

AN APPLICATION OF THE TAX RATIO OF INTENSION

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PUBLIC policy makers occasionally modify existing personal income tax legislation with the explicit intent of easing the tax burden through more generous personal maintenance allowances, leaving the tax schedule (in terms of marginal rates of tax per income bracket) unchanged. The modification of income tax structure¹ affects directly both public revenue and the disposable income of the tax-paying units.

A tax structure could be described by means of a series of ratios giving the effective rates (i.e. tax/own income) for different tax-unit statuses, whereby tax-status is defined in terms of the maintenance burdens. Such a series would become unhandy when comparative exercises are undertaken; therefore, it is helpful for certain purposes, if a summary statistic, expressing an overall view about a tax structure, were available.

Such a summary statistic is the tax-intension ratio.² The ratio is primarily intended to replace the conventional coefficients of tax-functions in estimating the 'progressiveness' of a tax structure in an economy; its value integrates the marginal tax rates and the income brackets at which the rates become effective and uses the number of taxpayers per income bracket for weighing. A macro-impression of personal income taxation in a given year is thus obtained.

However, the concept could be gainfully applied to the micro-level: to evaluate the impact of the nominal personal income tax schedules in a year or over time upon individuals in terms of varying tax-paying unit's social responsibilities (family size and health conditions) and in terms of tax-exempted allowances for basic subsistence for oneself, wife, children and/or dependents.

¹The term 'tax-schedule' refers to the series of marginal rates; 'tax structure' here stands for the marginal rates and the tax-exempted income allowances which change according to the maintenance burden of the taxpayer.

²For an explanation of this ratio see J.B. Bracewell-Milnes 'The Concept of Intension: A New Approach to the "Progressiveness" of Taxes'. (Public Finance, 1967, pp. 520-8)

The ratio varies between unity and zero; with a proportional tax of zero, starting at the origin, the ratio is unity; with a proportional tax of hundred percent raised from the first unit of income as defined by Inland Revenue Authorities, the ratio is zero. Given a tax structure and, so, a value for the Intension ratio (R_n), an increase in tax-exempted allowances raises the value of R_n while a rise in the marginal rates, with the income blocks at which they are activated remaining constant, would reduce the value of R_n .

Under this scheme a tax schedule is represented as a composite of three areas (i) the area of exemption giving the nominal value of income that forms the bulk of post-tax personal resource control per annum; (ii) the area of tax giving the value of personal funds withdrawn by the Tax Authorities; (iii) the area of intension, a buffer region between the other two. The larger this area the smaller must be one of the others.

To eliminate misconceptions in comparisons over time, we suggest that the area of exemption be held constant at its minimal value over the period under comparison. Any change in the tax schedule or the tax structure would then be apparent in the values of the areas of intension and tax. For example, if the marginal rates are raised for the same income blocks the tax area increases and the intension area falls accordingly with R_n approaching zero. On the other hand, if tax-exempted allowances are increased, the tax-schedule held unaltered, the area of tax is reduced and R_n moves towards unity.

It follows that the introduction of or additions to tax relief raises the R_n ; while an increase in the tax-burden is reflected in a fall in the ratio. The net effect of an increase in the marginal rates and in additional allowances; or of an absolute allowance rise added to changes over income blocks for which marginal rates become effective, could be obtained from the value of R_n . If R_n rises the benefits outweigh the tax burden; if R_n falls, the changes implemented operate against the tax-paying unit. Expressed in index form, the ratios constitute a ready-reckoner of the tax-payer's position over time by status (if the ratios are expressed in terms of a base year situation) or, in any given year, by relative location compared to other tax-paying units (if ratios are expressed in terms of a selected tax-unit for a base).

Of course, such indexes would not indicate where policy changes occur; they represent solely an end-result. If one is interested in the details of the change, one must refer to the actual computation data or to the effective rates series.

