INEQUALITY IN GREECE:
AN ANALYSIS BY INCOME SOURCE


BY


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# ABSTRACT

This paper employs a decomposition analysis of inequality by income source to understand and explain particular aspects of income inequality in Greece. The results suggest that entrepreneurial income is the most significant contributor to the overall inequality in Greece. It is also shown that there is a weak redistributive impact of taxes and social security contributions and this is mainly attributed to tax evasion, particularly in entrepreneurial income. The reduction of the inequality of entrepreneurial income appears to be the most effective way of reducing total inequality. Overall this analysis may help to establish links between the functional and personal income distribution. Therefore, our ability to evaluate and predict the potential implications of particular growth policies to inequality, poverty and, consequently, to social development, is significantly improved.

## 1. Introduction

This paper investigates income inequality in Greece using a decomposition analysis of inequality by sources of income. This analysis provides us with additional valuable information that allows us to evaluate the influences of particular government policies for growth and development on inequality and poverty.

"Development" is not a value-free term. It depends on a number of economic, social and cultural indicators and has a unique meaning for each individual country. Poverty, and more generally inequality, have been recognised as being among the most important indicators for evaluating the degree of development. After the Second World War the economies in most countries were characterised by high rates of growth, while governments appeared to have the necessary instruments and measures to guarantee these rates of growth. At the same time, according to conventional wisdom, all population groups - and in particular low-income groups – were to benefit from this continuous economic growth, thus reducing income inequalities and poverty (Kuznets 1955). Indeed, this was the case, and economies seem to have worked rather well until the mid 70's. During that period in most economies poverty declined rapidly and inequality was relatively stable (Joseph Rowntree Foundation 1995, Danziger and Gottschalk 1989, 1993, Karoly 1993). Thus, economic policy was mainly concerned with increasing the rate of growth, which became the criterion of success. It was, therefore, believed that the high rates of growth could also improve the other social indicators.

The recent experience, even among the developed countries, calls this conventional wisdom into question. Since the late 70's growth in a number of countries has led to a significant rise in inequality and poverty, while the poorest among the population find themselves poorer in the mid 90's than they were in the late 70's; not only in relative but also in absolute terms (Hills 1996, Joseph Rowntree Foundation, 1995, Gardiner 1993, Johnson and Webb 1993). The relation between growth and development has again been put in doubt.

The decomposition of inequality by income components considerably improves our ability to understand and explain inequality and poverty. It may help to establish links between the functional and personal income distribution. Therefore, our ability to evaluate and predict the potential influences of particular growth policies, to inequality, poverty and, consequently, to social development, is significantly improved.

## 2. The Data

The study uses the micro-data of the 1988 sample survey, conducted as part of the second European Antipoverty Programme by the Greek National Centre for Social Research.[1] This survey was designed to provide a national sample from the population resident in private households. Excluded from the sample were individuals living in

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[1] This survey was conducted by Yfantopoulos, J., Balourdos, D., Fagadaki, E., Kappi, C., Kostaki, A., Papaliou, O. and Papatheodorou, C. (Yfantopoulos *et al*., 1989, Deleeck *et al*. 1991 ). The data used in this study are the unpublished raw data.

institutions, health care units, hotels etc. Households with foreign members were included, providing they were in possession of a residence permit. The unit of analysis was the household and the general sample fraction was 1/1000 based on 1981 Population Census. The sample classification criteria were the Regional Developmental Areas (YPA) and the degree of Urbanisation (urban, semi-urban and rural areas). The total sample comprised 3,112 households. In 2980 households structured interviews were successfully conducted (response rate 95.8%).[2] Refusal to participate, absences or listing errors were the main reasons why interviews with the remaining households were not completed.

The household was defined as the group of people who live under the same roof, eat together and share a common budget. Excluded from this analysis were 30 households which did not fill in the questionnaire section on income. Finally, 10 more questionnaires were also excluded because of missing or insufficient information on some income components. Therefore, the total number of cases used in this analysis is 2940.

