INTERNATIONAL MONETARY FUND

SELECTED ISSUES PAPER

# Improving Investment in Human Capital in Croatia

## Efficiency of Public Spending on Education and Healthcare

Jean-Jacques Hallaert

SIP/2025/159

**IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries.** It is based on the information available at the time it was completed on November 20, 2025. This paper is also published separately as IMF Country Report No 25/330.

2025
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**IMF Selected Issues Paper**
European Department

# Improving Investment in Human Capital in Croatia: Efficiency of Public Spending on Education and Healthcare

**Prepared by Jean-Jacques Hallaert**

Authorized for distribution by Yan Sun
December 2025

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**ABSTRACT:** Croatia's public spending efficiency in education and healthcare can be increased. Increased efficiency would free fiscal resources that could be used for fiscal savings and/or improved outcomes. This would require reforms such as consolidating schools, increasing instructional hours, revising curricula, shifting emphasis from vocational education toward general education, and supporting tertiary enrollment. In healthcare, reforms should focus on telemedicine and primary care, reorganizing hospitals, and prioritizing preventive measures. These reforms would also foster human capital accumulation, reduce labor shortage and skills mismatches, boost productivity, and increase the creation and diffusion of innovation. They would improve potential growth.

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SELECTED ISSUES PAPERS

# Improving Investment in Human Capital in Croatia

## Efficiency of Public Spending on Education and Healthcare
## Republic of Croatia

Prepared by Jean-Jacques Hallaert[1]

[1] "The author(s) would like to thank Josip Funda (World Bank) and participants of the seminar at the Croatian National Bank for insightful comments, Estefania Cohn Bech for research assistance, and Eunmi Park for editorial support.

INTERNATIONAL MONETARY FUND

# REPUBLIC OF CROATIA

## SELECTED ISSUES

November 20, 2025

Approved By
**European Department**

Prepared By Jean-Jacques Hallaert (EUR)

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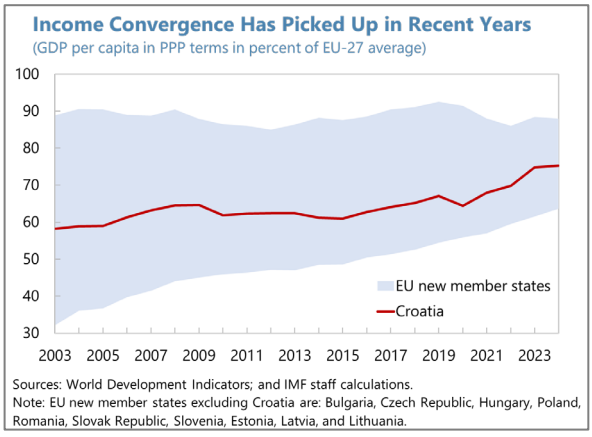
# IMPROVING INVESTMENT IN HUMAN CAPITAL IN CROATIA: EFFICIENCY OF PUBLIC SPENDING ON EDUCATION AND HEALTHCARE[1]

*This paper assesses the efficiency of Croatia's public spending on education and healthcare, identifying significant potential for both fiscal savings and improved outcomes. Mindful of the importance of societal preferences and consensus-building, it offers a menu of possible structural reforms that would increase efficiency. In education, consolidating schools could reduce fiscal costs without compromising educational outcomes. Increasing mandatory instructional hours and revising curricula to enhance skills acquisition would improve educational achievements. Promoting general track education over vocational education could foster higher educational outcomes and support tertiary education enrollment. In healthcare, developing telemedicine and primary care outside hospitals would help reduce the geographical inequality in access to health services. The central role of hospitals in the healthcare system could be reviewed, and hospitals be reorganized to face the changing needs due to population aging. Increasing prevention can improve the population well-being and health outcomes while, eventually, reducing spending and mitigating the fiscal cost of aging by fostering healthy aging.*

## A. Introduction

**1. Increasing public spending efficiency can contribute to the fiscal consolidation that Croatia plans to undertake.** After three years of expansionary fiscal policy that shifted the fiscal balance from a surplus of 0.1 percent of GDP in 2022 to a deficit projected at 2.9 percent of GDP in 2025, a fiscal consolidation over the medium term is needed. Increasing the efficiency of public spending would facilitate such consolidation as it preserves and even increases the impact of public spending at a lower fiscal cost.

**2. Fostering human capital is another motivation for increasing public spending efficiency.** This paper focuses on education and healthcare spending. Education and health contribute to the accumulation of human capital. Higher human capital increases individuals' job and earning prospects but also underpins innovation and productivity growth, which are necessary to sustain potential growth in the context of rapidly aging population and technological changes and to foster income

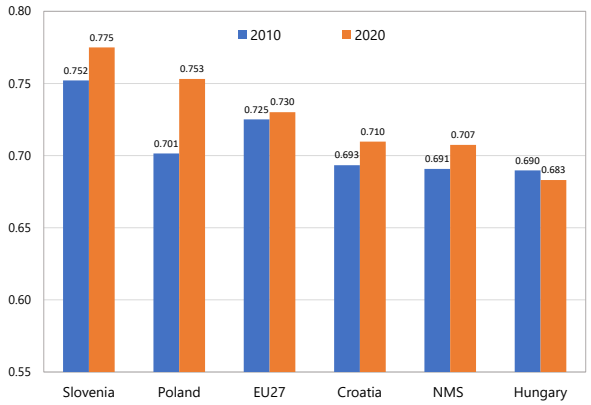



[1] Prepared by Jean-Jacques Hallaert (EUR). The paper benefited from insightful comments from Josip Funda (World Bank) and participants of the seminar at the Croatian National Bank. Estefania Cohn Bech provided research assistance.

convergence with the European Union.[2] For the same reason, education and health policies affect income inequality and social mobility.[3]

**3. Croatia's human capital has been increasing but still lags the EU average.** The World Bank estimates that a Croatian child born in 2020 will enter adulthood (age 18) about 71.0 percent as productive as a peer who receives complete education and proper healthcare.[4] This is 1.6 percentage points (ppts) improvement in a decade, a performance comparable to the average improvement in the EU Newer Member States (NMS).[5] Nonetheless, Croatia's human capital index still lags the EU average and has grown less rapidly than in Slovenia and Poland (Figure 1).[6] The decomposition of the human capital index reveals that both health and education have the potential to increase labor productivity but the potential gain is larger for education than for health.[7]

**Figure 1. Human Capital Index**
(Range 0 to 1)




Sources: World Bank and IMF staff calculations.
Note: Simple average for NMS and EU.

[2] For a review of literature on the link between education and innovation, see Biasi and others (2021) and Jaravel (2023). Draghi, in his report on competitiveness, "puts improving skills at the centre of this agenda, so that European companies can find the talent they need to innovate and adopt technology, and so that people in Europe are able to benefit fully from technological change" (Drahi 2024a and b).

[3] Since the seminal work of Becker (1964) on the impact of human capital on individuals' earnings and consumption, economic literature has provided evidence that, in advanced economies, equal access to education and health lifts pre-redistribution incomes for those at the bottom of the distribution contributing to reducing income inequality, which is strongly associated with intergenerational social mobility (Chancel, 2021). For more details on how education and health policies affect income inequality and social mobility, see Blanchard and Rodrik, 2021; Bruroni and others, 2013; Chetty and others, 2017; and Corak, 2013.

[4] Croatia's human capital index is 0.68 for boys and 0.74 for girls.

[5] EU newer member states are Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.

[6] In this paper, comparators are Hungary, Poland, and Slovenia. All three countries are NMS. Hungary and Poland have similar GDP per capita as Croatia and Slovenia is a neighboring country. Peers are other EU members. EU25 are the 25 EU members covered by OECD data.

[7] For illustrative purpose, everything else equal, if all the education components (harmonized test scores and expected years of school for children aged 0 to 14) were 10 percent higher, the human capital index would have been 84.6 instead of 71.0 percent. If all the health components (fraction of children under 5 not stunted and fraction of 15-year-olds who survive to age 60) were 10 percent higher, the human capital index would have been 74.2.

## B. Education

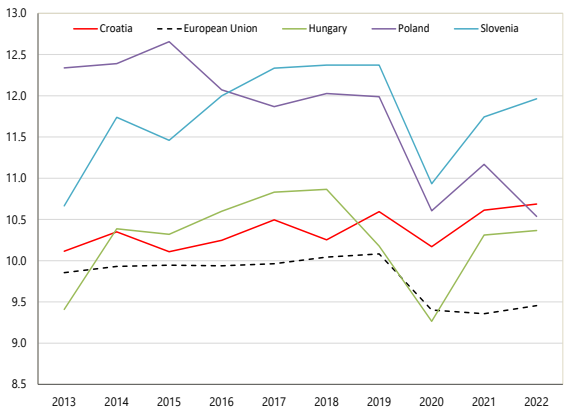
### Public Spending on Education is Comparatively High

**4. Public spending on education is comparatively high in Croatia.** At 5.3 percent of GDP, general government spending on education is above EU and NMS averages. It is also high for Croatia's income level. Moreover, in contrast to the situation a decade ago, education accounts for a larger share of public spending than in the comparators, except Slovenia (Figure 2).

**Figure 2. Evolution of Public Expenditure on Education**
(Percent)

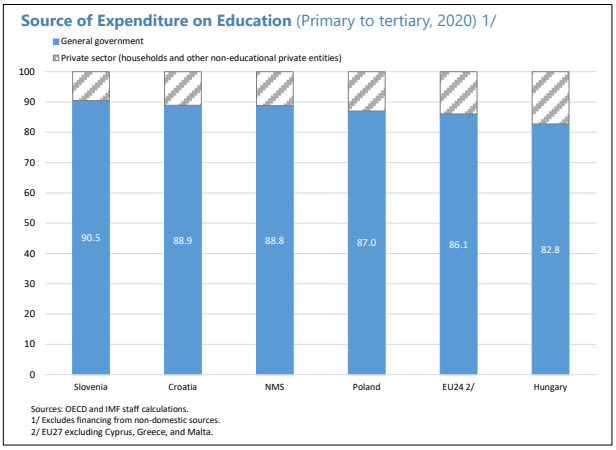
*As a Share of GDP Controlling for Income, 2023*


*As a Share of Total General Government Spending*




Sources: Haver and IMF Staff calculations.

**5. The comparatively high public spending on education is in part due to a larger share of public financing.** Private financing (including financing by international organizations and the rest of the world) is similar to the NMS average but slightly smaller than the EU average and that of the comparators (except Slovenia).

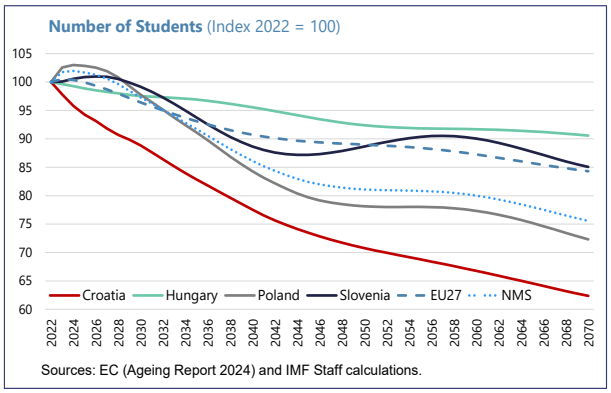



**6. Demographic changes are expected to marginally reduce spending on education in the near future.** According to the 2024 Ageing Report, the student population would decline by 38 percent between 2022 and 2070.[8] This is far more than for the EU as a whole and for any comparator.[9] As a result, demographic developments are expected to reduce spending on education. At unchanged policies, education spending would

[8] Student population is the number of students enrolled in education from early childhood to tertiary education.

[9] Only Latvia and Lithuania are projected to experience a stronger decline in student population.

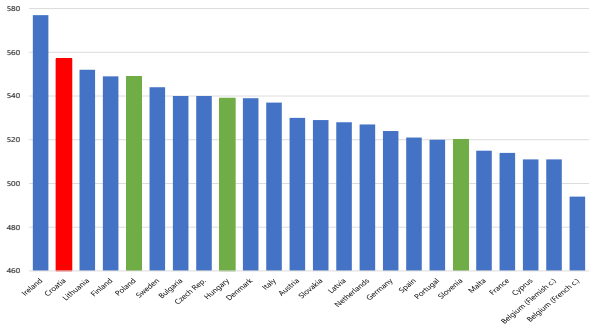
decline in the long term: in 2070, it would be about 0.5 percent of GDP lower than in 2024 (compared to 0.4 percent of GDP lower for the EU and 0.1 percent of GDP for NMS). However, in the near future, demographic development will not significantly support fiscal consolidation as public spending on education would decline by only 0.1 percent of GDP between 2024 and 2030.