Besides, the ratios represent the change in a minor variable in

nominal disposable income (since the area of tax exemption is being held constant through time). However for the tax-payer free from money illusion, it is disposable real income that matters. Ideally, therefore, the ratios should be integrated to suitable deflators based upon different income groups and household units. If such indexes were available the 'real' intension area, as distinct from the nominal, could be obtained with the values being deflated accordingly prior to ratio estimates are made. A general retail-price deflator would be misleading unless it is so constructed to reflect the weights of the consumption patterns of household units within the universe, unless it is revised regularly to account for improvements in the quality of commodities, and unless a detailed break-up of tax-payers is available. A positive step would be to construct deflators that could be applied to two separate income regions: that part which falls under surtax and that part which does not and so derive a deflated value being the weighted sum of the income ranges adjusted by the relevant consumption-prices index.

The nominal reduction, if there is any, in a unit's tax burden over time should not be interpreted unqualifyingly as the betterment of a tax-payer vis-a-vis purchasing power. Rather, the rise in the R_n , summarising the overall improvement in post-tax disposable income, could be insufficient to compensate for the rise in the prices of the goods and services consumed by a tax-payer over the period. In addition, account must be taken of the extension of social goods provided in kind by the State and excluded from income-tax considerations, for example, the provision of subsidised public housing or free education. If State provided services increase as between two points in time, they could in part compensate for the rise in commodity prices in so far as the tax-payer benefits from them. A realistic image of the true 'burden' of a tax structure is not an easy objective; the ratios being suggested should consequently be regarded as the first step in a series of approximations towards real-world situations.

This note applies the above technique to personal income taxation in Malta;³ a tabulated 'history' of this tax is appended. Table 1 submits the ratios of intension for several years (when changes in income-tax legislation were introduced) by different tax-paying unit's maintenance burden and allowance claims. Two sets of ra-

³Malta is an island in the central Mediterranean; current population is about 300,000. Up to 1971 £M1 = £1 sterling; since then the £M has fluctuated vis-a-vis sterling and recent exchange rate has been £M1 = £1.20 sterling.

TABLE I

Ratios of Tax Intension by Status of Tax-Payer: 1948-1976

YEAR	(a)							
	(1) S + ME	(2) S + ME + LA	(3) S + ME + D	(4) MC + ME	(5) MC + ME + LA	(6) MC + 3CH. + ME	(7) MC + 3CH. (-9) + D + ME	(8) MC + 3CH. (-9) + ME + LA
1948	.4568	.4668	.4648	.4767	.4868	.5008	.5088	.5108
1953	.4568	.4668	.4648	.4767	.4868	.5068	.5148	.5168
1959	.4222	.4323	.4302	.4422	.4829	.4722	.4802	.4822
1963	.4145	.4245	.4225	.4345	.4444	.4645	.4725	.4745
1969	.4205	.4415	.4325	.4465	.4565 (a)	(b) (c)/(d)	.4974	.4955
					.4855	.4945 .4890	.4974	.4955
1973	.4205	.4415	.4325	.4505	.4565 .4855	.4945 .4890	.5057	.5155
1975	.4265	.4465	.4385	.4565	.4767 .4955	.5045 .4890	.5087	.5164
1976	.4259	.4452	.4375	.4596	.4789 .4971	.5058 .5014		
(b)								
1948	.2732	.3132	.3052	.3532	.3932	.4492	.4812	.4892
1953	.2732	.3132	.3052	.3532	.3932	.4732	.5052	.5139
1959	.2732	.3132	.3052	.3532	.3932	.4732	.5052	.5139
1963	.2732	.3132	.3052	.3532	.3932	.4732	.5052	.5139
1969	.2972	.3372	.3452	.4012	.4412 .5572	.5932 .5712	.6052	.5972
1973	.2972	.3372	.3452	.4012	.4412 .5572	.5932 .5712	.6052	.5972
1975	.3212	.4012	.3692	.4412	.5212 .5972	.6332 .6112	.6452	.6772
1976	.2846	.3587	.3291	.4143	.4883 .5587	.5920 .5754	.6031	.6328

NOTE:

S = Single

ME = Medical Expenses Allowance

D = Dependent

MC = Married Couple

LA = Life Assurance Allowance

Children: (a) = under nine

(b) = nine to sixteen

(c) = sixteen plus.

