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THE POVERTY AND EQUITY IMPLICATIONS
OF A RISE IN THE VALUE ADDED TAX:
A MICROECONOMIC SIMULATION
FOR LEBANON

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Abstract

This paper examines the impact of a rise in the Value Added Tax (VAT) on poverty and inequality in Lebanon. To this end, the paper develops an empirical model based on consumer demand theory and uses only household survey data on expenditures and spatial price indexes. The simulation results — using an Almost Ideal Demand System — show that the projected VAT rate increases will have a limited impact on extreme poverty, due to the mostly progressive nature of current exemptions. However, overall poverty will be significantly affected, as households just above the national poverty line may fall into poverty as a result.

ملخص

تدرس هذه الورقة تأثير ارتفاع ضريبةالقيمةالمضافة على معدل الفقر وعدم المساواة في لبنان ولهذا الغرض تضع هذه الورقة نموذجاً تجريبيا يقوم على نظرية متطلبات العميل وتستخدم فقط بيانات مسح منزلي على المصروفات ومؤشرات الأسعار المكانية. وتبين نتائج المحاكاة التي تستخدم نظام الطلب شبه المثالي (AIDS) تبين أن المعدل المتوقع لزيادة ضريبة القيمة المضافة سيكون له تأثير محدود على معدل الفقر المدقع بسبب الطبيعة التصاعدية للإعفاءات الحالية. وعلى أية حال فإن المعدل الإجمالي للفقر سيتأثر بشكل ذي بال لأن الأسر التي فوق خط الفقر المحلي ربما لإنحدرت إلي الفقر بسب زيادة معدلات الفقر

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1. Introduction

The introduction of the Value-Added Tax (VAT) in Lebanon has been hailed as a public finance success. The relative ease of accounting, implementation and collection of the VAT are some of the main reasons behind its popularity and its adoption in more than 130 countries today and in Lebanon since 2002. The VAT is widely used in countries of the Middle East and North Africa (MENA) region. The principal rates for Morocco (20%), Tunisia (17%), and Turkey (16%) are higher than other countries (Algeria 14%, Lebanon, Egypt and Jordan 10%), (Jalali-Naini, 2000). Revenue yield for each percentage of the principal rate is the highest (0.44) in Algeria (Handy, 1998). By 2004, VAT receipts constituted 23.6% of total tax revenue in Lebanon, and around 5.1% of GDP in 2005.

In January of 2007 and as part of the reform package presented at the Paris III Conference on Assistance to Lebanon, the Lebanese government proposed to increase the VAT rate from its current 10% to 12% in 2008, and 15% in 2010. The tax increase comes in the context of a general agenda of fiscal discipline adopted by the Lebanese government and in an effort to redress the budget deficit from the revenue cuts that resulted from trade liberalization measures that the government had passed. After the skyrocketing post-civil war debt and trade and fiscal reforms since the early 1990s (Lucke, Soto and Zotti, 2007), the analysis in this paper is especially timely now that the Lebanese government has decided, because of the economic hardship faced by the Lebanese population more recently, to postpone its projected increases in the VAT until after 2009. This paper aims at estimating the incidence of such an increase in the tax rate and at measuring the degree of regressivity or progressivity of this policy, by examining the first order effects of the tax increase on households' real consumption. The distributional implications of the projected increase in the VAT rate are of paramount importance to anyone interested in studying the welfare effect of the proposed reforms.

This paper develops a simple tool to analyze the change in VAT rate using only household survey data on expenditures and a few price indexes. It uses spatial price variation to estimate an Almost Ideal Demand System (AIDS). This tool should be readily replicable in any context where such data is available, and in particular in the many MENA countries that have already adopted a VAT. Moreover, the paper can be seen as a contribution to the scarce literature on the incidence of VAT, particularly in developing countries. The rest of the paper is organized as follows: Section 2 provides an overview of the literature on the incidence of VAT; Section 3 details our empirical methodology, where the demand model is introduced and linked with the available household survey data. Section 3 also presents the incidence analysis results and an examination of the regressivity of VAT exemptions; and Section 4 concludes with some policy recommendations.

