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Measuring the Marginal Effective Tax Rate in Croatia, 2000–2024

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ABSTRACT

The analysis of marginal effective tax rate (METR) is particularly valuable in the context of labor markets and employment policy. High METR can reduce incentives for additional work or overtime, while lower rates or targeted tax allowances may encourage greater workforce participation. This paper aims to analyze the variations in the METR in Croatia from 2000 to 2024 across various household types, examining how changes in the tax and benefit system and wage growth over time have influenced METR trends. Additionally, a comparative assessment of METRs between Croatia and 22 EU countries that are also OECD members is conducted for 2024, evaluating Croatia's position relative to other countries. Notably, Croatia's METR for a single average-wage earner stands at 38.9%, which is below the EU-OECD average of 41.6%, with the lowest rates observed in the Czech Republic and Slovakia, and the highest in the Netherlands and Belgium.

Keywords: Marginal effective tax rate, Work incentives, Intensive margin, Croatia.

INTRODUCTION

Tax systems represent key instruments of economic policy, as they play a crucial role in shaping the financial incentives that influence individuals' behavior in the labor market. One of the most significant components of tax policy is the taxation of employment income, which directly affects labor force participation, labor supply decisions, and consequently, the overall productivity of the economy. The literature typically examines financial work incentives along the extensive and intensive margins of labor supply. The extensive margin refers to the decision of a non-employed individual to enter employment, that is, the transition from non-employment to employment. In contrast, the intensive margin captures the financial work incentives for individuals to increase their work effort by expanding their labor income.

This paper focuses on the analysis of financial work incentives along the intensive margin of labor supply, measured by the Marginal Effective Tax Rate (METR). The METR captures the effective tax burden on an additional unit of employment income, taking into account personal income tax, employee social security contributions, and any resulting changes in means-tested social benefits. The methodology applied follows the OECD's approach presented in its annual Taxing Wages publication (OECD, 2025a), where the METR is calculated for a one-unit increase in employment income. High marginal effective tax rates may discourage employed individuals from increasing their work effort or may even incentivize withdrawal from employment. Therefore, understanding the structure and variation of METR is essential for designing efficient and equitable tax systems that promote labor market participation while ensuring adequate public revenues and social protection.

One of the most extensive studies of METRs was conducted by Carone et al. (2004), who used the OECD model of taxes and social security contributions based on hypothetical households to estimate work incentives in the then EU countries and selected non-EU countries. In that study, METRs were estimated for a 1% increase in gross wages, and Croatia was not included in the analysis. The research has shown that in almost all countries, METRs on incomes above 67% of the average wage are driven entirely by income taxes and social security contributions, while benefit withdrawals typically affect incomes only below that threshold. Laporšek, Vodopivec and Vodopivec (2019), using the OECD model, estimated METRs for different types of hypothetical households where gross wages increase by 33 percentage points. The results suggest that METRs are highest for families with children. Jara and Tumino (2013) calculated METRs for the then 27 EU member states (excluding Croatia) using the EUROMOD microsimulation model and SILC survey data. Their analysis showed that METRs differ substantially across countries, both in terms of median values and within-country distribution. On average, rising tax liabilities represent the most significant component of country-specific METRs; however, benefit withdrawal is a key factor at lower income levels in countries that have adopted extensive means-tested programs. Navicke and Lazutka (2016) also use EUROMOD to estimate METRs in Lithuania. The analysis showed that work disincentives are particularly strong at the lower end of the income distribution, primarily driven by the impact of cash social benefits rather than taxes or social insurance contributions.

In Croatia, financial work incentives on the extensive margin of labor supply have been investigated so far. First, Bejaković et al. (2012) and Bezeredi (2019) calculated work incentives on the extensive margin of labor supply for selected types of hypothetical households. Then, Bezeredi (2021) calculated work incentives on the extensive margin of labor supply using survey data. As for research on the intensive labor supply margin, i.e. the METR estimate, Bornukova and Picos (2024) in the annual publication EUROMOD baseline report estimates the average METR for EU countries, as well as for Croatia, but there is no detailed analysis of the situation in Croatia. The same report also used a different methodology for calculating METR, where METR is calculated for the case of a 3% increase in employment income, and not for one monetary unit as in this research. Croatia is not a member of the OECD and is therefore not included in the OECD Taxing Wages reports in which METR is calculated for certain hypothetical households.

