_k(u, q) \mathrm{d}u. \tag{8}$$

Makdissi and Mussard (2008) also define the 3rd order concentration curve of good k as

$$C_k^3(p) = \int_0^p C_k^2(u) \mathrm{d}u. \tag{9}$$

Following Yitzhaki and Slemrod (1991) and Makdissi and Mussard (2008), one can identify a tax reform that increases social welfare for all rank-dependent social welfare function in Ω^s ($s \in \{2, 3\}$) by increasing marginally the tax on good j to decrease marginally the tax on good ℓ if and only if

$$C_\ell^s(p) - \gamma_{\ell j} C_j^s(p) \geq 0 \quad \forall p \in [0, 1]. \tag{10}$$

There is an intuitive interpretation of the above result if one focuses on the second order. The value of the second order concentration curve at rank p is the cumulative expenditures for all rank below p. Since all inequality averse social weight functions are decreasing in ranks, a potential loss at one social rank can be compensated by a gain at a lower rank. In such context, it makes sense to check if there is a cumulative gain of the reform at each rank.

Inspection of equation (10) indicates that the dominance result is contingent to a given value of the ratio of the marginal efficiency cost of public funds, $\gamma_{\ell j}$. Any estimate of this ratio is contingent to strong econometric assumptions on the structure of the demand system. In order to avoid relying on such strong assumptions, in Section 2.5, we build on Duclos, Makdissi and Wodon (2008) and propose a method to identify sets of values of $\gamma_{\ell j}$ that are compatible with a dominance result. To identify these sets, it is useful to lay out a restricted dominance result. Assume that we want to consider a subset of social weight functions $\Omega^s(p^*) \subset \Omega^s$ $(s \in \{2,3\})$ that includes only rank-dependent social welfare functions having social weight functions imposing a social weight of 0 for social ranks $p \geq p^*$. Building on Makdissi and Mussard (2008)[8], one can easily show that a tax reform that marginally increases the tax on good j to decrease marginally the tax on good ℓ increases social welfare for all rank-dependent social welfare function in $\Omega^s(p^*)$ $(s \in \{2,3\})$ if and only if

$$C^s_\ell(p) - \gamma_{\ell j} C^s_j(p) \geq 0 \quad \forall p \in [0, p^*]. \tag{11}$$

Although it may seem arbitrary to apply restricted dominance, it is worth mentioning that if p^* is high enough, the results obtained are more general than in a poverty analysis context.

[8]The results is obtained directly from equation (22) in Makdissi and Mussard (2008) and the assumption that social weight of 0 for social ranks $p \geq p^*$.

2.5 Identifying sets of efficiency ratios compatible with a socially improving tax reform

Let us define a function $\delta^s_{\ell j}(p) = C^s_\ell(p)/C^s_j(p)$. Duclos, Makdissi and Wodon (2008) interpret $\delta_{\ell j}(p)$ as the distributive benefit of taxing good j instead of taxing good ℓ. Using this new function, one can rewrite equation (11) as

$$\delta^s_{\ell j}(p) \geq \gamma_{\ell j} \quad \forall p \in [0, p^*]. \tag{12}$$

Equation (12) yields to an interesting economic interpretation of the dominance result. Since $\delta_{\ell j}(p)$ is the distributive benefit of taxing good j instead of taxing good ℓ and since $\gamma_{\ell j}$ represents the economic efficiency cost of taxing j relative to the economic cost of taxing ℓ, equation (12) can be interpreted as imposing that the distributive benefit of the tax reform should exceed its economic efficiency cost for all income ranks in $[0, p^*]$.

Let us now define a maximum efficiency ratio, $\gamma^s_{\ell j}(p^*)$, that will give us an upper limit to the set of efficiency ratios compatible with a socially improving tax reform. Using equation (12), one can identify this upper limit as

$$\gamma^s_{\ell j}(p^*) = \inf\{\delta^s_{\ell j}(p) \,|p \in [0, p^*]\} \tag{13}$$

Using this upper limit, one can assess that a tax reform that marginally increases the tax on good j to decrease marginally the tax on good ℓ increases social welfare for all rank-dependent social welfare functions in $\Omega^s(p^*)$ ($s \in \{2, 3\}$) and for all values of $\gamma_{\ell j} \in [0, \gamma^s_{\ell j}(p*)]$.

