THE MEASUREMENT OF FISCAL DRAG OF THE PERSONAL INCOME TAX : THE CASE OF GREECE 1972 - 1986

By

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1. INTRODUCTION

The present paper deals with the impact of inflation on personal income tax (P.I.T) and the measurement of the fiscal drag (F.D) during the period 1972 - 1986. This measurement covers all forms of F.D (nominal, real, net) and refers to various concepts of P.I.T (tax payments and accruals, with and without taxes of past years and tax refunds).

Our effort may be considered important, especially for the Greek case, given that there is a high rate of inflation (above 19 %), incomplete indexation of personal income tax (income brackets and deductions-allowances) and a great deal of tax evasion on the part of those whose income comes neither from wages nor from salaries. Moreover, there is no measurement of the fiscal drag for the period 1981 - 1986 in Greece.

The findings show that there is significant F.D under the existing personal income tax system in Greece which leads to an unfair distribution of the tax burden among the taxpayers, especially during recent years.

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Π. THE IMPACT OF INFLATION ON PERSONAL INCOME TAX

Inflation affects the tax liability of personal income in three ways: through income and tax allowances, the structure of income brackets and the structure of the marginal tax rates. This impact changes the taxable base, the real progressivity of the tax rates, as well as the timing of tax payments and reinforces the propensity of the taxpayers to resort to tax evasion. The taxable base may be particularly inflated because nominal income increases, while real income and the taxable capacity of the taxpayer remain unchanged. This leads to an increase in the number of taxpayers, the tax burden and the average tax rates. The real progrèssivity of tax rates is also affected, due to the reduction of the real value of various allowances - exceptions or tax credits, which may remains the same in nominal terms. At the same time the real width of income brackets is narrowed, this resulting in an alteration of the existing tax progressivity. Due to these reasons taxpayers try to avoid their increasing tax burden or postpone its payment. This postponement might be considered the cheapest source of borrowing money for taxpayers.

Many empirical studies have shown that inflation generally increases the average tax burden especially for the low income-earners and the taxpayers with large families[1]. This increase is significant mainly due to the non-indexation of allowances. In case of unchanged real income, during an inflationary period, an increase in nominal income automatically leads to an increase of the tax burden if the gover nment does not take any action. This automatic tax change constitutes the «nominal fiscal drag», deriving from an increase of nominal income, while the «real fiscal drag» derives from a real income increase. The nominal F.D might seem unfair and in this case it is necessary to proceed to an indexation of the personal income tax system. Methods for indexing tax systems in order to offset the impact of inflation have appeared since the 18th century. This necessity derives from the fact that, when the purchasing power of income is unstable, the hypotheses, on which the properties of a tax system are based, are no longer valid. For this reason the Radcliffe Report (1955) pointed out that in order to build up and introduce a tax system or a tax structure intended to achieve a fair distribution of the actual tax burden, it is necessary to ensure currency stability^. Consequently, it is necessary to evaluate a tax system in real and not in money terms.

Therefore, the F.D problem arises when there is a high rate of inflation, and

1. See, King L. (1973), p. 364, Tanzi V. (1966), Tanzi V. (1978), Nowotny E. (1980), p. 1029, and Morgan D. (1977).
2. H.M.S.O. (1955).

the government does not take any action to offset the impact of inflation on the tax burden. The size and the distribution of the F.D depends on the form of income-policy which is applied.

III. THE METHOD OF MEASURING THE FISCAL DRAG

Personal income tax is a function of the form : $T = a + t.Y$ and $dT = da + Ydt + tdY$ or $\Delta T = \Delta T^d + \Delta T^a$ where : $da + Ydt = \Delta T^d$ = discretionary change of tax and $tdY = \Delta T^a$ = automatic tax change. Consequently, if $\Delta T^d = 0$, then $\Delta T = \Delta T^a$, which means that the tax change in that period is only due to an automatic tax change[3]. Therefore, when there is no discretionary tax change in the taxation of personal income (e.g. income allowances, income brackets, marginal tax rates, number of taxpayers. and reduction of tax evasion) the fiscal drag is equal to the difference between the change in tax receipts in the year (t) and the natural change in tax revenue in the year (t) based on income changes :

$$FD_t = (T_t - T_{t-1}) - (T_{t-1}.Y_t/Y_{t-1} - T_{t-1}) = T_t - T_{t-1}.Y_t/Y_{t-1} \quad (1)$$