## Outcomes are Uneven

**7. Good level in reading but a low level in mathematics.** The reading score of Croatians' fourth graders is among the highest among the EU countries that participated in the PIRLS assessment (Progress in International Reading Literacy Study). In contrast, their score in mathematics is among the lowest according to the TIMSS assessment (Trends in International Mathematics and Science Study). The score in science is in an intermediate position but lower than that of comparators (Figures 3 and 4).[10,11] This picture remains broadly unchanged for 15-year-old students. Their performance measured by scores in the OECD's Programme for international Student Assessment (PISA) has been persistently much below peers' in mathematics.[12] In reading, the performance remains strong but is less clear than for 4th graders. Finally, in science, the mean score of 15-year-old students is comparable to the EU and NMS average but below that of comparators (Figure 5).[13]

**Figure 3. Reading Achievement of Fourth Graders**
(2021) 1/, 2/




Source: PIRLS.
1/ To allow country comparisons, the scale center point of 500 is located at the mean of the combined achievement distribution. 100 scale score points correspond to the standard deviation of the distribution.
2/ Assessed at the end of the school year. Due to the COVID-19 pandemic, Croatia, Hungary, Ireland, Latvia, and Lithuania administered PIRLS 2021 six months after the original assessment window to fifth-grade students at the beginning of the 2021–22 school year.

[10] These results were achieved at a high cost. Spending on pre-primary to primary education stood at 2.6 percent of GDP in 2023. This was 1.0 ppt more than the EU average. In the EU, only Denmark and Sweden spent more than Croatia (see Annex I).

[11] Slovenia did not take part in the 2019 assessment. In 2023, its scores in mathematics and science were higher than Croatia's in 2019.

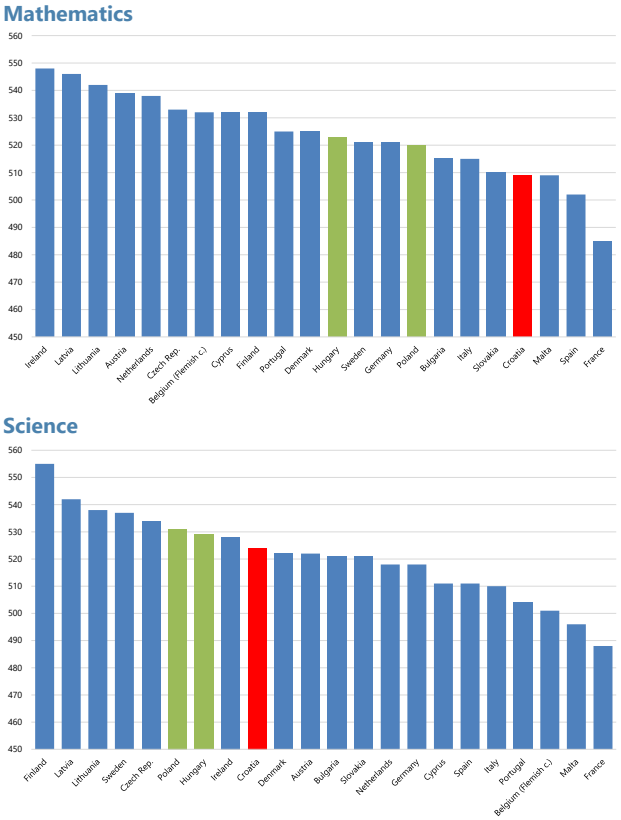
[12] For more details on proficiency levels, see OECD (2016) and the PISA Methodology.

[13] The OECD's survey of adult skills shows that, for the population aged 16–24, scores and ranking continue to be lower in numeracy than in literacy but, in both cases, mean performance is better than that of Hungary and Poland (OECD, 2024a and Annex II).

**8. Croatia experiences a higher share of low performers and a lower share of top performers than peers.**[14] In 2022, 40 percent of 15-year-old students had a test score in mathematics below the level that the OECD considers necessary to "fully participate in society." This share has been steadily increasing since 2012. Pointing to issues with mathematical education in vocational training, the share of low performers in mathematics reaches 44.0 percent for students enrolled in vocational track, compared to 7.8 percent in the general track (World Bank, 2024).[15] At the same time the share of high performers has declined to 5.2 percent, the fifth lowest level in the EU and well below that of comparators. At 31 percent, the share of low performers in reading and science is lower than in mathematics but is again markedly higher than in 2012. However, it is below the EU and OECD averages as well as that of Hungary. The better results in reading and science than in mathematics are, however, mitigated by a low share of top performers (Figure 6).

**Figure 4. Achievement in Mathematics and Science of Fourth Graders**

(2019) [1/, 2/]




Source: TIMSS.

1/ For mathematics, the assessment covers number, measurement and geometry, and data. For Science, it covers life science, physical science, and earth science. TIMSS uses scale anchoring to summarize and describe student achievement at four points on the mathematics and science scales—Advanced (625), High (550), Intermediate (475), and Low (400) international benchmarks. For details, see http://timss.bc.edu/publications/timss/2015-methods/chapter-14.html.

2/ The figure reports the results of the 2019 assessment because Croatia did not take part in the 2023 assessment.

[14] Low performers are students that achieve a proficiency level below 2. The OECD considers that level 2 is the baseline level of proficiency that is requires to participate fully in society. High performers are student achieving a level of proficiency 5 or 6.

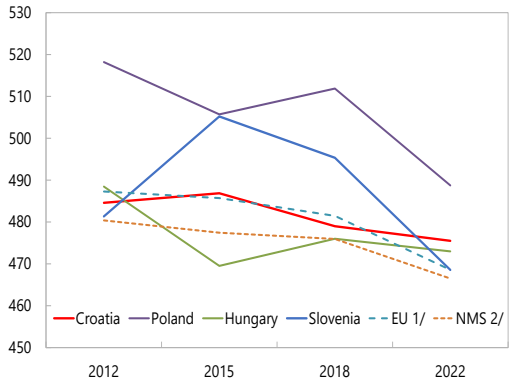
[15] Based on the 2018 PISA results, Dalvit and others (2023) estimate, that vocational track students have an average score in mathematics 90 points lower than that of general track students. This represents a difference equivalent to more than three years of schooling.

## Figure 5. Achievement of Fifteen-Year-Old Students

(PISA mean score)

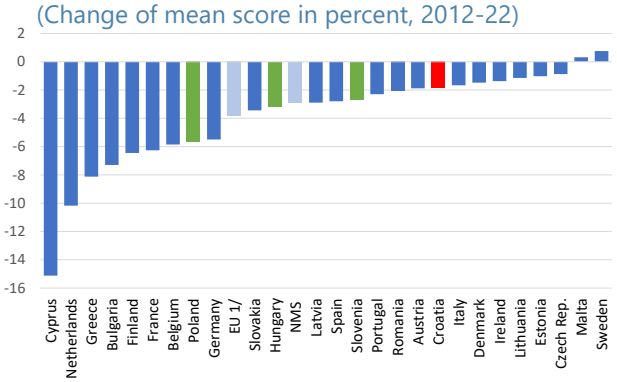
### Reading

**PISA Score (2012-22)**



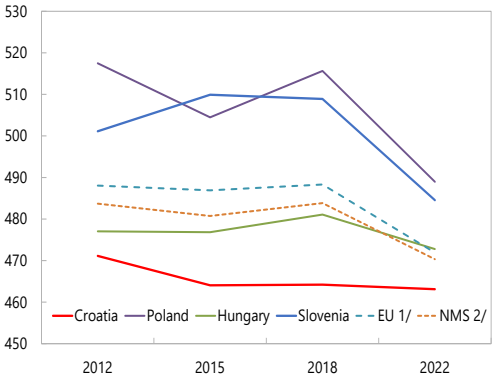

**Change in Score**

(Change of mean score in percent, 2012-22)



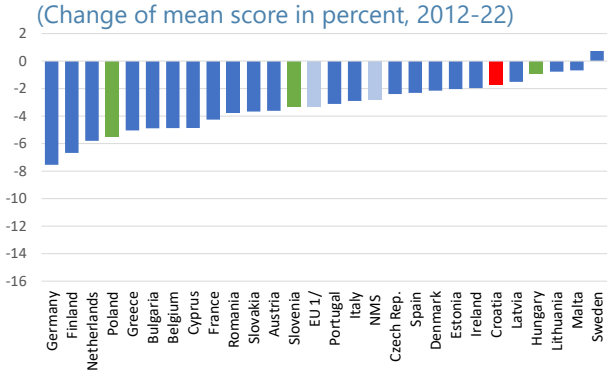

### Mathematics

**PISA Score (2012-22)**



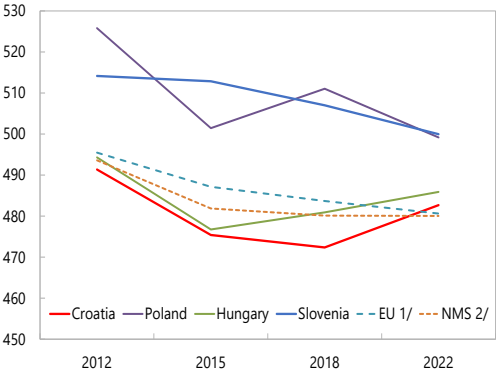

**Change in Score**

(Change of mean score in percent, 2012-22)



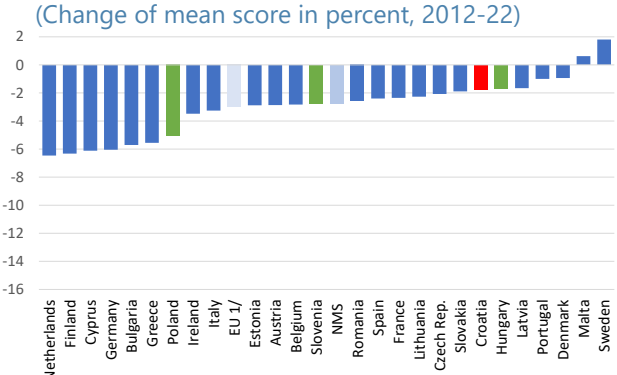

### Science

**PISA Score (2012-22)**




**Change in Score**

(Change of mean score in percent, 2012-22)

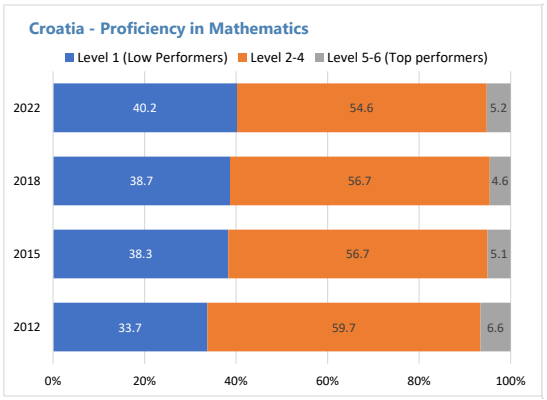


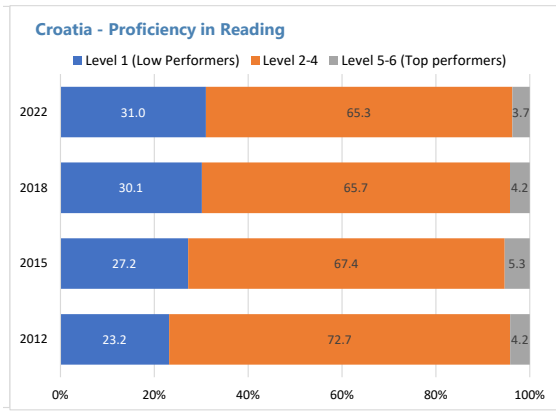

Sources: OECD and IMF staff calculations.

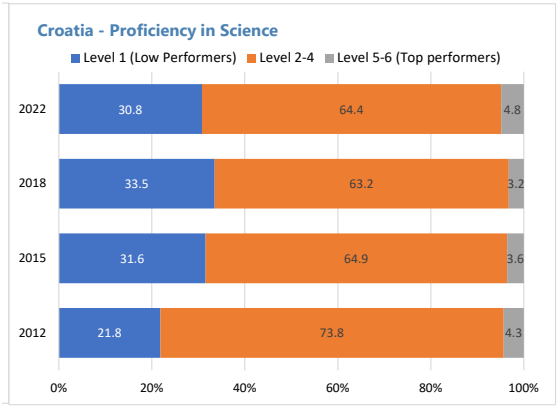
1/ EU27 (simple average) excluding Luxembourg due to data limitations.
2/ Simple average.