TABLE II

Index of Tax Intension Ratios: 1948-1976 ($R_{1948} = 100$)

(a)									
YEAR	(1) S + ME	(2) S + ME + LA	(3) S + ME + D	(4) MC + ME	(5) MC + ME + LA	(6) MC + 3CH. + ME		(7) MC + 3CH. (-9) + D + ME	(8) MC + 3CH. (-9) + ME + LA
1948	100	100	100	100	100	100		100	100
1953	100	100	100	100	100	100.20		101.18	101.18
1959	92.43	94.74	92.56	92.76	99.20	94.29		94.38	94.40
1963	90.74	93.03	90.90	91.15	91.29	92.75		92.87	92.89
					(a)	(b)	(c)/(d)	97.76	97.01
1969	92.05	96.76	93.05	93.67	93.78	96.97	98.74	97.65	97.01
1973	92.05	96.76	93.05	94.50	93.78	96.95	98.74	97.65	100.92
1975	93.37	97.85	94.35	96.55	97.88	98.94	100.74	99.64	100.74
1976	93.25	97.57	94.13	97.21	98.38	99.26	100.99	100.12	
(b)									
1948	100	100	100	100	100	100		100	100
1953	100	100	100	100	100	105.34		104.99	105.05
1959	100	100	100	100	100	105.34		104.99	105.05
1963	100	100	100	100	100	105.34		104.99	105.05
1969	108.75	107.66	113.11	113.59	112.21	124.04	132.06	127.16	122.08
1973	108.75	107.66	113.11	113.59	112.21	124.04	132.06	127.16	122.08
1975	117.60	128.10	120.97	130.84	132.55	132.95	140.96	136.06	138.43
1976	104.17	114.53	107.83	122.87	124.19	124.38	131.79	128.09	130.04

TABLE III

Index of Tax Intension Ratios: ($R_{S+ME} = 100$)

YEAR	(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)
	S+ME	S+ME+ LA	S+ME+ D	MC+ME	MC+ME+LA	MC+3CH.	+ME	MC+3CH. (-9) +D+ME	MC+3CH. (-9) +D+ME
1948	100	102.19	101.75	104.36	106.57	109.63		111.38	111.82
1953	100	102.19	101.75	104.36	106.57	110.94		112.70	113.15
1959	100	102.39	101.90	104.74	114.37	111.84		113.74	114.12
1963	100	102.41	101.93	104.86	107.21	112.06		113.99	114.48
					(a)	(b)	(c)/(d)	118.29	117.84
1969	100	104.99	102.85	106.18	108.56	115.46	117.60	116.29	118.29
1973	100	104.99	102.85	106.18	108.56	115.46	117.60	116.29	118.57
1975	100	104.69	102.81	107.03	111.77	116.18	118.29	120.87	119.44
1976	100	104.53	102.73	107.91	112.44	116.72	118.76	117.73	121.25
					(b)				
1948	100	114.64	111.71	129.28	143.92	164.42		176.14	179.06
1953	100	114.64	111.71	129.28	143.92	173.21		184.92	188.10
1959	100	114.64	111.71	129.28	143.92	173.21		184.92	188.10
1963	100	114.64	111.71	129.28	143.92	173.21		184.92	188.10
1969	100	113.46	116.15	134.99	148.45	187.48	199.60	192.19	203.63
1973	100	113.46	116.15	134.99	148.45	187.48	199.60	192.19	203.63
1975	100	124.91	114.94	137.36	162.27	185.93	197.14	190.29	200.87
1976	100	126.04	115.66	145.57	171.57	195.01	208.01	202.18	211.91

tios are introduced: one (Ia) covering income tax and surtax income regions, the other (Ib) restricted to the income tax region. As observed, with the exemption area held constant (0.35 Income) the smaller the R_n the higher the tax liability; and, conversely, as the ratio approaches unity, the disposable income that should be added to the proportion outrightly exempted from tax rises. Table II translates the absolute values in Table I into an index with R_{1948} for base; again, when the index registers an increase the nominal income at the disposal of the tax-payer rises; the opposite occurs when the intension index falls. Table III derives the relativities over time among tax-payers by using the intension ratio of the person, single, for a base in every one of the years indicated.