However, in case of discretionary changes, the fiscal drag can be reduced/increased by ΔT^d, as follows :

$$FD_t = (T_t - T_{t-1}) - (T_{t-1}.Y_t/Y_{t-1} - T_{t-1}) - \Delta T_i^d = T_t - T_{t-1}.Y_t/Y_{t-1} - \Delta T_t^d \quad (2)$$

From identity (2) it follows that : (a) when the income elasticity of the tax is greater than one ($e > 1$), the fiscal drag is positive ($FD > 0$); (b) if $e < 1$, then $FD < 0$, and (c) if $e = 1$ then $FD = 0$.

Relationship (2) refers to the «total fiscal drag», due to changes in the rate

3. Hansen B. (1969), p. 21, Balopoulos E. (1967), p. 8, and Ntogas D. (1982), p. 187.

of inflation and in real income. In order to compute only the part of the F..D which is due to price changes, we must multiply identity (2) with the ratio of price change over income change : FD = FDt. P/Y = FDt. Py. From this relationship we get the «gross nominal fiscal drag». However, a more accurate definition of the F.D is the «net nominal fiscal drag» which is obtained by adding of the discretionary changes to the gross nominal F.D. The effect of this component of the F.D is most unfair (inflationary tax) because the taxpayer has to pay more even though there has been no actual increase either in his real income or in his taxable capacity.

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IV. STATISTICAL RESULTS : INTERPRETATION AND POLICY IMPLICATIONS

Empirical studies have shown that there is, in fact, a positive F.D involved in personal income taxation[4].

A variety of past studies on the Greek Tax System have verified the existence, of high income elasticities and a significant amount of fiscal drag as far as persona' mcome tax is concerned[5].

The present paper presents statistical results concerning income elasticities and the magnitude of the fiscal drag for the period 1972 - 86 and refers to various concepts and categories of the P.I.T.

It is important to point out that the period 1982-1986, during which there was expected a redistribution of the tax burden in favour of the wage and salary earners as well as a reduction of the inflationary F.D, has been included.

The following Tables present the magnitude of the income elasticity with respect to P.I.T and the size of the fiscal drag. Summarising the findings obtained from the computation of the tax functions, it can be argued that the estimates satisfy many statistical criteria. Specifically, the computation of the tax functionss in linear logarithmic form[6] gives, according to Table 1, the income elasticities

4. Mishan & Dicks - Mireaux (1958), pp. 590 - 606, Prest A. (1962), pp. 576 - 596, Price, (1973), pp. 52 - 63, Barker & Woodward (1972), pp. 37 - 55.
5. Karagiorgas D. (1963), Balopoulos E. (1964), Tatsos N. (1981), and Ntogas D. (1982).
6. See, Mishan & Dicks-Mireaux (1958), p, 606 and Prest (1962), p. 586.

of the various concepts of P.I.T. We must point out that these elasticities give us no more than a feeling of the direction of the fiscal drag, not a measure of it.

The minimum elasticity is 1.35 while the maximum is 1.78 ; in every case the elasticity is greater than one (e > 1). The highest elasticity concerns the tax liability of the wage - earners (without pensioners). The same conclusion can be drawn from Figure I, where a comparison is made between the rate of change of P.I.T and that of non-agricultural income. Consequently, it is obvious that during the period 1972 -1986 the income elasticity of P.I.T in Greece was much higher than one (e > 1).