The aim of this paper is to address the identified gap by conducting a detailed analysis of the METR in Croatia, following the OECD Taxing Wages methodology, for selected types of hypothetical households over the period 2000 – 2024. The analysis seeks to illustrate how changes in the tax system and wage growth over time have shaped the METRs in Croatia. Finally, a comparative assessment of METRs between Croatia and 22 EU countries that are also OECD members is performed for 2024, in order to evaluate Croatia's position relative to other countries.

The paper is structured as follows. After the introduction, Section 2 outlines the research methodology, while Section 3 presents the main results. Section 4 provides the conclusions, and the appendix offers a brief description of the tax and employee social security system in Croatia.

METHODOLOGY

The paper examines the impact of the tax and benefit system on financial work incentives at the intensive margin of labor supply in Croatia from 2000 to 2024.* The marginal effective tax rate (METR) is used as an indicator of work incentives. Work incentives at the intensive margin refer to the decision of whether an employed individual will increase their work effort in order to earn a higher wage. This study develops a model of employment income taxation in Croatia for the period from 2000 to 2024. The model also incorporates social benefits provided by the general government in the form of cash transfers to taxpayers. The model applies the methodology developed by the OECD for its Taxing Wages survey (OECD, 2025a), with certain modifications. Specifically, in its Taxing Wages studies, the OECD does not include non-tax compulsory payments in the calculation of its indicators. For instance, under that methodology, mandatory employee contributions paid into the private pension pillar in Croatia would be excluded. In this paper, however, all mandatory payments are included, regardless of whether they are paid to the central government or to private funds, in order to provide a more comprehensive measure of the METR.

In accordance with the aforementioned methodology, the METR is calculated under the assumption of a one-unit increase in the employment income. The METR is formally defined as follows:

$$METR = 1 - \frac{Y^1 - Y^0}{X^1 - X^0}$$

where $Y^1(X^1)$ denotes the disposable (gross) income of the household in a hypothetical situation when the observed person increases his gross wage by one monetary unit, and $Y^0(X^0)$ is the disposable (gross) income of the household in the real situation. In households with more than one employed person, the METR is measured for the head of the household, who is considered the principal earner. The METR measures the portion of additional earnings that is lost due to the payment of taxes and employee social security contributions, as well as reductions in benefits, while also indicating the share that remains with the employee. For example, a METR of X% indicates that the employee loses X% of additional earnings as a result of an increase in their gross wage by one monetary unit. To examine the contributions of individual components of the tax and benefit system to the overall METR, the preceding equation may be decomposed as follows:

$$METR = \frac{(PIT^1 - PIT^0)}{X_i^1 - X_i^0} + \frac{(SSC^1 - SSC^0)}{X_i^1 - X_i^0} + \frac{(B^0 - B^1)}{X_i^1 - X_i^0} = METR_{PIT} + METR_{SSC} + METR_B.$$

The components $METR_{PIT}$, $METR_{SSC}$ and $METR_B$ represent the contributions of personal income tax, employee social security contributions and benefits, respectively, to the overall METR. A concise description of the personal income tax and employee social security contributions system is provided in the Appendix.

* For examples of studies examining work incentives at both the extensive and intensive margins, see Saez (2002), Bargain and Orsini (2006), Adam and Browne (2010), Blundell et al. (2013), Ranđelović and Žarković-Rakić (2013), Jara et al. (2017), and others.

RESULTS

This chapter analyzes the METR in Croatia from 2000 to 2024 across different household types.† Figure 1 first presents the METR for a single individual earning the average gross wage. The decomposition of the METR indicates that two components account for the total marginal rate: employee social security contributions and personal income tax. During the observed period, the METR ranged from a high of 44% in 2002 to a low of 34.2% between 2003 and 2006. Employee contributions exhibit an almost constant share in the total METR throughout the entire period. Specifically, their contribution amounted to 20.6 percentage points in the period 2000–2002, and 20.0 percentage points after 2003. This stability reflects the fact that the contribution rate on wages remained nearly unchanged, implying that all variations in the total METR can be attributed to changes in income tax.

