

# Tax wedge in Croatia, Austria, Hungary, Poland and Greece

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## Abstract

*The aim of this paper is to compare the tax burden on labour income in Croatia, Austria, Greece, Hungary and Poland in 2013. The Taxing Wages methodology has been applied to hypothetical units across a range of gross wages in order to calculate net average tax wedge, net average tax rate, as well as other relevant indicators. When it comes to single workers without children, the smallest tax wedge for workers earning less than the average gross wage was found in Croatia, while Poland had the smallest tax wedge for above-average wages. Due to a progressive PIT system, the tax wedge for a single worker in Croatia reaches 50% at 400% of the average gross wage, equalling that of Austria, Greece and Hungary. Tax wedges for couples with two children show a similar trend.*

*Keywords: tax burden, tax wedge, average tax rate, personal income tax, social insurance contributions, Croatia, Austria, Hungary, Poland, Greece*

## 1 INTRODUCTION

This paper investigates the tax burden on labour income in EU countries, looking into Croatia, Austria, Hungary, Poland and Greece. The paper offers a detailed account of the labour taxation components in those countries: personal income taxes (PITs), employer and employee social insurance contributions (SICs), and social family benefits. Additionally, the paper presents calculations of several tax burden indicators, defined in accordance with the Taxing Wages methodology, for each country. The indicators were calculated by using the author's microsimulation model, which allows the computation of the amounts of taxes, contributions, and social benefits for hypothetical family units in the five countries.

The key aim of this paper is to compare the average tax burdens in the five observed countries for eight hypothetical family units defined in OECD (2014). In order to gain insight into the tax burden of units earning higher personal incomes, additional detailed analyses are performed on two sets of hypothetical units – single workers and couples with two children – which are allocated a relatively wide range of gross wages.

The paper is structured as follows. Section 2 introduces some basic information about the methodology used. Section 3 offers a detailed overview of the labour taxation system in the observed countries and tax burden calculations; the net average tax wedge for single workers and couples with children across a wide range of gross wages is compared in section 4, which is followed by the conclusion section.

## 2 METHODOLOGY

### 2.1 AVERAGE WAGE

One of the basic concepts of the Taxing Wages methodology (OECD, 2014) is the average gross wage (AGW) in a specific country. The AGW is calculated based on sector-specific data, not for general economy. AGW is used to define hypothetical

units, where adult workers are allocated gross wages equal to a percentage of AGW. Table 1 shows 2013 AGW amounts that were used in this research.

**TABLE 1**

*Annual average gross wage in selected countries, 2013*

	AGW expressed in national currency	Exchange rate	AGW (in EUR)
Croatia	HRK 93,180	HRK/EUR = 7.5735	12,303
Austria	EUR 41,693	1	41,693
Hungary	HUF 2,914,514	HUF/EUR = 303.0270	9,618
Poland	PLN 41,442	PLN/EUR = 4.1945	9,880
Greece	EUR 20,604	1	20,604

*Notes: In calculation of yearly gross wage for Austria, 14 monthly wages are taken into consideration, since it is common practice that employers pay Christmas bonuses and leave bonuses equal to average monthly wages.*

*Source: (1) AGW – for Croatia: author's calculation as per CBS (2015) and Urban (2016); for other countries: OECD (2014); (2) Exchange rates – for Croatia: middle HRK/EUR exchange rate (CNB, 2016); for Hungary and Poland: OECD (2014).*

## 2.2 HYPOTHETICAL UNITS

Hypothetical units for which indicators are calculated comprise one or two adults (couple), either without children or with two children. The composition of all eight hypothetical units is shown in table 2.

**TABLE 2**

*Characteristics of observed hypothetical unit types*

Designation	Adults	Number of children	Spouse I (% of AGW)	Spouse II (% of AGW)
A-67-NC	Single worker	0	2/3 x 100	–
A-100-NC	Single worker	0	100	–
A-167-NC	Single worker	0	5/3 x 100	–
A-67-2C	Single worker	2	2/3 x 100	–
2A-100/0-2C	Couple	2	100	unemployed
2A-100/33-2C	Couple	2	100	1/3 x 100
2A-100/67-2C	Couple	2	100	2/3 x 100
2A-100/33-NC	Couple	0	100	1/3 x 100

*Note: The symbols stand for the following: AGW – average gross wage; A – adult; NC – no children; 2C – 2 children.*

*Source: OECD (2014).*

The first three hypothetical units (A-67-NC, A-100-NC, A-167-NC) constitute single workers without children whose gross wage equals 2/3, 100%, or 5/3 of AGW. Unit A-67-2C represents a single worker with two children whose gross wage equals 66.7% of AGW. The following three units represent families with two children (2A-100/0-2C, 2A-100/33-2C, 2A-100/67-2C), with Spouse I's gross wage amounting to 100% of AGW and Spouse II's wage amounting to, re-

spectively, 0, 1/3, and 2/3 of AGW. The final hypothetical unit comprises a couple without children (2A-100/33-NC), with Spouse I's gross wage amounting to 100% of AGW and Spouse II's wage amounting to 1/3 of AGW. The minimum wage in Croatia stipulated by the Regulation on Minimum Wage in 2013 exceeded 33% of the average gross wage; however, this has been disregarded in order to comply with the OECD model.

This paper introduces two units in addition to the abovementioned eight OECD typical units: single workers without children earning between 50 and 500% of AGW and couples with two children, where the author takes into account various combinations of spouses' wages, the family's total gross earning thus being between 100% of AGW and 500% of AGW (as an example, see figure 2).

### 2.3 TAX BURDEN INDICATORS

Two main tax burden indicators are used in this paper: average tax wedge and net average tax rate. Net average tax wedge is defined as the ratio of total net tax to total labour costs. Net average tax rate represents the ratio of net tax paid by the employee to gross wage.

To calculate total labour costs, total net taxes, and net taxes paid by the employee, formulas (1), (2), and (3) are used.

$$\begin{aligned}
 & \textit{Total labour cost} \\
 & = \text{gross wage} \\
 & + \text{employer SICs} \\
 & + \text{payroll taxes}
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 & \textit{Total net tax} \\
 & = \text{personal income taxes at all levels of government} \\
 & + \text{employee SICs} \\
 & + \text{employer SICs} \\
 & + \text{payroll taxes} \\
 & - \text{cash family benefits}
 \end{aligned} \tag{2}$$

$$\begin{aligned}
 & \textit{Net tax paid by the employee} \\
 & = \text{personal income taxes at all levels of government} \\
 & + \text{employee SICs} \\
 & - \text{cash family benefits.}
 \end{aligned} \tag{3}$$

In addition to the two key indicators, further two were used in the analysis: average PIT rate (ratio of PIT to gross wage) and average employee SIC rate (ratio of employee SICs to gross wage).

