Distribution of Income and Taxes in Slovenia and Croatia

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Abstract

This paper analyses the importance of personal income tax and social security contributions in Slovenia and Croatia. Besides estimating the redistributive effects of these taxes it also includes estimates of income inequality measures. The results suggest that Croatia experiences greater income inequality among taxpayers compared with Slovenia. In both countries the tax system reveals only a limited difference between potential and actual redistribution. The results also indicate that some types of income – especially wages – contribute a constant and high proportion to the overall inequality seen in both countries during the examined period.

Keywords: redistributive effect, income inequality, decomposition

JEL classification: D31, D33, H23, H24

1 Introduction

This paper analyses the importance of personal income tax (PIT) and social security contributions in Slovenia and Croatia. Besides estimating the redistributive effects of personal income tax and social security contributions in both countries, it also includes estimates of income inequality.

The paper is based on PIT databases from 1997 (for both countries) and 2000 for Slovenia and 2001 for Croatia. 1997 is chosen for analysis because it is the year which enables a comparison between the countries. At that time the main transitional processes were completed in both countries, as was the Croatian liberation war. In addition to the relatively recent year of 1997, another year is taken into consideration (2000 for Slovenia and 2001 for Croatia) to help examine any differences between the countries.

The results reveal that overall income inequality among taxpayers grew during this period in both countries. Croatia experienced greater inequality of both income subject to tax and net income than Slovenia. The Gini coefficient of the overall net income thus increased from 0.4032 (1997) to 0.4301 (2001) in Croatia and from 0.3194 (1997) to 0.3358 (2000) in Slovenia. The results also indicate that some types of income – especially wages – contributed a constantly high proportion to the overall inequality seen through the period. It is revealed that the personal income tax system in both countries and periods induced only a limited difference between actual and potential redistribution, this being a result of the small number and influence of elements that cause the different tax treatment of taxpayers with equal pre-tax income.

Our results are in contrast to those obtained in other studies, namely those which use overall household disposable income as a measure of income[1]. In these studies income includes not only income subject to tax but also other types of income which are tax exempt (for example, social security benefits). Čok (2003) and Stanovnik (1999) reported a reduction of inequality during the 1990s in Slovenia, while Nestić (2002) and Nestić (2005) reveal that inequality in Croatia remained unchanged in the same period.

The structure of our paper is as follows: Section 2 outlines the data and methodology, Section 3 describes the tax system in both countries, the results are presented in Section 4, while the final section offers some concluding remarks.

2 Data and methodology

Slovenia and Croatia introduced the main features of their current tax systems at the beginning of the 1990s. New personal income tax laws in both countries replaced the previous income tax systems, whereby only some categories of taxpayers (mostly the self-employed) had to submit tax returns. For those who were not self-employed, taxes were paid directly by their employers (which were mostly publicly-owned companies or institutions) and hence in practice such people did not have any contact with the tax authorities.

In Slovenia, 1991 was the first year taxpayers submitted their tax returns according to the new tax legislation. In 1993 and 1994 the PIT system was slightly modified and by 2004 had not been changed any more. In Croatia new income tax legislation was introduced in 1994 based on the concept of 'expenditure tax', while later modifications transformed this into a 'normal' (i.e. conventional) personal income tax system.

The Croatian samples cover the population of PIT payers and contain information on 102,778 (in 1997) and 122,299 (in 2001) tax units. In Slovenia, taxpayers below a certain income threshold do not submit tax returns[2] and consequently information on this part of the population is unavailable. Thus, the Slovenian samples cover the population of those filing tax returns and contain 49,983 (in 1997) and 44,959 (in 2000) tax units. Of course, the samples in either country do not allow a complete insight into income inequality, but only for the populations covered and only for those income sources which are subject to PIT.

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[1] Household disposable income reveals an opposite trend mainly due to social transfers made to households which played important roles during the transition in both countries.

[2] They are mostly individuals whose income is below the basic tax allowance and pensioners who pay personal income tax only in a small proportion due to the special tax scheme for pensions.

2.1 Measures of income at the individual taxpayer level

To achieve a comparison between the two countries, different types of income are aggregated into five groups: *(1) Wages; (2) Pensions; (3) Income from self-employment; (4) Income from contractual and part-time work; and (5) Income from property and capital.* In addition, *(6) Employees' social security contributions* and *(7) Personal income tax* are taken into account.

Incomes from sources 1-5 represent individual gross income subject to tax. After the deduction of employees' social security contributions and personal income tax, individual net income subject to tax is obtained. Employers' social security contributions and other taxes paid by the employer (for example, tax on contractual work) are omitted from our analysis.

