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Tax burden on labour income of young persons

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Systematic reduction of the tax burden on labour income in the period between 2014 and 2021 led to a drop in the average tax wedge by 4.2 percentage points. The analysis by age group shows that persons under the age of 30 experienced a larger reduction of the average tax wedge than the other age groups, primarily due to the introduction of reliefs for young workers in the systems of social insurance contributions and personal income tax.¹

Tax burden on labour income is a frequent topic for discussion in Croatia. For the past twenty years the representatives of entrepreneurs and labour unions, as well as many economists, have been highlighting the problem of a high tax burden on labour

¹ This Note is an outcome of the project “Impact of taxes and benefits on income distribution and economic efficiency” (IP-2019-04-9924) financed by the Croatian Science Foundation (HRZZ).



income, emphasising that the share of social insurance contributions and personal income tax in the total cost of labour is too high.

Since 2015, the government has been gradually introducing reductions to the relative tax burden on employment income by modifying various elements and parameters of the social insurance contributions and personal income tax systems – bases, rates, reliefs and definitions of non-taxable income items.² While some changes to the contribution rates and tax rates were applicable across the board, others were aimed at specific groups of taxpayers. The latter includes two reliefs aimed at young workers: employer social insurance contribution relief (introduced in 2015) and personal income tax relief for young workers (introduced in 2020). Due to these two specific reliefs, the average tax burden of young workers in Croatia is substantially lower than that of workers from other age groups. This is one of the main conclusions of this paper, which analyses the average tax wedge per age group in the period between 2014 and 2021.³

² A summary overview of the main changes is provided in Appendix 1.

³ The analysis is related to the [research](#) conducted by the Institute of Public Finance in 2020, which devised the method for calculating the tax wedge for employment income in Croatia by using administrative tax data and analysed tax wedge in the period between 2014 and 2018. The main results of this research have been presented in the paper by [Bezeredi, Bratić and Urban \(2022\)](#). The present analysis slightly changes the scope of workers analysed, hence the results of the two pieces of research are not fully comparable.

Definition of tax wedge

Tax wedge is the most popular indicator for measuring the tax burden on labour income. Paying a worker their salary entails payment of various mandatory levies, which reduce the worker's net salary while increasing the employer's overall cost. The indicator is calculated as follows:

$$\text{Tax wedge} = \text{total tax burden} / \text{total cost of labour},$$

and is expressed in percentage terms. The total cost of labour equals the sum of taxable income (i.e., gross salary), non-taxable income and employer social insurance contributions. The total tax burden includes employer and employee social insurance contributions and personal income tax and surtax.⁴

Average tax wedge in the period 2014-2021

The average tax wedge for the entire population of workers decreased from 34.0% in 2014 to 29.8% in 2021, or by 4.2 percentage points (Table 1). The largest tax wedge drop was recorded in the 18-25 and 26-30 age groups (7.0 and 7.7 percentage points respectively). These two age groups recorded the lowest tax wedge

⁴ Let us take, as an example, a worker with a monthly gross salary of EUR 800 in 2023, without non-taxable receipts. The worker has no dependants and resides in a local government unit with a 0% surtax rate. Employer (i.e., health insurance) contributions amount to EUR 132, employee (pension insurance, pillars I and II) contributions amount to EUR 160, while personal income tax equals EUR 21.82. This worker receives a net salary in the amount of EUR 618.18 (= 800 - 160 - 21.82). The total tax burden equals EUR 313.82 (= 132 + 160 + 21.82), while the total cost of labour equals EUR 932 (= 800 + 132). Ultimately, this hypothetical worker's tax wedge amounts to 33.7% (= 313.82 / 932).

values throughout the observed period, while the gap between them and the other age groups has been gradually increasing.⁵