The following concepts of income are used in this study:[3]

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[2] This response rate is considerably higher than similar surveys in other countries as well as with the sample surveys of the rest of the countries in the framework of the same programme (Atkinson and Micklewright, 1983, Deleeck *et al*., 1991). Nevertheless these high response rates are not unusual in Greece. Thus in Greek Family Expenditure Surveys the non-response rates are below 10%. The European Community Household Panel Survey also gives similar figures of non-response rate for Greece (Eurostat 1996). In addition, in this survey particular efforts were made in order to achieve a high response rate.

[3] The concepts of income that are adopted in this analysis and the estimates of the relevant income variables for the whole country were based on the definitions and methodology used by Papatheodorou (1992). Additional data cleaning took place for the needs of this study.

**I. Pre-tax (gross) Income:** This is the total household money income before (direct) taxes and social security contributions. Pre-tax Income is classified into six different sources:

- **Wages and Salaries:** This refers to incomes that the members of the household would have received if no deductions - taxes and social security contributions - had been made to their salaries/wages. In this source special annual "allowances" as well as bonuses that employees are entitled to, are also included.[4]

- **Entrepreneurial Income:** This refers to gross income from self-employment, free-lance occupations or business activities.

- **Property Incomes:** This refers to rents, interests and shares. Imputed rent is not included.

- **Agricultural Income:** This refers to income that derives from agricultural activities. This is equal to gross revenues minus expenditures from any agricultural production. In this source, incomes from leasing of agricultural machinery, leasing of land, incomes from employment in agricultural activities as well as estimations of production for own consumption are also included.

- **Income from Social Security:** This is divided in two sources.
  - *Pensions:* This refers to gross primary and auxiliary (occupational) pensions, old age pensions, pensions for farmers, widows' and orphans' pensions etc. Private insurance pensions are not included.

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[4]According to Greek legislation employees are entitled to extra "allowances" given by their employers on an annual basis. Thus for full-time annual occupations these allowances are equal to two months wages or salaries.

- *Other*: This refers to various Family Allowances, Maternity Allowances, Illness Allowances, Work related Illness Allowances, Scholarships for poor children, Poverty Allowances etc.

- **Income from Other Sources:** This refers to income alimonies for former spouse and children, gifts in cash, remittances, fringe benefits etc.

**II. Net (disposable) Income:** This is the total household income after taxes and social security contributions.

All the types of incomes used in this study are calculated on an annual basis and they refer to the year 1988. This mainly refers to cash income. However, estimates of basic components of non-cash income such as production for own consumption for agricultural households, as well as, fringe benefits or imputed rent in entrepreneurial income are also included.

The equivalence scale used in order to make comparable households with different composition is the scale C proposed by O'Higgins and Jenkins (1990) and recommended by OECD in its work on Social Indicators. According to this scale the first adult in each household has a weight of 1.0 and each additional adult a weight of 0.7 and each child of 0.5.

**3. The Structure of Household Income in Greece: Some Summary Findings.**

Before we analyse the decomposition of inequality according to the sources of income, it is important to know the main characteristics of the structure of household

income in Greece. Therefore, in this part, some figures and aggregate estimates concerning the structure of total household income in Greece according to its main sources are presented. Since our concern is the analysis of the structure of aggregate household income and not the comparison or the ranking of households with different composition, it is considered appropriate, at this stage, to use the total (not equivalent) household income before taxes and social security contributions. The total average annual household income in Greece, in 1988, was found to be 1624 thousand drachmas (which was equivalent to $10,973 at that time). As Figure 1 shows the share of wages and salaries to the total household income is 39.8% and therefore is by far the most significant source of household income. Entrepreneurial income is the second important source (22.4%) followed by income from social security (17%) and income from agricultural activities (13.4%).[5] Overall, the primary income (wages, salaries and entrepreneurial income) represents more than 62% of the total household income.[6]

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[5] The relevant figures for equivalent income (and per capita income), as far as the share of each individual source of income to the total household income is concerned, are, as expected, slightly different (see Table 1, p. 14). Of course these small differences do not affect the general picture of the contribution of each individual source to total household income. The same comments of course could be made if we used the equivalent income.

[6] It has to be noted that the figure of the share of the primary income to the total household income is underestimated since, as already noted, the incomes from employment in agricultural activities are included on "rural income" and not on "wages and salaries".