2.2 Methodology

The influence of taxes on income inequality is estimated by inequality indices and their decomposition. Two types of decomposition are used:

2.2.1 Decomposition by income sources

In this decomposition, individual income subject to tax is split into five separate income components, with subtractions for personal income tax and employees' social security contributions. We use the following decomposition of the Gini coefficient given in Rao (1969) and Kakwani (1977) to separate the influences of different income sources on overall inequality:

(1) $$G_X = \frac{1}{\mu}\sum_{i=1}^{n}\mu_i C_i$$

G_X the Gini coefficient of the distribution of total income

μ the mean of total income

μ_i the mean of the *i*th income source

C_i the concentration index of the *i*th income source

The contribution of source *i* to the overall inequality ($coin_i$) is estimated as:

(2) $$coin_i = \frac{\mu_i}{\mu} C_i$$

2.2.2 Decomposition of the redistributive effects of taxes

The aim of this breakdown is to estimate the loss of potential income redistribution caused by the characteristics of each personal income tax system. The redistributive effect of personal income tax is measured by comparing the pre-tax and post-tax Gini coefficients following the methodology developed by Aronson, Johnson and Lambert (1994) and Aronson and Lambert (1994). This methodology was originally developed for a model in which the pre-tax income distribution can be partitioned into exact pre-tax equals groups , and the tax system does not rerank these groups nor does it (obviously) rerank the members within any group in the transition from pre-tax to post-tax income.

However, in real world data-sets such as ours, there is a lack of exact equals and groups of close equals must be formed to render the methodology operational, and this gives rise to within-groups reranking. Further, a typical tax system also causes rank reversals of entire groups. In these circumstances the methodology originally developed falls down in terms of decomposing the redistributive effect. Urban and Lambert (2005) propose a new measurement system in which three distinct forms of reranking are disentangled and the vertical and horizontal contributions are redefined. In this paper we apply this new methodology to obtain measures of vertical, horizontal and reranking effects.

The *vertical effect* is a measure of the reduction in inequality that would have occurred if the equals had been treated equally (i.e. if taxpayers with equal income pay equal tax). In

other words, it measures the progressivity effect of personal income tax. The *horizontal effect* is a measure of the loss of a redistributive effect due to the unequal treatment of equals (i.e. taxpayers with equal income). It is a direct measure of classical horizontal inequity (the unequal treatment of equals). *Reranking* represents an additional loss of redistributive effect arising from the difference in the pre-tax and post-tax rankings of taxpayers.

The model comprises a number of measures, coefficients and relations, as shown below, with much more detail and explanation being found in Urban and Lambert (2005):

Measures

$RE = G_X - G_N$	redistributive effect
$V^K = G_X - D_1$	Kakwani vertical effect
$R^{APK} = G_N - D_1$	APK-reranking[3]
$R^{WG} = D_3 - D_1$	within-group reranking
$R^{EG} = D_4 - D_3$	entire group reranking
$R^{AJL} = G_N - D_4$	AJL-reranking[4]
$V = G_X - D_5$	full vertical effect
$H = D_1 - D_5$	second type of horizontal effect
$V^{AJL} = G_X - D_6$	AJL vertical effect
$H^{AJL} = D_4 - D_6 = D_3 - D_5$	AJL-type pseudo-horizontal effect
$K_T = D_T - G_X$	Kakwani index of progressivity

Gini coefficients:

G_X for the Lorenz curve of pre-tax distribution (L_X) calculated for vector X in which the income units are ordered by their pre-tax income level

G_N for the Lorenz curve of post-tax distribution (L_N) calculated for vector N_2 in which the income units are ordered by their post-tax income level

Concentration coefficients:

D_1 from concentration curve C_1 calculated for the post-tax income vector N_1, in which every value shows the actual post-tax income of a person with pre-tax income given by the X-value in the same row

D_3 from concentration curve C_3 calculated for the post-tax income vector N_3, in which the income units are ordered by the post-tax income within each group, and the groups are ordered by their pre-tax group means

D_4 from concentration curve C_4 calculated for the post-tax income vector N_4, in which the income units are ordered by the post-tax income within each group, and the groups are ordered by their post-tax group means

D_5 from concentration curve C_5 calculated for the post-tax income vector N_5 that would obtain if, counterfactually, each income unit had its pre-tax income X reduced by the fraction *g* (the mean post-tax income of the group to which the unit belongs)

[3] APK stands for Atkinson (1980), Plotnick (1981) and Kakwani (1984).
[4] AJL stands for Aronson, Johnson and Lambert (1994).