Table 1. Average tax wedge (%)

| Age group | 2014 | 2015 | 2017 | 2019 | 2021 | Diff. (in p.p.) |
|-----------|------|------|------|------|------|-----------------|
| 18 to 25 | 30.3 | 28.6 | 26.9 | 25.7 | 23.4 | -7.0 |
| 26 to 30 | 33.0 | 31.6 | 29.3 | 27.9 | 25.3 | -7.7 |
| 31 to 40 | 34.0 | 33.2 | 32.2 | 31.4 | 30.5 | -3.5 |
| 41 to 50 | 34.4 | 33.6 | 32.7 | 32.1 | 31.4 | -3.0 |
| 51 to 60 | 35.2 | 34.3 | 33.3 | 32.7 | 31.9 | -3.3 |
| over 61 | 36.7 | 35.5 | 34.4 | 33.2 | 32.0 | -4.7 |
| Total | 34.0 | 33.0 | 31.7 | 30.9 | 29.8 | -4.2 |

Note: The column "Diff. (in p.p.)" represents the difference between 2021 and 2014 expressed in percentage points. The results for 2016, 2018 and 2020 have been omitted for conciseness.

Source: Author's calculations based on Tax Administration data.

The fact that the average tax wedge of a certain age group in a specific year equals X% does not mean that the tax wedge of all persons in this age group equals X%. Namely, each subgroup is characterised by great variety regarding tax wedge values, which calls for an analysis of its distribution within each group. Data for the initial and final year of analysis (2014 and 2021, respectively) have been divided into five groups based on the tax wedge value (Table

⁵ The present analysis pertains to the tax burden on income generated through employment, i.e., working for an employer for a salary. Therefore, it excludes other forms of labour, for instance student labour, which is quite widespread in the young community. [Bezeredi, Bratić and Urban \(2022\)](#) highlight that any analysis of tax burden should include all types of income, which would provide a more accurate overview of the tax burden on young people.

2). Let us first observe the distribution for all workers (row “Total”). In 2014, 9% of workers could be classified in the “very high” wedge group (above 42.5%), while only 2.8% had “very low” tax wedge levels (below 22.5%). For the majority of workers (82%), the tax wedge lay somewhere between 27.5 and 42.5%. The situation in 2021 is very different, with only 1.7% of workers classified in the very high wedge group (above 42.5%) and as many as 12.2% belonging to the very low tax wedge (below 22.5%). Almost half of all workers between the ages of 18 and 25, as well as more than one-third of those in the 26 to 30 age group, recorded very low tax wedge levels (below 22.5%) in 2021.

Table 2. Distribution of tax wedge (in percentage of employees from each age group)

(a) 2014

| Age group | Tax wedge (in %) | | | | |
|-----------|------------------|-----------|-----------|-----------|--------|
| | < 22.5 | 22.5-27.5 | 27.5-32.5 | 32.5-42.5 | > 42.5 |
| 18 to 25 | 11.4 | 9.7 | 54.8 | 21.7 | 2.4 |
| 26 to 30 | 3.7 | 7.5 | 43.8 | 39.6 | 5.4 |
| 31 to 40 | 2.0 | 6.6 | 41.0 | 41.1 | 9.2 |
| 41 to 50 | 1.4 | 5.3 | 40.5 | 42.7 | 10.0 |
| 51 to 60 | 1.4 | 4.4 | 33.6 | 49.6 | 11.0 |
| over 61 | 1.4 | 3.4 | 28.1 | 48.9 | 18.2 |
| Total | 2.8 | 6.1 | 40.5 | 41.5 | 9.0 |

(b) 2021

| Age group | Tax wedge (in %) | | | | |
|-----------|------------------|-----------|-----------|-----------|--------|
| | < 22.5 | 22.5-27.5 | 27.5-32.5 | 32.5-42.5 | > 42.5 |
| 18 to 25 | 46.2 | 23.1 | 29.1 | 1.5 | 0.1 |
| 26 to 30 | 34.8 | 24.7 | 31.6 | 8.8 | 0.1 |
| 31 to 40 | 7.4 | 19.0 | 41.3 | 30.9 | 1.4 |
| 41 to 50 | 3.3 | 16.9 | 44.0 | 33.5 | 2.2 |
| 51 to 60 | 2.9 | 14.7 | 41.9 | 38.2 | 2.4 |
| over 61 | 6.0 | 12.9 | 39.3 | 38.4 | 3.4 |
| Total | 12.2 | 18.2 | 39.7 | 28.2 | 1.7 |

Note: Due to rounding-off of numbers, sums in individual rows may not equal 100.