It is important to note that employee and employer SICs include only those payments made to the general government, while contributions paid to other funds are

not included in the analysis. For instance, the Croatian pension system rests on two pillars – the 1<sup>st</sup> and the 2<sup>nd</sup>. Employee SICs paid into the 1<sup>st</sup> pillar are general government revenue, while the 2<sup>nd</sup> pillar contributions are paid to mandatory private pension funds. Thus, the former plays a role in the tax burden calculation and the latter does not. For more information about this topic, see Urban (2016), Blažić and Trošelj (2012), OECD (2014, 2015).

### 3 OVERVIEW OF LABOUR TAXATION

#### 3.1 CROATIA

##### 3.1.1 Basic components of labour taxation in Croatia

Croatian employers and employees pay five different social insurance contributions – their 2013 rates are shown in table 3. The maximum SIC base, EUR 74,790, is stipulated for the 1<sup>st</sup> pillar pension insurance contributions (Order on SIC Base Amounts for 2013). No such maximum base amount has been defined for other contributions.

**TABLE 3**  
*SIC rates (Croatia, 2013)*

Contribution	Employee rate (% of gross wage)	Employer rate (% of gross wage)
1 <sup>st</sup> pillar pension insurance contributions	15.0	–
2 <sup>nd</sup> pillar pension insurance contributions	5.0	–
Health insurance contributions	–	13.0
Work injury contributions	–	0.5
Employment contributions	–	1.7
Total	20.0	15.2

Source: *Social Insurance Contributions Act*.

The PIT base equals the taxpayer's gross wage minus pension insurance contributions and personal allowances. Personal tax allowance is the sum of the basic personal allowance and allowance for dependent family members (table 4).

**TABLE 4**  
*Personal tax allowance (Croatia, 2013)*

Personal tax allowance	Annual amount	
	HRK	EUR
Basic personal allowance	26,400	3,486
Adult dependent	13,200	1,743
First child	13,200	1,743
Second child	18,480	2,440
Third child	26,400	3,486
Fourth child	36,960	4,880
Fifth child	50,160	6,623
Partial disability allowance	7,920	1,046
Total disability allowance	26,400	3,486

Source: *Personal Income Tax Act*.

Table 5 shows the range and rates of the three PIT bands in 2013.

**TABLE 5**  
*PIT bands and rates (Croatia, 2013)*

<b>Tax band (in EUR)</b>	<b>Tax rate (%)</b>
[0, 3,486]	12
<3,486, 13,943]	25
<13,943, +∞>	40

*Source: Personal Income Tax Act.*

Local government surtax is a tax calculated as a percentage of the PIT amount. Its rates are determined by cities and municipalities. These rates were set at between 0% and 18% (for the City of Zagreb) in 2013. For the purpose of this analysis, the local government surtax rate was set at 12%, which represents, approximately, the average local government surtax rate calculated on the basis of all Croatian cities and municipalities.

Payroll taxes are not levied in Croatia. When it comes to cash family benefits, this analysis takes into account child benefits, which is a means-tested benefit for families with children paid by the central government. Child benefit amounts depend on personal income per family member. Table 6 shows how child benefits are calculated for a family with one or two children. The benefits received by the children of a single parent increase by 15%.

**TABLE 6**  
*Child benefits: annual bands and amounts (Croatia, 2013)*

<b>Gross personal income per family member (EUR)</b>	<b>Benefit amount per child (EUR)</b>
[0, 875]	474
<875, 1,765]	395
<1,765, 2,635]	316

*Source: Child Benefits Act.*

### 3.1.2 Tax burden indicators

Detailed calculations for the eight hypothetical units in Croatia are shown in tables A1, A2 and A3 in the annex. Table 7 shows tax burden indicators. The net average tax wedge of a single parent with two children (A-67-2C) is 12 percentage points lower than the tax wedge of a single worker earning the same wage (A-67-NC), as a consequence of the child benefits the former is entitled to. Similarly, there is a 5-percentage-point difference between units 2A-100/33-2C (couple with two children) and 2A-100/33-NC (couple without children), due to the former unit's right to claim child allowance.

TABLE 7

Tax burden indicators for basic hypothetical units (Croatia, 2013), in %

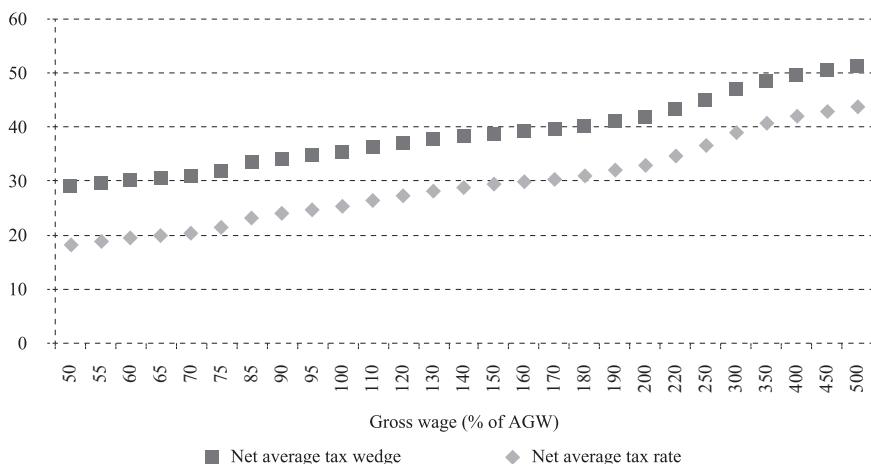
	A-67- NC	A-100- NC	A-167- NC	A-67- 2C	2A-100/ 0-2C	2A-100/ 33-2C	2A-100/ 67-2C	2A-100/ 33-NC
Average PIT rate	5.04	10.34	15.17	0.00	0.47	1.78	3.44	7.76
Average employee SIC rate	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Net average tax rate	20.04	25.34	30.17	6.13	10.33	16.78	18.44	22.76
Net average tax wedge	30.59	35.19	39.38	18.52	22.16	27.76	29.20	32.95

Source: Author's calculations.

Figures 1 and 2 outline net average tax wedge and net average tax rate trends for additional hypothetical sets of single workers and couples with two children across a wide range of gross wages. The figures clearly show that the Croatian wage taxation system is progressive, i.e. that the average tax rate grows as the gross wage increases. The net average tax wedge for single workers in the observed wage range increases from 29% to 51%. When it comes to couples with two children the tax wedge increases up to 42% for couples with gross wages amounting to 300% and 200% of AGW. The smallest tax wedge, 22%, is observed in married couples with gross wages of 100% and 0% of AGW. One can see that the tax wedge sharply rises to 28% for the next family (with 100% and 33% of AGW), due to them not being eligible for child benefits.

