

# Household Expenditure On Cigarettes and Tobacco in Syria

Ahmad Alachkar (email: aa398@kent.ac.uk) \*

December 2008

## Abstract

The study uses average data from Household Income and Expenditure Survey 2004 in Syria to examine monthly household expenditure on cigarettes and tobacco and its relationships with a group of socioeconomic variables. It is found that this expenditure increases by average household income. This increase, however, is relatively small; the percent of total expenditure allocated to smoking is much higher among the poor compared to the rich. Expenditure on smoking is negatively affected by the improvements in educational conditions. Household expenditure on domestic cigarettes does not vary by household income; it is positively correlated with characteristics of the place of residence, particularly with illiteracy, polygamy; and negatively with developed educational structure. Expenditure on foreign cigarettes is spread mostly in governorate centers and among rich households. The study deduces that people with low income cannot smoke unless they decrease their monthly expenditure on basic requirements. In order to decrease smoking, two recommendations are made, developing the educational structure and eradicating illiteracy and launching concentrated campaigns to raise awareness against smoking.

**KEYWORDS:** Household Economics; Social policy; Poverty.

**JEL CLASSIFICATION:** C21, D12.

**Acknowledgements:** I would like to thank Roger Vickerman, Jagjit Chadha and all the staff of Economics Department at the University of Kent for their valuable help.

---

\* Visiting Scholar at Department of Economics, University of Kent, Canterbury, UK,  
email: aa398@kent.ac.uk;

Professor of Economics, Faculty of Economics, University of Aleppo, Syria

# **Household Expenditure On Cigarettes and Tobacco in Syria**

## **1. Introduction**

In smoking households, household expenditure on cigarettes and tobacco (HECT) usually comprises an important percent of total household expenditure (THE). It lays a great burden on household budget. Smoking also bears great health danger and harm to individuals. Tobacco consumption is considered as the major behavioral risk factor for many health problems, including cancer, heart and respiratory diseases, dealing with which is burdensome and expensive for households and society. For example, in the USA society, Sturm (2002) found that current or ever smoking is associated with an average increase in costs for inpatient and ambulatory care of about \$230 per year. In relative terms, current or past smoking increases service costs 21 percent and medications costs 28–30 percent. On the other hand, tobacco production and distribution might be considered as an important branch of agriculture as well as industry and might contribute to the economy through its contributions to employment, incomes and tax revenues. See Wang (2006).

Some people argue that smoking is a living enjoyment such as food and beverages. Some smokers can bear hunger but cannot bear quitting smoking. Smokers increase smoking in happy as well as in unhappy occasions. The question here is whether expenditure on smoking participates in enhancing household wellbeing, or it is an unjustified expenditure. If the second case is true, then expenditure on smoking, drawn from total household expenditure, would negatively affect wellbeing of household through crowding out expenditure on other household requirements.

Many studies have addressed this crowding-out effect of smoking. Wang, Sindelar and Busch (2006) in a study on China report the following: “In these Chinese rural areas that we studied, expenditures on tobacco occur at the expense of education, medical care, insurance, and investment in farming. The crowd-out of these

expenditures through tobacco consumption could have negative impacts on the well-being of individuals and families, as well as the economy as a whole through reduced investment in human capital and farming.” Hu et al (2005) in a study on China also find out “a clear reduction in spending on other goods in smoking households.” They conclude that “if households stopped buying cigarettes and spent the money on other goods instead, households could improve their overall standard of living. This is especially true for poor households.”

Rijo (2008) in a study on India finds out that “tobacco consuming households had lower consumption of certain commodities such as milk, education, clean fuels and entertainment which may have more direct bearing on women and children. Tobacco spending was also found to have negative effects on per capita nutrition intake. The nature of crowding out was found to be similar in low- and high-income households.” Another study on India by Rijo and John (2005) concludes that “apart from the economic gains that tobacco industry is generating, tobacco use also imposes burden, especially on users, in the form of numerous tobacco related diseases and high health care spending. This has the potential to trap the poor in a vicious circle of poverty and ill health.”

While agreed on smoking health and economic prejudices, studies, however, differ as to whether smoking is similarly or differently spread among the poor and the rich. This question is expected to find different answers in different countries. With regard to expenditure, however, one would expect, that in higher income households people consume better sorts of cigarettes and tobacco and, hence, pay higher prices. As Ventura and Satorra (1998) suggest expenditure on smoking in higher income households will be higher than in low income households. Nevertheless, the percent of total household expenditure allocated to smoking is expected to be higher among the poorer households. Hu et al (2005), for example, found that “low income households in China bought much lower priced cigarettes than high income households. Lower income households also smoked fewer cigarettes than high income households, especially in rural households. However, given their relatively low income, households under the poverty level allocated a higher percent of their

income for cigarettes than did non-poor households.” On the other hand, Rijo and John (2005) found that “the consumption of tobacco in India is more among the poor and that the consequent higher health care spending arising out of tobacco related diseases leaves them economically worse off”.

In this article we study monthly HECT in Syria and examine its relationship with a group of socioeconomic variables, such as THE, the educational structure in the place of residence, etc. We also examine the impact of HECT on household standard of living, especially for poorer households. Our main concern is to clarify whether smoking has a negative effect on the living standard of the poor. This concern accords with the development strategy in the Tenth Five Year Plan oriented at enhancing the living standard of all the people, and particularly the poor. It also accords with the efforts of the Syrian Government to achieve the MDG related to alleviating poverty in the country. See State Planning Commission (2005).