## Figure 6. Share of Low and High Performers Among the Fifteen-Year-Old Students

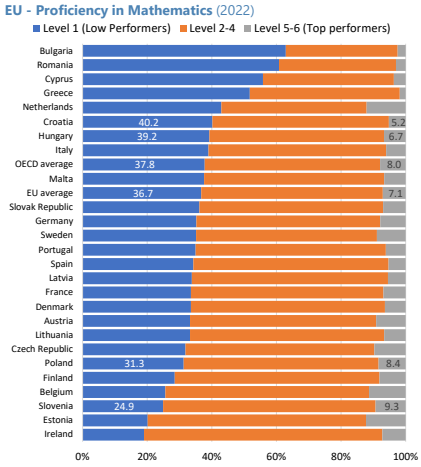
### Over time

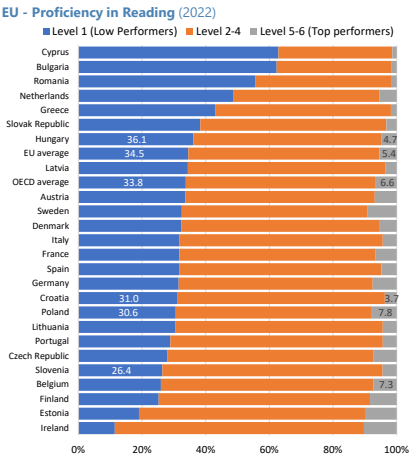


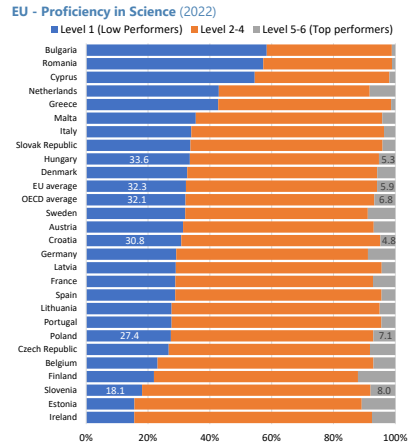




### Compared to EU peers



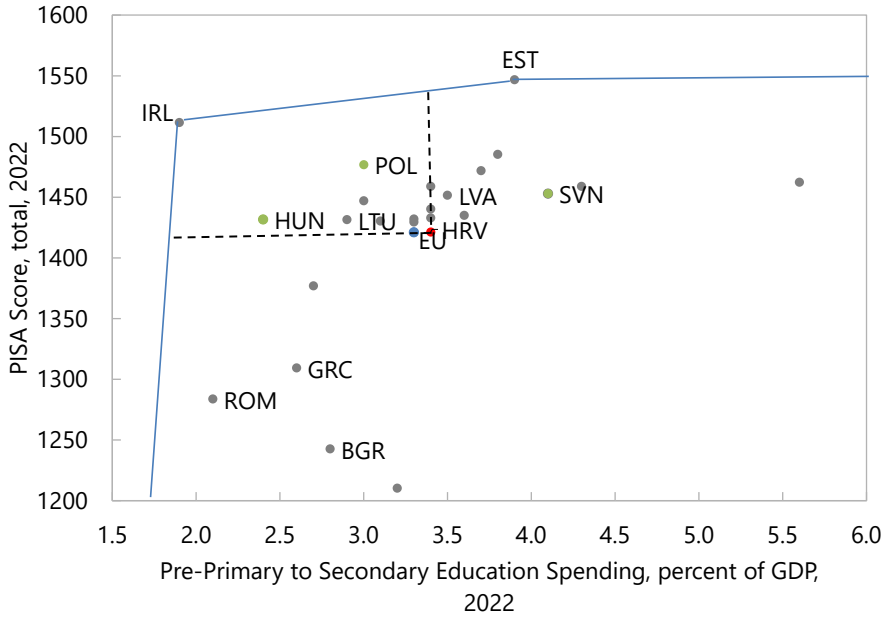

Source: OECD.

## Potential Efficiency Gains are Large

**9. That relatively high education spending translates to educational outcomes that are, at best, comparable to peers' points to potential efficiency gains.** Potential efficiency gains can be found at both the primary and secondary education levels (Annex I). As education is a cumulative process, the most relevant measure is assessing pre-primary to secondary spending against the overall mean PISA score (summing of the scores in the three domains tested). Potential efficiency gains are large. Both Hungary and Poland achieve a higher educational outcome than Croatia at a lower cost. The EU achieves the same outcome as Croatia but at a lower fiscal cost, while Austria achieves a higher educational outcome with similar spending as Croatia. In contrast, Slovenia's educational system is less efficient than Croatia's as a much larger spending translates to an educational outcome that is only modestly higher (Figure 7).

**10. Increasing spending efficiency to the level of the EU best performers would allow significant fiscal saving and/or better educational achievements.** Croatia could achieve higher outcomes (measured by the overall mean PISA score) for the same level of spending (vertical dotted line in Figure 7) or achieve the same outcome at a significantly lower cost (horizontal dotted line). Using comparators, potential fiscal saving ranges from 0.5 to 1.0 percent of GDP; increases in PISA scores range from 18 to 43 percent (Table 1).[16]

**Figure 7. Efficiency of Education Spending**




Sources: Eurostat and OECD.

[16] As differences in spending can be in part due to structural differences (e.g., demographic, distribution of students across level of education), the estimated efficiency gains and fiscal savings should be interpreted as "potential." For that reason, a range rather than a point estimate is preferred. Nonetheless, alternative measurements confirm that potential efficiency gains are large (Appendix II).

**Table 1. Croatia: Potential Efficiency Gains in Education (2022) 1/**

| If Croatia's education system was as efficient as | Fiscal saving (ppt of GDP) |
|---|---|
| Hungary | 1.0 |
| Poland | 0.5 |
| EU | 0.1 |
| Slovenia | -0.6 |
| | **Increase in overall PISA score (percent)** |
| Hungary | 43 |
| Poland | 18 |
| EU | 3 |
| Slovenia | -15 |

Sources: OECD, Eurostat, and IMF staff calculations.

1/ Pre-Primary, primary, and secondary education spending.

## Efficiency-Increasing Reforms

**11. Increasing spending efficiency, whether to support fiscal consolidation or to improve educational achievements, requires structural reforms.** The potential gains are large enough to envisage a package of reforms that would increase educational outcomes while, at the same time, reducing public spending. This would free resources to meet other needs of the education system or in another area and to support fiscal consolidation.

### *Cost-Reducing Reforms*

**12. Some features of the Croatian school system contain the fiscal cost of education.**[17] The number of compulsory years of education is among the lowest in the EU (Figure 8). The enrollment rate is relatively low both in early childhood care and education and, to a lesser extent, after the end of compulsory education (Figures 9 and 10). Moreover, Croatia has the lowest rate of grade repetition primary and secondary education in the EU.[18]

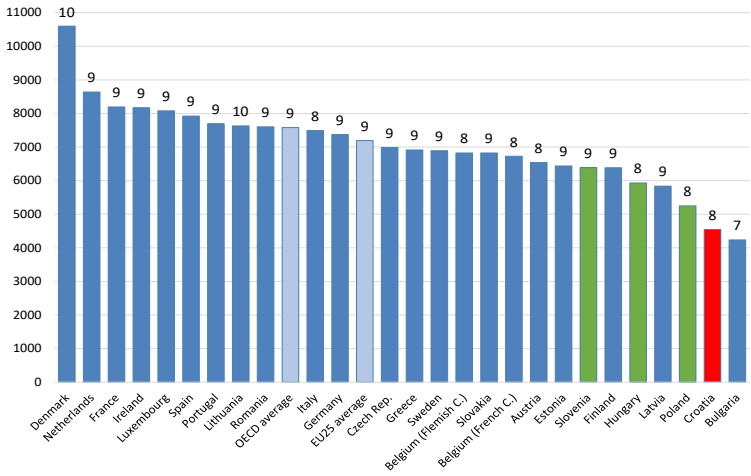
**13. Nonetheless, public spending on education is relatively high due to the large wage bill.** In 2023, compensation of employees of the education system accounted for 3.3 percent of GDP. This was 0.4 percent of GDP higher than EU, 0.3 percent of GDP higher than in Poland and 1.1 percent of

[17] For a detailed description of Croatia's education system, see Eurydice - Croatia.

[18] Irrespective of its impact on educational achievement, grade repetition can be a source of excessive spending (Hallaert, 2025a).

GDP higher than in Hungary. It was, however, 0.2 percent lower than in Slovenia.[19] Although compensation of employees of the education system was the same as a share of GDP in 2023 as in 2013, it represents a growing share of total government wage bill. This increase (+1.1 ppt) makes Croatia an outlier as all comparators (except Hungary) experienced a decline in the share of education in the general government's wage bill (Tables 2 and 3).

**Figure 8. Compulsory Instruction Time in Primary and Lower Secondary Education** (Hours, public institutions, 2023) 1/

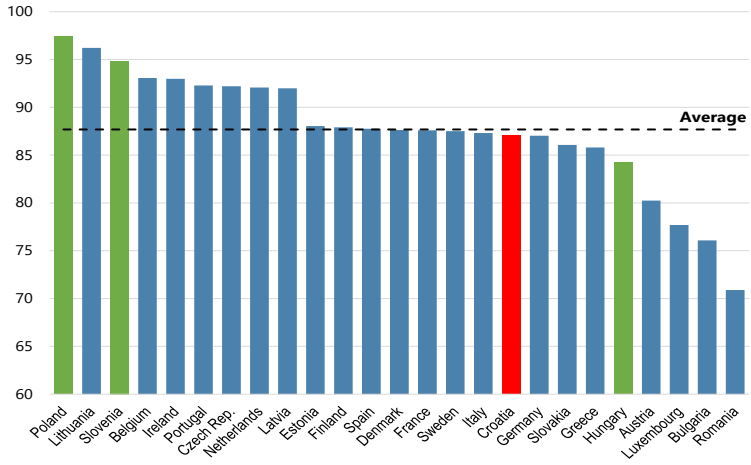



Sources: OECD and IMF staff calculations.

1/ Labels report the number of years for primary and lower secondary education. In addition, Croatia has a mandatory preschool program one-year before joining primary school.

**Figure 9. Enrollment Rate of 15–19-Year-Olds**

(2022, percent, national average, private and public institutions)

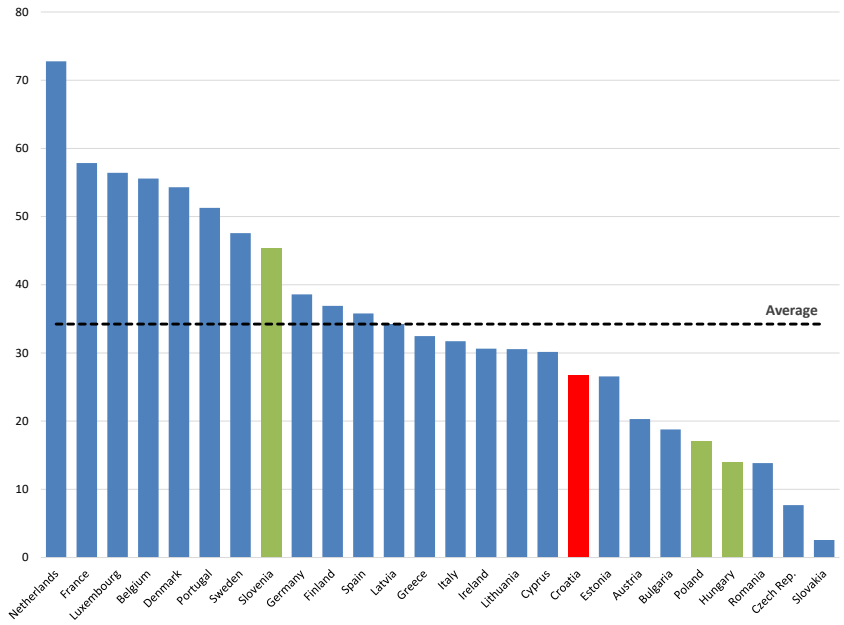



Sources: OECD and IMF staff calculations.