FIGURE 1

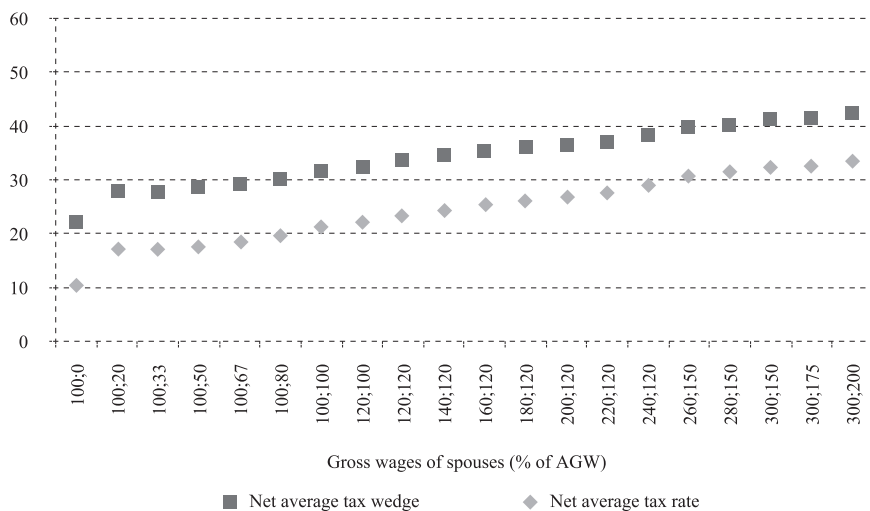
Net average tax wedge and net average tax rate for single workers without children (Croatia, 2013), in %



Source: Author's calculation.

FIGURE 2

Net average tax wedge and net average tax rate for couples with two children (Croatia, 2013), in %



Source: Author's calculation.

### 3.2 AUSTRIA

#### 3.2.1 Basic components of labour taxation in Austria

Table 8 shows social insurance contributions and rates in Austria. The maximum SIC base amounts to EUR 52,800 annually for the basic wage, while the ceiling for allowances is set at EUR 8,800.

TABLE 8

SIC rates (Austria, 2013)

Contribution	Employee SICs (% of gross wage)	Employer SICs (% of gross wage)
Health insurance	3.95	3.70
Unemployment insurance	(a)	3.00
Pension insurance	10.25	12.55
Accident insurance	–	1.40
Contribution to the labour chamber	0.50	–
Contribution for the promotion of residential building	0.50 (b)	0.50
Bankruptcy insurance	–	0.55

Notes (OECD): (a) employees' unemployment insurance rate depends on the taxpayer's monthly earnings, making it 0% for monthly gross wages lower than EUR 1,219, 1% for wages up to EUR 1,330, 2% for monthly gross wages up to EUR 1,497, and 3% for all gross wages above EUR 1,497; (b) no contributions to the labour chamber or contributions for the promotion of residential building are levied on allowances such as Christmas and leave bonus.

Source: OECD (2014).



As can be seen above, employee SICs depend on monthly gross wages and amount to between 15.2% and 18.2% of gross income, contributions on Christmas bonus and leave bonus amount to between 14.2% and 17.2% of gross income, while employer SICs amount to 21.7% of gross income for all gross wages.

A detailed account of tax reliefs applicable to the Austrian PIT system can be found in table 9.

**TABLE 9**

*PIT base reductions (Austria, 2013)*

- (1) Employee SICs and contributions levied on Christmas and leave bonuses: full amount
- (2) Work-related allowance: EUR 132
- (3) Basic annual allowance: EUR 60
- (4) Child allowance: EUR 220 per child if granted to one spouse only or EUR 132 per child if the tax relief is granted to both parents
- (5) Christmas and leave bonus allowance: EUR 620

*Source: OECD (2014).*

Just like in Croatia, a progressive tax schedule is applied in Austria. Tax bands and tax rates can be found in table 10.

**TABLE 10**

*PIT bands and rates (Austria, 2013)*

Tax band (in EUR)	Tax rate (%)
[0, 11,000]	0
<11,000, 25,000]	36.50
<25,000, 60,000]	43.21
<60,000, +∞>	50.00

*Source: KPMG (2014).*

Following the calculation of the tax liability, some taxpayers may be eligible for tax credits. There are three types of tax credit: basic employee tax credit (EUR 54 per year), commuting tax credit (EUR 291 per year), and primary earner's and sole parent's tax credit (EUR 494 per year for the first child, EUR 175 for the second child, and EUR 220 for each subsequent child). The total tax credit is limited to EUR 110 above the initially calculated personal income tax.

Payroll taxes in Austria are levied if the monthly gross wage exceeds EUR 1,095. There are two payroll taxes: the family burden equalisation contribution amounting to 4.5% of gross wage and the community tax amounting to 3% of gross wage.

Austrian taxpayers are entitled to child benefits which depend on the number of children and their age. For the purposes of this paper, the children are assumed to be between 10 and 15 years old. A fixed benefit for two children amounts to EUR 4,897.

### 3.2.2 Tax burden indicators

Table 11 shows the tax burden indicators in Austria. Average PIT rate grows as gross personal income increases, meaning that PIT is progressive. It is worth noting that the subjects of such comparisons are always the same – single workers without children or couples with two children. The contributions are proportional, until we reach higher wages, when the contributions become regressive. The tax wedge of a single parent with two children (A-67-2C) is 16 percentage points lower than the tax wedge of a single worker without children who earns the same wage (A-67-NC), which is a consequence of the impact of tax reliefs and cash benefits on families with children.

**TABLE 11**

*Tax burden indicators for basic hypothetical units (Austria, 2013), in %*

	A-67- NC	A-100- NC	A-167- NC	A-67- 2C	2A-100/ 0-2C	2A-100/ 33-2C	2A-100/ 67-2C	2A-100/ 33-NC
Average PIT rate	10.23	16.24	22.93	7.24	14.18	11.64	13.53	11.98
Average employee SIC rate	18.06	18.06	16.01	18.06	18.06	17.31	18.06	17.31
Net average tax rate	28.29	34.29	38.94	7.68	20.49	20.14	24.54	29.29
Net average tax wedge	44.46	49.12	51.92	28.51	38.42	38.15	41.56	45.24

Source: OECD (2014) and author's calculations.

Figures 3 and 4 show net average tax wedge and net average tax rate trends across a wide range of gross wages for additional sets of hypothetical single workers and couples with two children. Data for single workers (figure 3) show that the ceiling for contribution calculation is reached at 160% of average gross wage with the tax wedge starting to decline afterwards; the tax wedge thus decreases towards 50% for the highest gross wages presented in figure 3.