## **2. The data**

The study makes use of data from Income and Household Survey 2003-2004, conducted by the Central Bureau of Statistics in Syria. The sample consists of 29787 households in 14 governorates and in three places of residence, governorate center, other urban and rural areas. The data include important information on different socio-economic aspects of living in the sampled households. Given that Damascus has only governorate center, Rural Damascus does not have governorate center, and Alqunaitra Governorate has only rural areas, available data on each variable insure average values in 37 observations by places of residence, in addition to average values in 14 observations by governorates.

The income Survey data were claimed to be inaccurate and hence unpublished. See Duchene et al (2007). Therefore, we shall consider THE as a proxy variable for household income. In fact, THE has often been used by economists as a substitute to household income. Moreover, it is argued that consumption is a better indicator of the wellbeing of households than income. See, for example, Fan et al (2008).

## **A. Total household expenditure**

The average monthly THE is 21048 pounds. See Table 1. Given that the average number of individuals in household is 5.82 persons, the monthly per capita expenditure will be 3616 pounds. By governorates, the largest value of THE is in Damascus governorate, the smallest in Alsuaida governorate. By general places of residence, its largest value is in governorate center, the smallest in rural areas of governorate. 41% of THE in the average is allocated to food.

According to the level of THE in the sample we are interested in two groups of households, the relatively poor with THE less or equal to 10000 pounds and the relatively rich with THE higher than 35000 pounds. The first group constitutes 17.57% of total households and the second 11.96%. The percent of each group, however, varies by places of residence. The percent is 12%, 14% and 23% in governorate centers, other urban and rural areas respectively for the relatively poor, and 17%, 10% and 8% respectively for the relatively rich. Thus, the relatively poor are concentrated in rural areas; and the relatively rich in governorate centers.

In another households' distribution by the level of THE, we distinguish between 10 equal number expenditure deciles. THE in the 10<sup>th</sup> decile is around 10 times of that in the first decile. See Table 2. The lower monthly poverty line was 1458 pounds for an individual and 8486 pounds for a household. See UNDP (2005). This would leave 11.4% of the population in absolute poverty. The largest percent of poverty was found in Aleppo Governorate (20%) and in Alraqqa Governorate (17.6%); the smallest in Damascus and in Deir Elzour Governorates (4.7%). 62% of the absolutely poor resided in rural areas. Gini Coefficient for the equity of income distribution increased from 0.33 to 0.37 during the last few years.

## **B. Household expenditure on cigarettes and tobacco**

Average monthly HECT is 411 pounds. Although not all households spend on cigarettes and tobacco, this expenditure is higher than household expenditures on a number of food stuffs such as beef (249 pounds), milk (139 pounds), eggs (139

pounds), etc. HECT constitutes 2% of THE. This percent is quite sensible compared to that of expenditure on other household requirements. However, this percent is not large in international comparisons. In a sample of households in China, for example, Wang, Sindelar and Busch (2006) found that HECT constituted 6.5% of THE.

By governorates, the largest average HECT is found in Aleppo and Alraqqa governorates, the most absolutely poor; the smallest in Alsuida governorate, the least in average THE. Average HECT varies by places of residence. It is 432 in governorate center, 373 in other urban and 404 in rural areas. These variations, however, are relatively smaller than that of THE. The percent of THE allocated to HECT also varies by places of residence.

By expenditure deciles, as THE increases HECT increases and the percent of THE allocated to HECT decreases. See Figure 1.

### **C. Household expenditure on varieties of cigarettes and tobacco**

Original data on HECT distinguish between 7 varieties of cigarettes and tobacco. However, except for domestic and foreign cigarettes, household expenditure on all other varieties is very small. See Table 1. Therefore, in addition to HECT, we will study only household expenditure on domestic cigarettes (HEDC) and household expenditure on foreign cigarettes (HEFC).

Average monthly HEDC is 270 pounds (219 in governorate center, 257 in other urban and 318 in rural areas). By governorates, this expenditure attains its maximum value in Alraqqa Governorate and its minimum value in Damascus Governorate. Variations of average HEDC by expenditure deciles are limited; this expenditure is 205 pounds in the first decile and only 290 pounds in the 10<sup>th</sup>. Furthermore, HEDC does not increase continually from one decile to another.

Average monthly HEFC is 133 pounds (208 in governorate center, 110 in other urban areas and 78 in rural areas). Average HEFC constitutes 32% of average HECT. This percent varies very much by general places of residence. It is 48% in governorate center, 29% in other urban areas and 19% in rural areas. Average HEFC very much varies by governorates. It increases continually and sharply by

expenditure deciles. It is only 51 pounds in the first decile and as much as 370 pounds in the 10<sup>th</sup>.