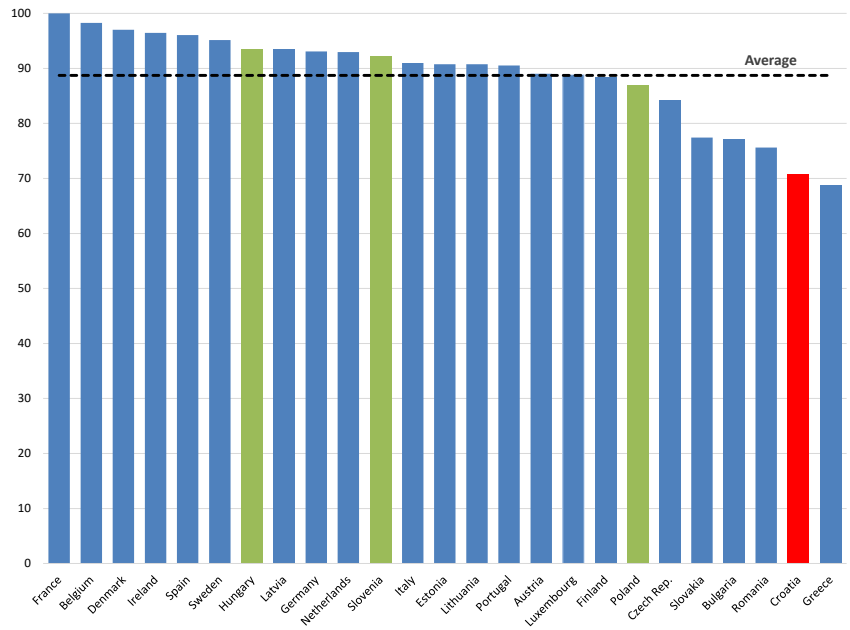
[19] The weight of education wage bill as a share of GDP is likely to have increase since 2023 following the large public sector wage increase implemented in 2024.

**Figure 10. Enrolment Rates in Early Childhood Education and Care Services** (Percent)

Age 0–2 [1/]




Age 3–5 [2/]




Sources: OECD and IMF staff calculations.

1/ 2022 or, if not available 2021.
2/ 2020 or latest.

**Table 2. Croatia: Composition of General Government Spending on Education**
(Percent of GDP unless otherwise specified)

| | Total | Current spending | Compensation of employees | Goods and services | Subsidies | Interest payments | Current transfers | Social benefits | Capital spending |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 2023 | | | | | |
| Croatia | **5.3** | 4.6 | *3.3* | *0.9* | *0.0* | *0.0* | *0.1* | *0.2* | 0.7 |
| Slovenia | **5.4** | 5.0 | *3.5* | *1.0* | *0.1* | *0.0* | *0.0* | *0.4* | 0.4 |
| Poland | **4.9** | 4.4 | *3.0* | *0.8* | *0.0* | *0.0* | *0.1* | *0.4* | 0.6 |
| EU | **4.7** | 4.3 | *2.9* | *0.8* | *0.1* | *0.0* | *0.3* | *0.3* | 0.4 |
| Hungary | **5.4** | 4.7 | *2.5* | *1.2* | *0.0* | *0.0* | *0.7* | *0.1* | 0.6 |
| | | | | 2013 | | | | | |
| Croatia | **5.0** | 4.8 | *3.3* | *1.0* | *0.1* | *0.0* | *0.2* | *0.2* | 0.3 |
| Slovenia | **6.5** | 5.7 | *3.8* | *1.2* | *0.1* | *0.0* | *0.1* | *0.5* | 0.8 |
| Poland | **5.3** | 4.9 | *3.6* | *0.9* | *0.0* | *0.0* | *0.2* | *0.3* | 0.4 |
| EU | **4.9** | 4.5 | *3.1* | *0.8* | *0.1* | *0.0* | *0.2* | *0.3* | 0.4 |
| Hungary | **4.7** | 4.4 | *2.5* | *0.9* | *0.1* | *0.0* | *0.7* | *0.2* | 0.3 |
| | | | | Change in percentage points 2013-2023 | | | | | |
| Croatia | **0.2** | -0.2 | *0.0* | *-0.1* | *-0.1* | *0.0* | *-0.1* | *0.0* | 0.4 |
| Slovenia | **-1.1** | -0.7 | *-0.3* | *-0.2* | *0.0* | *0.0* | *-0.1* | *-0.1* | -0.4 |
| Poland | **-0.4** | -0.6 | *-0.5* | *-0.1* | *0.0* | *0.0* | *0.0* | *0.1* | 0.2 |
| EU | **-0.2** | -0.3 | *-0.2* | *0.0* | *0.0* | *0.0* | *0.0* | *0.0* | 0.1 |
| Hungary | **0.7** | 0.3 | *0.1* | *0.3* | *-0.1* | *0.0* | *0.1* | *-0.1* | 0.2 |

Sources: Haver and IMF staff calculations.

Note: capital spending includes gross capital formation and capital transfers.

**Table 3. Croatia: Wage Bill in Education**
(Percent of general government wage bill)

| | 2013 | 2023 | Changes (ppt) |
|---|---|---|---|
| Croatia | 28.5 | 29.6 | 1.1 |
| Hungary | 25.4 | 26.2 | 0.8 |
| EU | 29.4 | 29.3 | -0.1 |
| Slovenia | 32.0 | 31.4 | -0.6 |
| NMS | 29.4 | 29.0 | -0.4 |
| Poland | 33.6 | 29.8 | -3.8 |

Sources: Haver and IMF staff calculations.

**14. Both the wage level and the number of teachers contribute to the high wage bill.**

- *Wages.* Data availability prevents a comparison of actual teachers' salaries. However, in 2022, statutory wages in public institutions were high by peer standards at every point of a teacher career (Table 4). The gap with peers is likely to have increased since 2022 following the strong wage growth of the public sector in recent years.

- *Employment.* In most European countries, the drop in student population has contributed to a decline in the share of public spending dedicated to education. However, even though the decline in student population over 2015–22 has been particularly large in Croatia (-4.8 percent

compared to -1.9 percent the EU, -3.9 percent in Hungary, and -2.4 percent in Poland), employment in education increased. And that increase was larger than in the rest of the public sector (Figure 11).[20] In contrast, employment in education declined in the EU, in Poland, and remained stable in Hungary.[21] This evolution resulted in a drop in the student-to-teacher ratio at all levels of education in Croatia. At the combined primary and secondary education level, comparators did not experience such a decline and, the student-to-teacher ratio is now lower in Croatia than in any comparator and the EU (Figure 12).

**Table 4. Croatia: Teachers' Statutory Salaries at Different Points in Teachers' Careers**
(2022, USD PPP, based on the most prevalent qualifications, public institutions)

| | | Croatia | Hungary | Poland | Slovenia | NMS average 1/ |
|---|---|---|---|---|---|---|
| Starting salary | Primary | 30 017 | 16 137 | 19 235 | 31 187 | 23 663 |
| | Lower secondary, general programmes | 30 017 | 16 137 | 19 235 | 31 187 | 23 670 |
| | Upper secondary, general programmes | 30 017 | 16 137 | 19 235 | 31 187 | 23 670 |
| Salary after 10 years of experience | Primary | 31 361 | 18 173 | 25 766 | 38 213 | 27 131 |
| | Lower secondary, general programmes | 31 361 | 18 173 | 25 766 | 38 213 | 27 140 |
| | Upper secondary, general programmes | 31 361 | 20 193 | 25 766 | 38 213 | 27 365 |
| Salary after 15 years of experience | Primary | 32 108 | 19 520 | 31 447 | 48 062 | 30 038 |
| | Lower secondary, general programmes | 32 108 | 19 520 | 31 447 | 48 062 | 30 047 |
| | Upper secondary, general programmes | 32 108 | 21 689 | 31 447 | 48 062 | 30 288 |
| Salary at top of scale | Primary | 35 841 | 27 597 | 32 778 | 57 595 | 36 589 |
| | Lower secondary, general programmes | 35 841 | 27 597 | 32 778 | 57 595 | 36 620 |
| | Upper secondary, general programmes | 35 841 | 30 663 | 32 778 | 57 595 | 36 993 |

Source: OECD (2023a, Table D3.1) and IMF staff calculations.

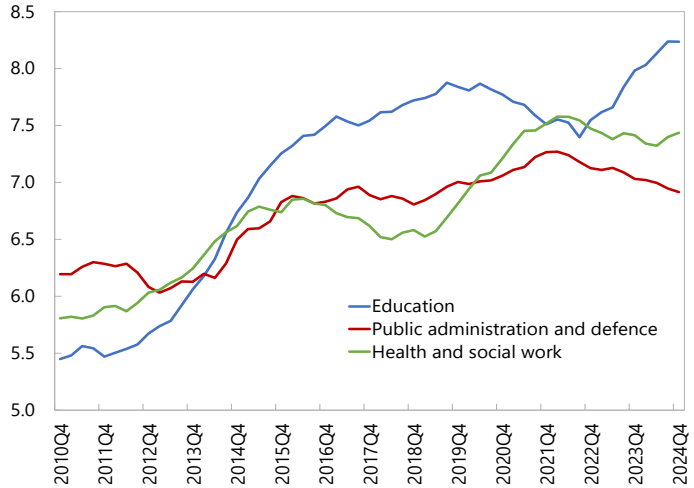
1/ Data for Estonia and Latvia are available only for starting salary. Slovenia has the highest salaries among NMS at all point of teacher's career except for starting salary where salaries are higher in Lithuania.

**15. A large number of small schools contribute to the high level of employment**. At both the primary and secondary education levels, Croatia has many small schools. A quarter of schools have 3 or fewer students per grade. The median primary school has 8 students per grade compared to an OECD average of 27 (OECD, 2024b and c). Therefore, the number of small schools is an important driver of high level of employment and low student-per-teacher ratio.

[20] In the four most recent years (the school year 2018–19 to 2022–23), the number of teachers at upper secondary level increased by 2.9 percent while the number of students declined by 0.8 percent (Croatian Bureau of Statistics, 2024).

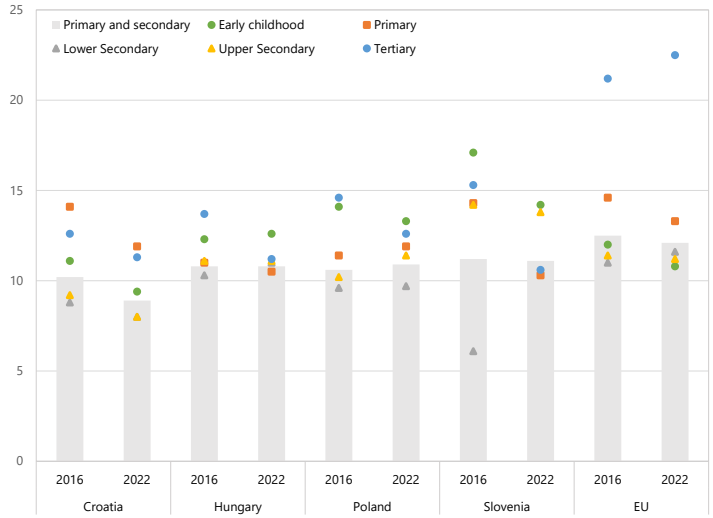
[21] Even in Slovenia, where the student population increased by 6.1 percent, the share of education in public spending increased less than in Croatia: 0.5 ppt versus 0.6 ppt.

**Figure 11. Government Employment in Selected Sectors**
(Percent of total employment; seasonally adjusted; 12-quarter moving average)




Sources: Haver Analytics; and IMF staff calculations.

**Figure 12. Student-to-Teacher Ratio**
(2022)

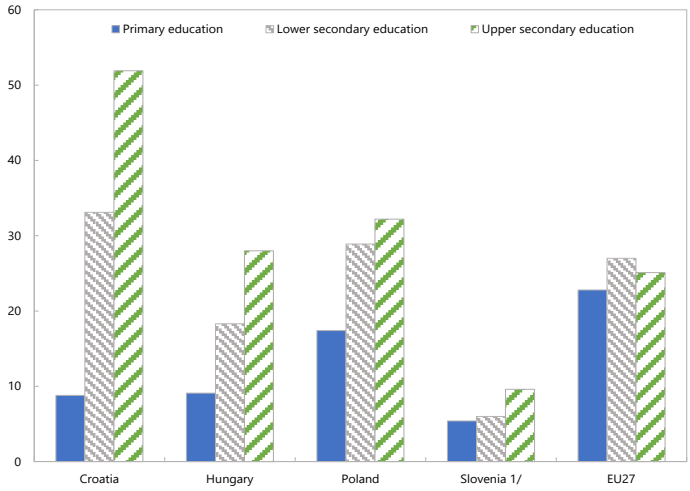



Source: OECD.