D_6 from concentration curve C_6 calculated for the post-tax income vector N_6, obtained as a rearrangement of N_5, in which the groups are reordered by post-tax means; and within the groups the income units take the values and order as in N_5

D_T from concentration curve C_T which was calculated for vector $N_T = X - N_1$

There are several important relations between the indices defined above. The first one in formula (3) shows that the reranking effect recognised already by Atkinson, Plotnick and Kakwani (therefore 'APK-reranking'), can be decomposed into three separate terms that describe three distinct forms of reranking: within-group reranking, entire group reranking and AJL-reranking.

(3) $$R^{APK} = R^{AJL} + R^{WG} + R^{EG}$$

Only *AJL-reranking* existed in the original model. It measures the aggregate effect of rank reversals which occur when single units from different groups change their places in their transition from pre-tax to post-tax income distribution. The *within-group reranking* is an aggregate measure of reranking that occurs within close equals groups, and *entire-group reranking* measures the effect that occurs when one group has higher mean post-tax income than another with lower mean pre-tax income.

Here we present three versions of the breakdown of the redistributive effect, which is defined as the difference between pre-tax and post-tax Gini coefficients ($RE = G_X - G_N$):

(4) $$RE = V^K - R^{APK}$$

(5) $$RE = V^{AJL} - H^{AJL} - R^{AJL}$$

(6) $$RE = V - H - R^{APK}$$

The first one, shown in (4), is due to Kakwani (1984) and lacks a pure horizontal term. The decomposition in (5) extends the original AJL methodology to the close equals group scenario but does not capture within-group and entire-group rerankings (if these occur). The final one presented in (6) rests upon the newly developed, so-called, full vertical effect and 'type 2 horizontal effect', both of which are constructed *ab initio* for the close equals model. In this decomposition, as in Kakwani's, the Atkinson-Plotnick-Kakwani measure R^{APK} is the measure of reranking and it captures all three forms of reranking.

A comparison of the second and third decompositions shown in (5) and (6) reveals that the AJL horizontal effect, H^{AJL}, consists of the 'type 2 horizontal effect' and within-group reranking:

$$(7) \qquad H^{AJL} = H + R^{WG}$$

The results for all three decompositions will be presented in this paper. We recommend the third one as the best choice because the horizontal effect, H, used in (6) has the character of a person-by-person comparison of actual and smoothed post-tax incomes (which we consider a better notion of horizontal inequity), while H^{AJL} breaks this link and represents a so-called 'pseudo-horizontal' effect. The Kakwani and AJL decompositions are given for the purpose of allowing comparisons with the results of previous studies.

The following relationship between the Kakwani vertical effect, V^K, the progressivity index, K_T, and the average tax rate, t, will also be useful:

$$(8) \qquad V^K = \frac{t}{1-t} K_T$$

3 Tax systems in Slovenia and Croatia

In Slovenia general government revenue represents a lower share of GDP compared with Croatia in the 1997-2003 period. While in Slovenia the revenue-to-GDP ratio is modestly rising (from 39.3% in 1997 to 41.5% in 2003) (Ministry of Finance (Slovenia), 2005), the opposite trend is revealed for Croatia (a decline from 48.6% in 1997 to 46.6% in 2003) (Ministry of Finance (Croatia), 2003).

However, in both countries PIT represents an important budget source: 14.9% of general government revenue in Slovenia and 8.0% in Croatia (in 2003).

PIT in **Slovenia** is levied on eight categories of income: (1) *income from employment;* (2) *income from contractual work;* (3) *pensions and pension benefits;* (3) *income from*

agriculture; (5) *income from private business and professional activity;* (6) *capital gains;* (7) *income from property; and* (8) *income from property rights*.

All these income categories are taxed within the PIT system on an annual basis, while withholding taxes are charged during the year for most income sources. Each taxpayer is treated individually. In their tax return, a taxpayer provides information on all types of income subject to tax, amounts of advance PIT paid during the year, employee social security contributions and tax allowances. The tax base is taxed according to a progressive annual tax schedule which contains six tax brackets with marginal tax rates of 17%, 35%, 37%, 40%, 45% and 50%[5]. The width of the first four tax brackets is half of the average national wage, the width of the fifth is equal to the average national wage, while the sixth is open.