Source: Author's calculations based on Tax Administration data.

A reasonable question to ask is what causes these tax wedge differences between various age groups. This question can be answered if we analyse the structure of the average tax wedge according to three types of mandatory levies (employer social insurance contributions, employee social insurance contributions and personal income tax and surtax) and three age groups (41-50, 26-30 and 18-25) (Graph 1).

Graph 1 shows that the largest share of the tax burden in the entire period analysed is taken up by employee social insurance contributions, i.e., pension insurance contributions. We can also notice that the share of the employee social insurance contributions has been more or less constant throughout the period, at approximately 16%. This stability is not surprising, since the statutory pension insurance contribution rates have not changed in the analysed period nor have they been subject to reliefs or exemptions for specific groups of taxpayers.

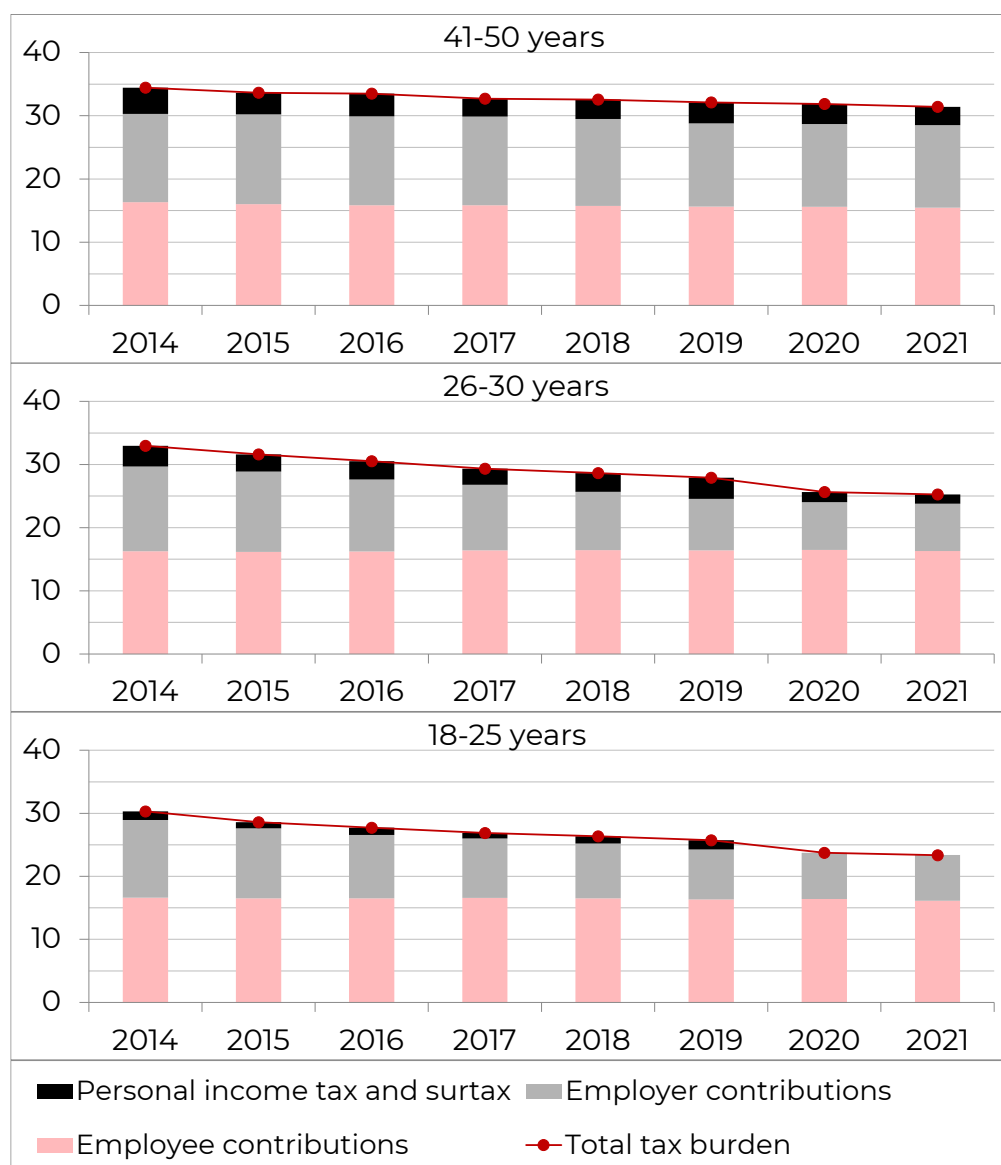
On the other hand, the share of employer social insurance contributions gradually decreased during the analysed period and fell by two percentage points in total. The reasons behind this fall include the following: (1) reduction of the overall employer social insurance contribution rate from 17.2% to 16.5% and (2) introduction of relief for young persons.⁶ The former measure affected all employees, while the latter applied only to workers under the age of 35.⁷