**16. Small schools contribute to an inefficient allocation of teachers resulting in part-time work and in teacher shortages.** At secondary education the proportion of teachers working part-time is much higher than in peers (Figure 13). Despite an increase in the number of teachers, the shortage has become more severe in recent years: the percentage of students in schools whose principal reports that the school's capacity to provide instruction is hindered to some or a large

extent by staffing issues increased from 18 percent in 2018 to 46 percent in 2022 (OECD, 2023b).[22] The shortage of teachers is particularly severe in physics and mathematics, affecting the acquisition of basic skills and, thus, the mathematics performance in test scores (EC, 2024d, 2025). This may require a review of the tertiary enrollment quotas that are inadequate to meet the demand for STEM teachers (EC, 2025).

**Figure 13. Teachers Working Part-Time**
(2022, percent of all teachers)




Source: Eurostat.

1/ 2017 for lower secondary education.

**17. A reorganization of the school system could reduce the fiscal cost of education without reducing outcomes.** School and class consolidation would allow better allocation of teachers and is needed considering the projected strong decline in student population in the coming years. It would:

- *provide saving…* Small schools are costly to run and result in a duplication of administrative tasks, jobs, and equipment. This appears to be the case in Croatia where spending per students and school size are negatively correlated at both the primary and secondary levels (Table 5).[23] However, as small schools may be important to ensure access to education in sparsely populated areas, the consolidation of schools may need to be accompanied by provision of free

[22] Though caution is needed in interpreting differences across countries as the indicator reflects principals' perceptions (which may be affected by cultural expectations) rather than an objective measurement, it is noteworthy that this share is higher than in Hungary (41 percent) and Slovenia (42 percent) but lower than EU average (46 percent) and in Poland (47 percent).

[23] Stanić and others (2026) found that larger public primary schools in the city of Zagreb are more efficient.

transportation in remote areas, building on free transportation provided to children attending kindergartens. [24, 25]

**Table 5. Croatia: Correlation Between School Sizes and Expenditure Per Student**
(2022, county level)

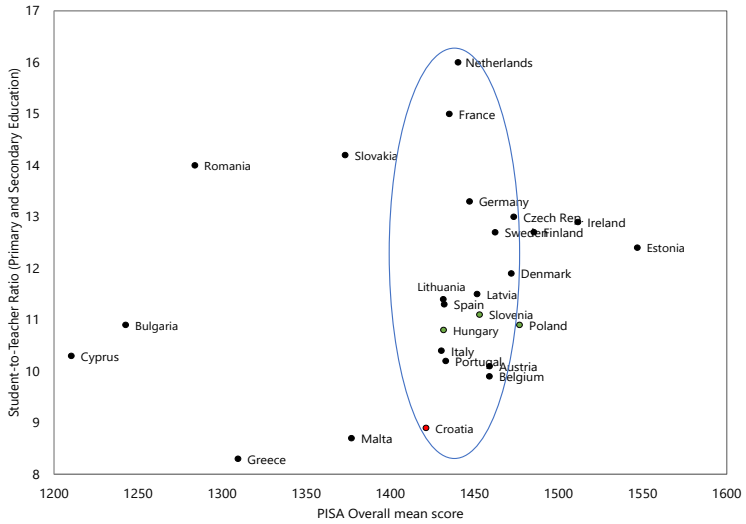
| | Primary education 1/ | Secondary education 2/ |
|---|---|---|
| Correlation spending per student/students per school | -0.20 | -0.22 |
| Correlation spending per student/teachers per school | -0.28 | -0.39 |

Sources: Croatian authorities and IMF staff calculations.

1/ 19 counties.
2/ 18 counties.

- … *without reducing educational achievements*. The lower student-to-teacher ratio in Croatia is not associated with comparatively higher educational outcomes (Figure 14). This is consistent with a large body of evidence. Hattie (2005) concludes a large meta-analysis pointing that reducing class-size has only a "tiny" positive effect and suggests that the main reason is that teachers of smaller classes adopt "the same teaching methods as they use in larger classes and thus [do] not optimiz[e] the opportunities presented by having fewer students."

**Figure 14. Class-Size and Educational Outcome**
(2022, primary and secondary education)




Sources: Eurostat, OECD, and IMF staff calculations.

[24] Annex III shows the large regional dimension to the small school issue.

[25] Illustrating regional disparities, the OECD (2024b) reports that Croatia as a largest regional difference (across the 4 NUTS2 regions) in enrollment of the 15–19-year-olds than any other EU country. It ranges 16½ percent in Northern Croatia to 100 percent in Zagreb.

**18. The move to a "whole day school" system provides an opportunity for more efficient use of primary education resources.** At the beginning of the decade, 40 percent of primary schools (60 percent of students) operated in double-shift work (Eurydice, 2023). In 2023, Croatia launched the revamping of the primary system that will be completed by 2028. Eliminating the double-shifts provides an opportunity for better use of primary school infrastructure and teachers and, thus, could result, once implemented, in lowering the fiscal cost of education.

***Outcome-Increasing Reforms***

**19. Increasing teaching time would improve the acquisition of skills.** Compounding a short number of compulsory years of education, the number of instructional hours is the lowest in the EU in both primary and secondary education levels (OECD 2023a, 2024d, Figure 8).[26] This constitutes "a major barrier to skill development" (World Bank, 2023) and contributes to relatively low educational outcomes. The whole-day school system will increase the instruction time for grades 1 to 8. If accompanied by better use of resources and by revised curricula and teaching methods, it could also increase educational outcomes (EC, 2024c; Eurydice, 2023; World Bank, 2023). International evidence suggests that such a reform could also boost women's labor force participation and thus help reduce labor shortages (Berthelon and others, 2024).[27]

**20. Revising the curriculum would help improve job prospects and reduce skills mismatch.** The test scores of both fourth graders and 15-year-old students (Figures 3 to 6) point to the need to improve the teaching of mathematics. It is important for job prospects as the 25–65 age group with higher numeracy skills enjoy higher labor force participation, lower unemployment, and higher earnings (OECD, 2024e). This calls for a review of the curriculum. A review of the VET curriculum is particularly important as VET students demonstrate a lower level of basic skills: in the 2022 PISA assessment, 92 percent of Croatian students of the general track education achieved a level 2 of proficiency level or above in mathematics compared to only 56 percent for vocational track students (World Bank, 2024).

**21. A revision of the curriculum is underway.** Working groups have been established to draft a proposal for a national early childhood and pre-school curriculum (EC, 2024c and 2025; Ministry of Science and Education 2023a and 2023 b). A revision of the VET curriculum to make it more skill-based is being implemented in all secondary vocational schools (Republic of Croatia 2025; EC, 2024c and 2025; Novi List, 2025; World Bank 2023). However, it is important to stress that the review of the curricula should be frequent as labor market needs evolve rapidly. Moreover, a strong collaboration with firms is needed not only to identify the labor market but also to ensure a smooth transition to a VET education that is less classroom based. International evidence suggests that when vocational

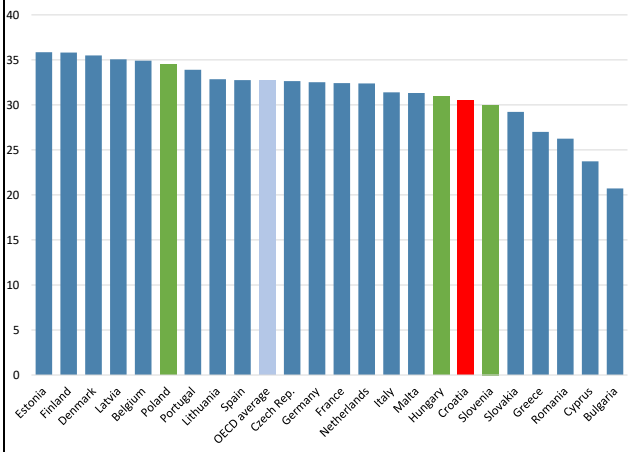
[26] In primary education, it was 473 hours per year in 2023 compared to 738 hours for the EU25 average (805 on average in the OECD, 679 hours in Hungary, 558 hours in Poland, and 682 hours in Slovenia). At the lower secondary, it reached 663 hours (876 for the EU25, 916 for the OECD, 803 in Hungary, 754 in Poland, and 766 in Slovenia). At the upper secondary level, it stood at 568 hours (EU25 799, OECD 842, Hungary 741, Poland 656, and Slovenia 710).

[27] The ongoing reform aims at increasing the numbers of hours in pre-school education from 250 to 700 (EC, 2025; Ministry of Science and Education, 2023a and b).

education does not heavily involve firms in the provision of professional skills, the labor market outcomes of VET graduates tend to be weak (World Bank, UNESCO, and ILO, 2023; World Bank, 2024). In Croatia, the involvement of employers in VET curricula and funding is limited. This has "exacerbated the mismatch between the demand for and supply of skills in the Croatian labor market" (World Bank, 2023). More specifically, a "consequence of the VET curricula not being driven by demand is that almost half of VET graduates work in a field outside their specialization" (World Bank, 2023) and there are more imbalances between job qualifications and requirements for medium skilled occupations in Croatia than in peers (Annex IV).

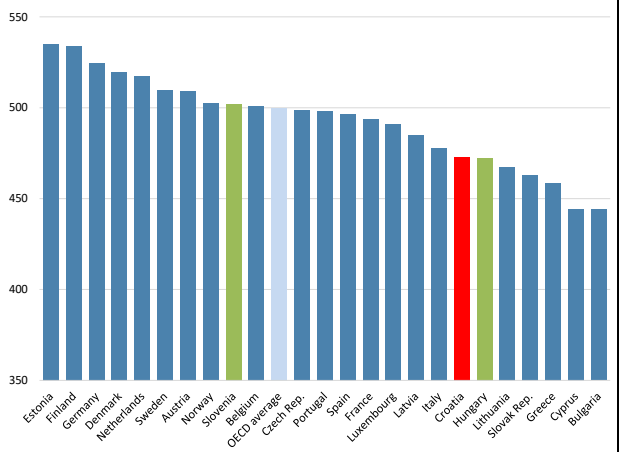
**22. A change in teaching methods should accompany the revision of the curricula.** A new curriculum and a successful transition to a VET education that is less theoretical and more skilled based implies a change in teaching methods.[28] This, in turn, requires reviewing the education of future teachers as well as training current teachers in new methods and providing them with adequate pedagogical support (EC, 2025). Highlighting the need for teacher support, only 45 percent of teachers in upper-secondary schools used ICT for teaching in 2018 and 38 percent feel adequately prepared to teach using digital aids (World Bank, 2023). Promoting group work and team teaching may address another weakness of Croatian students: creative thinking and problem-solving skills (Figures 15 and 16). These skills are increasingly important (and in demand) to succeed in an information-based economy and to adapt to rapid technological changes. They are better acquired in general track education than in the VET. The 2022 PISA shows that Croatian students' relative results in creative thinking are aligned with what could be expected from their performance in mathematics but below what could be expected based on their performance in reading. Moreover, VET students score lower than those in general track education on the "collaborative problem solving" dimension (a score of 448 compared to a national average of 473).

**Figure 15. Creative Thinking Performance of 15-Year-Old Students**
(2022, Mean score)




Source: OECD.

**Figure 16. Collaborative Problem-Solving Performance of 15-Year-Old Students**
(2022, Mean score)




Source: OECD.

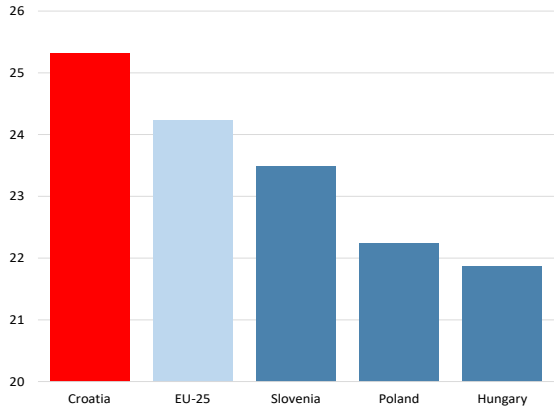
[28] "According to the national PISA report, students say that they are mostly taught formal mathematics, not applied mathematics" (EC, 2024c).

**23. Postponing the start of the VET may help increase the basic skills of younger workers.** VET starts earlier in Croatia than in peers (14–15 years). Delaying the start of the VET would complement the whole school day reform and the revision of the curriculum to give more time to students to better acquire basic skills (as well as non-routine and cognitive and social skills such as creative thinking and collaborative problem-solving) and diminish the gaps in educational performance between VET students and general track students.