2. Incidence Analysis of Value Added Tax: What Have we Learned so Far?

The effectiveness of VAT in raising public revenues has been praised since its introduction almost fifty years ago. Keen (2007) argues that this simple, non-distortionary, indirect tax has proved itself as a 'money-making machine', with over 130 countries having adopted it as of 2007. Yet research on the impact of VAT as a special kind of indirect tax on poverty and income distribution has been very scarce and mostly inconclusive. Chapter 1 in World Bank (2003) reviews empirical studies on the incidence of VAT and other indirect taxes in some African and Asian countries. Most studies find tax structures in these countries to be progressive, as most goods consumed by the poor are zero-rated. Yet the evidence from India and Pakistan reveals that a single-rate VAT system is highly regressive.

More recently, Gemmell and Morrissey (2005) review available evidence on the effects of various taxes, and hence of tax structure reform, on income distribution and the poor in developing countries. They find that taxes on exports and goods consumed especially by the poor (e.g. kerosene) are those most consistently found to be regressive, whereas taxes on 'luxury' items such as cars, beverages and alcohol are the most likely to be progressive. They also note that sales taxes are slightly more progressive, or less regressive, than taxes on imports.

Prieto-Rodriguez, Romano-Jordan and Sanz-Sanz (2005) use an AIDS model to identify the welfare effects of a VAT cut on cultural goods and find that the potential gains might be regressive. We use a similar methodology, but we resort to spatial differences in prices to identify the parameters in our AIDS model.

A recent paper that focuses explicitly on the distributional impact of VAT reform is Newhouse and Zakharova (2007), take on the latest VAT reform in the Philippines and evaluate alternative methods which were introduced to mitigate the effects of the reform on poor households. Using household survey data and welfare quintiles incidence analysis, they find that the VAT reform was progressive and relatively well targeted. The average gross reduction in household consumption following an increase in the VAT rate from 10% to 12% was estimated at 2.5%. Households in the bottom quintile incurred a 2.4% reduction in real consumption, while households in the top quintile lost 2.7%. Their finding was consistent with the consumption patterns of poor households in the Philippines, who tend to rely more on unprocessed agricultural products that are exempt from the VAT. They also find that mitigating social protection measures reduced the adverse impact of the VAT reform for all households, yet a sizable amount of the benefit accrued to high-income households.

To date, there are no studies that examine the distributional impacts of VAT reform in Arab countries, and this paper is a first attempt to fill this gap.

3. Empirical Analysis

Our empirical strategy for simulating the impact of a rise in VAT on poverty and inequality relies primarily on a survey of household living conditions and on a set of price indexes. We use a partial equilibrium framework where an increase in indirect taxes affects households' consumption expenditure, which translates into welfare losses and a potential increase in poverty. In particular, we make use of the detailed expenditure data collected in the expenditure module of the 2004 Household Living Conditions Survey for Lebanon to estimate the characteristics of demand and spending for different household expenditure categories. The approach is centered on using regional variation in price indexes across Mohafazas (provinces) — as individual price data are missing — to estimate demand elasticities and cross-price elasticities of demand. In the absence of individualized price data, we are able to identify both own and cross price elasticities for each of the categories of goods and services as long as the number n of Mohafazas with varying price indexes is such that $n(n-1)$ exceeds by more than 1 the number of categories of goods and services.

In the single tax rate environment of the Lebanese VAT, once we have estimated price elasticities of demand, we can simulate the effect on quantity demanded and on household spending of the proposed increase in the tax rate from 10% to 12% and eventually to 15%. We can thus calculate concentration indexes to evaluate the incidence of this increase in the tax rate and to determine the degree of progressivity or regressivity of this policy. Furthermore, our estimates of demand and spending elasticities will address the question about the equity of the current exemptions of the VAT and allow us to make recommendations on the most effective set of exemptions for redressing the regressive impact of the VAT.

3.1 Data and Empirical Strategy

The data for our study is drawn from the latest available household survey in Lebanon, conducted in 2004/2005. The 2004/2005 Multi Purpose Survey (MPS) was administered by the public statistical agency (Central Authority of Statistics). The sample design was nationally representative and the sample size was large enough to allow for inferences at governorate levels. Four survey forms were used in the MPS, two daily expenditure forms, other expenditure forms and "household characteristics and living conditions" form. Data on household characteristics and living conditions was collected from 13,003 households, while expenditure data was collected from a sub-sample of 7,431 households. In diary questionnaires, the main respondent as well as every household member above 15 years of age reported all expenditures which occurred during two weeks. Expenditure of non-food items was collected for the previous three months or the previous year depending on the type of commodity. Due to data secrecy constraints, individual prices and quantities were not made available to researchers, however total expenditure per each consumption category was available. Also, Paasche price indexes for each of the 6 Mohafazas and for each major food and non-food expenditure category were made available. In our empirical model below, we present a simple technique for dealing with this limited price information, by relying on spatial price variations to estimate demand parameters.