The tables are self-explanatory. Table IIa suggests that the net outcome of the various modifications in the general income tax structure will leave the tax-payer in 1976 with a higher tax-liability than in 1948, with the exception of the head of a household with at least three children (Columns 6, 8). However, over the income tax region (Ib) improvements favouring the tax-payer are observed, although one notes that the modifications proposed for implementation from year of assessment 1976 claws back partly or completely (in some cases) the gains for the tax-payer introduced by the changes effective from 1975. For example, for the tax-payer, single, changes proposed reduces him or her to a more burdensome position than any since 1969.

Moreover Table III shows that the relativities among tax-payers by status and maintenance burden established in 1948 have changed not so much over the £M0 – 5000 range as over the income tax range which has bettered the comparative position of the household of five that buys a life-assurance policy. Note that these same conditions minimise the income tax liability of the household while they provide the additional security in case of death of the tax-paying member in the family.

Tax relativity changes between two units should not be interpreted as discrimination against a tax-payer classified by status. The fact that relativewise the tax liability of a married couple, say, is reduced compared to that of a tax-payer, single, should not play down the reality that a husband who is obliged to support a wife is also compelled to meet specific expenses that the tax-payer, single, male or female, does not incur.

Still the above indexes could serve as a guide for policy makers if account is to be taken of the tax-relativity between tax-paying units and of the changes desirable to meet cost-of-living allowances without undue strain upon wage or salary claims, thus hope-

fully avoiding the wage-price-wage (or, price-wage-price) spiral. If it is a political party's policy that the distribution of relative tax liability should be altered, then such a policy should be explicitly stated; similarly, periodic adjustments in tax-exempted allowances should be appropriately introduced. For, unless a social money and tax illusion is assumed, it would be unrealistic for policy makers to concentrate entirely upon the revenue accruing from income taxation and failing to assess the probable reactions that could ensue from tax structure changes. Ad hoc revenue-oriented tax-exemption allowances could fail to countervail in part the upward movement of the cost of living while they could introduce distortion in a set pattern of income tax liability. The ratios and the indexes in the tables above are devices that could assist in the formation of an objective assessment of the nominal effects of changes in personal tax structures.

NOTE

Personal Income Tax in Malta: Marginal Rates, Personal Deductions and Allowances.

Marginal Tax Rates

YEAR	INCOME TAX	RATE	SURTAX
1948	Chargeable Income		Over £M2500
	£M200	10c	500 10c
	300	15c	500 12c5
	400	22c5	500 15c
	Remainder	32c5	Remainder 17c5
1959	Same as 1948		Over £M2500
			500 10c
			500 15c
			500 20c
			Remainder 25c
1964	Same as 1948		Over £M2500
			500 10c
			500 15c
			500 20c
			500 25c
			500 30c
			Remainder 32c5
1976			Over £M2700
	200	10c	Rates same as 1964
	200	15c	
	300	22c5	
	Remainder	32c5	

Personal Deductions and Allowances

Single: £M240 (1948-1968); 300 (1969-1972);
320 (1973-1974); 380 (1975) 430 (1976)

Married Couple:

£M420 (1948-1968); 540 (1969-1972)
580 (1973-1974); 680 (1975) 780 (1976)

Children:

First Child –	£M 80
Second Child –	60
Third Child –	40 (1948-1951)
Every Child –	80 (1952-1968)
Child – 9 years	110
9 – 16	125
16 +	140 (1969-1972)
Child – 9 years	130
9 – 16	145
16 +	160 (1973 onwards)

Dependents: Maximum allowance of £M 60 (1948-1968)
100 (1969-1972)
120 (1973 onwards)

Medical Expenses: £M20 per head including dependent relative (1948-1972). Since then an annual allowance up to a maximum of £M300 per family is granted, against the presentation of bills for professional, nursing, hospitalisation fees and medicinals. In addition a chronic illness allowance of £M100 per annum is granted where required.

Life Assurance: Maximum of £M100 per annum or one-sixth of total income which ever is less. (1948-1974). Since then maximum has been raised to £M200 annually.