**24. Promoting the general track system would improve outcomes and job prospects.** [29] This would:

- *Increase the overall educational outcomes*. The Croatian education system is heavily tilted towards VET. Croatia has the third highest enrollment rate of upper secondary students in VET among EU countries (Dalvit and others, 2023). Moreover, the rate has been steadily increasing in recent years from 68.2 percent in 2018–19 to 69.7 percent in 2021–22 (Croatian Bureau of Statistics, 2024). The emphasis on VET contributes to higher spending per student in upper secondary education than in peers (Figure 17) but also to a lower overall educational outcome as VET students demonstrate, in the PISA assessment, lower performance than students in the general track.

**Figure 17. Expenditure on Educational Institutions Per Full-Time Equivalent Student—Upper Secondary Education**
(2020, percent of GDP per capita)




Source: OECD.

- *Foster enrollment in tertiary education*. The return to education is large: higher education was associated with an increase in earnings of 9.8 percent in 2022, which is more than in most regional peers (World Bank, 2024). The employment rate of the population with tertiary education is much larger than for total population (Figure 18) and the over-qualification is one of the lowest in Europe (Figure 19).[30,31] Nonetheless, the share of working age population with a tertiary education is lower than the EU average and in any comparator (Table 6) and student

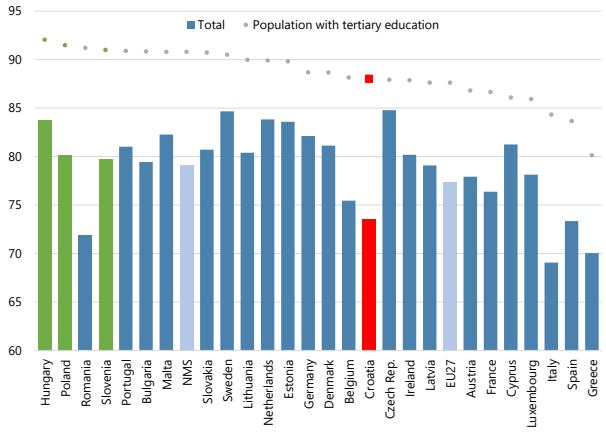
[29] Increasing the enrollment in general education is supported by the National Recovery and Resilience Plan and cohesion policy (EC, 2025).

[30] There is over-qualification when people with tertiary education are employed in occupations that do not require such a high level of education. For more details see Eurostat - EU Labour Force Survey - new methodology from 2021 onwards.

[31] A recent survey confirms that overqualification is comparatively low: at 15 percent it is well below the OECD level of 23 percent. Being overqualified leads to a wage on average 7.3 percent lower than peers in well-matched jobs with similar educational attainment compared to 12.5 percent average in OECD and 11.4 percent for EU countries that participated in the survey (OECD, 2024e).

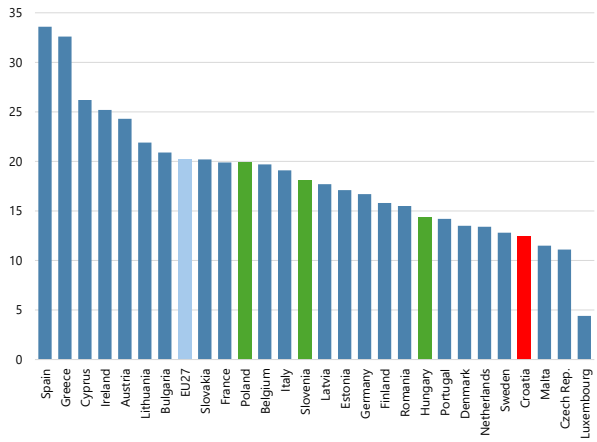
enrollment in tertiary education is below capacity, pointing to the need to consolidate or merge tertiary institutions (Kršul, 2025).[32] The low enrollment rate in tertiary education is, in part, due to the difficulty to join (and succeed) in tertiary education after VET. In 2019–20, the failure rate to the "matura" exam reached 3.9 percent for students from general track but 37.8 percent for students from VET (World Bank, 2023). In this situation, promoting general track education may be a better way to foster tertiary education than reforming VET.

**Figure 18. Employment Rate**
(2023, percent, population 25–64)




Sources: Eurostat and IMF staff calculations.

**Figure 19. Over-Qualification Rate**
(2024, percent, population 20–64)




Source: Eurostat.

**25. Promoting tertiary education would reduce skills mismatch, labor shortages and, eventually, boost innovation and competitiveness.** Skills mismatch is high in Croatia (Figure 20). It contributes to low labor force participation despite labor shortages and reflects insufficient graduates from tertiary education compared to the needs (Table 6).[33] Although the employment rate of people with tertiary education is much higher than for the rest of the population, it is lower than in the comparators and the NMS average (Figure 18). This is due to a relatively high share of tertiary students enrolled in fields with little job prospects (World Bank, 2023; EC, 2025). Therefore, the promotion of tertiary education should be accompanied by measures to inform students about the fields offering the best job opportunities. Building on past reforms that link funding to quality, the promotion of tertiary education should be also accompanied by measures to ensure its quality and adequate curriculum (World Bank, 2023; EC, 2025). For example, Pažur Aničić and others (2023) point that, in some areas, graduates lack practical knowledge as well as application skills and adaptability skills. They report that the largest deficit is in biomedical and health sciences, an area where the mismatch between job qualifications and requirements is the most severe for highly skilled occupations according to the CEDEFOP (Annex IV).

[32] The NRRP indicates that at least 12 faculties, polytechnics and/or institutes should be merged or integrated.

[33] The labor force participation of the population aged 15–64 was 71.9 percent in 2024. This was the fifth lowest rate in the EU (75.4 percent). It reached 78.6 in Hungary, 74.9 percent in Poland, and 75.9 percent in Slovenia.

## Table 6. Skills Mismatch

(2024, percent, working age population) [1/]

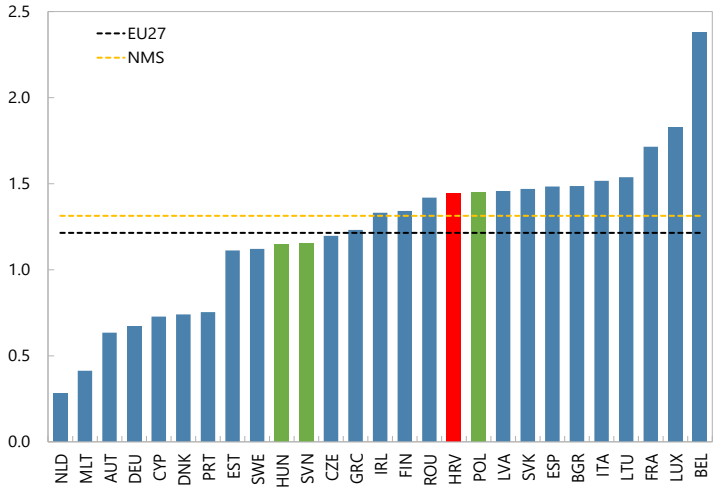
| | | Croatia | EU27 | Hungary | Poland | Slovenia | Romania |
|---|---|---|---|---|---|---|---|
| Low skills | Share of population | 14.4 | 24.2 | 17.7 | 11.8 | 16.2 | 22.4 |
| | Share of employment | 5.1 | 15.8 | 9.1 | 3.5 | 8.0 | 13.0 |
| | *Difference* | *9.3* | *8.4* | *8.6* | *8.3* | *8.2* | *9.4* |
| Medium skills | Share of population | 59.0 | 44.0 | 55.4 | 53.9 | 53.4 | 61.0 |
| | Share of employment | 60.9 | 45.3 | 58.2 | 53.5 | 54.7 | 63.7 |
| | *Difference* | *-1.9* | *-1.3* | *-2.8* | *0.4* | *-1.3* | *-2.7* |
| High skills | Share of population | 26.6 | 31.7 | 27.0 | 34.3 | 30.5 | 16.5 |
| | Share of employment | 34.0 | 38.7 | 32.7 | 43.1 | 37.3 | 23.3 |
| | *Difference* | *-7.4* | *-7.0* | *-5.7* | *-8.8* | *-6.8* | *-6.8* |

Sources: Eurostat and IMF staff calculations.

1/ Skills are proxied by education achievement: Low skills are less than primary, primary and lower secondary education, medium skills are upper secondary and post-secondary non-tertiary education, high skills are tertiary achievement

## Figure 20. Skills Mismatch

(2024, squared difference in proportions between population and employed, by level of education) [1/]




Sources: Eurostat; and IMF staff calculations.

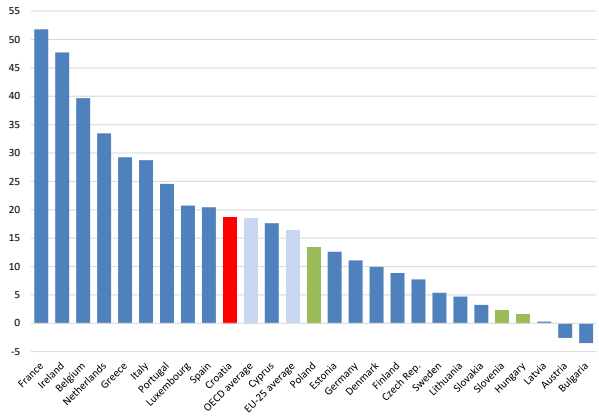
1/ Measured for working age population (15 to 64) considering three levels of education: 1) low skill (less than primary, primary and lower secondary education), 2) medium skills (upper secondary and post-secondary non-tertiary education), and 3) high skills (tertiary education).

**26. The development of childcare infrastructure would help increase educational achievement, labor force participation, and productivity.** Supported by the EU (Cohesion policy and National Recovery and Resilience Plan), the Croatian government develops childcare infrastructure especially in rural areas and in smaller and less developed areas (EC, 2025). This effort should increase the comparatively low enrollment in early childhood education (Figure 10).[34] Because early childhood is a critical time to shape abilities, this effort, if accompanied by measures to have adequate staffing to provide high quality education, can be expected to increase educational achievement of children (and ultimately long-term productivity) as well as women's labor force participation (Hallaert and others, 2023). Providing adequate staffing is not limited to addressing the teacher shortages. It is also ensuring that teachers have proper training as evidence shows that the impact of early childhood on future educational achievement of children depends on the quality of teachers (EC, 2025; Hallaert and others, 2023). The Croatian government offered primary school teachers the possibility to become early childhood educators, which could help ensure adequate, high-quality staffing of the ongoing expansion of early childhood education facilities.

**27. A large body of evidence shows that the impact of early childhood education on educational achievement is particularly strong for poor children** (Hallaert and others, 2023). Access to early childhood education is inequal in Croatia. 11 percent of children aged 0 to 2 of bottom income tertile are enrolled, compared to 29 percent for the top tertile. This is a larger gap than the EU and OECD averages and in the comparators (OECD, 2024b and Figure 21). Children aged 0 to 2 whose mother has a tertiary education benefit more from early childhood education than children whose mother does not have tertiary education (35.1 percent versus 20.5 percent). This 14½ ppts gap is about 4 ppts larger than for the EU25 average and twice as large as the gap in Hungary and Slovenia (OECD, 2023a). In this context, it is crucial to ensure that new childcare facilities are accessible financially. Currently, the childcare cost paid by parents accounts for a lower share of household income than on average in the EU and, for most types of families, declined over time (Figure 22). The Government provides subsidies to socially disadvantaged families and minorities (notably support to Roma parents who are exempted from kindergarten expenses) and provides transport to facilities in remote areas (OECD,2024b).