When compared to the social insurance contributions, the share of personal income tax and surtax in the tax wedge seems quite modest, undergoing reductions in the 2014-2021 period from 4.0 to 2.6 percentage points. The share of personal income tax in the tax wedge of the youngest workers (those in the 18-25 age group) is very low, due to their relatively lower income. However, thanks to the young persons' tax relief, the share of personal income tax in 2020 and 2021 dropped to zero. For the 26-30 age group, the share of personal income tax in the average tax wedge equalled 3.3 percentage points before the introduction of the relief, declining to 1.5 percentage points after its introduction.

⁶ Even though the current Note refers only to the main employer social insurance contributions (health insurance, occupational health and safety and employment contributions), the analysis also included other contributions arising from employment (see Articles 12 to 17 of the Contributions Act).

⁷ Young persons' relief is not the first measure of its kind in the mandatory contributions system. A similar relief was introduced in 2009 for "first-time employees", while in 2012 it was extended to include new recruits. However, unlike the two earlier measures above, which attracted a relatively small number of beneficiaries, the young persons' relief became extremely popular with both employers and young employees. The number of beneficiaries of this measure in late 2015 was around 23,000, increasing in a linear manner ever since, only to reach more than 165,000 beneficiaries in late 2022 (Croatian Pension Insurance Institute (HZMO), 2022. [HZMO Statistical Review](#), No. 10).

Graph 1. Decomposition of the average tax wedge (in %)



Source: Author's calculations based on the Tax Administration data.

Labour supply and average salary

Even though this paper addresses the tax burden on labour income, it would be useful to look back at some indicators that are connected to the tax wedge in the economic literature, primarily

the number of employees, average salary, number of hours of work and average hourly wage (see Appendix 2). For instance, the analysis of the 2014-2021 period leads to the following conclusions:

- The overall number of employees increased by around 150,000 (10.9%), with the majority of new employees recruited from the above-40 age group (Table D1-a). The number of employees in the 18-25 age group increased by 24,000 (18.7%) but decreased in the 26-30 age group (by 7,000) and 31-40 (by 5,000).
- The average annual salary increased for all age groups, with youngest workers benefitting from the highest increase: 65.8% for the 18-25 age group and 43.1% for the 26-30 age group (Table D1-b).
- The increase in the average annual salary can be explained by changes to the number of hours of work in a year and the hourly wage rate (Tables D1-c and D1-d). For workers between 18 and 25 years of age, the average number of hours worked increased by 11.5%, while their average hourly wage increased by 48.7%. For workers between the ages of 26 and 30, the number of hours of work increased by 2.3%, while their average hourly wage increased by 39.8%.