TABLE I

INCOME ELASTICITIES OF PERSONAL INCOME TAX 1972 - 1986 (COMPUTATION IS BASED ON THE LINEAR LOGARITHMIC TAX EQUATIONS $LogT_i = a + b\ LogY$)

Dependent variable	Coefficient of Independent variable (elasticity)	$\bar{R}2$	D.W*
T1	1.36	0.994	2.23
T1	1.35	0.991	2.03
T2	1.36	0.989	2.18
T2	1.37	0.989	2.10
T3	1.36	0.992	2.07
T3	1.36	0.989	1.94
T4	1.37	0.986	2.04
T4	1.38	0.987	2.00
T5	1.36	0.993	2.08
T5	1.36	0.991	1.95
T6	1.47	0.990	2.07
T6	1.47	0.987	1.91
T7	1.77	0.992	2.12
T7	1.77	0.960	2.35

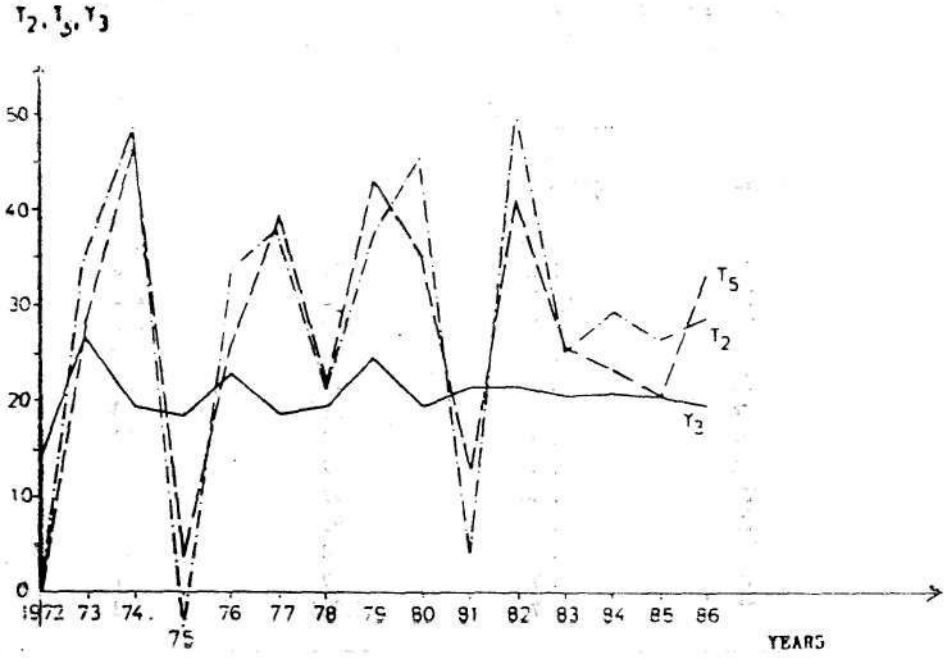
* The Durbin-Watson statistics have been adjusted for autocorrelation by Cochrance-Orcutt technique.