The consumer demand model we estimate is the AIDS (Almost Ideal Demand System) which was developed by Deaton and Muellbauer (1980) and has since become one of the most popular demand systems in the economic literature. It constitutes a practical way of modeling expenditures with several commodities and satisfies basic economic assumptions on consumer behavior. It is also simple and straightforward to estimate.[1]

Utility maximization by the representative consumer yields the following share equations:

$$w_i = \alpha_i + \sum_k \gamma_{ik} \, \log p_{ik} + \beta_i \log(E/P^T). \qquad\qquad 1$$

The share of demand for good i, denoted w_i, is a function of the price of all other goods (p_{ik}), and also a function of total expenditure divided by an overall price index: E/P^T. The Tornqvist (or Paashe) price index P^T typically involves all prices, and it can be computed as a weighted price index using the shares in total demand of the goods as weights.

A set of restrictions are imposed in equation (1), relating to consistency with consumer theory. First, coefficients for cross-price effects should be symmetric across equations; and second, total expenditure should vary in the same proportion as a uniform change in all prices (homogeneity in prices):

$$\gamma_{ik} = \gamma_{ki} \quad \forall i,k$$

$$\sum_i \alpha_i = 1 \ \forall i, \quad \sum_k \gamma_{ik} = 0 \ \forall i.$$

Based on the demand parameter estimates, we can compute own-price and cross-price elasticities between commodity groups according to the following definitions (Green and Alston, 1990):

The Marshallian own-price elasticity — measuring the change in the quantity demanded for good i resulting from a change in its own price — is defined as follows:

$$\varepsilon_{ii} = -1 + \gamma_{ii}/w_i - \beta_i$$

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[1] For recent applications of the AIDS model, see Deaton (1990) and Chaaban and Thomas (2007).

The second is the Marshallian cross-price elasticity, measuring the change in the quantity demanded for good i resulting from a change in the price of a different good k:

$$\varepsilon_{ik} = \gamma_{ik} / w_i - \beta_i \left(w_k / w_i \right)$$

The third and last one concerns the expenditure elasticity, i.e., the percent change in total demand for good i when total expenditure on all goods changes:

$$\theta_i = 1 + \beta_i / w_i$$

The own-price and cross-price elasticities are the central objects of our empirical analysis. With the former, we can predict the change in the quantity demanded for any given commodity following a VAT increase. With the latter, it is possible to assess the degree of substitution patterns among consumption goods and services as their price changes following the indirect tax reform.

The above demand elasticities can be used to compute the change in real consumption expenditure following an increase in VAT. The impact of the varying household welfare aggregate (here consumption expenditure) can then be traced on poverty incidence and inequality. This methodology follows Newhouse and Zakharova (2007), by focusing only on the first-order effects of the price changes on household welfare. Yet unlike Newhouse and Zakharova, our model incorporates potential consumption adjustments by households through our cross-price effects. However, we abstract from the potential impact of the VAT increases on final prices through firms' input adjustment, and from potential feedback effects through the government's budget. The effects of increasing the tax should therefore be viewed as an upper bound to the welfare changes brought about by rising prices.

Table 1 below presents the main consumption categories in the data, as shares of total household expenditure. The shares are reported by household expenditure quintiles, ranked from the poorest to the richest quintile.

Overall, food has the highest spending category (27%), followed by transport and then communication spending. The share of the household budget spent on food declines with wealth, as the poorest 20% of the Lebanese population spend 35% of their budget on food while the richest 20% spend only 19%. Transport expenditure has a high share among the poor (almost 30% of the household budget) while the share of communication spending increases with wealth (Figure 1).

3.2 Estimation of Demand Parameters

The estimation of a demand system with all consumption categories is impossible, as the number of parameters to be estimated increases exponentially with product groups. Therefore, we aggregate the household expenditure categories into the following ones: 1) Food and Alcohol; 2) Housing and Clothing; 3) Health and Education; 4) Transport and Communication and 5) Recreational and other.