**Figure 1**: Synthesis of Household Income according to the
Main Sources of Income
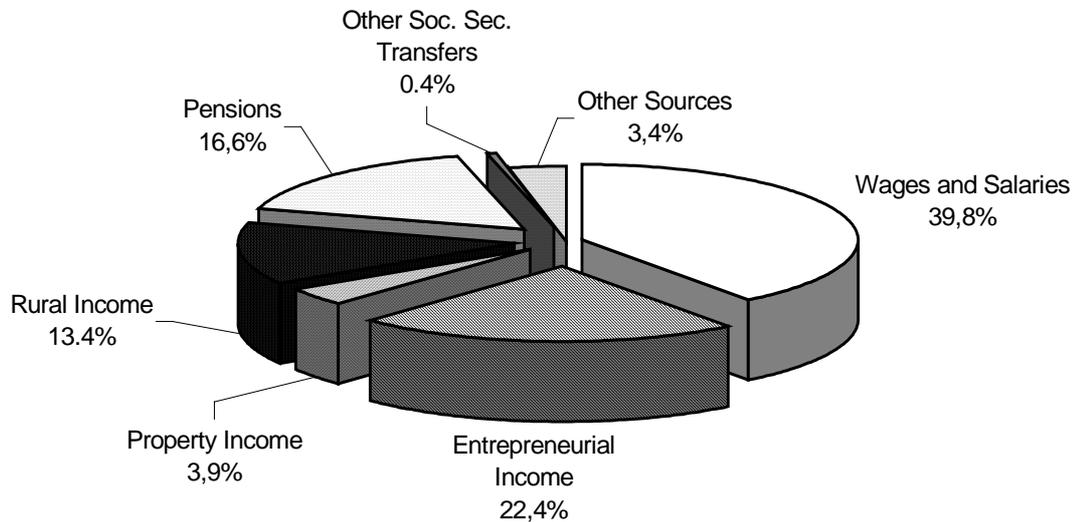


Pensions represent 98% of the total household income from social security. It thus

appears that social security payments other than pensions are limited in Greece. One

explanation for this is that some of the benefits for invalidity are classified in Greece

as pensions (Deleeck et al 1991). Similarly, many of the family allowances and social

security benefits are given as a proportion or as a part of the wages and salaries or

pensions and thus it is rather difficult to examine them separately (Papatheodorou,

1992). Despite the efforts made in the design of the questionnaire and during the

empirical investigation of the 1988 survey to extract correct and detailed information

on social security allowances and benefits, their share is, as expected, significantly

underrepresented in the relevant figures. The attempts made by Yfantopoulos et al

(1989) and Deleeck et al (1991) to present more detailed results from the 1988 survey

on the contribution of some of the individual social security benefits and allowances to total disposable household income in Greece are therefore not particularly accurate (Papatheodorou 1992). Thus their estimates on these figures could not be seen as a particularly reliable source of information for in-depth analysis on the subject.

## 4. Decomposing Inequality by Income Source

The decomposition analysis of inequality by income source seems rather more complicated than the one by population subgroup. Although Shorrocks (1982, 1983) has suggested that there are, potentially, a large number of inequality indices that could be used for this type of decomposition analysis, in practice only a limited number appears to be really satisfactory and convenient (Shorrocks 1982, Cowell 1995). The most significant problem in the decomposition of inequality by income source is the fact that quite often the income of one unit is attributed to more than one source. In other words the sources of income are overlapping. In addition there is a need to take into account and estimate the non-negative as well as the negative contribution that a particular source of income might have to total inequality. Similarly, it is of great importance to estimate contributions to total inequality of particular sources, like the one of taxes and social security contributions, that should be considered as negative incomes.

In this study, the square of the coefficient of variation was chosen since it seems to satisfy all the decomposability properties and has, a more straightforward interpretation (Cowell 1995, Jenkins 1995).

$$C^2 = \frac{1}{\mu^2 n}\sum_{i=1}^{n}[Y_i - \mu]^2 = \frac{\sigma^2}{\mu^2}$$

where $C^2$ is the squared coefficient of variation, $Y_i$ the income of the unit (household) i, $\mu$ the mean income and $\sigma^2$ the variance.