## **2. Variables and econometric model**

To analyze variations of HECT, HEDC and HEFC, we use econometric models for these three expenditures as dependent variables. The independent variables are differentiated by governorates, places of residence and expenditure deciles. The used variables and the econometric models are as follows.<sup>1</sup>

### **A. The variables of governorates (with N = 14 observations)**

As average data these variables depict the main socioeconomic features of governorates. They include seven educational variables as percents of educational groups (PEDG) for the population 15 years or more. See Table 3. Besides, they include the following other variables:

1. Percent of absolutely poor households (PAPOOR).
2. Average number of children in household (HNCH).
3. Economic activity rate 15 years and over (EAR).
4. Percent of polygamy, i.e. percent of males with more than one wife (PPOL).<sup>2</sup>

The model is OLS single regression equation of HECT on one of the educational variables and all the other above mentioned variables:

$$\text{HECT} = \beta_0 + \beta_1 \text{PEDG} + \beta_2 \text{PAPOOR} + \beta_3 \text{HNCH} + \beta_4 \text{EAR} + \beta_5 \text{PPOL} + \varepsilon \quad (1)$$

Since we have 7 educational groups there will be 7 similar equations.

### **B. The variables of places of residence (with N = 37 observations)**

As average data these variables capture the main socioeconomic characteristics of places of residence. These variables are:

1. Average THE.

---

<sup>1</sup> Data on variables other than THE, HECT, HEDC and HEFC are not included in the study. They can be provided by the author upon request.

<sup>2</sup> The high percent of polygamy in a governorate refers to a larger degree of backwardness in the governorate.

2. Percent of relatively poor households (PRPOOR).
3. Percent of relatively rich households (PRRICH).
4. Average number of individuals in household (HNI).
5. Residential dummy variables (GC, OU and RU, attached to governorate centers, other urban areas and rural areas respectively).

The dummy variables are used to capture the urban-rural nature of the place of residence. If the place of residence for an observation matches a certain dummy variable, the dummy variable will assume the value of 1, and the other two variables will assume the value of 0.

The model is OLS single regression equation of HECT on the above mentioned variables. In order to avoid the Dummy Variables Trap, just two dummy variables might be included in a regression equation. The model is as follows:

$$\text{HECT} = \beta_0 + \beta_1 \text{GC} + \beta_2 \text{OU} + \beta_3 \text{THE} + \beta_4 \text{PRPOOR} + \beta_5 \text{PRRICH} + \beta_6 \text{HNI} + \varepsilon \quad (2)$$

In this equation,  $\beta_1$  and  $\beta_2$  measure the effect of changing the place of residence from rural areas to governorate center and to other urban areas respectively. Substituting the variable OU in equation (2) by the variable RU we get another equation, in which  $\beta_1$  and  $\beta_2$  measure the effect of changing the place of residence from other urban areas to governorate center and to rural areas respectively.

### **C. The variables of expenditure deciles (with N = 10 observations)**

Here we have only one explanatory variable, average THE. Beside the linear and the constant elasticity forms, for comparison objectives we will use the logarithmic form as suggested by De Witte and Cramer (1986). The three models are as follows:

$$\text{HECT} = \beta_0 + \beta_1 \text{THE} + \varepsilon, \quad (3)$$

$$\text{LN HECT} = \beta_0 + \beta_1 \text{LN THE} + \varepsilon, \quad (4)$$

$$\text{HECT /THE} = \beta_0 + \beta_1 \text{LN THE} + \varepsilon. \quad (5)$$

In addition, we have another equation for the percent of THE allocated to HECT:

$$\text{HECT /THE} = \beta_0 + \beta_1 \text{THE} + \varepsilon. \quad (6)$$

In equations (1) – (6) substituting HECT by HEDC and HEFC we get similar equations for HEDC and HEFC as dependent variables.

#### **4. Analysis of HECT, HEDC and HEFC variations**

Estimating the above regression equations we here analyze variations of HECT, HEDC and HEFC.

##### **A. HECT**

First, we use chi square test to verify whether there are significant variations in average HECT by governorates. Considering two HECT in each governorate, the real and the hypothesized overall average, and calculating chi square on 14 observations, we find  $\chi^2 = 7.888$ . This value is smaller than the critical value (=22.36) for  $df = 13$ . We, therefore, conclude that HECT is not significantly varied by governorates (at the 5% significance level).

Estimating regression equation (1) shows that average HECT in governorate is positively affected by the percents of illiterates and those who merely read and write, and negatively by the percents of primary and preparatory certificates holders. It isn't significantly affected by all other variables in the equation. Table 3 shows how much (in pounds) an average HECT changes in a governorate when the mentioned educational percents increase 1%. We notice that the positive effects of educational variables are smaller in absolute values than the negative effects.

Estimating regression equation (2) we find that average HECT is not significantly affected by any one of the variables in the equation.

By expenditure deciles, we notice that variations of HECT are relatively smaller than variations of THE. The ratio between the values in the 10<sup>th</sup> and the first deciles is 2.62 for HECT and 9,92 for THE. Adjusting HECT to THE measurements shows that the variance of THE is 6.8 times as large as that of the adjusted HECT. Estimating the regression equation (3) shows that HECT is significantly and positively affected by THE. This effect however, is very small. See Table 4.

Using equations (3), (4) and (5) to estimate THE elasticity of HECT when the two expenditures are at their average values, we find three values that are notably close to each other and much less than unity. See Table 4. Using *t*-test statistic in the three functional forms we find that elasticity is significantly less than 1.

Accordingly, the percent of THE allocated to HECT decreases continually by deciles. In the first decile the percent is around 4 times of that in the tenth decile. Indeed estimating equation (6) we find that the mentioned percent is significantly and negatively affected by THE ( $P = 0.000$ ).