The full system of equations to be estimated is the following one:

$$w_{iF} = \alpha_{0F} + \beta_{FF} \log p_{iF} + \beta_{FH} \log p_{iH} + \beta_{FT} \log p_{iT} + \beta_{FR} \log p_{iR} + \gamma_{1F} \log(E_t / P_t^T) \qquad (2)$$

$$w_{iH} = \alpha_{0H} + \beta_{HH} \log p_{iH} + \beta_{HF} \log p_{iF} + \beta_{HT} \log p_{iT} + \beta_{HR} \log p_{iR} + \gamma_{1H} \log(E_t / P_t^T)$$

$$w_{iT} = \alpha_{0T} + \beta_{TT} \log p_{iT} + \beta_{TF} \log p_{iF} + \beta_{TH} \log p_{iH} + \beta_{TR} \log p_{iR} + \gamma_{1T} \log(E_t / P_t^T)$$

$$w_{iR} = \alpha_{0R} + \beta_{RR} \log p_{iR} + \beta_{RF} \log p_{iF} + \beta_{RH} \log p_{iH} + \beta_{RT} \log p_{iT} + \gamma_{1R} \log(E_t / P_t^T)$$

Where F, H, T and R denote respectively the 4 major categories; (1) Food and Alcohol; 2) Housing and Clothing; 4) Transport and Communication and 5) Recreational and other). Note

that category 3 (Health and Education) is not in the system above, as the parameters for its demand equation can be recovered post-estimation. This leads to 24 parameters to be estimated. Paasche spatial price indexes for each category were constructed and used as dependent variables.

The proxy for the income effect — here real total expenditure (E/P^T) — is clearly an endogenous variable, and this might seriously affect the quality of the parameter estimates. For this, we use average expenditure by regional strata as a proxy for expenditure. As we have 15 regional strata in the data, we aggregate household real expenditure by strata and average it out across strata residents. This proxy ensures exogeneity of the expenditure proxy.

The system of share equations is estimated by the well-known Zellner SURE (Seemingly UnRelated Equations) method, imposing the linear homogeneity and symmetry conditions on parameters. The estimates are obtained through STATA and detailed in the Appendix. The Appendix presents estimation results for each consumption category, where we report goodness-of-fit statistical measures and parameter estimates for the four share equations. Results show that the AIDS model performs satisfactorily, as parameters associated with price indexes are in the majority of cases significantly different from zero.

Table 2 presents the demand elasticities computed based on parameter estimates. All own-price elasticities have the expected negative sign with plausible magnitudes, and the total expenditure elasticity is positive for all product categories.

3.3 Incidence Analysis of the Increase in VAT

In this section we simulate the impact of the proposed VAT increases in Lebanon, stipulated to move from 10% to 12% and then to 15%. The simple methodology for the incidence analysis of these increases is summarized as follows: the impact of rising prices is first mapped onto households' consumption expenditure through the demand elasticities estimated above. Then, the distributional impact of varying consumption expenditure levels is analyzed by computing simple inequality measures (quintile ratios) and expenditure concentration curves. Also, the new levels of consumption are compared against the national poverty line to compute the incidence of poverty. The national money-metric poverty lines are obtained from El-Laithy et al. (2008), and the simulations incorporate the current exemptions in the Lebanese VAT system (see below).

Figure 2 summarizes the impact on real consumption expenditure of the rise in VAT by household expenditure quintiles, under the two scenarios. It is noticed that the 2 percent increase in VAT results in almost 11% decrease in the consumption expenditure of the poorest households, and nearly 19% decrease in that of the richest ones. Increasing the VAT to 15% results in a much larger decline in the real consumption expenditure of all households, yet the decrease is higher for the rich than the poor. This shows that the current VAT system is slightly progressive.

How do the figures above compare with those of Newhouse and Zakharova (2007), who evaluate a similar case for the Philippines' increase in the VAT rate from 10% to 12%? In the Philippines' case, the reduction in households' real consumption was not greater than 2.5%, with households in the poorest quintile only losing 2.4% of their consumption. This is much smaller than the reduction simulated above for the case of Lebanon (11% decline in real consumption of the poorest households). The reason for this difference is that spending on exempted food categories in the Philippines constitutes as much as 64% of the consumption of poor households; while in Lebanon overall spending on food does not exceed 35% of the poor's total spending.