2.6 Identifying *potential* socially improving tax reform with group data

As we mention earlier, in some cases, researchers do not have access to household survey data. If one does not have access to the data but has access to average expenditures for income groups, it is still possible to identify *potential* socially improving tax reforms. We use the term *potential* to highlight the fact that any evidence based policy recommendation

should be made using the complete data set and applying the appropriate statistical inference techniques. Assume that one has access only to average consumption by predefined income groups. Assume that we have G ordered income groups, each one with their average income y_g and average consumption of goods $x_k(g)$. Assume that each group represents a proportion w_g of the total population. If we define $p_0 = 0$, one can identify the interval of social ranks that is covered by each group as:

$$[p_{g-1}, p_g] = \left[\sum_{i=1}^{g-1} w_i, \sum_{i=1}^{g} w_i\right] \tag{14}$$

One can still get an approximation of the concentration curves using the following expressions:

$$C_k^2(p_g) = \frac{1}{X_k(q)} \sum_{i=1}^{G} \mathbb{1}(y_i \leq y_g) w_i x_k(i), \tag{15}$$

$$C_k^3(p_g) = \frac{1}{X_k(q)} \sum_{i=1}^{G} \mathbb{1}(y_i \leq y_g) \frac{p_g - p_i}{2} w_i x_k(i). \tag{16}$$

The values of $C_k^s(p)$ for $p \in (p_{g-1}, p_g)$ are then obtained by simple linear interpolation.

3 *Potential* socially improving tax and subsidy reforms in Lebanon

The Central Administration of Statistics has given us some excel files with information on expenditures by income groups based on the 2004/2005 National Survey of Households Living Conditions (NSHLC) of Lebanon.[9] In this section, we use this partial information to perform our analysis. The NSHLC is a cross-sectional survey that is representative at both national and mohafaza levels. This survey is the result of a joint effort from the Central Administration of Statistics and Capacity Building for Poverty Reduction: a Ministry of Social Affairs-UNDP project. It monitors housing conditions, access to basic services and income-related indicators and consumption at the household level. The survey is composed

[9] In order to validate the information contained in the many excel files, we have cross-validated their computed averages in one file using proportions in other excel files. To our best of our knowledge, the numbers seem accurate or at least consistent with one another.

of a sample of 13,003 households, which equates to 56,000 individuals. Expenditure data were collected from a sub-sample of 7,431 observations that can be assumed to be fairly representative at national and mohafaza levels. It is worth noting that the data represent the status of households in Lebanon as of 2004/2005. The information is dated from 15 years. Many consumer goods, such as intelligent mobile phone, were not common back then. The war of 2006 between Israel and Lebanon and the Syrian civil war happened since then. This last event has changed substantially the demographics of the country with a very large influx of Syrian refugees. The results should be interpreted with care. However, for the main consumption categories analyzed in this section, the results are still a good starting point to start a policy discussion.

Lebanon has a VAT of 11% on consumption goods. It also has a system of subsidies on energy and food. Electricity benefits from direct cash transfers to Électricité Du Liban allowing it to run with recurring deficits. This implies that electricity is implicitly subsidized. There is also a VAT exemption on diesel. This VAT exemption is applied to all use of diesel. One of this use is transportation but other important usages are diesel based housing heating and private electricity generators that sell electricity to consumers when Électricité du Liban cuts the delivery.[10] In 2007/2008, following the international food price crisis, the government of Lebanon reintroduced subsidies on wheat, bread and flour. As we write these lines, the Government of Lebanon is planning to restructure its public debt and there are discussion to eliminate many of these subsidies, including those on food. Although the authors of this paper agree that it would be desirable to move from consumption subsidies to real means-tested social transfer programs and a progressive income taxation system, such move cannot be efficiently implemented before reviewing the governance structure of the public sector of the country.[11] Until a good governance structure is imposed on the

[10]To this date, Électricité du Liban has never been able to provide a 24 hours of service of electricity per day. Each Lebanese household has to buy part of its electricity from a private diesel electricity generator.

[11]The country's economy is essentially a crony capitalist economy where politicians and some en-

public sector allowing for the efficient implementation of means-tested direct cash transfers, at least food subsidies should be maintained since an important proportion of the Lebanese population suffers from food insecurity. The objective of the analysis presented in this section is to identify some avenues for tax/subsidy reforms that would allow keeping subsidizing food at a given public budget level by identifying tax sources to finance these subsidies.