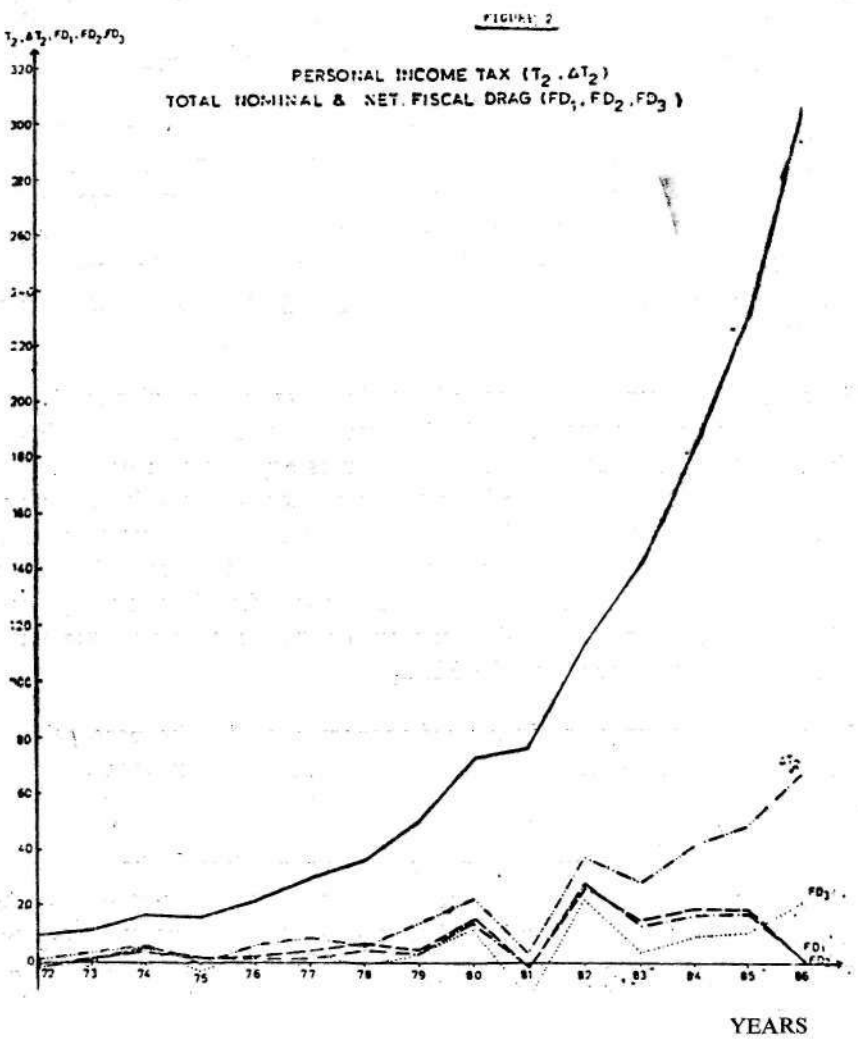
Based on these findings, our next step was to measure the size of the F.D. Our estimation of the F.D was based on the method described above[7]. In order

7. See also, Ntogas D. (1982), p. 186 - 201.

FIGUPE 1

PERCENTAGE CHANGES OF PERSONAL INCOME TAX (T_2, T_5) & NON AGRICULTURAL GDP (Y_3)





to obtain more reliable results, we measured the F.D using the income concept of the non-Agricultural Income since the agricultural sector is for the most part exempted from the P.I.T. For reasons of brevity this paper deals with only two tax concepts, that is T_2 and T_5.

The results, as they appear in Table 2 and Figure 2, are very interesting and show the development of the inflationary and net F.D. The first observation we can make is that the F.D amounted to 28.2 % of personal income tax payments, which means 32,223 mil. drs., in the year 1982, while the minimum (zero F.D)

occurred in the years 1972 and 1981. Then, if we take into account the real rate of change of GDP and the discretionary changes, the unjustified net F.D still remains a high percentage (19.7 %) of the tax. Moreover, cumulatively, for the period 1977 - 1986 the unjustified F.D is 20 % of the tax payment, viz. 258,000 mil. drs., for 1977 - 81 13 %, viz. 33,000 mil. drs.[8] and for the peruiod 1982 - 1986 22 %, viz. 224,000 mil. drs. In addition, during the period 1981 - 1986 indirect taxes increased significantly, i.e. by 235.5 %, while the cumulative increase for the previous five years (1976 - 1981) was 129.7 %. It must be pointed out also, that the P.I.T during the period 1981 - 86 increased by 283.4 %, while the non-agricultural income (at current prices) by 156.0 % (e.g. average income elasticity e = 1.82).

We come to the same conclusions by looking at the cumulative F.D for a concrete year. Specifically, as far as 1981 is concerned the cummulative F.D. was 7 %, then it started increasing and now (1986) it is expected to reach the 24 % of he tax payments. This concept of F.D is very important because the unfair burden of the taxpayer for the yeartis not limited only to the net FD_t. This unfair burden, of the current year will be paid as well during the next year, even if the taxpayer's income remains unchanged. This derives from the fact that the tax of the previous period t — 1 includes an unfair FD_{t-1} and during the current year, even with zero FD_t, the taxpaver will again pay the FD_{t-1}.