Table 3 below, details the inequality implications of the rise in VAT; the share of the poorest households in total consumption hardly varies, while the share of the richest households

decreases slightly. This is a direct implication of the larger decline in the consumption expenditure of the richer households. Inequality, measured by the simple ratio of richest 20% of households to poorest 20%, slightly declines.

The small decline in inequality can also be seen by examining concentration curves for households' consumption expenditure. These curves plot the share of consumption against households' consumption rank. The concentration curve in Figure 3 shifts slightly inwards and closer to the perfect equality line (45° line) as a result of the VAT increase to 15%.

We now turn to examining the incidence of the rising VAT rate on poverty. We use two poverty lines as benchmarks: the lower poverty line is set at 2.4 USD per person per day, which is comparable to a food poverty line. The upper poverty line (food and non-food basic needs) is set at 4 USD per person per day (El-Laithy et al., 2008). The poverty lines indicate the level of consumption expenditure for each individual which is required to keep him/her out of poverty. The current lower poverty rate is 8%, and it increases to 10% if the VAT rate is set at 12%. If the VAT is increased to 15% (Table 4), lower poverty rates further rise to 16%. Upper poverty incidence is estimated at 28%, and rises to 35% and 47% as the VAT rate is increased to 12% and 15% respectively.

These simulations show that a slight increase in VAT has a somewhat limited impact on extreme poverty in Lebanon, yet the impact on overall poverty is significant. Increasing VAT to 15% translates into a significant rise in both extreme and overall poverty rates, with the overall poverty headcount ratio approaching 50% of the population. This deterioration in economic living conditions is mostly due to the impact of the rising VAT on the lower middle class (second and third quintiles), as households currently just above the poverty line risk falling into poverty as prices increase.[2]

The somewhat limited impact of price rises on extreme poverty could be a reflection of a potential positive effect of the current VAT exemptions. If products exempted from the tax constitute a large share of the consumption of the poorest households, then raising the VAT rate will have limited impact on these categories. This is tackled in the next section.

3.4 Equity Analysis of the Current Exemptions

The current VAT law in Lebanon, as enacted in 2002, has many goods and services that are exempted from the tax (Table 5). The list contains items that are commonly considered to be consumed mostly by the poor (e.g. basic food commodities, education and health); but some goods and services included in the exemption list raise some concern. These include precious metals and jewelry, yachts, air transportation, and gambling.

To further examine the equity of these exemptions and how well they target the poor, we compute from the household survey data the share of each main exemption category in households' total expenditure. If this share is higher for poorer households than it is for richer households, then the exemption can be considered well-targeted, i.e. somewhat progressive. Table 6 presents the main consumption expenditure groups for which we have identified data in the survey. Spending on exempted categories was aggregated for each household, and then the average share of exempted expenditure was computed by household welfare quintiles. Spending on exempted food items represents on average almost 14% of overall households' budget, with a share much higher for the poorest 20% (almost 18% of spending) than the richest ones (9.2%).

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[2] A word of caution is due here: these simulated changes in poverty are only an upper limit, as our partial equilibrium framework focuses only on demand-induced consumption changes and ignores economy-wide effects.

Figure 4 plots the share of spending on the exempted goods and services by expenditure quintiles. Food exemptions appear to be progressive, as the share of households' budget spent on exempted food items declines as households get richer. The butane and collective transport exemptions are also somewhat progressive, while the education and books spending category is highly regressive. This is a direct implication of higher spending of richer Lebanese households on private education. Spending on health, which is significant for all households (almost 7% of their budget), does not appear to change much with households' welfare status. Exempted luxury and air transport categories are obviously highly regressive, although constituting a small share of overall consumption (0.2%).

Our findings regarding the regressivity of some exempted categories echo those of Gibson (1998) for the case of Papua New Guinea. The paper uses a technique similar to the one presented above, where the "distributional characteristic" of each good is defined as a measure of how heavily its consumption is concentrated among the poor. Gibson argues that instead of removing existing distortions by virtue of being a uniform consumption tax, the VAT will introduce new distortions through the proposed "merit good" exemptions: on financial services, health and educational services and public road transport. Using data from the 1996 Papua New Guinea Household Survey, Gibson also finds that the proposed exemptions rank lower than other items for which consumption is concentrated among the poor, including axes, bush-knives, and garden tools; school fees and children's clothing; pots and pans; salt, rice and tinned fish.