In the partial data we have, there is a category for expenditures on bread and cereals. We compare this category of expenditure with expenditures on fuels and lubricants for personal transportation. Figure 1 displays the second order concentration curve of these two categories of expenditures. Since we don't have access to the raw survey data, we cannot estimate a demand system for Lebanon. Instead, we estimate the upper bounds of sets of admissible efficiency ratios for a tax reform that increases the tax on fuels and lubricants for personal transportation to increase the subsidy on bread and cereals.

In order to estimate upper bounds for the efficiency ratio at the second order, one needs to set a value for p^*, the maximum social rank of interest for the policymaker. We will only use one value of that threshold: $p^* = 0.9$. This choice is motivated by the fact that Assouad (2019) shows that average income growth was -2% over the period from 2005 to 2014. During the same period, the incomes of the upper decile increased substantially. In addition, Assouad (2019) shows that 57.1% of all incomes in Lebanon is held by this top decile and 23.4% is held by the top percentile. Using this value of $p^* = 0.9$, we find an upper bound is $\gamma^2_{\ell j}(0.9) = 1.19$. This means that a tax reforms that increases the tax on fuels and lubricants for personal transportation and uses the proceeds to subsidize bread and cereals would increase social welfare for any rank-dependent social welfare function belonging to $\Omega^2(0.9)$ and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.19]$. At the third order, the two upper bounds of interest are $\gamma^3_{\ell j}(0.9) = 2.01$ and $\gamma^3_{\ell j}(1) = 1.72$. A tax reforms that increases the

trepreneurs work hand in hand to extract rents rather than engage in activities that promote economic growth. For more details on this issue, the reader can refer to Diwan and Haidar (2019).

tax on fuels and lubricants for personal transportation and uses the proceeds to subsidize bread and cereals would then increase social welfare for any rank-dependent social welfare function belonging to $\Omega^3(0.9)$ and all economic efficiency ratios $\gamma_{\ell j} \in [0, 2.01]$ or for any rank-dependent social welfare function belonging to Ω^3 and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.72]$. Just to get an idea of the values one can get when estimating these efficiency ratios from an econometric demand system, we refer to Duclos, Makdissi and Araar (2014) who have estimated an efficiency ratio when transportation cost are taxed to subsidize food with an econometric model of a demand system for Mexico.[12] The value of their estimated efficiency ratio is $\widehat{\gamma}_{\ell j} = 1.04$ which is way below the upper bounds of all our set of admissible efficiency ratios. In conclusion, eliminating VAT on diesel and increasing the taxation on fuels and lubricants for personal transportation would be welfare improving if an important part of the proceed is used to maintain subsidies that impact on the price of bread and cereals. In addition, a higher tax rate on these fuels has a double dividend component since it will deter polluting activities.

Before turning to the analysis of other tax reforms, let us discuss briefly the values of efficiency ratios. As mentioned earlier, Duclos, Makdissi and Araar (2014) have estimated all these ratios in the context of a Mexican demand system. Just to get a grasp of the potential values of all efficiency ratios, all the values Duclos, Makdissi and Araar (2014) do not exceed 1.201.

Let us now consider an alternative reform. If one wants to protect the food security of the population, a subsidy on all non-processed food categories (Bread and cereals, Meat, Fish and Seafood, Milk and Cheese, Oils and Fats, Fruits, Vegetables) may be introduced by taxing transportation costs or increasing the VAT on all other expenditures categories. Let us first look at transportation costs. The concentration curves of the expenditures on

[12] It would have been interesting to get a similar value from Salti and Chaaban (2010). Unfortunately, they do not consider this ratio in their paper and the information on their price-elasticity alone did not allow us to compute this value.