**FIGURE 3**

*Net average tax wedge and net average tax rate for single workers without children (Austria, 2013), in %*



Source: Author's calculation.

Net average tax wedge for couples (figure 4) has intervals where the wedge is “stagnant”, i.e. it remains the same when the wage earned by one spouse increases. The first such interval appears in the tax wedge of couples where one spouse earns 100% of AGW, while the second spouse’s wage is between 0 and 50% of AGW; the second interval starts with a couple whose gross wage is 140% and 120% of AGW. This interval continues to the end of the observed range.

**FIGURE 4**

*Net average tax wedge and net average tax rate for hypothetical units (Croatia, 2013), in %*



Source: Author's calculation.

### 3.3 GREECE

#### 3.3.1 Basic components of labour taxation in Greece

There are three types of social insurance contributions in Greece, all paid by both employees and employers (table 12). The total rate payable by employers is relatively high: 27.46%. The maximum annual SIC base is EUR 66,562.

**TABLE 12**

*SIC rates (Greece, 2013)*

Contribution	Employee SICs (% of gross wage)	Employer SICs (% of gross wage)
Social insurance (IKA)	9.22	18.43
Social insurance (ETEAM)	3	3
Other insurance funds	4.28	6.03
Total	16.50	27.46

Note: IKA and ETEAM are social insurance management funds.

Source: OECD (2014).

Deductions for social insurance contributions are the only allowance recognized in PIT base calculation. PIT bands and rates are shown in table 13.

**TABLE 13**  
*PIT bands and rates (Greece, 2013)*

<b>Tax band (in EUR)</b>	<b>Tax rate (in %)</b>
[0, 25,000]	22
<25,000, 42,000]	32
<42,000, +∞>	42

Source: OECD (2014).

Another special tax has been introduced in Greece, called “solidarity contribution”, which is calculated as a percentage of the gross wage minus employee SICs. For solidarity contribution rates, see table 14.

**TABLE 14**  
*Solidarity contribution rates (Greece, 2013)*

<b>Gross income minus SICs (in EUR)</b>	<b>Solidarity contribution (in %)</b>
[0, 12,000]	0
<12,000, 20,000]	1
<20,000, 50,000>	2
<50,000, 100,000>	3
<100,000, +∞>	4

Source: OECD (2014).

There is only one tax credit type in Greece, which is calculated as follows: let  $x$  be the gross wage. If  $x \leq 21,000$ , the tax credit will be EUR 2,100. If  $x > 21,000$ , the EUR 2,100 tax credit is reduced by EUR 100 for each EUR 1,000. Therefore, if the gross wage is EUR 30,000, the tax credit equals EUR 1,200.

No payroll taxes are levied, and there are no cash family benefits. There is, however, a unique feature which may be classified as a sort of cash benefit. If the employee is married, the employer shall increase their standard gross wage by 10%. For each child, the wage will be increased by an additional 5%. For example, if the employee is married and has two children, their gross wage will increase by 20%.

### 3.3.2 Tax burden indicators

Table 15 shows tax burden indicators in Greece. The tax wedge of a single parent with two children (A-67-2C) is higher than the tax wedge of a single worker without children earning the same wage (A-67-NC). Similarly, the tax wedge for 2A-100/33-2C (couple with two children) exceeds 2A-100/33-NC (couple without children). This is a result opposite to the one found in Croatia and in Austria, where a lower tax burden is imposed on hypothetical units with children as compared to units without children earning the same wage. The reason for this is the

special employer's child allowance in Greece. This allowance is a component of the gross wage, meaning that its effect cannot be seen in this analysis since it is based on equivalent initial gross wages.

**TABLE 15**

*Tax burden indicators for basic hypothetical units (Greece, 2013), in %*

	A-67- NC	A-100- NC	A-167- NC	A-67- 2C	2A-100/ 0-2C	2A-100/ 33-2C	2A-100/ 67-2C	2A-100/ 33-NC
Average PIT rate	3.08	9.01	18.78	5.31	12.76	9.57	10.24	7.79
Average employee SIC rate	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Net average tax rate	19.58	25.51	35.28	21.81	29.26	26.07	26.74	24.29
Net average tax wedge	36.91	41.56	49.22	38.65	44.5	42	42.52	40.6

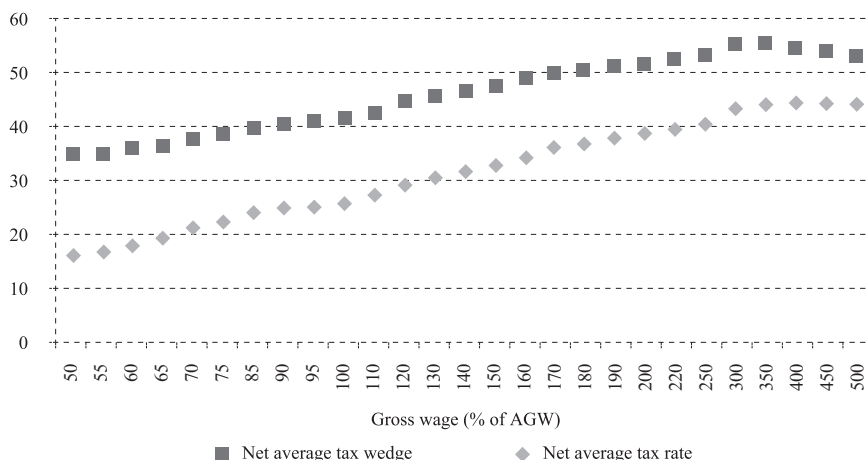
Source: OECD (2014) and author's calculations.

Figures 5 and 6 show net average tax wedge and net average tax rate trends applicable to a wide range of gross wages, for additional hypothetical sets of single workers and couples with two children. The tax wedge at relatively high gross wage levels exceeds 55% for single workers (figure 5) but starts decreasing towards 50% when 300% AGW is exceeded, due to the SIC base ceiling.

An interesting development for couples (figure 6) is a mild regressive trend of the net average tax wedge and net average tax rate, which show a decreasing tendency when couples with gross wages equalling 100 and 0% of AGW and couples with gross wages amounting to 100 and 50% AGW are observed.