PIT in **Croatia** is levied on four major income categories: (1) *income from employment;* (2) *income from self-employment;* (3) *income from property and property rights;* and (4) *income from capital.*

The majority of income tax in Croatia is collected by withholding, except for income arising from self-employment. Wages, salaries and pensions (income from employment) are taxed on a monthly basis using the same technique as in the case of personal income tax in general (bands, rates, personal allowances). Other forms of income are taxed by final withholding, where corresponding flat rates are applied after standardised costs are deducted. For those who submit a tax return, the final tax base is taxed according to a progressive annual tax schedule which contained two tax brackets in 1997 and three in 2001. The marginal tax rates were 20% and 35% in 1997, and 15%, 25% and 35% in 2001.

[5] In January 2005, the new personal income tax came into effect. The tax raises the threshold for exempt income and gives higher tax allowances for children while preserving the highest marginal tax rate of 50 percent. It is based on the concept of worldwide income, introduces the taxation of interest and abolishes the generous tax allowances for income from property rights. It also introduces new mechanisms to prevent untaxed transfers of income occurring through reductions of capital (equity) to company owners. Further changes to the tax code, which are effective from January 2006, include the schedular taxation of interest, dividends and capital gains. Those types of income are not taxed with a progressive tax schedule but rather with a single 20% flat rate.

4 Results

4.1 Decomposition by income sources

In this section a decomposition by income sources is presented. As noted, the Gini coefficient (G) is used as a measure of inequality due to its suitability for decomposition by income sources. In this decomposition, personal income tax and social security contributions are regarded as negative incomes. The results are presented in Table 1.

The first column of Table 1 presents the shares of different income sources relative to the net income, which is defined as gross income less employee social security contributions less personal income tax. The concentration coefficient (C) for overall income (the last row) shows that the inequality of net income grew between 1997 and 2000 (2001) in both countries.

(Table 1 about here)

Wages are the main source of income in both countries and also the largest source of total income inequality. The contribution of wages to overall inequality fell from 0.5371 (1997) to 0.5078 (2001) in Croatia thanks to their decreasing share in total income and despite the increase in concentration. In Slovenia, wages reveal an increased share in total income as well as an increase in concentration, which resulted in the rise of their contribution to overall inequality from 0.3750 (1997) to 0.4360 (2000).

Pensions are the second most important income source in both countries. In Slovenia they are also the second biggest contributor to overall inequality. This is not a surprise since in Slovenia only pensioners with high pension levels effectively pay personal income tax (and our sample contains only those individuals whose income is above a certain level). In the period from 1997 to 2001, due to early retirements the number of pensioners in Croatia almost doubled and, consequently, the share of pensions in total income increased. With their negative concentration coefficient pensions were an income-equalizing factor in 1997, while in 2001 they made a mild positive contribution to inequality.

Regarding Table 1 it is also worth mentioning that income from property represents around 5% of total income in Slovenia, whereas in Croatia its share reached only 2% in 2001. This is due to the fact that capital gains are not taxed, and dividends were only captured by income taxation in 2001 (effectively in 2002 because dividends for 2001 were paid out in following year).

Employees' social security contributions and *personal income tax* constituted an increasing share of total income between 1997 and 2000 in Slovenia. The reason is the growing share of wages in total income (wages are the most important income form taxed by social security contributions) and the falling shares of other income sources which are not taxed (for example, pensions and income from property). Therefore, it is no surprise that the negative contribution of social security contributions to overall inequality increased along with the increased negative contribution of personal income tax.

The reverse case applies to Croatia. The share of wages in total income decreased and social security contribution rates were lowered which led to a fall in the relative burden of this tax. Concerning the PIT system, personal allowances grew faster than average pre-tax income and this also resulted in a lower average burden. Although the concentration of both taxes in Croatia rose, their contributions to reducing inequality diminished.

4.2 Decomposition of the redistributive effect of personal income tax

The previous section includes an estimation of the influence of personal income tax and social security contributions on overall inequality. In this section an alternative approach is taken following the methodology used by Wagstaff et al. (1999). This approach allows us to examine the extent of inequality reduction caused by taxes as well as the extent of the lost inequality reduction that is caused by anomalies built into the tax system, such as standardised cost connected with some types of income etc.

Aronson et al. (1994) showed that the unequal tax treatment of taxpayers reduces the potential redistributive effects of personal income tax. Different types of tax allowances,

tax credits, income exemptions and other elements of the tax system may mean that taxpayers with an equal gross income pay different amounts of tax and/or may experience different rankings in the post-tax income distribution compared with their rankings in the pre-tax income distribution.