Conclusion

The main objectives of the young persons' social insurance contribution relief were to “reduce young persons' unemployment rates and secure their permanent employment as much as possible”, while the primary objective of the personal income tax

relief was to “create a stimulating environment for young persons to prevent their emigration from Croatia”.⁸

Data by the Croatian Bureau of Statistics show that the unemployment rate of young persons (age 15 to 29) decreased from 32% in 2014 to 17% in 2021, while their employment rate increased from 35% to 42% in the same period.⁹ Migration indicators for this age group also improved. At the peak of the emigration trend (2017), the number of young persons (15-29 years of age) who emigrated abroad exceeded the number of immigrants by 8,700. On the other hand, in 2021 the number of immigrants exceeded the number of emigrants by 300.¹⁰

However, drawing conclusions solely on the basis of these data would be hasty. To answer the question as to how successful and efficient these reliefs truly are, we should, among other things, do the following: (a) assess the impact of other factors that might have an effect on unemployment and migration; (b) compare the effects on younger age groups with the effects on other age groups; (c) estimate the costs of the reliefs in the form of lost budget revenue; and (d) assess the effects of alternative tax reform scenarios on employment rates, salaries and budget, etc. The analysis presented in the current paper, and the data on which it is based, may serve as the basis for a more elaborate study.

⁸ For details, see [Proposal of the Law on Amendments to the Law on Contributions](#) (from November 2014) and [Proposal of the Law on Amendments to the Income Tax Act](#) (from November 2019).

⁹ Croatian Bureau of Statistics, 2022. [Statistics in Line: Employment – Active population](#), Table 9.1.3. Indicators of population activity by age and sex.

¹⁰ Croatian Bureau of Statistics, 2022. [Migration of Population of Republic of Croatia](#), various years.

What can be ascertained is that young persons' reliefs in the systems of social insurance contributions and personal income tax successfully reduced the relative tax burden. Namely, in the period between 2014 and 2021, the average tax wedge for the 18-25 age group decreased by 7.0 percentage points and 7.7 percentage points for the 26-30 age group. These drops are almost twice as high as the fall for the entire working population, whose average tax wedge fell by 4.2 percentage points.

Unfortunately, there is no similar research on the topic of tax wedge available for other European countries, so we are unable to rank Croatia on the tax wedge ranking list.¹¹ However, in regard to young people, we can hypothesise, for some future analyses, that Croatia's tax wedge for young workers is one of the lowest in the European Union.¹²

¹¹ Urban, Čok and Verbič (2019) compared the average tax wedge in Croatia, Slovenia and Slovakia, but they used survey data.

¹² Special reliefs for young workers are quite rare. For instance, Poland introduced a 100-percent reduction of personal income tax for persons under the age of 26.

APPENDIX

Appendix 1. Main changes to social insurance contributions and personal income tax systems between 2014 and 2021

Social insurance contributions:

- 2015 saw the introduction of a relief whereby employers were exempt from paying social insurance contributions for “young persons” (i.e., workers employed on a permanent basis who were under the age of 30 at the moment of employment) for a 5-year period;
- 2019 saw the abolishment of occupational health and safety and employment contributions, as well as an increase in the health insurance contribution rate, which resulted in the overall employer social insurance contribution rate being reduced from 17.2% to 16.5%.

Personal income tax:

- In 2015, the threshold for applying the highest marginal rate was raised from EUR 1,168.00 to 1,751.90 (HRK 8,800 to 13,200) per month, while personal deduction rates were also moderately raised;
- 2017 saw an additional increase in personal deduction rates, the number of tax rates was reduced from three (12, 25 and 40%) to two (24 and 36%). The threshold for applying the highest rate was raised to EUR 2,322.65 (HRK 17,500) per month, and further lifted to EUR 3,981.68 (HRK 30,000) in 2019;

- 2020 saw the introduction of relief for young persons which reduced the personal income tax obligation by 50% for persons between the ages of 26 and 30 and by 100% for persons between 18 and 25 years of age;
- In 2021, the previous 24 and 36% tax rates were reduced to 20% and 30% respectively.