These results show that, during inflationary periods, the personal income tax system absorbs a significant amount of tax from the workers which is unjustifiable.

This phenomenon acquired dramatic dimensions during the period 1982-1986. It is obvious that we get the same results when we evaluate the findings in term of constant prices. However, we believe that the main point to consider is the size of the F.D expressed in current prices, compared to the tax receipts at current prices.

Finally, Table 2 presents the same picture for the other tax concept T5.

8. Our results agree with those obtained, for that period, by Ntogas D. (1982) and Kalivianakis K. (1980).

V. CONCLUSIONS

Our findings show that there is considerable fiscal drag in the personal income tax in Greece[9]. Moreover, the unjustified (net) F.D is the main component of total F.D. This has been continuously increasing, especially during the last five years, while there is a simultaneous increase of indirect taxes. It may well be argued that these findings have significant economic implications. This is SJ because the existence of significant unjustified F.D creates many distortions in the economic and the social field. More specifically, the F.D affects the allocation of resources and the size and distribution of the tax burden, mainly to the disadvantage of employees,(wage and salary earners) who have large families. This category of taxpayers are not offered the possibility to shift their tax burden (forward or backward); while the taxpayers who are self-employed can shift their total tax burden[1]**.

Therefore, in the light of these conclusions, it is necessary to establish : (a) an automatic institutional connection between the rate of inflation and the factors determining tax liability (e.g. indexation of the income brackets of the tax schedule and of tax allowances-exceptions); (b) a connection between tax and incomes policy and finally, (c) a system of income tax allowances instead of the present tax credit deductions scheme[11].

9. Our method rather underestimates than overestimates the magnitude of fiscal drag.

10. Agapitos G. (1979).

11. Agapitos G. (1986).

TABLE 2 *

MEASUREMENT OF FISCAL DRAG FOR THE PERSONAL INCOME TAX IN GREECE : 1972 - 86

Years		Absolute amounts mil./ drs						Percentages					
		FD1	FD2	FD3	ΣFD1	ΣFD2	ΣFD3	FD1 / T	FD2 / T	FD3 / T	ΣFD1 / T	ΣFD2 / T	ΣFD3 / T
	T2												
1972	8400	—493	—133	—833	—493	—133	—833	—5.9	—1.6	—9.9	—5.9	—1.6	—9.9
1973	11300	632	360	360	139	227	—473	5.6	3.2	3.2	1.2	2.0	4.2
1974	16700	3208	3818	3818	3347	4045	3345	19.2	2.29	22.9	20.0	24.2	20.0
1975	16200	410	287	—3713	3757	4332	—368	2.5	1.8	—22.9	23.2	26.7	—2.3
1976	21700	1090	1079	1779	4847	5411	1411	5.0	5.0	8.2	22.3	24.9	6.5
1977	29900	3342	969	1769	8189	6380	3180	11.2	3.2	5.9	27.4	21.3	10.6
1978	36400	6699	4421	—1579	14888	10801	1601	18.4	12.1	—4.3	40.9	29.7	4.4
1979	50100	4709	3532	3532	19597	14333	5133	9.4	7.0	7.0	39.1	28.6	10.2
1980	73100	15130	14827	12827	34727	29160	17960	20.7	20.3	17.5	47.5	39.9	24.6
1981	76500	—1536	—1505	—12505	33191	27655	5455	—2.0	—2.0	—16.3	43.4	36.2	7.1
1982	114400	32223	33512	22512	65414	61167	27967	28.2	29.3	19.7	57.2	75.5	19.7
1983	143100	15019	13817	3817	80433	74984	31784	10.5	9.7	2 7	56.2	52.4	22.2
1984	184900	19749	17182	9182	100182	92166	40966	10.7	9.3	5.0	54.2	49.8	22.2
1985	233800	18996	18236	10236	119178	110402	51202	8.1	7.8	4.4	51.0	47.2	21.9
1986	300800	1409	1367	21367	120587	111769	72569	0.5	0.5	7.1	40.1	37.2	24.1
					Cumulative								
1976-86	1243000				596386	538817	257817				47.7	43.1	20.6
1976-81	266000				110592	88329	33329				42.0	33.6	12.7
1982-86	977000				485794	450488	224488				48.6	45.0	22.4