**FIGURE 5**

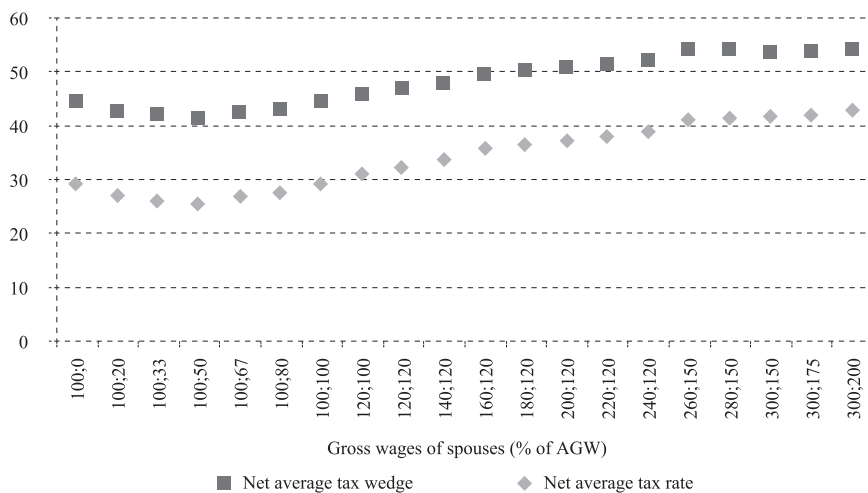
*Net average tax wedge and net average tax rate for single workers without children (Greece, 2013), in %*



Source: Author's calculation.

FIGURE 6

Net average tax wedge and net average tax rate for couples with two children (Greece, 2013), in %



Source: Author's calculation.

### 3.4 HUNGARY

#### 3.4.1 Basic components of labour taxation in Hungary

Three types of social insurance contributions, payable by employees and employers, are levied in Hungary. Just like in Greece, employer SICs are relatively high and total 27% of the gross wage. The rates are shown in detail in table 16.

TABLE 16

SIC rates (Hungary, 2013)

Contribution	Employee SICs (% of gross wage)	Employer SICs (% of gross wage)
Pension insurance	10.0	24.0
Health insurance	7.0	2.0
Unemployment insurance	1.5	1.0
Total	18.5	27.0

Source: OECD (2014).

PIT can be reduced by claiming a child allowance of EUR 206 monthly per child. PIT rate is universal and stands at 16%. There is no tax credit.

Payroll taxes amount to 1.5% of gross wage.

Cash transfers amount to EUR 98 per month for a single worker with two children and 88 EUR per month for a couple with two children.

### 3.4.2 Tax burden indicators

Table 17 shows tax burden indicators in Hungary. The tax wedge of a single parent with two children (A-67-2C) is as many as 24 percentage points lower than that of a single worker without children earning the same wage (A-67-NC). If we compare hypothetical couples 2A-100/33-2C (with two children) and 2A-100/33-NC (without children), we find a difference of 11 percentage points. Allowances in the PIT system and child benefits thus have a significant impact on the tax burden in Hungary.

**TABLE 17**

*Tax burden indicators for basic hypothetical units (Hungary, 2013), in %*

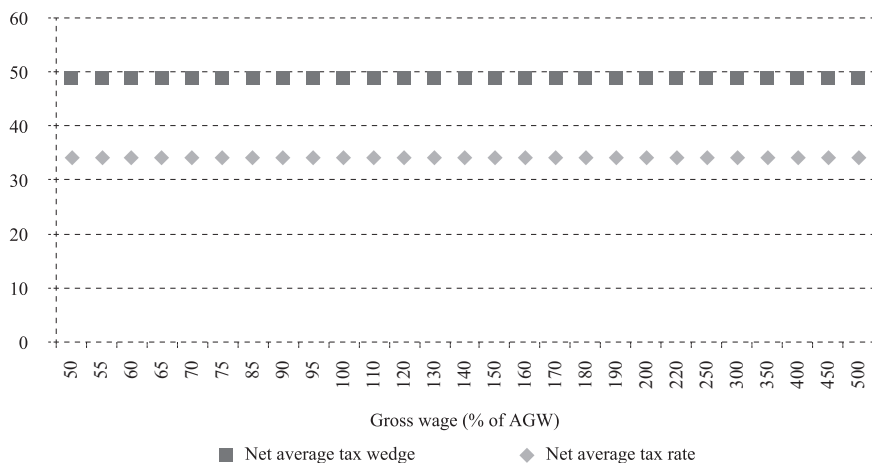
	A-67- NC	A-100- NC	A-167- NC	A-67- 2C	2A-100/ 0-2C	2A-100/ 33-2C	2A-100/ 67-2C	2A-100/ 33-NC
Average PIT rate	16.00	16.00	16.00	3.65	7.77	9.82	11.06	16.00
Average employee SIC rate	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
Net average tax rate	34.50	34.50	34.50	3.87	15.31	20.11	22.99	34.50
Net average tax wedge	49.03	49.03	49.03	25.19	34.10	37.83	40.07	49.03

*Source: OECD (2014) and author's calculations.*

The analysis of the system shows that single workers without children are not entitled to any tax reliefs, tax credit, or cash transfers; only one PIT rate and one employee SIC and employer SIC rate is applied. This makes the tax wedge and ratio of paid taxes to gross wage equal for all gross wages earned by single workers without children (table 17 and figure 7). Therefore, the Hungarian tax system is proportional for single workers without children.

**FIGURE 7**

*Net average tax wedge and net average tax rate for single workers without children (Hungary, 2013), in %*

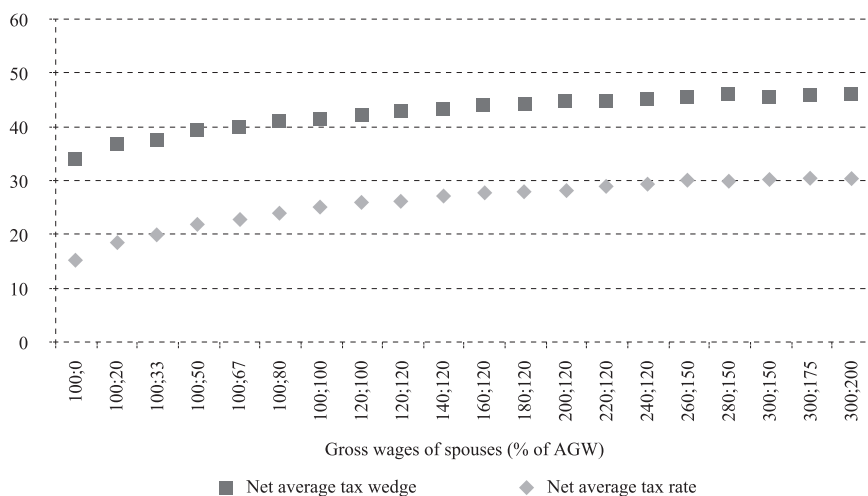


*Source: Author's calculation.*

On the other hand, the system applied to couples with children is progressive, owing to a personal allowance for dependent children and a universal child benefit (figure 8).