Comparing variations of HECT with variations of household expenditure on food, for example, we find that both expenditures increase by THE, the percent of THE allocated to each of them decreases, and they both have significantly smaller than 1 THE elasticity. However, in HECT the ratio of the average values in the tenth and the first expenditure deciles is 2.62, the poor in the first decile allocate as much as 4 times higher percent of THE compared to the rich in the tenth decile, and THE elasticity is around 0.4; while in household expenditure on food the three figures are 5.74, 1.7 and higher than 0.7 respectively. This comparison shows that HECT is stickier and less varied by THE compared to household expenditure on food.

## **B. HEDC**

Since the price rate on domestic cigarettes is around half of that on foreign cigarettes, one would expect the demand to be higher among the poor for domestic and among the rich for foreign cigarettes.

By governorates, estimating the regression equation (1) for HEDC we find that beside the effects of low educational levels, HEDC is significantly affected by educational developments at higher than preparatory levels. See Table 3. HEDC is negatively affected by the percents of primary, preparatory, secondary and university certificate holders. The negative effects are higher in absolute values than the positive effects. Among the educational variables, HEDC is not affected only by the percent of intermediate institute certificate holders.

Beside educational variables in equation 1, HEDC has no significant relationship with percent of absolutely poor and economic activity rate in governorate. However, it has significant relationships with the other two variables. HEDC increases:

1. 80 pounds when average number of children in household increases 1,
2. 34 pounds when the percent of polygamy increases 1%.

Estimating regression equation (2) for HEDC, we find that HEDC has no significant relationships with all the variables in the equation except for average number of individuals in household. HEDC increases 52 pounds when average number of individuals in household increases 1.

Estimating regression equation (3) for HEDC, we find that this equation is significant only at the 10% level. HEDC increases only 0.981 pounds when THE increases 1000 pounds. Using equations (3), (4) and (5) for HEDC to estimate THE elasticity of HEDC when the two expenditures are at their average values, we find three very small values. See Table 4.

The percent of THE allocated to HEDC decreases continually and sharply by THE. This percent in the first decile is 7 times as much large as that in the tenth decile. Indeed estimating equation (6) we find that the mentioned percent is significantly and negatively affected by THE ( $P = 0.000$ ).

### **C. HEFC**

Estimating equation (1) for HEFC shows that, except for the percent of primary certificate holders in governorate, HEFC is unaffected by any other variable in the equation. HEFC decreases 5.8 pounds when the mentioned percent increases 1%.

HEFC is significantly related to a number of variables in the place of residence.

Estimating the regression equation (2) for HEFC shows that HEFC increases:

1. 0.007 pounds when average THE increases 1 pound,
2. 4.84 pounds when the percent of relatively rich households increases 1%,
3. 114 pounds when residence changes from rural areas to governorate center,
4. 78 pounds when residence changes from other urban areas to governorate center.

Estimating the regression equation (3) reveals that HEFC increases 0.006 pounds when THE in deciles increases 1 pound. This increase is as much larger as 6 times of the corresponding increase of HEDC. Using equations (3), (4) and (5) to estimate THE elasticity of HEFC when the two expenditures are at their average values, we find that the third equation is insignificant. From the other two equations we find this elasticity is very close to unity. Using *t* test statistic shows that the null hypothesis that elasticity = 1 cannot be rejected.

The percent of THE allocated to HEFC does not have a clear tendency when THE increases. Estimating equation (6) we find that this equation is insignificant and the mentioned percent is unaffected by THE.

If we confine the analysis to the first 5 expenditure deciles, which are closer to the relatively poor, similar findings will be generally found. In particular, the percents of THE allocated to smoking and THE elasticities of HECT, HEDC and HEFC will have the same main characteristics as before. See Figure 2.

#### **D. Findings**

HECT constitutes 2% of THE. It does not significantly differ by governorates. It is virtually not affected by educational conditions higher than the preparatory level, the level of poverty, average family size, the level of economic activities and 'socially backward' habits as polygamy. It is positively affected by the percents of illiterates and of those who merely read and write; and negatively by the percents of primary preparatory certificates holders. Average HECT does not significantly vary by urban- rural residence. It is not significantly affected by average level of THE, the level of relative poorness, the level of relative richness or average household size in the place of residence.

Although it is positively affected by average THE in expenditure deciles, its THE elasticity does not exceed 0.4. Relative changes in THE lead to only slight relative changes in HECT and the rich spend on smoking only slightly more than the poor. The percent of THE allocated to HECT decreases by THE; the poor assign much higher percent of THE to smoking compared with the rich.

HEDC is spread in all households, poor and rich alike, and in all places of residence. It is more attributed to 'socially backward' characteristics of governorate, such as illiteracy, polygamy, extended families and high number of children in household; it is less attributed to developed structure of education in governorate. THE elasticity of HEDC does not exceed 0.13. Thus, HEDC almost does not change by THE increase and average HEDC among the poor and the rich are alike. The percent of THE allocated to HEDC decreases sharply by THE increase; the poor assign much higher percent of THE for HEDC compared with the rich.