non-processed food and transportation cost curves are displayed in Figure 2. The estimated upper bounds of sets of admissible efficiency ratio for a tax reform that increases the tax on fuels and lubricants for personal transportation $\gamma^2_{\ell j}(0.9) = 1.40$, $\gamma^3_{\ell j}(0.9) = 2.17$ and $\gamma^3_{\ell j}(1) = 1.90$. Increasing the taxation of transportation costs to finance a subsidy on non-processed foods would be socially improving for all social welfare function belonging to $\Omega^2(0.9)$ and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.40]$, for all social welfare function belonging to $\Omega^3(0.9)$ and all economic efficiency ratios $\gamma_{\ell j} \in [0, 2.17]$, and all social welfare function belonging to Ω^3 and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.90]$. However, one may worried that the level of per capita expenditures on transportation costs is only 72.5% of the per capita expenditures level on non-processed food. In this context, it may put too much fiscal pressure on this consumption category. In order to address this issue, we have also investigated the possibility of increasing taxation on all other expenditures to finance a subsidy on expenditures on non-processed food. The concentration curves are displayed in Figure 3. For this comparisons, the estimated upper bounds of sets of admissible efficiency ratio for a tax reform that increases the tax on fuels and lubricants for personal transportation $\gamma^2_{\ell j}(0.9) = 1.21$, $\gamma^3_{\ell j}(0.9) = 1.42$ and $\gamma^3_{\ell j}(1) = 1.36$. This reform would be socially improving for all social welfare function belonging to $\Omega^2(0.9)$ and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.21]$, for all social welfare function belonging to $\Omega^3(0.9)$ and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.42]$, and all social welfare function belonging to Ω^3 and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.36]$.

Finally, we consider the possibility of increasing more the taxation on fuel and lubricant for private vehicles to reduce the increase of the general VAT. In order to get an idea of the desirability of this proposition, we consider a reform that would increase the tax on fuel and lubricant for private vehicles (and eliminating the VAT exemption on diesel) and use the proceeds to reduce taxation on all other expenditures. One can also see this as a way to

reduce the burden of the previously mentioned reforms. Second order concentration curves for these expenditures are displayed in Figure 4. There would not be a socially improving tax reforms at the second order since the concentration curves cross at higher socioeconomic ranks. However, dominance results can be obtained if one only considers social welfare functions obeying the principle of dual diminishing transfers. Third order concentration curves for these expenditures are displayed in Figure 5. Since these curves do not cross, we estimate the upper bounds of the sets of admissible efficiency ratios and get $\gamma^3_{\ell j}(0.9) = 1.39$ and $\gamma^3_{\ell j}(1) = 1.25$. This indicates that increasing taxation on fuel and lubricant for private vehicles (and eliminating VAT exemption on diesel) would be socially improving for all social welfare function belonging to $\Omega^3(0.9)$ and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.39]$, and all social welfare function belonging to Ω^3 and all economic efficiency ratios $\gamma_{\ell j} \in [0, 1.25]$.

4 Conclusion

In this short article, we have explored some avenues of tax reform that could improve social welfare for wide classes of rank-dependent social welfare functions. These result are robust to the assumptions on the econometric demand system, the chosen social welfare function and large sets of economic efficiency ratios. The implication is that one cannot obtain the opposite results under any reasonable assumptions using the same data. These preliminary analyses should help policymakers seeking solutions to the current fiscal crisis. The results show that these policymakers should be reluctant to eliminate food subsidies and should even consider extending these subsidies to other food categories. These subsidies could be financed entirely by raising VAT, eliminating the VAT exemption on diesel and imposing a surcharge on energy used in motor vehicles.

It is important to remain cautious about the analytical results of this article being based on partial data. Policy recommendations should eventually be based on an analysis of the

survey microdata available to the government. Policymakers should also consider developing a microsimulation model using these microdata that would allow them to study the potential distributional impacts of their current and future reforms. Our recommendation to use food subsidy is linked with the context where no progressive taxation and means tested transfer programs exist. We strongly believe that once the Lebanese government has solved its governance issues, it would be desirable to have a redistributive policy based on a progressive taxation of income and direct means-tested programs. The analysis of Assouad (2019) indicates that there is a large source of unexploited government revenue if one imposes very high income tax rates at the top of the income distribution in Lebanon. Ultimately, redistribution through indirect taxation and subsidies should only play a marginal role in redistribution.