**Figure 21. Difference in Participation Rates in Early Childhood Education Between Highest and Lowest Income Tertiles**

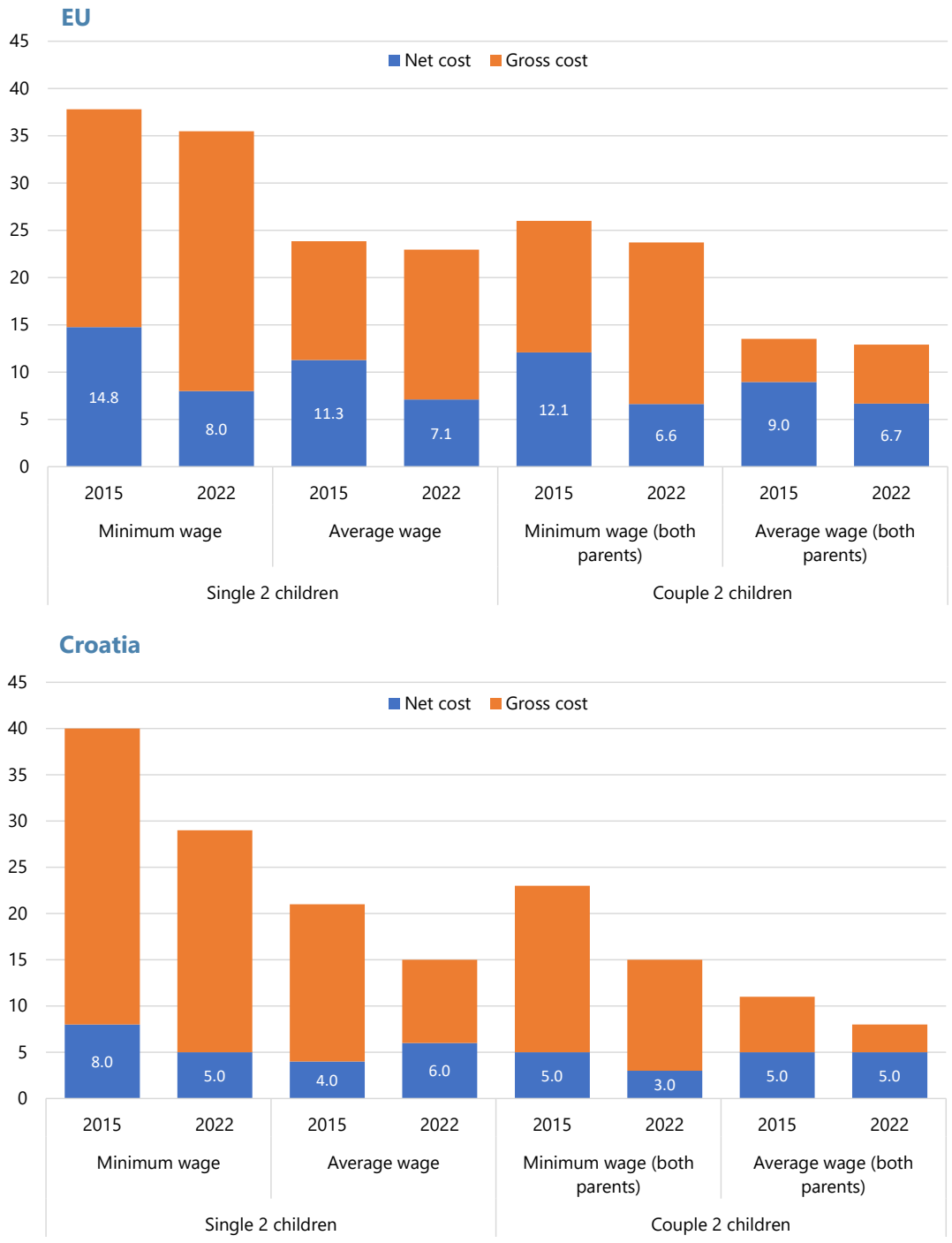
(0–to 2-year-olds, 2022 or latest)




Source: OECD.

[34] In 2022, the government approved amendments to the Preschool Education Act to increase access to ECEC for 6-months-old children and the creation the creation of a network of kindergartens at the national level (Eurydice - Croatia; World Bank 2023).

**Figure 22. Childcare Cost by Type of Household**
(Percent of net household income) [1/]




Sources: OECD and IMF staff calculations.

1/ EU is the EU21 simple average. The cost is for full-time center-based childcare for parents working full time. The difference between gross and net cost reflects the impact of support through taxes and benefits. Net household income includes social assistance.

## C. Healthcare

### Public Healthcare Spending is Comparatively High

**28. Croatia dedicates a larger share of its public resources to healthcare than peers.** In 2023, public spending on healthcare reached 7.8 percent of its GDP (Table 7). This is half a point of GDP more than the EU27 average, almost 2 ppts higher than the NMS average, and more than in any of the three comparators. The higher level of spending in 2023 was in part driven by higher capital expenditure. However, this does not distort the analysis: in 2022, though capital spending was more limited and more in line with that of peers (0.5 percent of GDP), total public spending on healthcare reached the same level as in 2023 (7.8 percent of GDP). In other terms, the increase in capital spending in 2023 was accompanied by a decline in the same proportion of current spending. Moreover, Croatia spending on healthcare is much higher than in countries with a similar income per capita level (Figure 23). Finally, public spending on healthcare has increased much more over the past decade than in European peers.

**Table 7. Croatia: Composition of General Government Spending on Healthcare**
(Percent of GDP unless otherwise specified)

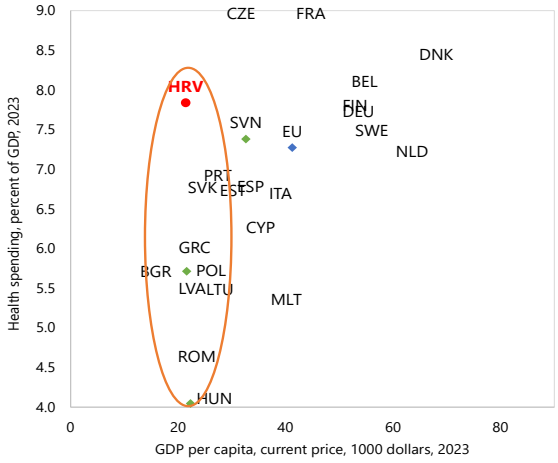
| | Total | Current spending | Compensation of employees | Goods and services | Subsidies | Interest payments | Current transfers | Social benefits | Capital spending |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 2023 | | | | | |
| Croatia | **7.8** | 7.0 | *2.8* | *2.3* | *0.0* | *0.0* | *0.0* | *1.9* | 0.8 |
| Slovenia | **7.4** | 6.9 | *2.9* | *2.0* | *0.0* | *0.0* | *0.2* | *1.8* | 0.5 |
| EU | **7.3** | 7.0 | *1.7* | *1.4* | *0.1* | *0.0* | *0.1* | *3.9* | 0.3 |
| NMS | **6.0** | 5.6 | *2.0* | *1.4* | *0.0* | *0.0* | *0.1* | *2.1* | 0.4 |
| Poland | **5.7** | 5.3 | *1.6* | *1.9* | *0.0* | *0.0* | *0.1* | *1.7* | 0.4 |
| Hungary | **4.0** | 3.9 | *1.6* | *1.1* | *0.0* | *0.0* | *0.1* | *1.1* | 0.2 |
| | | | | 2013 | | | | | |
| Croatia | **6.4** | 6.0 | *2.3* | *1.6* | *0.0* | *0.0* | *0.0* | *2.1* | 0.4 |
| Slovenia | **6.9** | 6.4 | *2.7* | *1.8* | *0.0* | *0.0* | *0.1* | *1.8* | 0.5 |
| EU | **7.1** | 6.8 | *1.7* | *1.1* | *0.0* | *0.0* | *0.1* | *3.9* | 0.3 |
| NMS | **5.1** | 4.8 | *1.5* | *1.2* | *0.0* | *0.0* | *0.1* | *2.0* | 0.3 |
| Poland | **4.7** | 4.3 | *1.3* | *1.4* | *0.0* | *0.0* | *0.0* | *1.6* | 0.3 |
| Hungary | **5.0** | 4.8 | *1.7* | *1.4* | *0.1* | *0.0* | *0.1* | *3.9* | 0.3 |
| | | | | Change in percentage points 2013-2023 | | | | | |
| Croatia | **1.4** | 1.0 | *0.6* | *0.7* | *0.0* | *0.0* | *0.0* | *-0.3* | 0.4 |
| Slovenia | **0.5** | 0.5 | *0.2* | *0.2* | *0.0* | *0.0* | *0.1* | *0.1* | 0.1 |
| EU | **0.2** | 0.2 | *0.0* | *0.3* | *0.0* | *0.0* | *0.0* | *0.0* | 0.0 |
| NMS | **1.0** | 0.8 | *0.4* | *0.2* | *0.0* | *0.0* | *0.0* | *0.2* | 0.2 |
| Poland | **1.0** | 0.9 | *0.3* | *0.5* | *0.0* | *0.0* | *0.0* | *0.1* | 0.1 |
| Hungary | **-1.0** | -0.9 | *-0.1* | *-0.3* | *-0.1* | *0.0* | *0.0* | *-2.7* | -0.1 |

Sources: Haver and IMF staff calculations.
Note: capital spending includes gross capital formation and capital transfers.

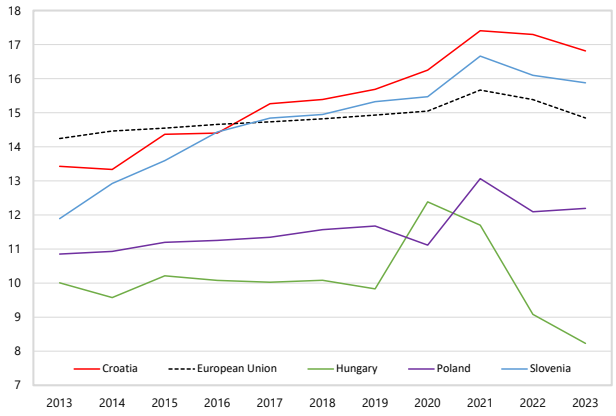
**29. Healthcare also accounts for a larger share of general government spending than in peers.** In 2023, healthcare represented a higher share of general government expenditure than in the EU or any of the comparators. This share increased steadily over the last decade, becoming larger than in the EU and comparators as early as 2017 (Figure 23).

**Figure 23. Evolution of Public Expenditure on Healthcare**
(Percent)

*As a Share of GDP Controlling for Income*




*As a Share of Total General Government Spending*

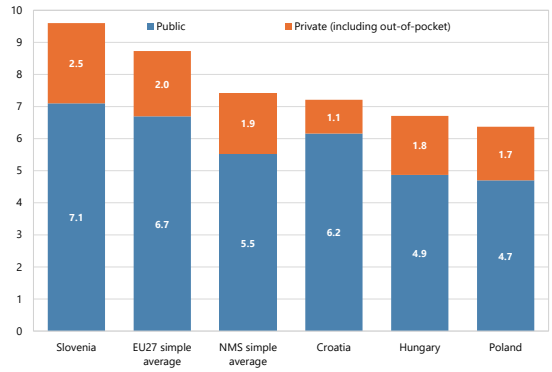



Sources: Haver and IMF Staff calculations.

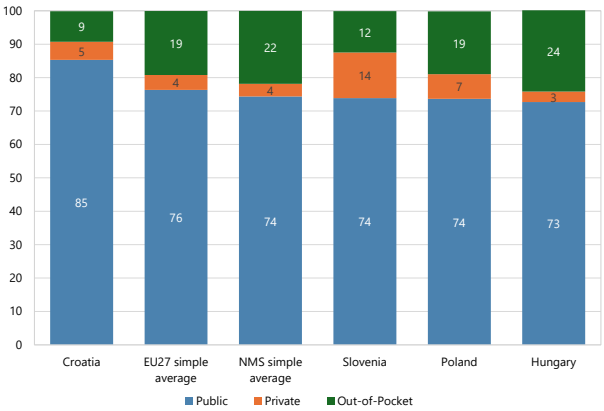
**30. The comparatively high public spending on healthcare reflects a more limited private financing.** Public spending accounts for 85 percent of current healthcare spending in Croatia. This is about 10 ppts more than EU or NMS averages. As a result, although, as a share of GDP, total current healthcare expenditure is smaller in Croatia than the NMS average, public spending is larger (Figure 24).

**Figure 24. Source of Healthcare Expenditure**
(2022, percent, excluding capital investment)

*As a Share of GDP*




*Distribution*



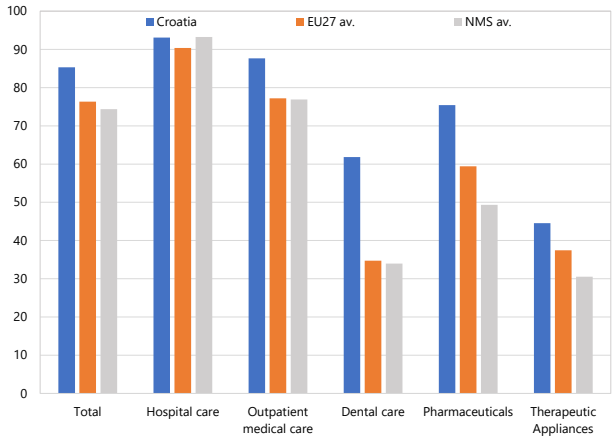

Sources: Eurostat and IMF staff calculations.