**FIGURE 8**

*Net average tax wedge and net average tax rate for couples with two children (Hungary, 2013), in %*



Source: Author's calculation.

### 3.5 POLAND

#### 3.5.1 Basic components of labour taxation in Poland

The basic information on SIC rates in Poland are shown in table 18. However, the relatively complicated calculation of payable contributions does not fit the simple pattern applied in most of the other observed countries. For the calculation method, see OECD (2014). Pension insurance contributions and unemployment contributions are levied on a maximum base of EUR 26,555.

**TABLE 18**

*SIC rates (Poland, 2013)*

Contribution	Employee SICs (% of gross wage)	Employer SICs (% of gross wage)
Pension insurance (ZUS <sup>a</sup> )	6.11	6.11
Pension insurance (ZUS II)	2.25	2.25
Pension insurance (OPF)	1.40	1.40
Unemployment contribution	1.50	6.50
Sickness insurance	2.45	4.17
Health insurance	9.00	–

<sup>a</sup>ZUS and ZUS II are pension fund management institutions. OPF is short for “open pension fund”.

Source: OECD (2014).



There are two different allowances in the Polish PIT system: the basic work-related relief is capped at EUR 318 for all workers, while the other relief amounts to a part of the employee's contributions and is calculated using a specific formula.

PIT calculation in Poland is based on two tax rates and two tax bands (table 19). Having applied the tax rate, the taxpayer can use three types of tax credit. The basic tax credit amounts to EUR 133 per year or EUR 265 per year for a single worker with children. The tax credit for children is EUR 133 per year for each child, if the annual gross wage received by one parent does not exceed EUR 26,700, while the threshold for the other parent is EUR 13,350. Health insurance contributions can almost entirely be claimed as tax credit.

No payroll tax is levied and no cash family benefits are received.

**TABLE 19**

*PIT bands and rates (Poland, 2013)*

Tax band in PLN	Tax rate
[0, 20,390]	18%
<20,390, +∞>	3,538 + 32%

Source: OECD (2014).

### 3.5.2 Tax burden indicators

Table 20 shows the tax burden indicators in Poland. It is noteworthy that the average PIT rate is relatively low and shows a relatively slow upward trend as the taxpayer's income grows. The tax wedge of a single parent with two children (A-67-2C) falls 5 percentage points behind that of single workers without children earning an equal wage (A-67-NC). If we compare hypothetical couples 2A-100/33-2C (with two children) and 2A-100/33-NC (without children), the difference amounts to 3.5 percentage points.

**TABLE 20**

*Tax burden indicators for basic hypothetical units (Poland, 2013), in %*

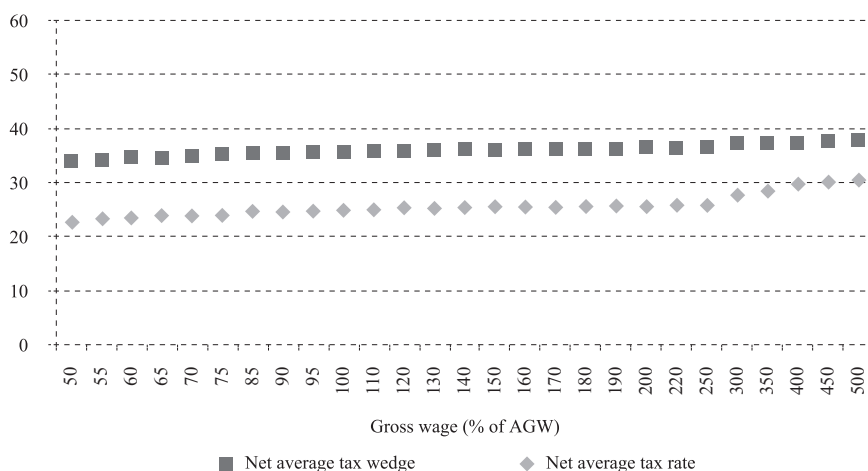
Family type	A-67- NC	A-100- NC	A-167- NC	A-67- 2C	2A-100/ 0-2C	2A-100/ 33-2C	2A-100/ 67-2C	2A-100/ 33-NC
Average PIT rate	5.96	6.92	7.69	0.00	0.22	1.94	3.32	5.96
Average employee SIC rate	17.83	17.83	17.83	17.83	17.83	17.83	17.83	17.83
Net average tax rate	23.79	24.75	25.52	17.83	18.04	19.76	21.14	23.79
Net average tax wedge	34.74	35.56	36.22	29.63	29.82	31.29	32.48	34.74

Source: OECD (2014) and author's calculations.

The Polish progressive taxation system is applied both to single workers and couples with children; however, net average tax wedge and tax rate variations across a wide range of gross wages are relatively small (figures 9 and 10).

FIGURE 9

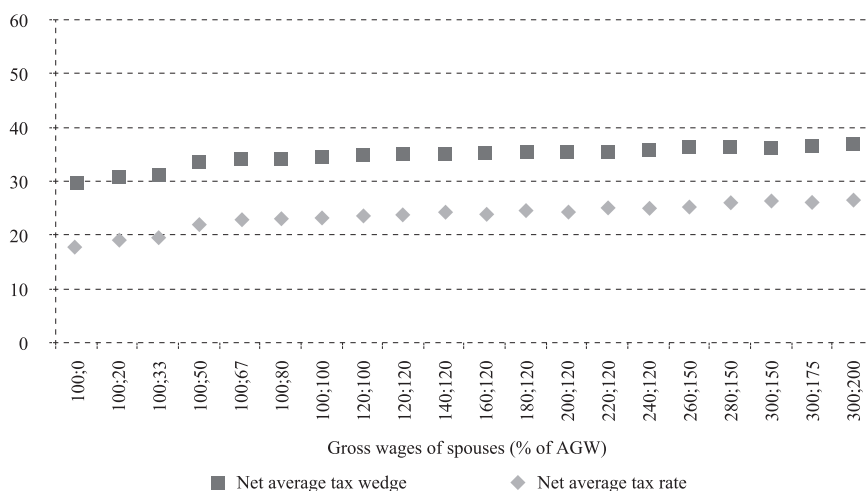
Net average tax wedge and net average tax rate for single workers without children (Poland, 2013), in %



Source: Author's calculation.