Besides personal income tax, social security contributions also reduce income inequality. To separate the influence of these taxes two scenarios are considered. In the first one, taxes are composed of both personal income tax and employees' social security contributions[6] and the definitions of pre-tax and post-tax income do not differ from the definitions used in the previous section. The second scenario only includes personal income tax. In this case, pre-tax income is defined as gross income subject to tax minus an employee's social security contributions. The results of these decompositions are presented in Tables 2a and 2b for the respective definitions of income and taxes.[7]

(Tables 2a and 2b about here)

The vertical effect depends on both tax progressivity and the average tax rate. The relationship between these variables is given in eq. 8. The same amount of redistributive effect can be achieved through higher (lower) progressivity and a lower (higher) average tax rate. This is exactly what Figure 1 shows: each ray from the origin shows all values of the vertical effect that are obtained given the average tax rate, t, varying the amount of progressivity (measured by Kakwani's index).

(Figure 1 about here)

The markers in Figure 1 show how the Slovenian and Croatian tax systems achieved their vertical effects in the observed years. The four shaded markers on the left show the results for the first specification of pre-tax income and taxes (T=SSC+PIT). Here the progressivity is relatively low but the average tax burden is high. The empty markers on

[6] The rate of employees' social security contributions in Slovenia is 22.1% in both years and they are levied on gross wages. In Croatia the rate was 22.8% in 1997 and 20.6% in 2001.

[7] Bootstrap sampling was used to reject the null hypotheses that the values of a measure obtained for two periods/countries are different. The tests were done for the following measures: G_X, G_N, RE, K^T, V^K and R^{APK}. On the methodology see Duclos and Araar (2005) and Anderson et al. (2003).

the right correspond to the second definition of pre-tax income and taxes (T=PIT). The vertical effect is achieved with higher progressivity and a lower average tax rate.

The Croatian tax system is becoming more progressive, suggesting that taxpayers with high incomes paid relatively more tax in 2001 compared with 1997. At the same time, the average tax rate is decreasing. In Slovenia we have the opposite trend – the progressivity of taxes is decreasing while the average tax burden is rising. However, the result of these opposite movements in progressivity and average tax rate is the same for both countries: a non-increasing vertical effect. Namely, it is decreasing in Croatia for both definitions of taxes, while for Slovenia it is decreasing if the first definition of taxes is used and remains unchanged if only PIT is analysed.

Croatia experiences greater pre-tax inequality than Slovenia. The lower inequality in Slovenia can be partly explained by the fact that the bottom part of the population is not captured by samples for this country. In both countries pre-tax inequality increased over the period.[8] The two tax systems did not act as buffers that would bring post-tax inequality in the end of the period to the level of 1997. This would require a rising vertical effect while, as we saw above, the opposite happened.

The difference between the vertical effect (measured by V^K, V^{AJL} or V) and the redistributive effect (RE) measures the gap between potential and actual redistribution. Thus, in Slovenia (1997) the difference of 6.3% of RE, as shown in Table 2b, implies that personal income tax would have been 6.3% more redistributive if there were no different tax treatments.

This loss of the redistributive effect is attributed to reranking and horizontal inequity. The measures of these two effects depend on the methodology used. Kakwani's decomposition (eq. 4) only recognises the reranking effect (R^{APK}) which amounted to 6.31% of RE. If the AJL decomposition is used (eq. 5), then the horizontal effect counts for 0.60% of RE and the remainder of 5.69% of RE is due to the AJL reranking effect (R^{AJL}). However, if the decomposition (eq. 6) is used then the horizontal effect (H) is close to zero and negative,

while the reranking effect is 6.31% of RE. Remember that the reranking term (R^{APK}) in (eq. 6) captures all three forms of reranking and one of them is within-group reranking (R^{WG}), which is equal to 0.61% of RE. Having H close to zero, and with the help of relation (eq. 7), we conclude that the majority of the AJL horizontal effect (H^{AJL}) is actually a within-group reranking.

The causes of redistributive loss are rooted in the particular personal income tax systems. In Slovenia, gross pre-tax income is reduced by standardised costs connected with some types of income and for tax allowances which are in a lump-sum form and depend mostly on the personal characteristics of taxpayers (age, disability status, number of children etc.). Both elements mean that taxpayers with an equal pre-tax income may pay different tax amounts and may be ranked differently with regard to their post-tax income. Apart from tax allowances and standardised costs, the Croatian PIT system may also induce a redistributive loss due to the final withholding tax with different rates for various income types which might be effectively lower than if a taxpayer had been taxed globally.

However, the redistributive loss of both Slovenian and Croatian PIT systems is relatively low, being less than 2.5% of RE, except in Slovenia in 1997 when it amounted to 6.3% of RE.

In the other scenario, where both personal income tax and social security contributions are analysed, the redistributive loss is significantly higher (see Table 2a). However, this result may not be of particular relevance for policy-makers since it is primarily a consequence of the fact that the social security contributions are paid only by employed taxpayers, i.e. those who earn income from wages.