The initial question in this decomposition exercise is how to settle a rule that will enable us to define the total inequality as the sum of the contributions of each source of income.[7]

$$S = \sum S_k$$

where $S$ is the total inequality and $S_k$ is the *absolute contribution* of the source $K$ to total inequality. Therefore, the proportionate contribution of each source to total inequality could expressed as:

$$s_k = \frac{S_k}{S}, \quad \text{while} \quad \sum s_k = 1.$$

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[7] The method for decomposing inequality by the sources of income, which is presented here, is mainly based on Shorrocks 1982 and 1983.

where $s_k$ is the *proportional contribution* of factor $K$ to total inequality.

Any function that creates appropriate values for the proportional contribution could be considered as a rule for the decomposition. According to Shorrocks (1982, 1983) there is an unlimited number of decomposition rules that can be applied to each inequality index. These rules are also independent of the inequality index that we chose. Despite this, based on theoretical and empirical evidence, Shorrocks (1983) has argued in favour of a unique function, the "natural decomposition rule of the variance", which seems to perform in a rather satisfactory way in understanding the relative contribution of each source of income to total inequality.[8] This decomposition rule has already been used in a number of relevant studies in the field (Adams 1994, Adams and He 1995, Jenkins 1995). It is easy to prove that this rule is also the natural decomposition rule for the square of the coefficient of variation (Shorrocks 1982). Using the squared coefficient of variation, the absolute contribution $S_k^c$ of income from the source $K$ to total inequality becomes:

$$S_k^c = \frac{\mathrm{cov}(Y_k, Y)}{\mu^2}$$

where $Y$ is the total households income and $\mathrm{cov}(Y_k, Y)$ is the covariance between the household incomes from $K$ source and total income. The proportional contribution $s_k$ of incomes from source $K$ to total inequality is now

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[8] Of course variance is rather problematic as an inequality measure since it does not satisfy the mean independence axiom (Cowell 1995, Sen 1997)

$$s_k = \frac{\text{cov}(Y_k, Y)}{\sigma^2}$$

and since

$$\text{cov}(Y_k, Y) = \rho_k \sigma_k \sigma$$

the proportional contribution of each sources could also be expressed as

$$s_k = \frac{\rho_k \sigma_k}{\sigma}$$

where $\rho_k$ is the correlation coefficient between $Y_k$ and $Y$, $\sigma_k$ is the standard deviation for the incomes from source $K$ and $\sigma$ is the standard deviation for total income.

Although this analysis could provide us with estimates concerning the proportional as well as the absolute contribution of each source of income to overall inequality, it would be more illuminating to have some further information on the issue. From a policy perspective, it will be of particular importance to know the influence that a decrease of inequality in the distribution of income in one source would expected to have on overall inequality. Similarly, it will be equally significant to compare that estimate with the alternatives; i.e. the expected impact on overall inequality that a decrease of inequality of income of another individual source or of the rest of the sources would have. Shorrocks (1982) proved that, indeed, the contribution that each source of income has to total income inequality is attributable to two factors: first, the inequality that would exist if the source $K$ was the only source of income inequality,

while the income of the rest of the sources were to be equally distributed; and second, the reduction of overall inequality that would be caused if the inequality in income receipts from source $K$ were eliminated while the distribution of income for the rest of the sources remained unchanged. He also shows that, for the square of the coefficient of variation the contributions of each source could be expressed as follows:

$$S_k^c = \frac{(C_k^a + C_k^b)}{2}$$

where:

$$C_k^a = \frac{\sigma_k^2}{\mu^2} \quad \text{and} \quad C_k^b = \frac{\sigma_k + 2\operatorname{cov}(Y_k, Y - Y_k)}{\mu^2}$$

Following Jenkins (1995), in this study we will also provide the following estimates

$$\alpha_k = \frac{C_k^a}{C^2} \quad \text{and} \quad \beta_k = \frac{C^2 - C_k^b}{C^2}$$

where $\alpha_k$ is the proportion of inequality that would remain if the distribution of income from source $K$ remained unchanged while the incomes for the rest of the sources became equally distributed; and $\beta_k$ is the proportion of the inequality that would remain if the income from source $K$ became equally distributed while the

distribution of income of the rest of the sources remained unchanged. In the analysis that follows we will refer to these impacts as effects $\alpha$ and $\beta$ respectively.