FIGURE 10

Net average tax wedge and net average tax rate for couples with two children (Poland, 2013), in %

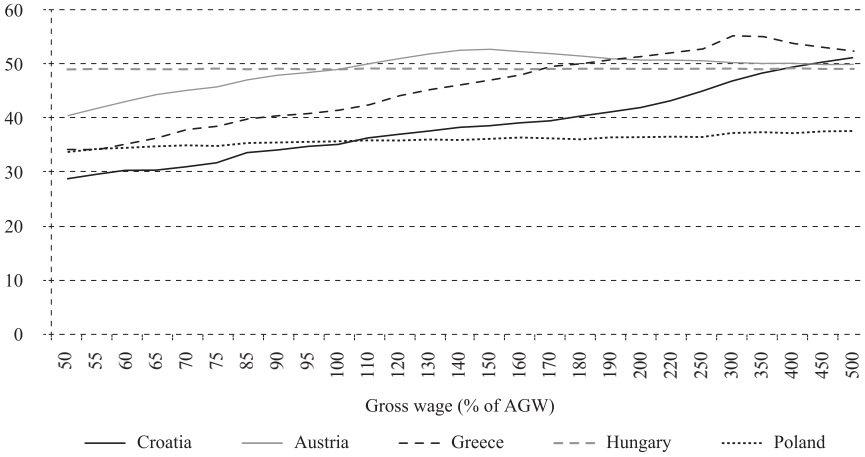


Source: Author's calculation.

#### 4 COMPARATIVE ANALYSIS

This chapter offers a comparative analysis of the results presented in chapter 3. To find out which country imposes the highest taxes on its taxpayers, we will again take a look at hypothetical couples with two children and single workers without children in order to compare the net average tax wedge.

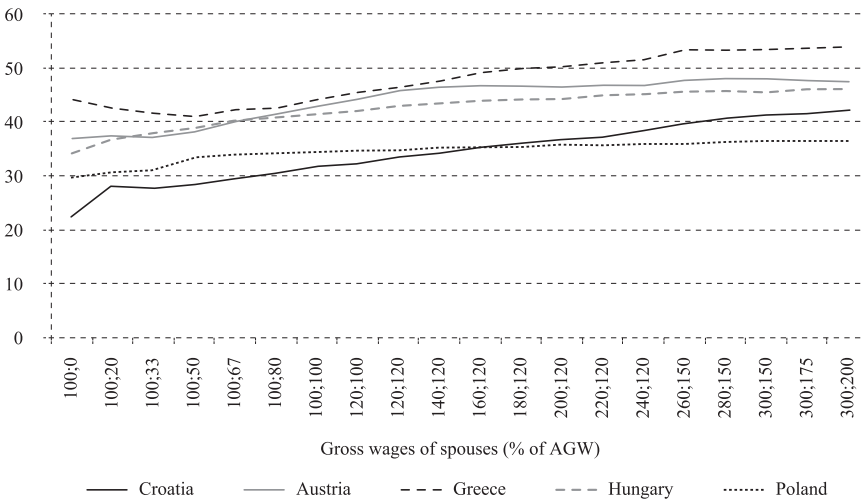
**FIGURE 11**  
*Net average tax wedge for single workers (2013), in %*



Source: Author's calculation.

The lowest tax wedge for single taxpayers earning less than 100% of AGW is found in Croatia, followed by Poland and Greece (figure 11). If we look at the interval in which the gross wage exceeds 100% of AGW, Poland's tax wedge is convincingly the lowest, while the curves indicating Hungary's, Austria's and Greece's tax wedge are "intertwined" in this interval. The Croatian tax wedge curve rises steeply in the interval indicating wages between 180% and 400% of AGW and meets the level of the aforementioned three countries as wages reach the highest amounts.

**FIGURE 12**  
*Net average tax wedge for couples with two children (2013), in %*



Source: Author's calculation.

Greece has the highest tax wedge for couples with two children at all wage levels (figure 12). Even though Hungary's and Austria's PIT systems are significantly different, it is noticeable that the two countries' tax wedges are very similar across all gross wage levels. Among the analysed countries, Croatia's and Poland's tax wedges are the lowest; as is the case for single workers, the tax wedge is initially higher in Poland, but the tax wedge in Croatia exceeds the Polish tax wedge at a certain point. When comparing figures 12 and 11, it becomes evident that the correlation between tax wedge curves for single workers and those for couples with children differs substantially. This is due to the fact that significantly different tax reliefs and cash benefits for families with children apply.

## 5 CONCLUSION

The aim of this paper was to compare the average tax burden imposed on taxpayers in Croatia, Austria, Greece, Hungary and Poland. OECD data and methodology presented in OECD's Taxing Wages publication were used to calculate indicators for the eight hypothetical family units defined by the OECD. Moreover, such indicators were calculated for a number of other hypothetical units across a wide range of gross wages in order to gain an insight into the tax burden at higher income levels. A microsimulation model for hypothetical units across all five countries developed by the author specifically for this research was used for the above calculations.

Even though the observed countries are geographically relatively close and are all EU members, substantial differences in the labour income taxation systems are found. Each of the countries has its own unique features. For instance, Poland's system for calculating social insurance contributions is relatively complicated; Hungary has only one PIT rate; Greece lacks the usual child benefits: instead, employers increase the employee's gross wage by a certain percentage for each child; there is no tax credit in Croatia, but taxpayers are entitled to child benefits (which are means-tested), etc.

In spite of the differences in the taxation systems, some countries follow similar patterns and have similar net average tax wedge levels for different wage levels (for instance, Hungary and Austria in the case of couples with children). The comparison of hypothetical units with and without children has shown that the relative amounts of tax reliefs and child benefits differ among countries.

The analysis has also shown that Croatia has the lowest net average tax wedge for single workers with lower wages, while the tax wedge for single workers with above-average wages is lowest in Poland. However, it is worth noting that both Polish and Croatian taxpayers pay additional social insurance contributions which are not included in the tax burden calculations under the methodology used in this paper (see Urban, 2016).

The analysis of a wide range of income levels sheds a brighter light on the Croatian tax wedge pattern: even though the tax wedge for low gross wages is relatively low, it sharply increases to reach the same level as that of other countries (Austria, Hungary and Greece) for higher wages.