4. Conclusion and Policy Implications

This paper has developed a simple methodology for estimating the poverty and inequality implications of a uniform increase in the VAT. The methodology makes use of a system of demand equations to estimate the price transmission effects on households' consumption expenditure. These effects are evaluated through own and cross-price demand elasticities, which allow for consumption adjustments following price changes. The impact of the varying household welfare aggregate is then traced on poverty and inequality incidence, by comparing consumption welfare losses against national money-metric poverty lines. The main contribution of our empirical methodology is that it allows researchers and policymakers interested in indirect tax incidence analysis to apply a simple demand framework on household survey data, and at the same time deal with missing price information by incorporating spatial price indices.

Turning to the simulation results of the planned VAT reform in Lebanon, our methodology allowed simulating the impact of the various planned rate increases, assuming that the current list of exempted goods and services remains unchanged. Our results show that the 2 percentage point increase in the VAT results in a decrease in the consumption expenditure of the poorest households of almost 11%, and a decrease of nearly 19% for the richest ones. Furthermore, increasing the VAT to 15% results in a much larger decline in the real consumption expenditure of all households, yet the decrease is higher for the rich than the poor. This shows that the current VAT system is slightly progressive, as it impacts the poor less than the rich; yet the effects of raising the VAT rate on overall real consumption remain high.

Our simulations also show that a slight increase in the VAT has a somewhat limited impact on extreme poverty in Lebanon, yet the impact on overall poverty is significant. Increasing VAT to 15% translates into a significant rise in both extreme and overall poverty rates, with the overall poverty headcount ratio approaching 50% of the population. This deterioration in economic living conditions is mostly due to the impact of the rising prices on the lower middle class, because households currently living just above the poverty line risk falling into poverty as prices increase following the increase in VAT.

Concerning current VAT exemptions, we have evaluated the various zero-rated goods and services by considering the share of each consumption category among the overall consumption of the poor. Results show that food and butane exemptions are well targeted, while jewelry and air transport are not. Although the education exemption is regressive — as spending on education is much higher for richer than poorer households, reflecting the impact of private educational spending — it is advisable in the short term not to remove this exemption. Increasing the cost of private education in a country such as Lebanon which relies heavily on human capital is highly problematic.

In a nutshell, our results show that increasing the VAT from 10 to 12% in Lebanon will have a limited impact on the very poor, because current exemptions (especially on food and butane) are well targeted. However, these tax rate increases will have major negative impacts on the welfare of the middle class and households living just above the poverty line. Overall poverty in Lebanon, currently evaluated at almost 30% of the population, might increase to 35 and even 50% as the VAT rate is raised to 12 and 15%. Although these estimates are an upper limit on the true poverty changes, they are still cause for concern. Our recommendations are therefore not to increase the VAT rate under the current circumstances, unless concrete mitigating measures targeting the poor and vulnerable are enacted (such as conditional cash transfers and higher and more effective social spending). We also recommend that luxury items be eliminated from the exemption list, and exploring more effective strategies to reduce the cost of expenditure categories that bear heavily on the poor (such as transport costs).

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Figure 1: Evolution of Household Expenditure Shares by Quintiles
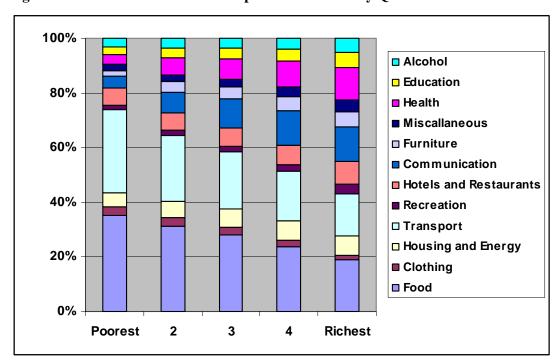