**5.  The Decomposition of Inequality by Income Source: Main Findings**

Table 1 presents estimates for the decomposition of inequality of equivalent household income before taxes and social security contribution according to the main sources of income. As can be seen, although the income from entrepreneurial activities represents only 21% of the aggregate total equivalent household income, it appears to be by far the most significant source of inequality: 65.8% of the overall inequality is attributed to income from entrepreneurial activities. By contrast, wages and salaries, despite being the main source of household income, contribute to the overall inequality by only 16.3%, followed by rural income with 9.5%. Incomes from property, social security and other sources appear to have a relatively small proportional contribution to the overall inequality.

Examining the impact on inequality that each individual source of income has, under the effects $\alpha$ and $\beta$, the importance of entrepreneurial income is also signified. By equalising the distribution of all other sources of income, with the exception of the income from entrepreneurial activities, the inequality would remain at the 74.7% of its current level.  In other words, the total inequality would be reduced by only 25%. On the other hand, if the income from entrepreneurial activities became equally distributed while the distribution of income from the rest of the sources remain

unchanged, overall inequality would be expected to be reduced to 43% of its actual figure. Therefore, by eliminating only the inequality in the distribution of the entrepreneurial income, the overall inequality would be reduced by 57%.

**Table 1**: Decomposition of inequality of equivalent household income before taxes and social security contributions, by sources of income

| | SOURCES OF INCOME | | | | | | Average Gross Income |
|---|---|---|---|---|---|---|---|
| | Wages & Salaries | Entrepr. Income | Proper. Income | Rural Income | Social Security | Other Sources | |
| $(\mu_k/\mu)*100$ | 38.3 | 21.0 | 4.2 | 11.9 | 19.8 | 4.7 | 100.0 |
| $\rho_k$ | 0.299 | 0.762 | 0.238 | 0.236 | 0.105 | 0.038 | 1.000 |
| $C_k^2$ | 2.186 | 18.362 | 16.935 | 12.449 | 3.519 | 14.345 | 1.086 |
| $S_k$ | 0.177 | 0.715 | 0.043 | 0.103 | 0.041 | 0.007 | 1.086 |
| $s_k*100$ | 16.3 | 65.8 | 3.9 | 9.5 | 3.8 | 0.7 | 100.0 |
| $\alpha_k*100$ | 29.5 | 74.7 | 2.7 | 16.3 | 12.8 | 3.0 | 100.0 |
| $\beta_k*100$ | 97.0 | 43.0 | 94.8 | 97.2 | 105.2 | 101.7 | 0.0 |

$(\mu_k/\mu)*100$ : the share (in percentages) of income from source $K$ in total gross household income,

$\rho_k$ : the correlation coefficient between the income from the source $K$ and the total gross household income (all the values are statistical significant at 0.01 level),

$C_k^2$ : the squared coefficient of variation,

$S_k$ : the absolute contribution of the source $K$ to total inequality,

$s_k*100$ : the proportional contribution (in percentages) of source $K$ to total inequality,

$\alpha_k*100$ : the percentage of total inequality that would remain if the distribution of income from source $K$ remained unchanged while the incomes for the rest of the sources became equally distributed,

$\beta_k*100$ : the percentage of the total inequality that would remain if the inequality of income from source $K$ were eliminated while the distribution of income of the rest of sources remained unchanged.

By investigating the influence of wages and salaries to overall inequality under the effects $\alpha$ and $\beta$, it was found that, despite being by far the most significant source of household income, they have a much less significant impact than entrepreneurial income has. Indeed, if wages and salaries became the only source of inequality while the incomes from the rest of the sources become equally distributed, the inequality would be reduced to 29.5% of its current level. If, by contrast, the only source of income that became equally distributed were wages and salaries - which represent 38.3% of total gross equivalent household income - the overall inequality would remain at the 97% of its actual figure. In other words, by eliminating the inequality of the distribution of wages and salaries but leaving the distribution of income of the rest of the sources unchanged, overall inequality would be reduced by only 3%.