## REFERENCES

1. CBS, 2015. *DZS website*. [online] Available at: <<http://www.dzs.hr/>>.
2. Child Benefits Act (Zakon o doplatku za djecu), NN 94/01, 138/06, 107/07, 37/08, 61/11, 112/12, 82/15. [online] Available at: <<http://www.zakon.hr/z/475/zakon-o-doplatku-za-djecu>>.
3. KPMG, 2014. *2014 KPMG International Annual Review*. [online] Available at: <<http://www.kpmg.com/TW/zh/Documents/2014/international-annual-review-2014.pdf>>.
4. OECD, 2014. *Taxing Wages 2014*. Paris: OECD.
5. OECD, 2015. *Non-tax compulsory payments as an additional burden on labour income*. [online] Available at: <[http://www.oecd.org/tax/tax-policy/Non-tax-compulsory-payments\\_2014.pdf](http://www.oecd.org/tax/tax-policy/Non-tax-compulsory-payments_2014.pdf)>.
6. Personal Income Tax Act (Zakon o porezu na dohodak), NN 177/04, 73/08, 80/10, 114/11, 22/12, 144/12, 43/13, 120/13, 125/13, 148/13, 83/14, 143/14. [online] Available at: <<http://www.zakon.hr/z/85/Zakon-o-porezu-na-dohodak>>.
7. Social Insurance Contributions Act (Zakon o doprinosima), NN 84/08, 152/08, 94/09, 18/11, 22/12, 144/12, 148/13, 41/14, 143/14. [online] Available at: <<http://www.zakon.hr/z/365/Zakon-o-doprinosima>>.
8. Urban, I., 2016. Tax wedge on labour income in Croatia and the European Union. *Financial Theory and Practice*, 40(2), pp. 157-168. doi: 10.3326/fintp.40.2.1

## TAX AND CONTRIBUTION CALCULATIONS FOR THE EIGHT HYPOTHETICAL FAMILY UNITS IN CROATIA

TABLE A1

*Elements of tax burden indicator calculation: part 1 (Croatia, 2013)*

	A-67-NC	A-100-NC	A-167-NC	A-67-2C
1. Gross wage	8,202	12,303	20,505	8,202
2. Employee SICs	1,640	2,461	4,101	1,640
2.1. Paid into the 1 <sup>st</sup> pension insurance pillar	1,230	1,845	3,076	1,230
2.2. Paid into the 2 <sup>nd</sup> pension insurance pillar	410	615	1,025	410
3. Personal income tax	369	1,136	2,777	0
3.1. Tax base reductions	5,126	5,947	7,587	9,309
3.1.1. Employee SICs	1,640	2,461	4,101	1,640
3.1.2. Personal allowance	3,486	3,486	3,486	7,669
3.2. PIT base	3,076	6,357	12,919	0
4. Local government surtax on PIT	44	136	333	0
5. Total personal income taxes	413	1,272	3,110	0
6. Child benefits	0	0	0	727
7. Net wage	6,148	8,570	13,295	7,289
8. Employer SICs	1,247	1,870	3,117	1,247
9. Total employee taxes (= 2.1 + 5 – 6)	1,643	3,117	6,186	503
10. Total employee and employer taxes (= 8 + 9)	2,890	4,987	9,303	1,750
11. Total labour cost (= 1 + 8)	9,449	14,174	23,623	9,449
12. Net average tax rate (= 9 / 1 x 100)	20.04	25.34	30.17	6.13
13. Net average tax wedge (= 11 / 12 x 100)	30.59	35.19	39.38	18.52

*Note: According to the Taxing Wages methodology (OECD, 2014), employee SICs paid into the 2<sup>nd</sup> pension insurance pillar are not tax levies and are therefore not included in item 9.*

*Source: Author's calculations.*

TABLE A2

Elements of tax burden indicator calculation: part 2 (Croatia, 2013)

	2A-0/100-2C			2A-100/33-2C		
	A1	A2	Total	A1	A2	Total
1. Gross wage	12,303	0	12,303	12,303	4,101	16,404
2. Employee SICs	2,461	0	2,461	2,461	820	3,281
2.1. paid into the 1 <sup>st</sup> pension insurance pillar	1,845	0	1,845	1,845	615	2,460
2.2. paid into the 2 <sup>nd</sup> pension insurance pillar	615	0	615	615	205	820
3. Personal income tax	52	0	52	261	0	261
3.1. Tax base reductions	11,872	0	11,872	10,130	4,306	14,436
3.1.1. Employee SICs	2,461	0	2,461	2,461	820	3,281
3.1.2. Personal allowance	9,412	0	9,412	7,669	3,486	11,155
3.2. PIT base	431	0	431	2,174	0	2,174
4. Local government surtax on PIT	6	0	6	31	0	31
5. Total personal income taxes	58	0	58	292	0	292
6. Child benefits	632	0	632	0	0	0
7. Net wage	10,417	0	10,417	12,831	0	12,831
8. Employer SICs	1,870	0	1,870	1,870	623	2,493
9. Total employee taxes (= 2.1 + 5 – 6)	1,271	0	1,271	2,137	615	2,752
10. Total employee and employer taxes (= 8 + 9)	3,141	0	3,141	4,007	1,238	5,245
11. Total labour cost (= 1 + 8)	14,174	0	14,174	14,174	4,725	18,899
12. Net average tax rate (= 9 / 1 x 100)			10.33			16.78
13. Net average tax wedge (= 11 / 12 x 100)			22.16			27.76

Note: (a) see the note under table A1; (b) A1 – Spouse I, A2 – Spouse II, “Total” – sum of values for Spouse I and Spouse II.

Source: Author’s calculations.

TABLE A3

Elements of tax burden indicator calculation: part 3 (Croatia, 2013)

	2A-100/67-2C			2A-100/33-NC		
	A1	A2	Total	A1	A2	Total
1. Gross wage	12,303	8,202	20,505	12,303	4,101	16,404
2. Employee SICs	2,461	1,640	4,101	2,461	820	3,281
2.1. paid into the 1 <sup>st</sup> pension insurance pillar	1,845	1,230	3,075	1,845	615	2,460
2.2. paid into the 2 <sup>nd</sup> pension insurance pillar	615	410	1,025	615	2,015	2,630
3. PIT	261	369	630	1,136	0	1,136
3.1. Tax base reductions	10,130	5,126	15,256	5,947	4,306	10,253
3.1.1. Employee SICs	2,461	1,640	4,101	2,461	820	3,281
3.1.2. Personal allowance	7,669	3,486	11,155	3,486	3,486	6,972
3.2. PIT base	2,174	3,076	5,250	6,357	0	6,357
4. Local government surtax on PIT	31	44	75	136	0	136
5. Total personal income taxes	292	413	705	1,272	0	1,272
6. Child benefits	0	0	0	0	0	0
7. Net wage	15,699	0	15,699	11,851	0	11,851
8. Employer SICs	1,870	1,247	3,117	1,870	623	2,493
9. Total employee taxes (= 2.1 + 5 – 6)	2,137	1,643	3,780	3,117	615	3,732
10. Total employee and employer taxes (= 8 + 9)	4,007	2,890	6,897	4,987	1,238	6,225
11. Total labour cost (= 1 + 8)	14,174	9,449	23,623	14,174	4,725	18,899
12. Net average tax rate (= 9 / 1 x 100)			18.44			22.76
13. Net average tax wedge (= 11 / 12 x 100)			29.20			32.95

Note: (a) see the note under table A1; (b) A1 – Spouse I, A2 – Spouse II, “Total” – sum of values for Spouse I and Spouse II.

Source: Author’s calculations.