HEFC constitutes around one third of HECT. It is spread mostly in governorate centers, among higher expenditure households and in areas of higher percent of relatively rich people. Except for the percent of primary certificate holders it is not affected by the level of education in governorate. THE elasticity of HEFC is close to unity. The percent of THE allocated to HEFC is not associated with THE.

## **5. Discussion and recommendations**

Probably the most important finding in this study is that household expenditure on smoking does not much differ by household income; the percent of income allocated to smoking is much higher in poor households than in rich households. Therefore, in households with relatively low incomes, smoking results in a crowding out of expenditures on other requirements. It would prevent parents from fulfilling their obligations towards children and prevent them from having tangible savings that may enhance household living conditions.

Some smokers argue that smoking is to be enjoyed. But if it is so, why do they not want their children to smoke and get this enjoyment? The answer is that beside its relatively high expense, smoking is correlated with a number of potential health problems that parents do not want their children to face. Other smokers confess that smoking is harmful, but they cannot get rid of it. This denotes the importance of increasing the awareness towards smoking before one starts smoking.

One important finding in the study is that expenditure on smoking is negatively affected by improving the educational structure in the area of residence. In

particular, expenditure on domestic cigarettes, which constitutes two thirds of total expenditure on smoking, is more attributed to ‘socially backward’ characteristics of the place of residence, such as illiteracy, polygamy and extended families. These findings suggest that some mitigation in smoking may be found through measures taken by the government; for example:

1. Developing the educational structure and eradicating illiteracy, especially in disadvantaged areas;
2. Launching concentrated campaigns in the media, schools and universities to raise people’s awareness in general, and against smoking in particular.

Besides, the government might organize programs of direct subsidies to the poor provided that they did not smoke or they quitted smoking. These programs are in line with public efforts to decrease the suffering of the poor. The government should also be more firm against foreign cigarette smuggling, which exhausts an important share of income of smokers and wastes budget revenues.

It does not suffice that the government issues directions for preventing smoking in public places. The government that cares for the people’s interests should assign more resources, either (i) for measures taken against smoking or (ii) for dealing with the health problems of smoking and its deleterious effects on the lives of the poor. The logic, however, calls for the first option, since it is more profitable and useful.

**Table 1: Average Monthly Household Expenditures on Varieties of Cigarettes and Tobacco and THE (in pounds) by Governorates and Places of Residence, 2004**

| Governorates   | Place of Residence | Varieties of cigarettes and tobacco |    |    |   |   |      |   |      | THE   |
|----------------|--------------------|-------------------------------------|----|----|---|---|------|---|------|-------|
|                |                    | HEDC                                | a  | b  | c | d | HEFC | e | HECT |       |
| Damascus       | Gov. Center        | 182                                 | 0  | 4  | 0 | 1 | 143  | 0 | 331  | 28598 |
| Rural Damascus | Other Urban        | 179                                 | 0  | 3  | 0 | 0 | 98   | 1 | 282  | 20101 |
|                | Rural areas        | 204                                 | 1  | 2  | 0 | 0 | 66   | 0 | 272  | 18450 |
|                | Total Gov.         | 191                                 | 0  | 3  | 0 | 0 | 82   | 1 | 277  | 19288 |
| Homs           | Gov. Center        | 267                                 | 0  | 3  | 0 | 0 | 175  | 3 | 448  | 22672 |
|                | Other Urban        | 377                                 | 5  | 0  | 0 | 0 | 106  | 4 | 491  | 19905 |
|                | Rural areas        | 376                                 | 5  | 1  | 0 | 0 | 74   | 2 | 459  | 17287 |
|                | Total Gov.         | 324                                 | 3  | 2  | 0 | 0 | 125  | 3 | 457  | 20095 |
| Hama           | Gov. Center        | 63                                  | 0  | 1  | 1 | 0 | 11   | 0 | 76   | 18419 |
|                | Other Urban        | 261                                 | 0  | 1  | 1 | 0 | 91   | 0 | 353  | 24087 |
|                | Rural areas        | 314                                 | 22 | 1  | 2 | 0 | 20   | 4 | 362  | 21632 |
|                | Total Gov.         | 243                                 | 14 | 1  | 1 | 0 | 25   | 3 | 287  | 21083 |
| Tartous        | Gov. Center        | 278                                 | 35 | 11 | 0 | 0 | 275  | 3 | 603  | 24112 |
|                | Other Urban        | 173                                 | 36 | 2  | 0 | 0 | 205  | 4 | 421  | 25229 |
|                | Rural areas        | 246                                 | 13 | 3  | 3 | 1 | 68   | 3 | 337  | 22482 |
|                | Total Gov.         | 242                                 | 20 | 4  | 2 | 1 | 125  | 3 | 398  | 23161 |
| Latakia        | Gov. Center        | 287                                 | 17 | 9  | 0 | 0 | 219  | 2 | 533  | 21364 |
|                | Other Urban        | 296                                 | 18 | 3  | 0 | 0 | 74   | 1 | 392  | 16354 |
|                | Rural areas        | 298                                 | 4  | 5  | 0 | 1 | 44   | 1 | 353  | 19720 |
|                | Total Gov.         | 293                                 | 10 | 6  | 0 | 1 | 119  | 1 | 431  | 20051 |
| Idleb          | Gov. Center        | 184                                 | 0  | 1  | 0 | 0 | 78   | 1 | 264  | 22581 |
|                | Other Urban        | 191                                 | 1  | 8  | 0 | 0 | 77   | 1 | 277  | 23309 |
|                | Rural areas        | 230                                 | 4  | 1  | 1 | 0 | 47   | 2 | 285  | 18825 |
|                | Total Gov.         | 219                                 | 3  | 2  | 1 | 0 | 55   | 1 | 281  | 19990 |
| Aleppo         | Gov. Center        | 211                                 | 0  | 1  | 0 | 0 | 314  | 0 | 526  | 21457 |
|                | Other Urban        | 525                                 | 0  | 0  | 0 | 0 | 190  | 1 | 717  | 14787 |
|                | Rural areas        | 444                                 | 2  | 0  | 0 | 0 | 163  | 2 | 611  | 12183 |
|                | Total Gov.         | 316                                 | 1  | 0  | 0 | 0 | 253  | 1 | 571  | 17774 |
| Alraqqa        | Gov. Center        | 278                                 | 0  | 1  | 2 | 0 | 194  | 1 | 476  | 20067 |
|                | Other Urban        | 401                                 | 0  | 0  | 0 | 0 | 23   | 0 | 424  | 20537 |
|                | Rural areas        | 460                                 | 2  | 0  | 0 | 0 | 90   | 0 | 552  | 19421 |
|                | Total Gov.         | 403                                 | 1  | 0  | 0 | 0 | 113  | 0 | 518  | 19711 |
| Deir Elzour    | Gov. Center        | 460                                 | 0  | 1  | 1 | 1 | 171  | 1 | 635  | 35964 |