The sharp increase in the METR value between 2001 and 2002, amounting to 9.3 percentage points, resulted from the growth of the average wage, which shifted part of the income into the second tax bracket, taxed at a rate of 25%. In 2003, the amount of the personal allowance was increased and the lowest tax bracket, taxed at a rate of 15%, was expanded, which consequently reduced the METR by 9.2 percentage points. An additional decline of 0.6 percentage points resulted from the previously mentioned reduction in the contribution rate from 20.6 to 20%.

The subsequent increase in the total METR in 2007, amounting to 9.4 percentage points (from 34.2 to 43.6%), was driven by wage growth, as the income tax system remained unchanged during that period. From 2007 to 2020, the METR for this household type remained nearly constant, hovering around 43%. Since 2021, however, it has been declining, reaching 38.9%, reflecting the reduction in the personal income tax rate applied to the average wage. These figures indicate that, between 2021 and 2024, 38.9 cents of each additional euro earned were lost to taxes and contributions, while the remaining 61.1 cents represented the employee's net gain.

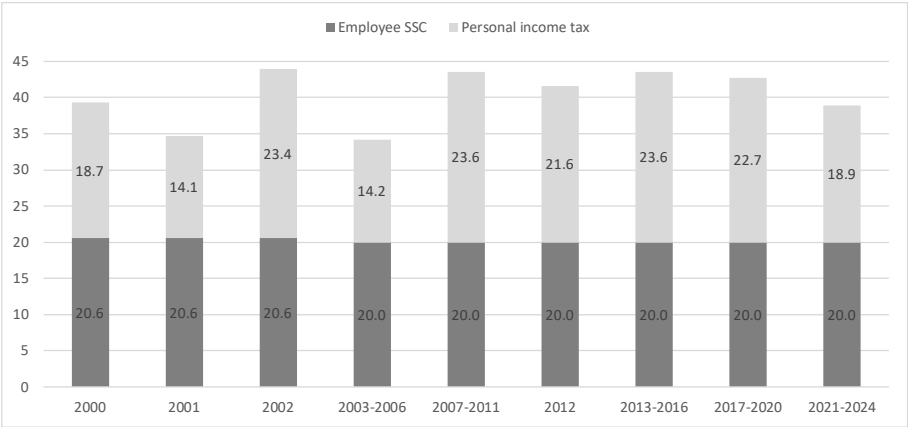

Figure 1: Marginal effective tax rate for single worker earning 100% of the average wage
Source: Authors' calculations

Figure 2 examines a single individual earning 67 percent of the average gross wage. The total METR indicates that this wage level was taxed at the lowest applicable rates throughout the

† The average gross wage values for activities B to N published on the official OECD website are used.

observed period. Consequently, the lowest METR for this household type occurred between 2011 and 2016, at 31.3%, while the highest levels were observed between 2017 and 2020 (38.9%) and in 2024, when it reached 44.6 percent. Analyzing the contribution of income tax to the total METR reveals that the highest effective income tax rate applied to the lowest incomes was 24% during 2017–2020. It is important to note that the increase in the METR in 2024 was not driven by a rise in the employee social security contribution rate, but rather by the application of a relief that affects the contribution rate at lower income levels. Specifically, this relief decreases linearly as income rises, so at this wage level it results in an increase in the impact of employee social security contributions on the overall METR from 20 to 27.5 percentage points.

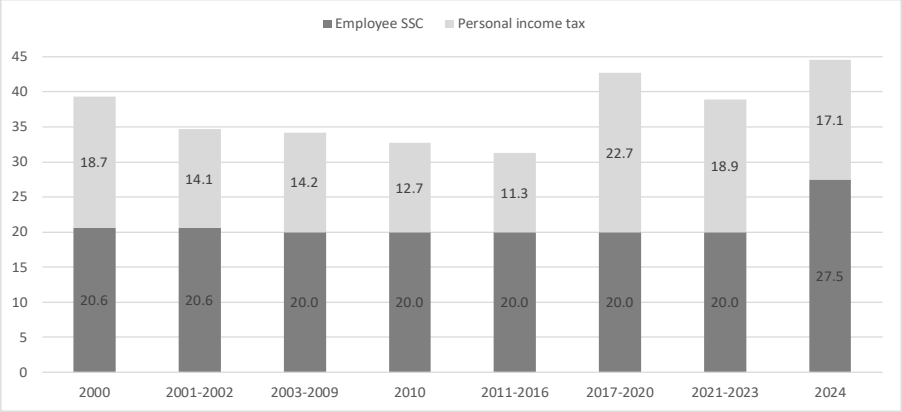

Figure 2: Marginal effective tax rate for single worker earning 67% of the average wage
Source: Authors' calculations