An important comment should be made about the influence that the property income appears to have on the overall inequality. It is obvious and has already been reported in the relevant literature that, usually, property income is significantly underestimated in distributional statistics. Therefore, according to our data, the income from this source appears to represent only the 4.2% of total equivalent household income in Greece. Despite that, and despite also the fact that property income appears to be a rather small contributor to total inequality, the elimination of the inequality of the distribution of income from this source alone, will be expected to reduce the overall inequality more than if we had eliminated the inequality in wages and salaries. On the contrary, as should be expected, if the income from social security were the only source that became equally distributed, the overall inequality would be increased by 5.2%. If, therefore, the income from social security, which appears to contribute by 3.8% to overall inequality, became equally distributed while the distribution of income

from the other sources remained unchanged, it would result in an increase to overall inequality, though not a large one.

An impact similar to that of social security income appears to come from income in the category "other sources". By eliminating only the inequality of the distribution of income from this source, overall inequality would increase, although marginally. That is because the income from this source is mainly attributed to alimony for former spouse and children, as well as other remittances. As Papatheodorou (1992) has shown, the proportional contribution of income from this source to total household income appears to be more significant for the low and middle-income population than among the rich.[9]

The above figures, concerning the influence of each individual source of income to overall inequality, change considerably when the inequality in question is that of disposable household income. This is the household income after taxes and social security contributions. Disposable household income could be expressed as the sum of incomes of all the sources of gross household income minus the taxes and social security contributions. Therefore, taxes and social security contributions are treated here as a negative income. Table 2 presents estimates of the decomposition of the

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[9] Papatheodorou (1992) shows that, if no equivalence scale is used, the income from "other sources" appears to represent more than 13.5% of the total household income among the 20% of the households with the lower income. By contrast, the proportional contribution of this source to overall income is bellow the 4% for the 40% of the richer households (Table 3.4, page 67). If the equivalent income (OECD scale) is used instead, this impact becomes less clear. However, it still appears that the proportional contribution which the income from this source has on the total household income is more significant among the low and middle income range households than among the rich (Papatheodorou 1992, Table 3.7, page 79).

inequality of the disposable household income by sources of income and taxes and social security contributions.

**Table 2:** Decomposition of inequality of disposable (equivalent) household income according to sources of (gross) income and taxes and social security contributions.

| | SOURCES OF INCOME | | | | | | Taxes & Social Security Contrib. | Average Disposable Income |
|---|---|---|---|---|---|---|---|---|
| | Wages & Salaries | Entrepr. Income | Proper. Income | Rural Income | Social Security | Other Sources | | |
| $(\mu_k/\mu)*100$ | 42.6 | 23.4 | 4.7 | 13.2 | 22.1 | 5.3 | -11.2 | 100.0 |
| $\rho_k$ | 0.207 | 0.786 | 0.235 | 0.273 | 0.109 | 0.049 | -0.300 | 1.000 |
| $C_k^2$ | 2.186 | 18.362 | 16.935 | 12.449 | 3.519 | 14.345 | 2.768 | 1.186 |
| $S_k$ | 0.142 | 0.857 | 0.049 | 0.139 | 0.049 | 0.011 | -0.061 | 1.186 |
| $s_k*100$ | 12.0 | 72.2 | 4.1 | 11.7 | 4.1 | 0.9 | -5.1 | 100.0 |
| $\alpha_k*100$ | 33.4 | 84.5 | 3.1 | 18.4 | 14.4 | 3.4 | 2.9 | 100.0 |
| $\beta_k*100$ | 109.4 | 40.0 | 94.8 | 95.0 | 106.1 | 101.6 | 113.1 | 0.0 |

$(\mu_k/\mu)*100$ : the share (in percentages) of income from source $K$ in total disposable household income,

$\rho_k$ : the correlation coefficient between the income from the source $K$ and the total disposable household income (all the values are statistical significant at 0.01 level),

$C_k^2$ : the squared coefficient of variation,

$S_k$ : the absolute contribution of the source $K$ to total inequality,

$s_k*100$ : the proportional contribution (in percentages) of source $K$ to total inequality,

$\alpha_k*100$ : the percentage of total inequality that would remain if the distribution of income from source $K$ remained unchanged while the incomes for the rest of the sources became equally distributed,

$\beta_k*100$ : the percentage of the total inequality that would remain if the inequality of income from source $K$ were eliminated while the distribution of income of the rest of sources remained unchanged.