[8] Except in the case of pre-tax inequality in Slovenia according to the first definition, where the increase is not statistically significant at the 95% level.

5 Conclusion

The paper examines the importance of PIT and social security contributions in Slovenia and Croatia and the role of these taxes in reducing income inequality during the period 1997-2000 (2001). The analysis confirms that the inequality of income subject to tax increased during the period under consideration and that wages remained the key source of overall inequality. In spite of the enhanced role of taxes in reducing inequality, post-tax income in 2000 (2001) reveals greater inequality compared with 1997. In other words, the tax system itself was unable to shift the level of post-tax income inequality back to the level of 1997. In addition, the analysis shows that the personal income tax systems in both countries cause a certain, albeit relatively limited, difference between potential and actual redistribution. This implicitly suggests that the tax system only includes a limited set of elements that lead to the different tax treatment of taxpayers with equal pre-tax income.

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Box 1. PIT systems in Slovenia and Croatia

Slovenia	Croatia
Personal Allowance	
1997 1. Basic: SIT 190,411 for all taxpayers. 2. Seniority: SIT 138,480 if the taxpayer is above 65 years of age. 3. For dependents: SIT 173,100 for the first child, SIT 432,750 for the second etc. **2000** 1. Basic: SIT 353,000 for all taxpayers 2. Seniority: SIT 184,000 if the taxpayer is above 65 years of age. 3. For dependents: SIT 230,000 for the first child, SIT 345,000 for the second etc.	**1997** 1. Basic: HRK 9,600 for non-pensioners; HRK 24,000 for pensioners 2. For dependants: HRK 2,900 for one child; HRK 6,700 for two children etc. **2001** 1. Basic: HRK 15,000 for non-pensioners; HRK 30,000-45,000 for all people living in ASNC*; HRK 30,000 for pensioners 2. For dependents: HRK 7,500 for one child; HRK 18,000 for two children etc.
Standardised Costs	
1997 1. Rental income: 40% or 60% of receipts 2. Dividends: 40% of receipts 3. Income from property rights: 40% of receipts 4. Income from part-time and contractual work: 10% of receipts **2000** 1. Rental income: 40% or 60% of receipts 2. Dividends: 40% of receipts 3. Income from property rights: 40% of receipts 4. Income from part-time and contractual work: 10% of receipts	**1997** 1. Rental income: 30% or 50% of receipts **2001** 1. Rental income: 30% or 50% of receipts 2. Income from part-time and contractual work: 25% or 40% of receipts
Deductions	
1997 1. Premiums for additional health and pension insurance, gifts to charity etc. For all purposes together up to 3% of an individual tax base. 2. Employment incentives – part of wages for newly employed workers, disabled people and apprentices. **2000** 1. Premiums for additional health and pension insurance, gifts to charity etc. For all purposes together up to 3% of an individual tax base. 2. Employment incentives – part of wages for newly employed workers, disabled people and apprentices.	**1997** none **2001** 1. Premiums for life, additional health and voluntary pension insurance, up to HRK 12,600 2. Exemption for people carrying out an artistic or cultural activity, up to HRK 20,000 3. Exemption for the self-employed who live in ASNC*, 25%, 50% or 75% of pre-tax income 4. Employment incentives – wages of newly employed workers and apprentices
Tax Rates	
1997 SIT 0 - 860,487 17% SIT 860,487 - 1,720,973 35% SIT 1,720,973 - 2,581,461 37% SIT 2,581,461 - 3,441,947 40% SIT 3,441,947 - 5,162,920 45% > SIT 5,162,920 50% **2000** SIT 0 - 1,143,196 17% SIT 1,143,196 - 2,286,390 35% SIT 2,286,390 - 3,429,587 37%	**1997** HRK 0-28,800: 20%; > HRK 28,800: 35% **2001** HRK 0-30,000: 15%; HRK 30,000 - 75,000: 25%; > HRK 75,000: 35%

SIT 3,429,587 - 4,572,781 40% SIT 4,572,781 - 6,859,171 45% > SIT 6,859,171 50%	
Final withholding rates	
1997 none **2000** none	**1997** 1. Rental income: 25% **2001** 1. Income from contractual work: 35% 2. Rental income: 15% 3. Royalties & income from sale of real estate: 35% 4. Dividends: 15%