	Absolute amounts mil./drs						Percentages					
T5	FD1	FD2	FD3	ΣFD1	ΣFD2	ΣFD3	FD1/T	FD2/T	FD3/T	ΣFD1/T	ΣFD2/T	ΣFD3/T
8700	—421	—114	—814	—421	—114	—814	—4.8	—1.3	—9.4	—4.8	—1.3	—9.4
11100	51	29	29	—370	—85	—785	0.5	0.3	0.3	—3.3	—0.8	—7.1
16300	3047	3626	3626	2677	3541	2841	18.7	22.2	22.2	16.4	21.7	17.4
16900	1585	1110	—2890	4262	4651	—49	9.4	6.6	—17.1	25.2	27.5	—0.3
21200	—270	—267	433	3992	4384	384	—1.3	—1.3	2.0	18.8	20.7	1.8
29600	3574	1036	1836	7566	5420	2220	12.1	3.5	6.2	25.6	18.3	7.5
36100	6758	4460	—1540	14324	9880	680	18.7	1.24	—4.3	39.7	27.4	1.9
51700	6683	5012	5012	21007	14892	5692	12.9	9.7	9.7	40.6	28.8	11.0
70100 70100	10215	10011	8011	31222	24903	16703	16.6	14.3	11.4	44.5	35.5	19.5
79400	5118	5016	—5984	36340	29919	7719	6.4	6.3	—7.5	45.8	37.7	9.7
112000	26291	27343	16343	62631	57262	24062	23.4	24.4	14.6	55.9	51.1	21.5
140800	15616	14367	4367	78247	71629	28429	11.1	10.2	3.1	55.6	50.9	20.2
174300	11932	10381	2381	90179	82010	30810	6.8	6.0	1.4	51.7	47.1	17.7
210000	7978	7659	—341	98157	89669	30469	3.8	3.6	—0.2	46.7	42.7	14.5
280000	9050	8779	37829	107207	98448	68298	3.2	3.1	13.5	38.3	35.2	24.4
1184000				546880	484032	212075				46.2	40.8	17.9
266900				107207	85014	30014				40.2	31.9	11.2
917100				439673	399018	182061				47.9	43.5	19·9

DATA APPENDIX [1]

T_1 = Personal Income Tax Payments (codes : 0111 + 0112 + 0113 + 0511 + + 0611 + 0631), e.g. the main tax of the current year (0111 + 0112 + + 0113), the contribution for OGA (0511), and tax payments during the current year for past five years' incomes [2] (sources : Budgetary Reports & Bulletins of Public Finance of the Ministry of Finance).

T_2 = T_1 minus tax refunds (payments)

T_3 = 0111 + 0112 + 0113 (payments)

T_4 = T_3 minus tax refunds (payments)

T_5 = 0111 + 0112 + 0113 + 0511 (accruals, excluding taxes of past years' incomes)

T_6 = Personal income tax accruals (based on tax returns)

T_7 = T_6 minus non-wage and salary income tax (PIT on wages and salaries)

Ti = Personal income tax (payments or accruals) minus the discretionary tax changes (according to the annual Budgetary Reports).