As it can be seen in Table 2, the impact of income from entrepreneurial activities as contributor to overall inequality has been increased. Thus 72.2% of the inequality of the total net household income is now attributed to the incomes from this source, while the relevant figure for gross income, as far as the contribution of this source to overall inequality is concerned, was 65%. By contrast, the proportional contribution of wages and salaries to overall inequality has now been reduced to 12%. It thus appears lower than the comparable figure concerning its contribution to inequality of gross income. The proportional contributions to the overall inequality of disposable income that the rest of the sources have, appears to be higher, though marginally, than the corresponding figures concerning the gross income. It, therefore, seems that the negative contribution that taxes and social security contribution have to the overall inequality of disposable income is mainly associated with the reduction of the contribution of wages and salaries.

The impact that the different sources of income as well as taxes and social security contributions have on the overall inequality of disposable income could be elucidated more, when it is also examined under the $\alpha$ and $\beta$ effects. It is, therefore, found that if the distribution of entrepreneurial income became the only source of inequality, the overall inequality of the disposable household income would be the 84.5% of its actual level. On the contrary, by eliminating the inequality in the distribution of entrepreneurial income while leaving the distribution of income of the rest of the sources unchanged, the overall inequality would be reduced by 60%. It thus appears that the impact of the entrepreneurial income to overall inequality, under the effects $\alpha$ and $\beta$, is by far the most significant one. It also signifies the increased impact that

entrepreneurial income has on the overall inequality of disposable income in comparison with its relevant impact to the inequality of gross income.

One figure that changes dramatically in disposable income, compared with that of the gross income, is the influence that wages and salaries appear to have under the effects $\alpha$ and $\beta$. By leaving the distribution of wages and salaries unchanged, while eliminating the inequality of the distribution of income for the rest of the sources, overall inequality would be reduced by almost 67%. On the contrary, if the inequality in the distribution of wages and salaries were eliminated while the income distribution of the rest of the sources remains unchanged, the overall inequality would then be increased by 9.4%. This phenomenon should be explained by looking into the association that taxes and social security contributions appear to have with wages and salaries. Indeed, as Papatheodorou (1992) has shown, the proportion of household income that goes for taxes and social security contributions appears to be associated mainly with the proportion of wages and salaries to total household income rather than the total income itself. As already reported in a number of studies, there is substantial tax evasion in Greece which is mainly observed in high income groups in which the entrepreneurial income is a significant contributor to household total income.[10] An attempt to eliminate inequality in the distribution of wages and salaries, leaving the distribution of income from other sources unchanged, would reduce the negative impact that taxes and social contributions have, and would, therefore, increase

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[10] Karayiorgas and Pakos (1988) have also argued that tax evasion in upper income groups results in a reduction of the taxes that these groups are obliged to pay. Athanassiou (1994) has shown that the declared income to tax authorities was only 29.9% of the relative figure in National Accounts, while agricultural income represented only 0.28%, entrepreneurial income 3% and salaries and wages 44% respectively. Negreponti-Delivani (1990) has also argued that there are obvious indications that tax evasion mainly concerns the self-employed.

inequality. In other words, it seems that the redistributive impact of taxes and social security contributions concerns mainly the wages and salaries. Therefore, the reduction in inequality that the (unchanged) distribution of taxes and social security contributions causes is now partly compensated by the increase in inequality of disposable (after tax and contributions) income which the equality of the distribution of wages and salaries create. The impact that the rest of the sources have, under the effects $\alpha$ and $\beta$ on the overall inequality of disposable income is more or less the same with that on gross income and, therefore, the same comments would apply.

## 6. Conclusions and Policy Implications

In this study income inequality in Greece was investigated using a decomposition analysis by income source. The aim was to provide suitable additional information on the structure and the profile of the income inequality in Greece. In addition, the results could also serve as a frame of reference for evaluating the potential effect that particular government policies could have on income inequality. Policy makers might be helped by these results in two main ways: first, by being able to decide on more effective policies for reducing inequality, and second, by improving their tools for evaluating and predicting the potential implication that other government policies or actions might have on income inequality, poverty and consequently social development.