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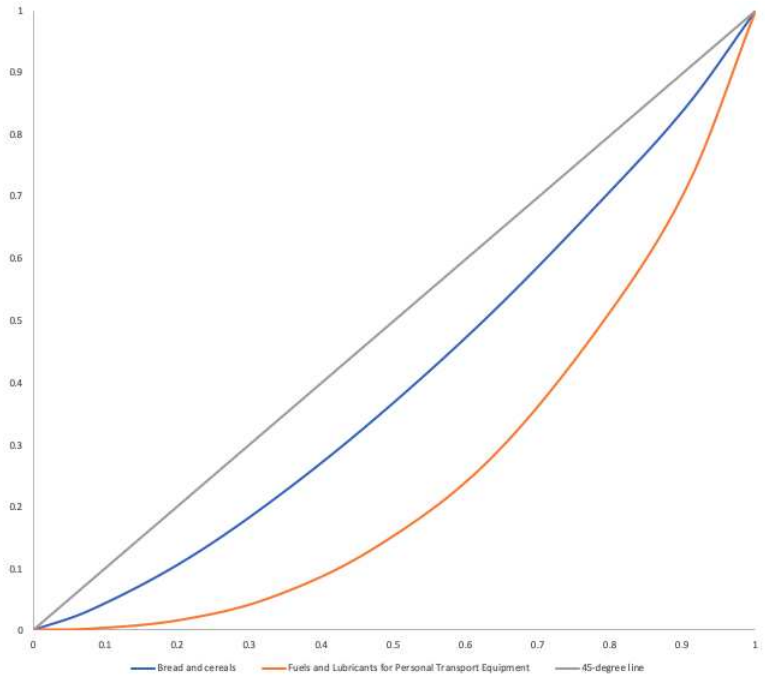