|                   |                    |     |   |   |   |   |     |   |     |       |
|-------------------|--------------------|-----|---|---|---|---|-----|---|-----|-------|
|                   | <b>Other Urban</b> | 224 | 0 | 0 | 0 | 0 | 64  | 2 | 290 | 18950 |
|                   | <b>Rural areas</b> | 349 | 0 | 1 | 0 | 0 | 66  | 0 | 415 | 18237 |
|                   | <b>Total Gov.</b>  | 367 | 0 | 1 | 0 | 0 | 93  | 0 | 462 | 22941 |
| <b>Alhasaka</b>   | <b>Gov. Center</b> | 266 | 0 | 0 | 0 | 0 | 376 | 0 | 643 | 27389 |
|                   | <b>Other Urban</b> | 255 | 0 | 0 | 0 | 0 | 156 | 1 | 413 | 23581 |
|                   | <b>Rural areas</b> | 355 | 0 | 0 | 2 | 0 | 121 | 2 | 480 | 21937 |
|                   | <b>Total Gov.</b>  | 321 | 0 | 0 | 1 | 0 | 169 | 2 | 494 | 23135 |
| <b>Alsuaida</b>   | <b>Gov. Center</b> | 188 | 0 | 0 | 0 | 0 | 73  | 0 | 260 | 22184 |
|                   | <b>Other Urban</b> | 180 | 0 | 6 | 0 | 0 | 69  | 2 | 257 | 16110 |
|                   | <b>Rural areas</b> | 196 | 0 | 0 | 0 | 0 | 19  | 0 | 216 | 14758 |
|                   | <b>Total Gov.</b>  | 192 | 0 | 0 | 0 | 0 | 37  | 0 | 231 | 16738 |
| <b>Daraa</b>      | <b>Gov. Center</b> | 271 | 0 | 3 | 0 | 0 | 107 | 0 | 380 | 24551 |
|                   | <b>Other Urban</b> | 290 | 0 | 0 | 0 | 0 | 45  | 0 | 335 | 21884 |
|                   | <b>Rural areas</b> | 292 | 3 | 7 | 1 | 0 | 58  | 1 | 361 | 23269 |
|                   | <b>Total Gov.</b>  | 287 | 2 | 5 | 0 | 0 | 65  | 1 | 360 | 23248 |
| <b>Alqunaitra</b> | <b>Rural areas</b> | 232 | 0 | 0 | 0 | 0 | 0   | 0 | 232 | 19031 |
| <b>Average</b>    | <b>Gov. Center</b> | 219 | 2 | 3 | 0 | 0 | 208 | 1 | 432 | 24359 |
|                   | <b>Other Urban</b> | 257 | 3 | 2 | 0 | 0 | 110 | 1 | 373 | 20225 |
|                   | <b>Rural areas</b> | 318 | 5 | 1 | 1 | 0 | 78  | 2 | 404 | 18503 |
|                   | <b>Total</b>       | 270 | 3 | 2 | 0 | 0 | 133 | 1 | 411 | 21048 |

The Source: Household Income and Expenditure Survey Data, 2003-2004

Gov. denotes governorate,

HEDC denotes household expenditure on domestic cigarettes,

HEFC denotes household expenditure on foreign cigarettes,

HECT denotes household expenditure on cigarettes and tobacco,

THE denotes total household expenditure,

a. denotes household expenditure on ordinary tobacco,

b. denotes household expenditure on honey tobacco,

c. denotes household expenditure on cigarettes smoke,

d. denotes household expenditure on pipe smoke,

e. denotes household expenditure on others.