The results show that entrepreneurial income, although it appears to represent only 21% of the total equivalent household income, makes by far the most significant contribution to overall inequality. Even if the distribution of the incomes of the rest of the sources became equally distributed, by leaving the distribution of entrepreneurial income unchanged, the overall inequality of disposable income would remain at the 85% of its current level. Eliminating only the inequality of the distribution of entrepreneurial income, the overall inequality would be reduced by 60%. By contrast, wages and salaries, despite being the most important source of income, are considerably less significant contributors to overall inequality. The change on the impact that wages and salaries have on the inequality of disposable income in comparison with that of gross income provide evidence for the association that this source of income has with taxes and social security contributions. Thus, the negative contribution that taxes and social security contributions have on the overall inequality is mainly attributed to the reduction of the inequality among wages and salaries.

Taxes and social security contributions appear to be a negative contributor to the overall inequality, though not a large one. This weak impact in reducing inequality is mainly attributed to tax evasion in Greece and in particular among the incomes from entrepreneurial activities. Taxes and social security contributions seem to influence only the distribution of wages and salaries.

Comparing these findings with those of other studies, the importance of entrepreneurial income as a contributor to overall inequality in Greece is emphasised. Additionally, the weakness of the Greek system of income taxes and social security contributions in reducing inequality is also stressed. Jenkins (1995) showed that the

dominant contributor to overall inequality in the UK, during the period 1971-86, was employment earnings. Similarly his estimates show that, during the same period, the negative contribution that income taxes and national insurance contributions had to overall inequality in the UK were almost six times higher than the relevant figures for Greece.[11]

The reduction of the inequality of entrepreneurial income appears to be the most effective way to reduce total inequality in Greece. It is, therefore, of great importance to redesign the current tax system in Greece in order to become efficient enough to eliminate the tax evasion among the recipients of entrepreneurial income. This policy could prove the most efficient, if not the only way, to significantly reduce income inequality. A simple increase of tax rates, under the current structure of the Greek tax system, will mainly affect the incomes from wages and salaries. Therefore, the contribution of net income from wages and salaries to total disposable household income is expected to be reduced. In addition, depending on the progressivity of taxes and social security contributions, it will also cause a further decrease in the inequality of net wages and salaries. This possible decrease in the inequality of wages and salaries would be expected to have only a marginal impact on the overall inequality of the disposable income.

The sources in which the household income is decomposed in this analysis would

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[11] According to Jenkins (1995) estimates, during the period 1971-86, the negative contribution that income taxes alone had to overall inequality were between -25% to -34%, while the effect of the national insurance contributions were between -3% to -6%. The relevant figure in Greece, concerning the effect that both income taxes and social security contribution have on the overall inequality, were only -5.1%.

allow a comparison with the relevant macroeconomic figures, and in particular those of the National Accounts. Assuming that any increase of the income of a source $K$ would be distributed in the same way as the rest of the income from the same source, the above results could provide a frame of reference to evaluate the potential implication that a number of government policies – such as growth policies – might have on the overall inequality. Thus any increase of the share that entrepreneurial income has in the total income would result in a significant increase in overall inequality. By contrast, an absolute increase of the total wages and salaries, while everything else remains unchanged, would cause a decrease in the share of entrepreneurial income to total household income, and thus would result in a reduction to the overall inequality. Similarly, an increase in unemployment would not only reduce the wages and salaries but would quite possibly increase the proportional contribution of entrepreneurial income to total income. Therefore, overall inequality would be expected to increase not only because of the growth of inequality in wages and salaries, but also because of the effect that the now increased share of entrepreneurial income would be expected to have.

Lack of available data in Greece has restricted this analysis to the use of income data of only one year. Decomposition analysis by sources of income for time-series data would allow us to investigate in more detail the effect that changes in particular macroeconomics figures have on income inequality. It would thus allow more precise predictions and evaluations on the implication that a number of government policies - particularly those which are targeted at the growth of certain macroeconomic indicators - would have on income inequality and, consequently, on poverty and social development.

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