Appendix 2 Other results

Table D1. Employment rate and average salary

(a) Number of employed persons (in thousands)

| Age group | 2014 | 2015 | 2017 | 2019 | 2021 | Diff. (in %) |
|-----------|-------|-------|-------|-------|-------|-----------------|
| 18 to 25 | 130 | 137 | 155 | 170 | 154 | 18.7 |
| 26 to 30 | 184 | 181 | 178 | 180 | 177 | -3.7 |
| 31 to 40 | 409 | 415 | 419 | 421 | 404 | -1.1 |
| 41 to 50 | 358 | 364 | 374 | 395 | 409 | 14.1 |
| 51 to 60 | 284 | 292 | 312 | 332 | 332 | 17.0 |
| over 61 | 54 | 57 | 65 | 83 | 97 | 81.3 |
| Total | 1,418 | 1,445 | 1,504 | 1,581 | 1,573 | 10.9 |

(b) Average annual salary (in EUR thousand)

| Age group | 2014 | 2015 | 2017 | 2019 | 2021 | Diff. (in %) |
|-----------|------|------|------|------|------|-----------------|
| 18 to 25 | 5.0 | 5.1 | 5.9 | 7.3 | 8.2 | 65.8 |
| 26 to 30 | 8.3 | 8.5 | 9.2 | 10.7 | 11.8 | 43.1 |
| 31 to 40 | 10.9 | 11.0 | 11.6 | 12.9 | 14.2 | 30.2 |
| 41 to 50 | 12.0 | 12.3 | 13.0 | 14.3 | 15.6 | 29.6 |
| 51 to 60 | 12.3 | 12.4 | 12.6 | 13.6 | 14.8 | 20.2 |
| over 61 | 14.0 | 13.7 | 13.7 | 13.5 | 14.0 | 0.4 |
| Total | 10.7 | 10.8 | 11.4 | 12.6 | 13.8 | 29.2 |

(c) Average number of hours of work per year

| Age group | 2014 | 2015 | 2017 | 2019 | 2021 | Diff. (in %) |
|-----------|-------|-------|-------|-------|-------|-----------------|
| 18 to 25 | 1,303 | 1,306 | 1,361 | 1,414 | 1,454 | 11.5 |
| 26 to 30 | 1,640 | 1,647 | 1,660 | 1,671 | 1,679 | 2.3 |
| 31 to 40 | 1,803 | 1,805 | 1,800 | 1,790 | 1,794 | -0.5 |
| 41 to 50 | 1,902 | 1,904 | 1,902 | 1,888 | 1,895 | -0.4 |
| 51 to 60 | 1,896 | 1,902 | 1,901 | 1,884 | 1,887 | -0.5 |
| over 61 | 1,695 | 1,684 | 1,715 | 1,599 | 1,600 | -5.6 |
| Total | 1,775 | 1,778 | 1,781 | 1,770 | 1,782 | 0.4 |

(d) Average salary per hour of work (in EUR)

| Age group | 2014 | 2015 | 2017 | 2019 | 2021 | Diff. (in %) |
|-----------|------|------|------|------|------|-----------------|
| 18 to 25 | 3.8 | 3.9 | 4.3 | 5.1 | 5.7 | 48.7 |
| 26 to 30 | 5.0 | 5.1 | 5.5 | 6.4 | 7.0 | 39.8 |
| 31 to 40 | 6.0 | 6.1 | 6.4 | 7.2 | 7.9 | 30.8 |
| 41 to 50 | 6.3 | 6.5 | 6.8 | 7.6 | 8.2 | 30.1 |
| 51 to 60 | 6.5 | 6.5 | 6.6 | 7.2 | 7.8 | 20.8 |
| over 61 | 8.2 | 8.1 | 8.0 | 8.4 | 8.8 | 6.3 |
| Total | 6.0 | 6.1 | 6.4 | 7.1 | 7.7 | 28.7 |

Notes: "Salary" includes the sum of gross salary and non-taxable receipts. The column "Diff. (in %)" represents the difference between 2021 and 2014 expressed as a percentage. The results for 2016, 2018 and 2020 have been omitted for conciseness. The original amounts in HRK were converted in EUR using the conversion rate of 7.5345 HRK/EUR.