* ASNC - Areas of Special National Concern

** Exchange rates in 1997: EUR 1 = SIT 186.7 = HRK 6.96; in 2000(2001): EUR 1 = SIT 230.3 = HRK 7.47

Table 1: Decomposition of inequality of income subject to tax by income sources

Slovenia 1997

Income source	Share (%)	C	Share (%)*C / 100
gross wages	94.4	0.3974	0.3750
pensions	30.2	0.1939	0.0586
self-employed	5.7	0.2678	0.0153
part time / contractual	1.6	0.5518	0.0086
property	4.8	0.7279	0.0349
PIT	-16.3	0.5919	-0.0965
SSC	-20.4	0.3755	-0.0765
All	100.0	0.3194	0.3194

Slovenia 2000

Income source	Share (%)	C	Share (%)*C / 100
gross wages	122.1	0.3572	0.4360
pensions	12.8	0.4075	0.0520
self-employed	5.1	0.3686	0.0189
part time / contractual	2.7	0.2396	0.0064
property	4.9	0.7533	0.0371
PIT	-20.8	0.5807	-0.1209
SSC	-26.7	0.3502	-0.0936
All	100.0	0.3358	0.3358

Croatia 1997

Income source	Share (%)	C	Share (%)*C / 100
gross wages	104.2	0.5155	0.5371
pensions	20.7	-0.0130	-0.0027
self-employed	7.2	0.7284	0.0526
part time / contractual	4.3	0.6727	0.0289
property	1.4	0.6229	0.0085
PIT	-14.0	0.7061	-0.0988
SSC	-23.8	0.5155	-0.1225
All	100.0	0.4032	0.4032

Croatia 2001

Income source	Share (%)	C	Share (%)*C / 100
gross wages	89.1	0.5700	0.5078
pensions	26.6	0.0664	0.0177
self-employed	5.7	0.7050	0.0401
part time / contractual	4.3	0.6915	0.0301
property	1.7	0.5938	0.0102
PIT	-9.1	0.7800	-0.0711
SSC	-18.4	0.5700	-0.1046
All	100.0	0.4301	0.4301

Share (%) - share of income source in total net income
C - coefficient of concentration for income source k
Share (%)*C / 100 - contribution of income source to total inequality

Table 2a: Decomposition of redistributive effects in Slovenia and Croatia

T=SSC+PIT; X=N+SSC+PIT

	Slovenia 1997		Slovenia 2000		Croatia 1997		Croatia 2001	
		% RE		% RE		% RE		% RE
G_X	0.3722		0.3761		0.4588		0.4792	
G_N	0.3194		0.3358		0.4032		0.4301	
RE	0.0528		0.0402		0.0556		0.0491	
RE / G_X	0.1419		0.1070		0.1212		0.1026	
K_T	0.1755		0.0909		0.1609		0.1927	
t	0.2683		0.3223		0.2740		0.2155	
V^K	0.0643	121.85	0.0432	107.42	0.0607	109.21	0.0529	107.66
R^{APK}	0.0115	21.85	0.0030	7.42	0.0051	9.21	0.0038	7.66
R^{AJL}	0.0110	20.90	0.0028	6.91	0.0046	8.33	0.0034	6.84
R^{WG}	0.0005	0.88	0.0002	0.45	0.0005	0.85	0.0003	0.65
R^{EG}	0.0000	0.07	0.0000	0.05	0.0000	0.03	0.0001	0.17
V^{AJL}	0.0643	121.76	0.0432	107.36	0.0607	109.20	0.0528	107.52
H^{AJL}	0.0005	0.87	0.0002	0.45	0.0005	0.87	0.0003	0.67
R^{AJL}	0.0110	20.90	0.0028	6.91	0.0046	8.33	0.0034	6.84
V	0.0643	121.83	0.0432	107.42	0.0607	109.23	0.0529	107.68
H	0.0000	-0.01	0.0000	-0.01	0.0000	0.02	0.0000	0.02
R^{APK}	0.0115	21.85	0.0030	7.42	0.0051	9.21	0.0038	7.66

Note: Subgroups of pre-tax close equals are created using an income interval of EUR 100.