**Table 2: Average Monthly HECT, HEDC, HEFC and THE (in pounds) by Expenditure deciles, 2004**

| Deciles        | HEDC  |          | HEFC  |          | HECT  |          | THE   |
|----------------|-------|----------|-------|----------|-------|----------|-------|
|                | Value | % of THE | Value | % of THE | Value | % of THE |       |
| 1              | 204.6 | 3.30     | 51.4  | 0.83     | 258   | 4.16     | 6205  |
| 2              | 245.0 | 2.82     | 53.1  | 0.61     | 300   | 3.45     | 8689  |
| 3              | 254.9 | 2.42     | 60.4  | 0.57     | 319   | 3.03     | 10533 |
| 4              | 269.1 | 2.18     | 71.6  | 0.58     | 346   | 2.80     | 12353 |
| 5              | 278.4 | 1.95     | 88.7  | 0.62     | 372   | 2.61     | 14280 |
| 6              | 286.3 | 1.72     | 111.4 | 0.67     | 403   | 2.42     | 16675 |
| 7              | 279.9 | 1.42     | 128.7 | 0.65     | 415   | 2.11     | 19695 |
| 8              | 311.0 | 1.28     | 172.7 | 0.71     | 494   | 2.04     | 24231 |
| 9              | 281.1 | 0.89     | 226.2 | 0.72     | 521   | 1.65     | 31614 |
| 10             | 289.5 | 0.47     | 370.1 | 0.60     | 677   | 1.10     | 61559 |
| <b>Average</b> | 270.0 | 1.31     | 133.4 | 0.65     | 411   | 2.00     | 20584 |

The Source: Household Income and Expenditure Survey Data, 2003-2004

HECT denotes household expenditure on cigarettes and tobacco,

HEDC denotes household expenditure on domestic cigarettes,

HEFC denotes household expenditure on foreign cigarettes,

THE denotes total household expenditure,

**Table 3: The changes in HECT, HEDC and HEFC (in pounds) when educational variable increases 1%\***

| Educational variables                         | HECT   |       | HEDC   |       | HEFC   |       |
|---|--------|-------|--------|-------|--------|-------|
|   | Change | P     | Change | P     | Change | P     |
| Percent of illiterates                        | + 6.88 | 0.017 | + 5.44 | 0.000 |        |       |
| Percent of merely read and write              | + 7.67 | 0.086 |        |       |        |       |
| Percent of primary certificate                | - 13.5 | 0.004 | - 6.99 | 0.024 | - 5.85 | 0.053 |
| Percent of preparatory certificate            | - 14.1 | 0.026 | - 10.9 | 0.002 |        |       |
| Percent of secondary certificate              |        |       | - 9.28 | 0.025 |        |       |
| Percent of intermediate institute certificate |        |       |        |       |        |       |
| Percent of university certificate             |        |       | - 16.8 | 0.046 |        |       |

\* Change is the coefficient of the corresponding educational variable in the regression equation (1).

HECT, HEDC and HEFC denote household expenditure on cigarettes and tobacco, on domestic cigarettes and on foreign cigarettes, respectively,

P denotes the Significance level in the regression equation.

**Table 4: Estimating THE elasticity of HECT, HEDC and HEFC for three forms of demand function\***

| Function                | Regression Equation               | R-Sq  | P     | Elasticity |
|-------------------------|-----------------------------------|-------|-------|------------|
| <b>HECT:</b>            |                                   |       |       |            |
| <b>Linear</b>           | HECT = 258 + 0.00740 THE          | 93.6% | 0.000 | 0.371      |
| <b>Cons. Elasticity</b> | LN HECT = 1.81 + 0.429 LN THE     | 99.2% | 0.000 | 0.429      |
| <b>Logarithmic</b>      | HECT /THE = 0.152 – 0.0130 LN THE | 95.9% | 0.000 | 0.349      |
| <b>HEDC:</b>            |                                   |       |       |            |
| <b>Linear</b>           | HEDC = 250 + 0.000981 THE         | 29.7% | 0.104 | 0.075      |
| <b>Cons. Elasticity</b> | LN HEDC = 4.29 + 0.134 LN THE     | 58.9% | 0.000 | 0.134      |
| <b>Logarithmic</b>      | HEDC/THE = 0.143 - 0.0128 LN THE  | 96.5% | 0.000 | 0.024      |
| <b>HEFC:</b>            |                                   |       |       |            |
| <b>Linear</b>           | HEFC = 7.40 + 0.00612 THE         | 98.3% | 0.000 | 0.944      |
| <b>Cons. Elasticity</b> | LN HEFC = - 4.78 + 0.974 LN THE   | 97.1% | 0.000 | 0.974      |

In the linear form, equation (3),  $ELASTICITY = \beta (Average\ THE)/(Average\ HECT)$ ;

in the constant elasticity form, equation (4),  $ELASTICITY = \beta$ ;

in the logarithmic form, equation (5),  $ELASTICITY = 1 + \beta (Average\ THE)/(Average\ HECT)$ .

HECT denotes household expenditure on cigarettes and tobacco,

HEDC denotes household expenditure on domestic cigarettes,

HEFC denotes household expenditure on foreign cigarettes,

THE denotes total household expenditure,

P denotes the Significance level in the regression equation.

.