FD_1 = Total Fiscal Drag = $T_t - T_{t-t} . Y_t/Y_{t-1} - \Delta T^d_t$

FD_2 = Gross Nominal Fiscal Drag = $FD_1(dp/p/dy/y) = FD_1/\dot{P}_y$

FD_3 = Net nominal Fiscal Drag = $FD_1 . P_y + \Delta T$

$\Sigma FD_t = FD_t + FD_{t-1} + FD_{t-2} \ldots$

the cumulative fiscal Drag for a period t to t_2 is :

$\Sigma FD_t + \Sigma FD_{t+1} + \Sigma FD_{t+2} \ldots$

Y_3 = non-agricultural income, at current prices.

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1. The complete time series of all statistical material are available on request from the author.

2. The tax payments during the current year for the past five years incomes were allocated equally among the last five years.

BIBLIOGRAPHY

Agapitos, G., «The Impact of Taxes on Price Inflation», Bulletin of Economic Research, pp. 14-23, May, 1979.

» «The Income Tax in Greece: Harmonisation with EEC and Indexation», Center of Planning and Economic Research, Athens, (in greek), 1986.

Allen, R. & Savage, D., «Indexing Personal Income Taxation», in Leisner & King eds. Indexing for inflation», London, Institution for Fiscal Studies, pp. 41 - 60, 1975.

Balapoulos, E., «Quantitative Analysis of Personal Income Tax», Bulletin of Economic & Political Sciences, pp. 121 -153, Athens, (in greek), 1964.

» «Fiscal Policy Models of the British Economy», N. Holland, Amsterdam, 1967.

Barker, S. & Woodward, H., «Inflation, Growth and Economic Policy in the Medium-term», N.I.E.R., May, pp. 37-55, 1972.

Hansen, B., «Fiscal Policy in Seven Countries 1955 - 65», OECD, Paris, 1969.

H.M.S.O., «Royal Commission on Taxation of Income and Profits» (Chairman, Lord Radcliffe), cod. 9474, 1955.

Jarrvis, G. & Smith, R., «Real Income and Average Tax Rates : an extension for the period 1970-75», Canadian Tax Journal 25, No. 2, pp. 206 -15, 1977.

Kalivianakis, C, «The Wage Earners : Beast of the continously increasing income tax Burden», Economicos Taxidromos, Nov., pp. 17-20, Athens (in Greek), 1980.

Karagiorgas, D., «The Progressivity of the Greek Income Tax and its Stabilisation Impact», Bank of Greece, Athens (in greek), 1963.

King, A.L., «The Impact of Inflation on Income Tax Liability», British Tax Review, pp. 363-367, 1973.

Mishan, E. & Dicks-Mireaux, L., «Progressive Taxation in an Inflationary Economy», American Economic Review, 48, pp. 590 - 606, 1958.

Morgan, D., «Over-Taxation by Inflation», Institute of Economic Affairs, London, 1977.

Nowotny, E., «Inflation and Taxation: Reviewing the macroeconomic Issues» Journal of Economic Literature, vol. XVIII, pp. 1025-1049, 1980.

Ntogas, D., «The fiscal drag from the Direct Taxes : Greece 1960 - 82», The Greek Economy, Bank of Greece, pp. 186-201, Athens (in greek) 1982.

Prest, A., «The Sensitivity of the Yield of Personal Income Tax in the U.K.», The Economic Journal, vol. 72, pp. 576 -1962.

Price, R., «Some Aspects of the Progressive Income Tax Structure in the U.K.», N.I.E.R., pp 52-63, Aug., 1973.

Sunley, E. & Pechman, J., «Inflation Adjustment for the Individual Income Tax», in Aaron' H. (éd.), Inflation and the Income Tax, D.C. Brookings Institute, Washington, pp. 153-66, 1976.

Tanzi, V., «A Proposal for a Dynamically Self-adjusting Personal Income Tax», Public Finance, pp. 507-519, 1966.

* «Inflation, Real Tax Revenue, aad the Case for Inflationary Finance : Theory with an Application to Argentina», International Monetary Fund Staff Papers, pp. 417-451, 1978.

Tatsos, K., «The Income Elasticity of Personal Income Tax in Greece», Spoudai, pp. 1120-40 Dec., (in greek), 1981.