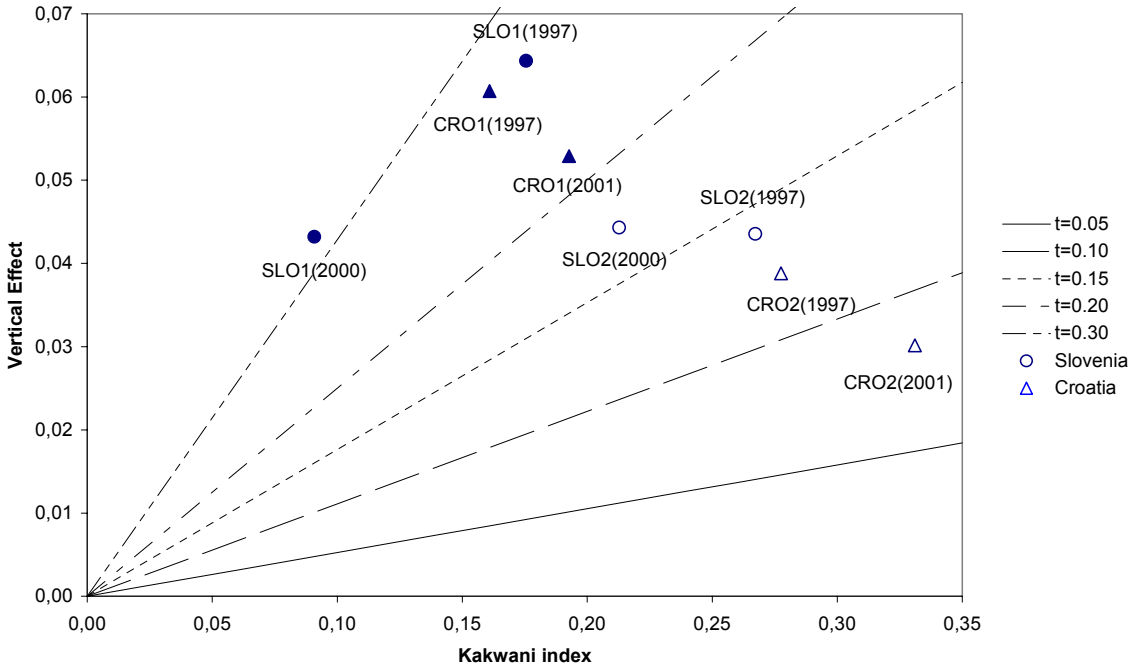
Table 2b: Decomposition of redistributive effects in Slovenia and Croatia

T=PIT; X=N+PIT

	Slovenia 1997		Slovenia 2000		Croatia 1997		Croatia 2001	
		% RE		% RE		% RE		% RE
G_X	0.3604		0.3791		0.4413		0.4598	
G_N	0.3194		0.3358		0.4032		0.4301	
RE	0.0410		0.0433		0.0380		0.0297	
RE / G_X	0.1136		0.1142		0.0862		0.0646	
K_T	0.2672		0.2128		0.2775		0.3310	
t	0.1401		0.1724		0.1227		0.0835	
V^K	0.0435	106.31	0.0443	102.35	0.0388	102.09	0.0302	101.51
R^{APK}	0.0026	6.31	0.0010	2.35	0.0008	2.09	0.0004	1.51
R^{AJL}	0.0023	5.69	0.0009	2.04	0.0006	1.60	0.0004	1.18
R^{WG}	0.0002	0.61	0.0001	0.30	0.0002	0.48	0.0001	0.32
R^{EG}	0.0000	0.01	0.0000	0.01	0.0000	0.01	0.0000	0.01
V^{AJL}	0.0435	106.29	0.0443	102.33	0.0388	102.06	0.0302	101.50
H^{AJL}	0.0002	0.60	0.0001	0.29	0.0002	0.46	0.0001	0.32
R^{AJL}	0.0023	5.69	0.0009	2.04	0.0006	1.60	0.0004	1.18
V	0.0435	106.31	0.0443	102.34	0.0388	102.07	0.0302	101.51
H	0.0000	-0.01	0.0000	-0.01	0.0000	-0.02	0.0000	0.00
R^{APK}	0.0026	6.31	0.0010	2.35	0.0008	2.09	0.0004	1.51

Note: Subgroups of pre-tax close equals are created using an income interval of EUR 100.

Figure 1. Relationship between progressivity and the redistributive effect for different average tax rate levels



Legend:

SLO1(1997)	Slovenia in 1997; T=SSC+PIT; X=N+SSC+PIT
SLO1(2000)	Slovenia in 2000; T=SSC+PIT; X=N+SSC+PIT
CRO1(1997)	Croatia in 1997; T=SSC+PIT; X=N+SSC+PIT
CRO1(2001)	Croatia in 2001; T=SSC+PIT; X=N+SSC+PIT
SLO2(1997)	Slovenia in 1997; T= PIT; X=N +PIT
SLO2(2000)	Slovenia in 2000; T= PIT; X=N +PIT
CRO2(1997)	Croatia in 1997; T= PIT; X=N +PIT
CRO2(2001)	Croatia in 2001; T= PIT; X=N +PIT