Figure 2: Impact of the Rise in VAT on Household Real Consumption Expenditure, by Quintiles (percentage change from initial)
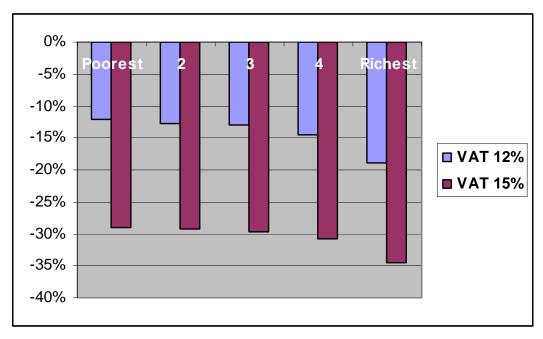
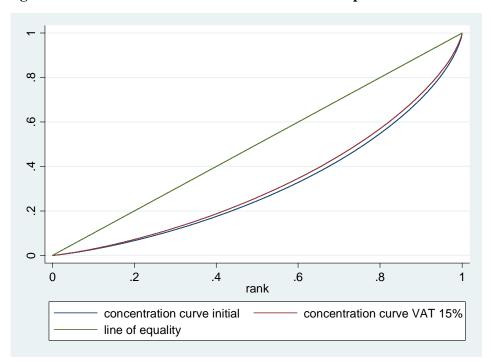**Figure 3: Concentration curves for household consumption**

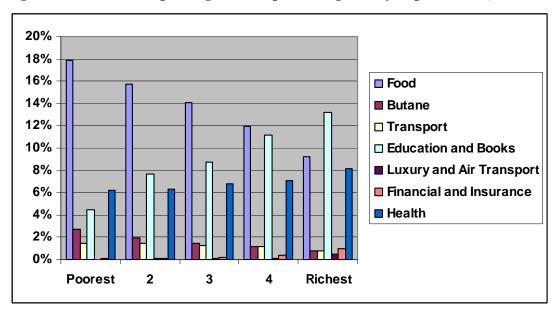**Figure 4: Evolution of Spending on Exempted Categories by Expenditure Quintiles**

Table 1: Household Expenditure Shares by Expenditure Quintiles

	Poorest	2	3	4	Richest	Overall
Food	35	31	28	24	19	27
Clothing	3	3	3	2	2	3
Housing and Energy	5	6	7	7	7	6
Transport	30	24	21	18	16	22
Recreation	2	2	2	2	3	2
Hotels and Restaurants	6	6	7	7	8	7
Communication	4	8	10	13	13	10
Furniture	2	4	4	5	5	4
Miscellaneous	3	3	3	3	4	3
Health	3	6	7	10	12	8
Education	3	3	4	4	6	4
Alcohol	3	4	4	4	5	4
	100	100	100	100	100	100

Source: 2004/2005 Household Survey

Table 2: Own, Cross-Price and Income Elasticities

	Food and Alcohol	House and Clothing	Health and Education	Transport and Communication	Recreational and other
Food and Alcohol	-5.48	-0.36	4.44	2.15	7.25
House and Clothing	-0.59	-2.12	3.63	1.32	-0.21
Health and Education	2.16	1.27	-5.84	-2.86	-2.47
Transport and Communication	2.34	-0.08	-2.65	-4.73	-4.89
Recreational and other	0.43	0.40	-1.49	-0.18	-0.95
Expenditure	*1.14*	*0.88*	*0.11*	*1.51*	*0.51*

Table 3: Inequality Measures

	Status quo	VAT at 12%	VAT at 15%
Share of consumption, poorest 20% (%)	9.6%	10.0%	10.0%
Share of consumption, richest 20% (%)	39.3%	37.7%	37.7%
Ratio of richest 20% to poorest 20%	4.1	3.78	3.77

Table 4: The Impact of Raising VAT on Poverty Headcount Ratios

	Lower Poverty Line	Upper Poverty Line
Current poverty rate	8%	28%
Increase VAT to 12%	10%	35%
Increase VAT to 15%	16%	47%

Table 5: List of VAT-exempted Products and Services in Lebanon

Goods:
• Livestock, poultries, live fish and agricultural alimentary products sold in their raw state;
• Bread, flour, meat and fish, milk and yogurt and their derivatives, rice, bulgur, sugar, cooking salt, vegetable oil, macaroni and all different kinds of pasta and baby's food;
• Books, magazines, newspapers, paper and paperboard of a kind used for writing and printing, newsprints in rolls or sheets, printing ink;
• Postal and fiscal stamps and paper money;
• Gas for household consumption (butane);
• Seeds, fertilizers, feeds and agricultural pesticides;
• Agricultural machinery;
• Medicines, drugs and pharmaceutical products including those used for health and pharmaceutical purposes;
• Medical tools, installations and equipment;
• Precious and semi-precious stones, precious and semi-precious stones destined for mounting or renewed, pearls, diamonds, gold, silver and other precious metals.
• Negotiable money in paper or coins.
• Yachts and other excursion or sports sailboats with a length exceeding 15 meters that are only owned by non-Lebanese.
• Means of air transportation used for persons and goods.