If the gross wage of a single person is increased to 167% of the average (Figure 3), it is evident that for this type of household, the METR has decreased over the years, from 53.4% in 2000 to 38.9% in the period 2021-2024. The high METR in 2000 is due to the tax system consisting of two rates of 20 and 35% plus surtax and a lower threshold for taxation at the lowest income tax rate, so a certain amount of income also fell into the second income tax bracket. In the following years 2001-2020, the METR was around 43%, and in the period 2021-2024 it slightly decreased to 38.9%.

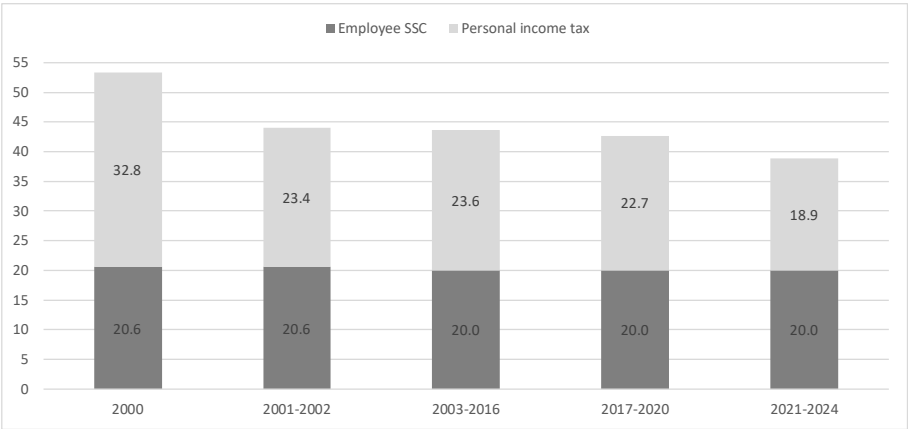

Figure 3: Marginal effective tax rate for single worker earning 167% of the average wage
Source: Authors' calculations

For individuals earning four times the average gross wage (Figure 4), the METR fluctuated around 55% between 2000 and 2018, with only minor variations. A more pronounced decline occurred in 2019, when the METR fell to 42.7%. This change was driven by a 70% increase in the threshold for the lower income tax rate, which reduced the contribution of income tax to the total METR by 11.3 percentage points. A new significant increase in the METR was observed in 2023, when the METR rose to 48.3%, which is a result of the increase in the average wage, causing part of the employment income to move into a higher income tax bracket.

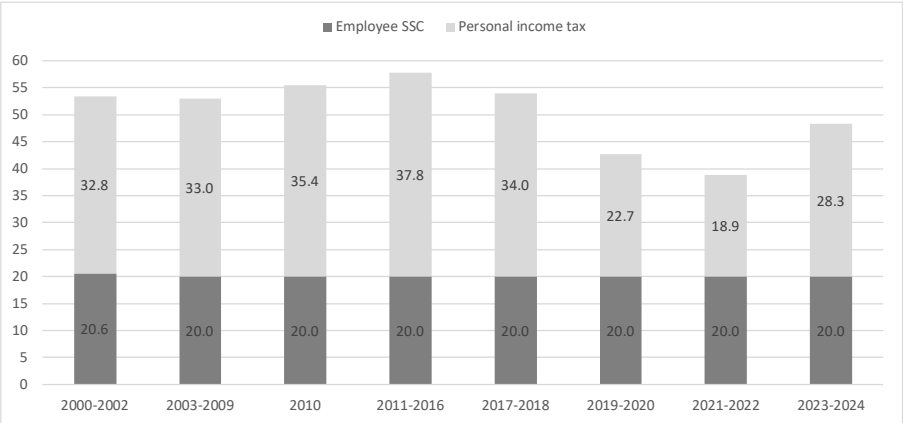

Figure 4: Marginal effective tax rate for single worker earning 400% of the average wage
Source: Authors' calculations

The METR for a single parent with two children consists solely of employee social security contributions (Figure 5), indicating that this household type did not pay income tax throughout the entire observed period. For a one-earner couple with two children, where the working parent earns an average wage, the METR has steadily declined over the years (Figure 6). In 2000, the METR was 39.3%, gradually decreasing to only 20% since 2012. The notable decline in 2012 resulted from an increase in the personal allowance, meaning that this type of household no longer paid income tax. From 2012 onwards, the personal allowance has been systematically adjusted to ensure that wage growth does not diminish its value.