Figure 1: Bread and cereals vs fuels and lubricants for personal transportation

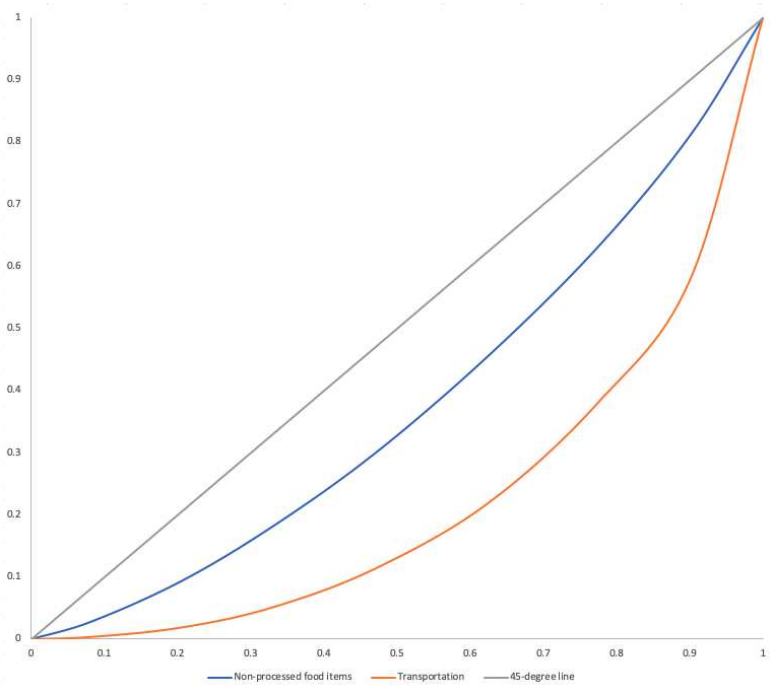

Figure 2: Non-processed foods vs transportation costs

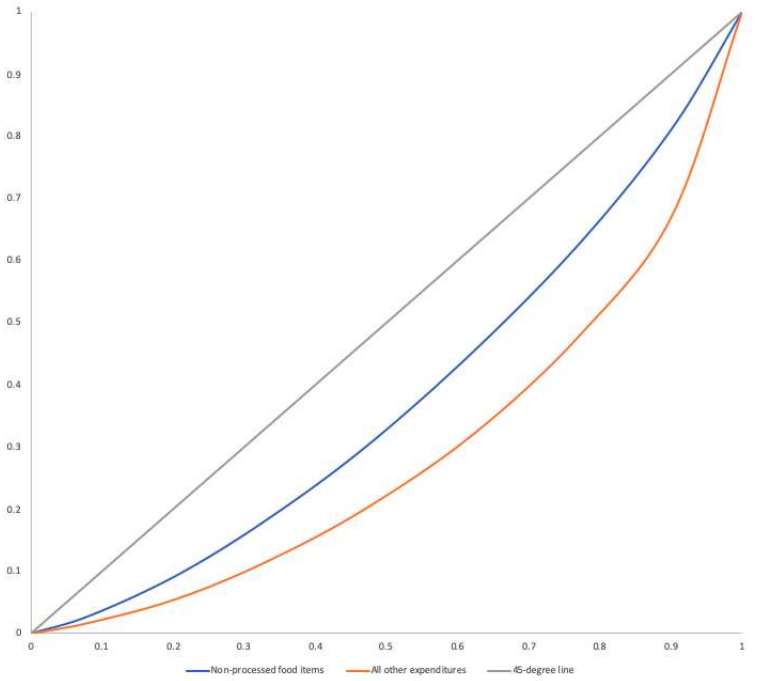

Figure 3: Non-processed foods vs all other expenditures

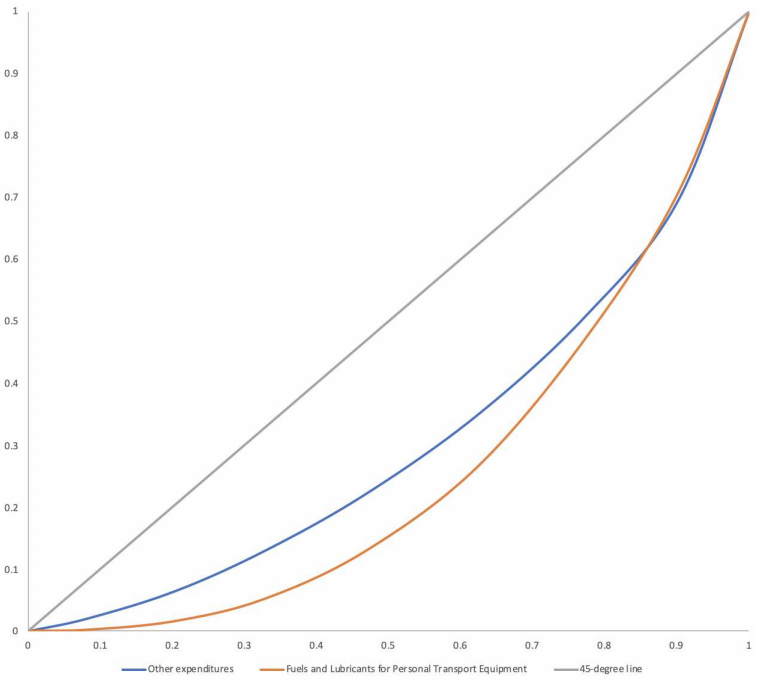

Figure 4: Expenditures on fuel for private vehicles vs all other expenditures

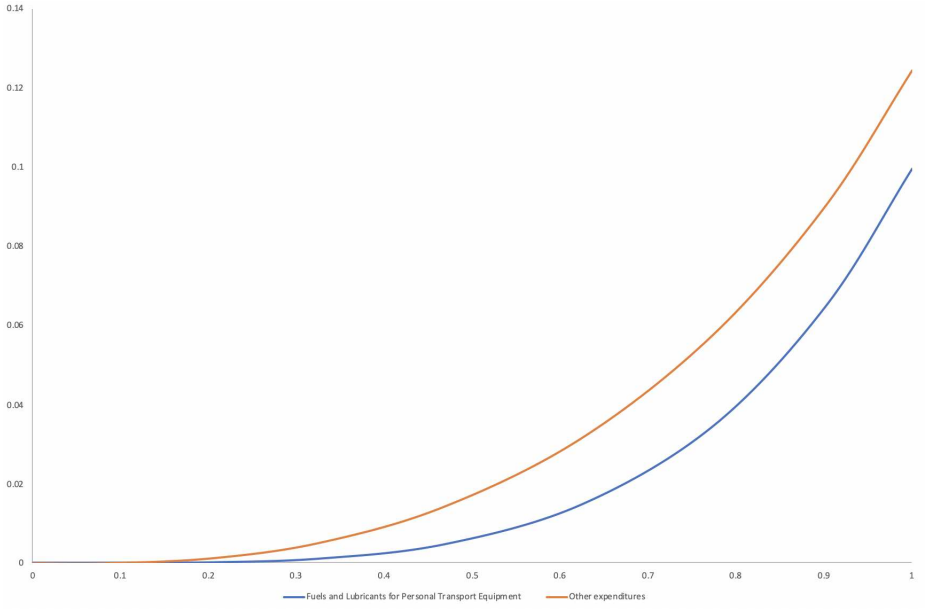

Figure 5: Expenditures on fuel for private vehicles vs all other expenditures