Services:
• Services offered by physicians or persons performing a medical activity, and hospital fees;
• Education;
• Insurance and reinsurance, and medical coverage provided by mutual assistance fund and employers and related services;
• Banking and financial services;
• Non-profit organizations and the activities performed for non-profit purposes;
• Collective transport of persons, including transport by taxicabs;
• Supply of gold to the Central Bank;
• Betting, lotteries and other forms of gambling;
• Sale of built properties;
• Residential letting of built properties;
• Farmer's activities concerning the supply of their agricultural production.

Source: Ministry of Finance

Table 6: Share of Exempted Goods and Services Consumption by Quintile *(percent of household total expenditure)*

Exempted Category	Poorest	2	3	4	Richest	*Overall*
Food Items	17.9%	15.7%	14.1%	12.0%	9.2%	*13.8%*
Butane	2.7%	1.9%	1.4%	1.1%	0.7%	*1.6%*
Collective Transport	1.4%	1.5%	1.3%	1.1%	0.8%	*1.2%*
Education and Books	4.5%	7.6%	8.7%	11.2%	13.2%	*9.0%*
Luxury and Air Transport	0.0%	0.1%	0.1%	0.1%	0.5%	*0.2%*
Financial and Insurance	0.1%	0.1%	0.2%	0.4%	1.0%	*0.4%*
Health	6.2%	6.3%	6.8%	7.1%	8.2%	*6.9%*

Appendix: Demand Estimation Results

Estimation Results

	Equation	Obs	RMSE	R-sq	chi$_2$	P
Food and Alcohol	s_foodal	32417	0.111315	0.0792	3548.34	0
House and Clothing	s_housecl	32417	0.1296	0.0346	1047.85	0
Transport and Communication	s_transcom	32417	0.105341	0.0556	1660.68	0
Recreational and other	s_recmi	32417	0.061972	0.026	1184.26	0

Sample Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
s_foodal	0.268258	0.116007	0.006526	0.816737
s_housecl	0.367622	0.131904	0.039676	0.982924
s_transcom	0.138999	0.108397	0	0.809579
s_recmi	0.088939	0.062794	0	0.646085
p_foodal	0.961192	0.047303	0.890113	1.015316
p_housecl	0.980963	0.047663	0.898796	1.058135
p_transcom	0.995088	0.011569	0.981591	1.009964
p_recmi	0.897851	0.148686	0.732887	1.096635

Parameter Estimation Results

s_foodal	Parameter	Std. Error	z-value	P>z
p_foodal	-1.19225	0.029543	-40.36	0
p_house	-0.1442	0.017842	-8.08	0
p_transcom	0.633376	0.042356	14.95	0
p_recmi	0.117595	0.00887	13.26	0
expn	0.036315	0.002481	14.64	0
_cons	0.180979	0.049622	3.65	0

s_housecl	Parameter	Std. Error	z-value	P>z
p_foodal	-0.1442	0.017842	-8.08	0
p_house	-0.42629	0.022941	-18.58	0
p_transcom	-0.03467	0.062583	-0.55	0.58
p_recmi	0.144774	0.008251	17.55	0
expn	-0.04423	0.002512	-17.6	0
_cons	1.606954	0.063603	25.27	0

s_transcom	Parameter	Std. Error	z-value	P>z
p_foodal	0.633376	0.042356	14.95	0
p_house	-0.03467	0.062583	-0.55	0.58
p_transcom	-0.44114	0.258868	-1.7	0.088
p_recmi	0.00057	0.023677	0.02	0.981
expn	-0.04356	0.002337	-18.64	0
_cons	0.768971	0.192173	4	0

s_recmi	Parameter	Std. Error	z-value	P>z
p_foodal	0.117595	0.00887	13.26	0
p_house	0.144774	0.008251	17.55	0
p_transcom	0.00057	0.023677	0.02	0.981
p_recmi	-0.03748	0.00429	-8.74	0
expn	0.017	0.001229	13.84	0
_cons	-0.4321	0.027182	-15.9	0