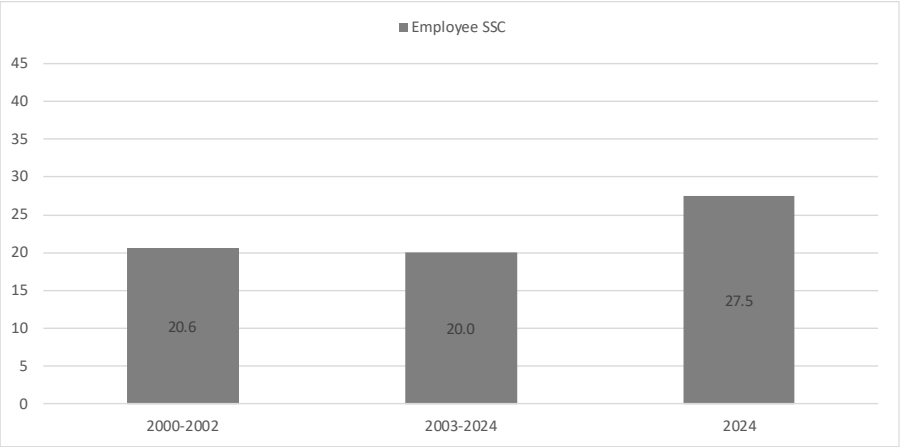

Figure 5: Marginal effective tax rate for single parent with two children earning 67% of the average wage
Source: Authors' calculations

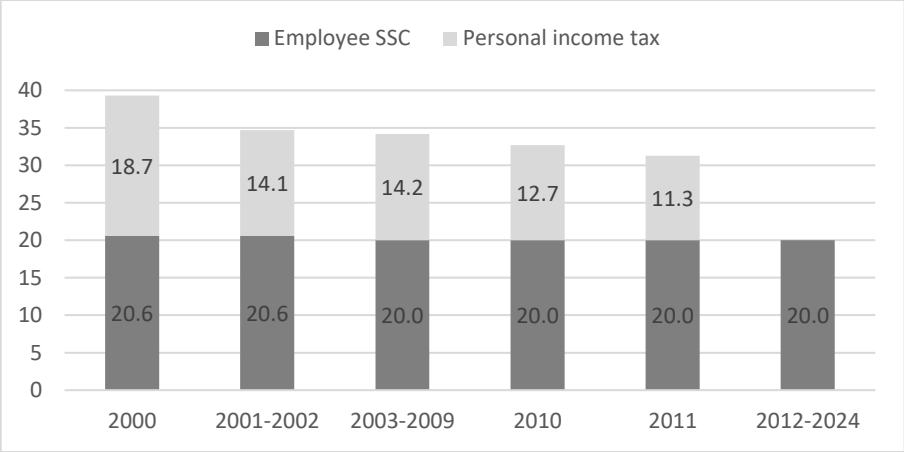

Figure 6: Marginal effective tax rate for one-earner with two children earning 100% of the average wage
Source: Authors' calculations

For two-earner couples with two children earning 100 percent of the average gross wage (Figure 7), the METR declined from 2000 to 2016, decreasing from 39.3% in 2000 to 31.1% during the period 2001–2016. Afterward, the METR increased to 42.7% in 2017–2020 and then decreased to 38.9% in 2021–2024. The rise in the METR in 2017 was due to an increase in the lowest income tax rate from 12 to 24%, while in 2021 the rate was reduced to 20%.