Figure 1: HECT, HENC and HEFC with THE (10 Deciles)

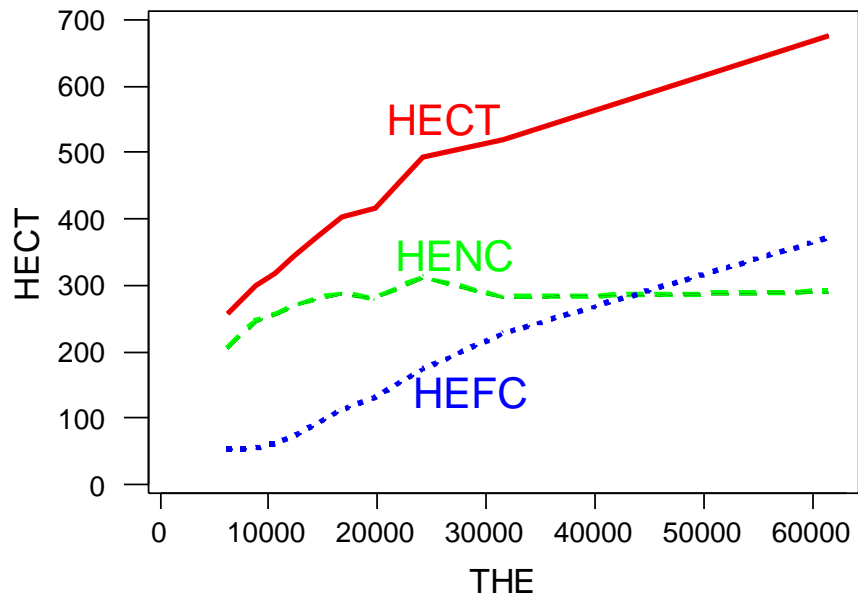
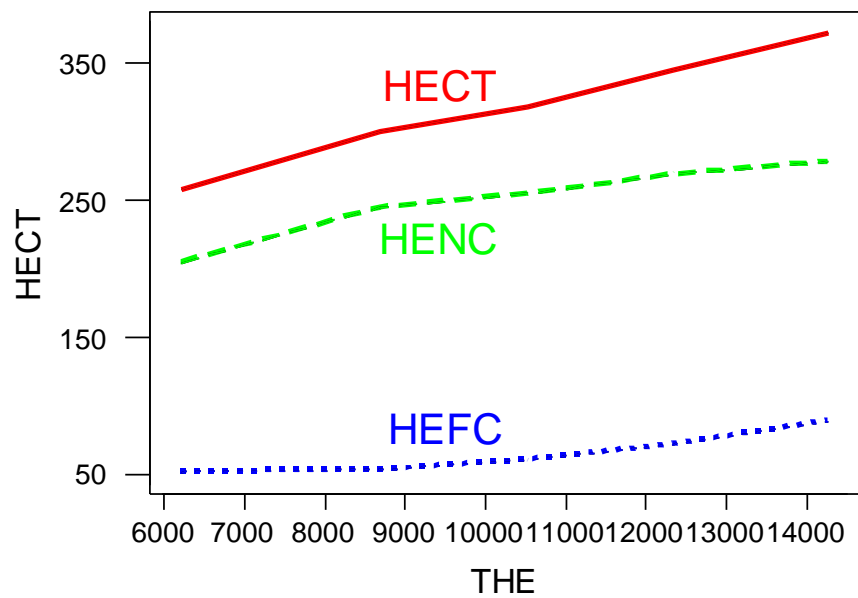


Figure 2: HECT, HENC and HEFC with THE (5 Deciles)



## References

1. De Witte M. A. C. and Cramer J. S., 1986, "Functional form of Engel Curves for foodstuffs" *European Economic Review*, Volume 30, Issue 4, August.
2. Duchene, G., Noujoum O., 2007, *Syrian Economic Trends Bulletin*. Vol. 1, Issue 1.
3. Fan L., Habibov N., 2008, "Targeting social assistance in Azerbaijan: what can we learn from micro-data?", *International Journal of Social Welfare*, Volume 17, Issue 4.
4. Hu T. w, Mao Z., Liu Y., de Beyer J., Ong M., 2005, "Smoking, standard of living, and poverty in China", *Tobacco Control*; 14: 247-250.
5. Rijo M. J., 2008, "Crowding out effect of tobacco expenditure and its implications on household resource allocation in India" *Social Science & Medicine*, Volume 66, Issue 6, March, Pages 1356-1367.
6. Rijo M. John, 2005, "Tobacco consumption patterns and its health implications in India", *Health Policy*, Volume 71, Issue 2, February.
7. State Planning Commission, UNDP, 2005, National Report on MDG in Syria.
8. Sturm R., 2002, "The Effects of Obesity, Smoking, and Drinking On Medical Problems And Costs". *Health Affairs*, March / April.
9. UNDP, 2005, "Poverty in Syria".
10. Ventura E., Satorra A., 1998, "Life-Cycle Effects on Household Expenditures: A Latent-Variable Approach", Working Paper 354, Department of Economics and Business, Universitat Pompeu Fobra.
11. Wang H., 2006, "Tobacco control in China: the dilemma between economic development and health improvement." *salud pública de méxico* / vol. 48, suplemento 1.
12. Wang H., Sindelar J. L. and Busch S. H., 2006, "The impact of tobacco expenditure on household consumption patterns in rural China" *Social Sciences and Medicine*, Volume 62, Issue 6, March.