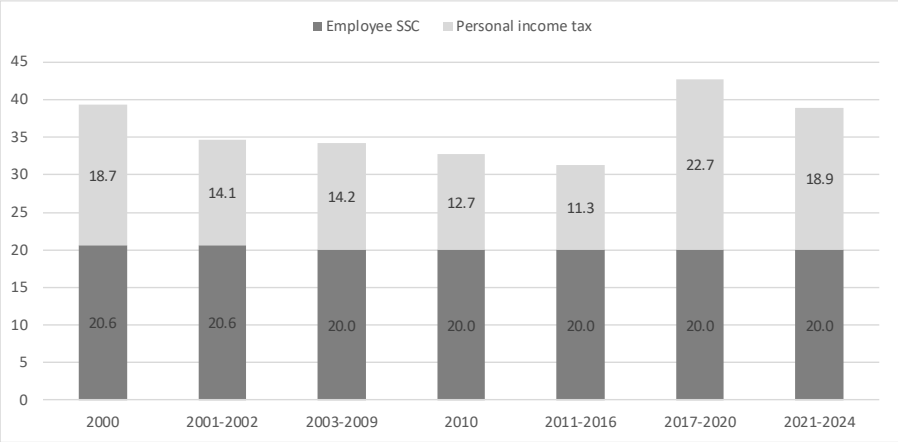

Figure 7: Marginal effective tax rate for two-earner couple with two children earning 100% of the average wage
Source: Authors' calculations

To provide insight into Croatia's position relative to other European countries, Figure 7 presents a comparative analysis of the METR in Croatia and 22 EU countries that are also OECD members. The analysis indicates that for a single person earning 100 percent of the average gross wage, Croatia falls among the half of countries with lower METR. In Croatia, the METR is 38.9%, which is 2 percentage points below the OECD-EU22 country average. The lowest METRs are observed in the Czech Republic (26.6%) and Slovakia (29.9 %), whereas the highest METRs are found in the Netherlands (54.1 percent) and Belgium (55.6%).

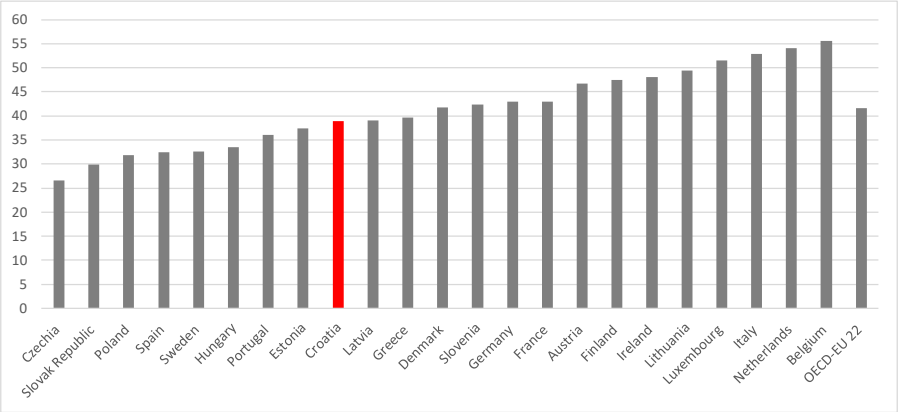

Figure 7: Marginal effective tax rate for single worker earning 100% of the average wage in the OECD-EU countries

Source: Authors' calculations for Croatia and OECD (2025b) for OECD-EU 22 countries.

CONCLUSION

The marginal effective tax rate on employment income is an important indicator for understanding the real tax burden on additional work and its impact on individual economic behavior. Unlike nominal tax rates, METR accounts for all relevant elements of the tax system, including deductions, allowances, social security contributions, and other fiscal measures, providing a more accurate picture of the actual cost of earning extra income. The estimation also considers cash transfers provided by the central government. METR shows how much of each additional unit of income truly remains with the worker after income taxes, employee social security contributions and benefit are considered.

To the best of our knowledge, this paper is the first to provide, within a single analysis, a detailed and comprehensive overview of the METR in Croatia over time. The paper analyzes the variations in METRs in Croatia from 2000 to 2024 across various household types. For single earners at the average wage, METRs ranged from 44% in 2002 to 34.2% in 2003–2006, with changes primarily driven by income tax reforms, while employee social security contributions remained largely stable. Lower-wage earners (67% of average) faced the lower METRs, from 31.3% in 2011–2016 to 44.6% in 2024, with the recent increase resulting from reduction of employee social security reliefs at lower income levels. Higher earners (167% of average and four times the average wage) saw a general decline in METRs over time, from 53.4% in 2000 to 38.9% in 2021–2024. For single earners with an income equivalent to four times the average wage, the METR decreased from a peak of 57.8% during the 2011–2016 period to a low of 38.9% in 2021–2022. Among families, single parents with two children were subject only to employee social security contributions, while one-earner couples with two children experienced steady METR reductions, largely reflecting increases in personal allowances. Compared with 22 EU OECD countries, Croatia's METR for a single average-wage earner (38.9%) is below the EU-OECD average (41.6%), with the lowest rates in the Czech Republic (26.6%) and Slovakia (29.9%) and the highest in the Netherlands (54.1%) and Belgium (55.6%).

This analysis utilized hypothetical data to examine the patterns of the METR across various household types in Croatia, offering insights into potential dynamics of tax burdens. Among the

advantages of using hypothetical households is that the results are independent of population structure (Gasior and Recchia, 2019), enabling a direct focus on specific mechanisms within the tax and benefit system. This approach also serves as a valuable method for comparative research aimed at identifying differences in tax and benefit systems across countries (Immervoll et al., 2004). Future studies could leverage actual survey or administrative data to provide a more precise assessment of the prevalence of high METR among households within the population.

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Appendix

This appendix provides a brief overview of the income tax system and employee social security contribution rates in Croatia for the period 2000-2024. Table 1 shows the income tax brackets and rates. In cases where tax rules changed during a particular year, the annual average for that year is shown. In Croatia, a surtax was also paid on income tax in the period 2000-2023, and the rate was determined by cities and municipalities. The model uses a surtax rate of 18%, which was in force for the capital city of Zagreb throughout the entire period.

Table 1: Income tax rates and brackets in Croatia from 2000 to 2024

	Income tax brackets, in EUR per year (income tax rate, in %)
2000	up to 5.674 (20%); above 5.674 (35%)
2001 – 2002	up to 3.982 (15%); 3.982 – 9.954 (25%); above 9.954 (35%)
2003 – 2004	up to 4.778 (15%); 4.778 – 10.751 (25%); 10.751 – 33.446(35%); above 33.446 (45%)
2005 – 2007	up to 5.097 (15%); 5.097 – 12.741 (25%); 12.741 – 35.676 (35%); above 35.676 (45%)
2008	up to 5.415 (15%); 5.415 – 13.538 (25%); 13.538 – 37.906 (35%); above 37.906 (45%)
2009	up to 5.734 (15%); 5.734 – 14.334 (25%); 14.334 – 40.135 (35%); above 40.135 (45%)
2010	up to 5.734 (13.5%); 5.734 – 14.334 (25%); 14.334 – 17.201 (30%); 17.201 – 40.135 (37.5%); above 40.135 (42.5%)
2011	up to 5.734 (12%); 5.734 – 17.201 (25%); above 17.201 (40%)
2012	up to 3.504 (12 %); 3.504 – 5.734 (22.83%); 5.734 – 14.016 (25%); 14.016 – 17.201 (37.5%); above 17.201 (40%)
2013 – 2014	up to 3.504 (12%); 3.504 – 14.016 (25%); above 14.016 (40%)
2015 – 2016	up to 3.504 (12%); 3.504 – 21.023 (25%); above 21.023 (40%)
2017 – 2018	up to 27.872 (24%); above 27.872 (36%)
2019 – 2020	up to 47.780 (24%); above 47.780 (36%)
2021 – 2023	up to 47.780 (20%); above 47.780 (30%)
2024	up to 50.400 (23.6%); above 50.400 (35.4%)

The basic personal allowance amounts were: 2000: 1.892 EUR per year, 2001-2002: 1.991 EUR per year, 2003-2004: 2.389 EUR per year, 2005-2007: 2.548 EUR per year, 2008: 2.708 EUR per year, 2009-2011: 2.867 EUR per year, 2012: 3.398 EUR per year, 2013-2014: 3.504 EUR per year, 2015-2016: 4.141 EUR per year, 2017-2019: 6.052 EUR per year, 2020-2023: 6.371 EUR per year, 2024: 6.720 EUR per year.

The employee social security contribution rate amounted to 20.6% between 2000 and 2002, and to 20% from 2003 to 2024. In 2024, a reduction in the contribution base for lower-income earners was introduced. The base gradually decreases as income rises, until it is completely phased out.

For more information on the rules of the tax and benefits system in Croatia, see OECD (2024) and Urban and Bezeredi (2025)[‡].

[‡] The same publications have also been issued for previous years.