**31. The large share of public spending reflects the organization of the healthcare sector and the health insurance generosity.** "The Croatian health system is centralized and most healthcare providers are in public ownership […]. However, the number of private providers has grown, especially in primary care, dental services, and specialized clinics. The majority of primary care practices have been privatized, but most are contracted by the CHIF [Croatian Health Insurance

Fund] to provide publicly paid services, which are their main source of income" (Džakula and others, 2024).[35] The mandatory health insurance covers all residents, including foreign nationals residing in the country longer than three months. As a result, more than 99 percent of the population benefits from health insurance.[36] And, the system is relatively generous as it

- covers most health services and medical goods and a large share of the cost, resulting in the lowest out-of-pocket cost in the EU (Figures 25 and 26). Therefore, unlike in some Eastern European countries, sickness is rarely a reason for falling into poverty or experiencing "catastrophic health spending" (Hallaert and Primus, 2022; OECD/EC, 2024).

**Figure 25. Healthcare Coverage**
(2022 or latest, government and compulsory insurance spending as a share of total health spending)



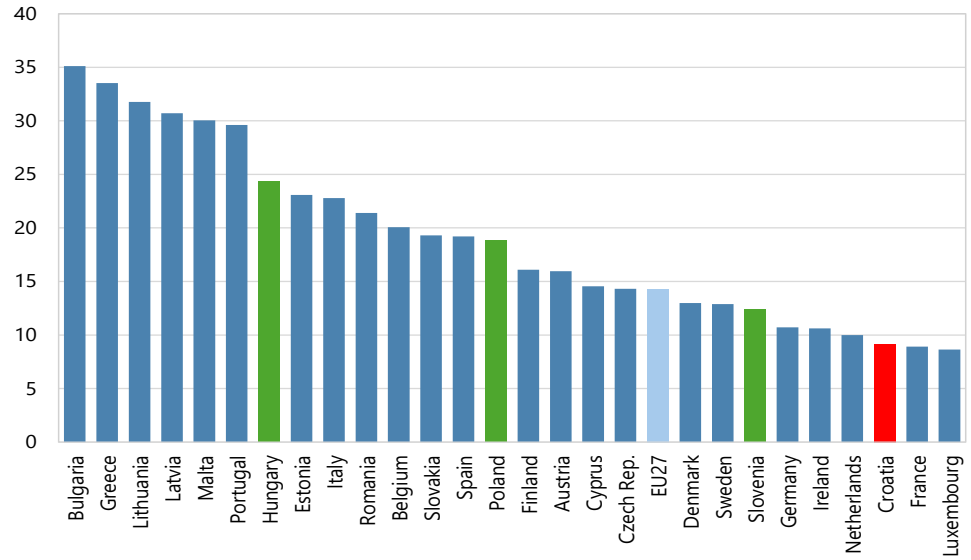

Source: OECD.

- provides exemptions from co-payments for vulnerable population groups. Certain groups (such as people with disabilities) have the right to free complementary health insurance membership, and their respective contributions are financed from the state budget (Džakula and others, 2024; EC, 2023; and OECD/EC, 2024).

[35] The CHIF "is the single purchaser of health services provided under the mandatory health insurance scheme. It also offers complementary voluntary insurance that covers co-payments required in the social health insurance system" (Džakula and others, 2024).

[36] Amendments to the 2023 Law on Mandatory Health Insurance has reduced the health coverage. The amendments introduced the obligation for all insured unemployed that are not registered in the register of unemployed to regularly report to the Croatian Health Insurance Fund. As a result, "in 2024, 13,184 people were deregistered from health insurance" (Office of the Ombudswoman of the Republic of Croatia, 2025). This accounts for about 0.3 percent of insured persons. The Office of the Ombudswoman of the Republic of Croatia submitted in June 2023 "a request to the Constitutional Court for the review of the constitutionality of the provisions of the amendments" emphasizing "that some persons will not be able to perform [the new obligation] due to disability, health or financial condition, and since their health insurance is canceled if they do not access the CHIF, such an obligation puts them in an unequal position. […] The decision of the Constitutional Court has not yet been issued" (Office of the Ombudswoman of the Republic of Croatia, 2025).

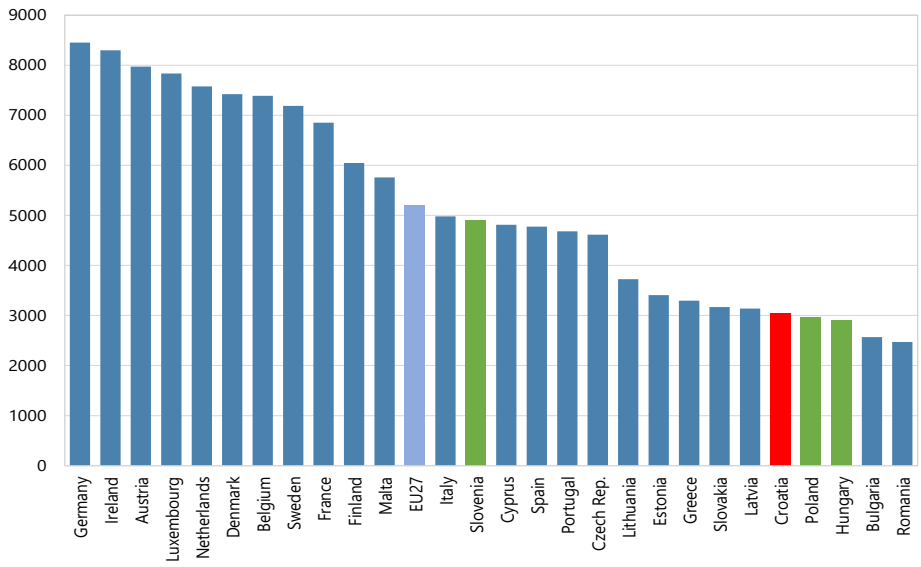
**Figure 26. Out-of-Pocket Healthcare Expenditure**
(2022, percent of total health spending)




Source: Eurostat.

**32. The large public financing of healthcare masks a low spending per capita.** Total (private and public) current health expenditure per capita (measured in PPP) increased rapidly in recent years. The growth outpaced the one in any comparator and the EU27 between 2019 and 2022. Nonetheless, it remained in 2022 one of the lowest in the EU (Figure 27).

**Figure 27. Total Current Health Expenditure**
(2022, USD PPP per capita) [1/]



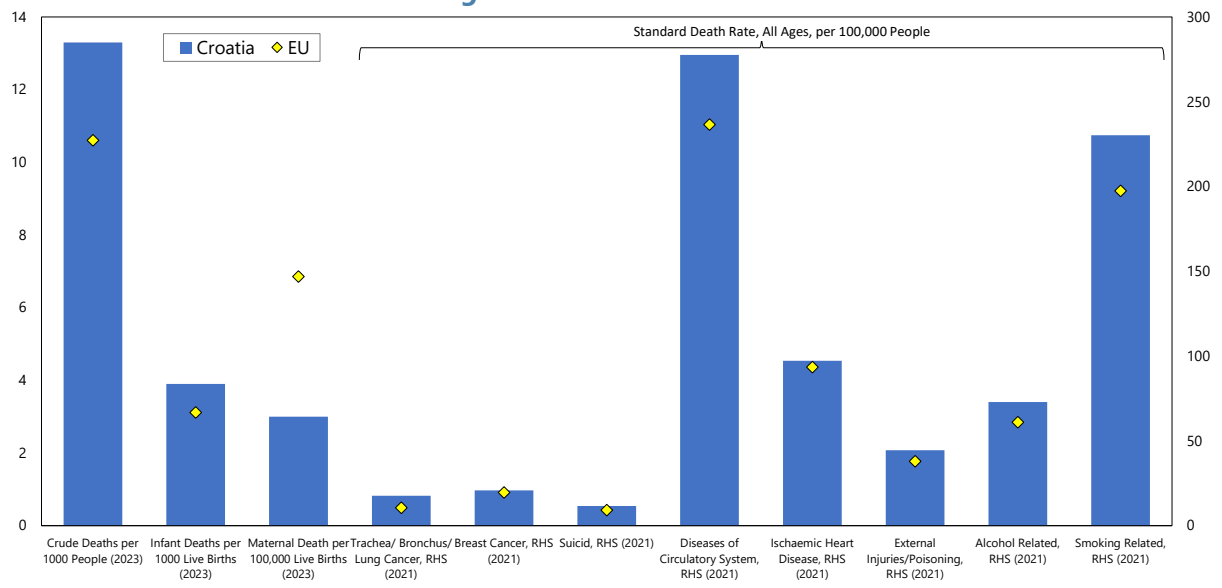

Source: WHO.
1/ Public, private, and external expenditures.

## Health Outcomes are Lower than Peers

### 33. Against most metrics, health outcomes are lower than in the EU:

- Except for maternal death, the death rates are all higher than the EU averages, often by a significant margin (Figures 28 and 29).

**Figure 28. Health Outcomes**

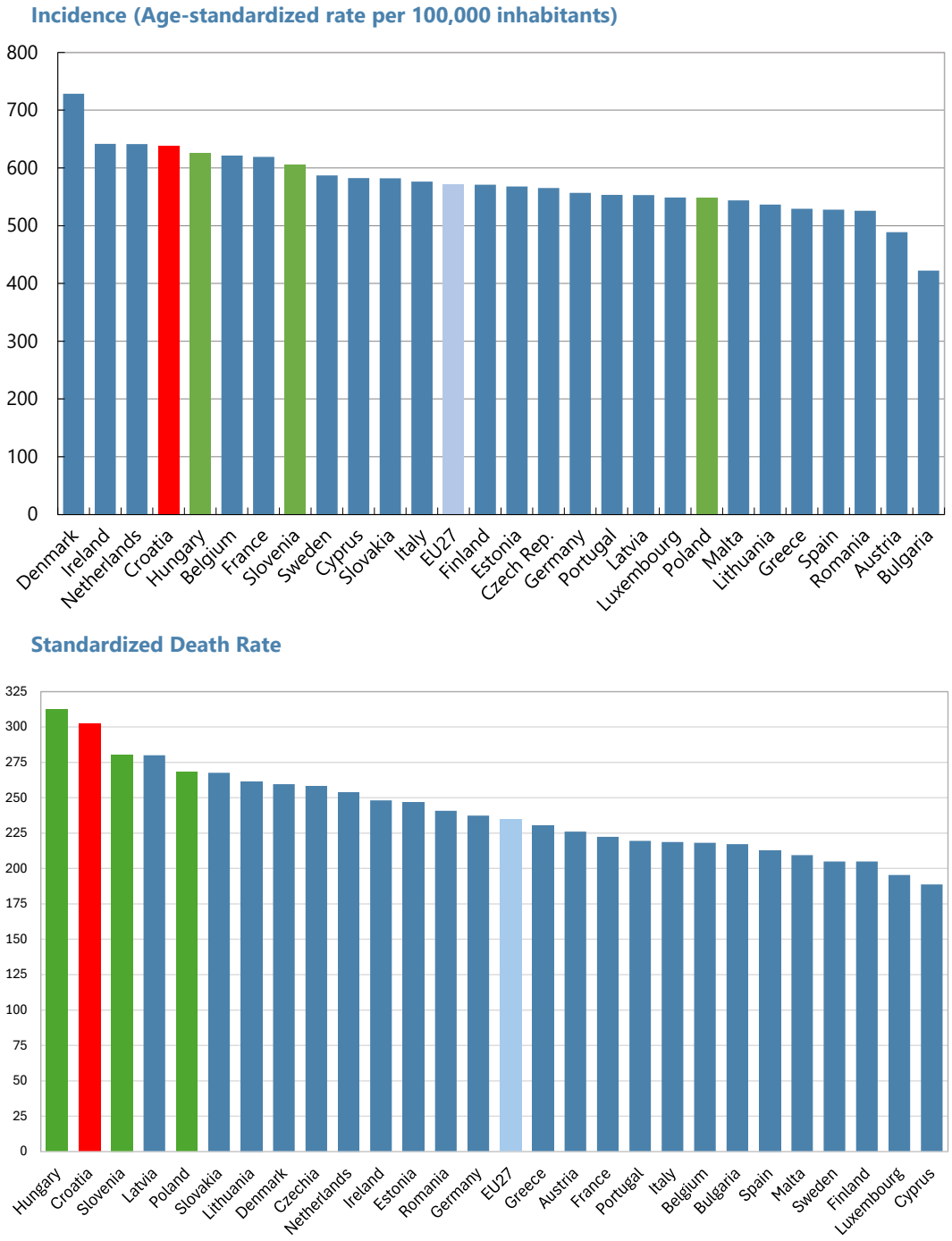



Sources: WHO, World Bank, and IMF staff calculations.

- Life expectancy at birth is comparatively low and even lower at 65 (Figure 30).
- The number of years a person lives in good health (healthspan), estimated by the healthy life years (HLY) or the health-adjusted life expectancy (HALE), are also comparatively low. Moreover, both indicators declined over the past decades (Figure 31).[37]

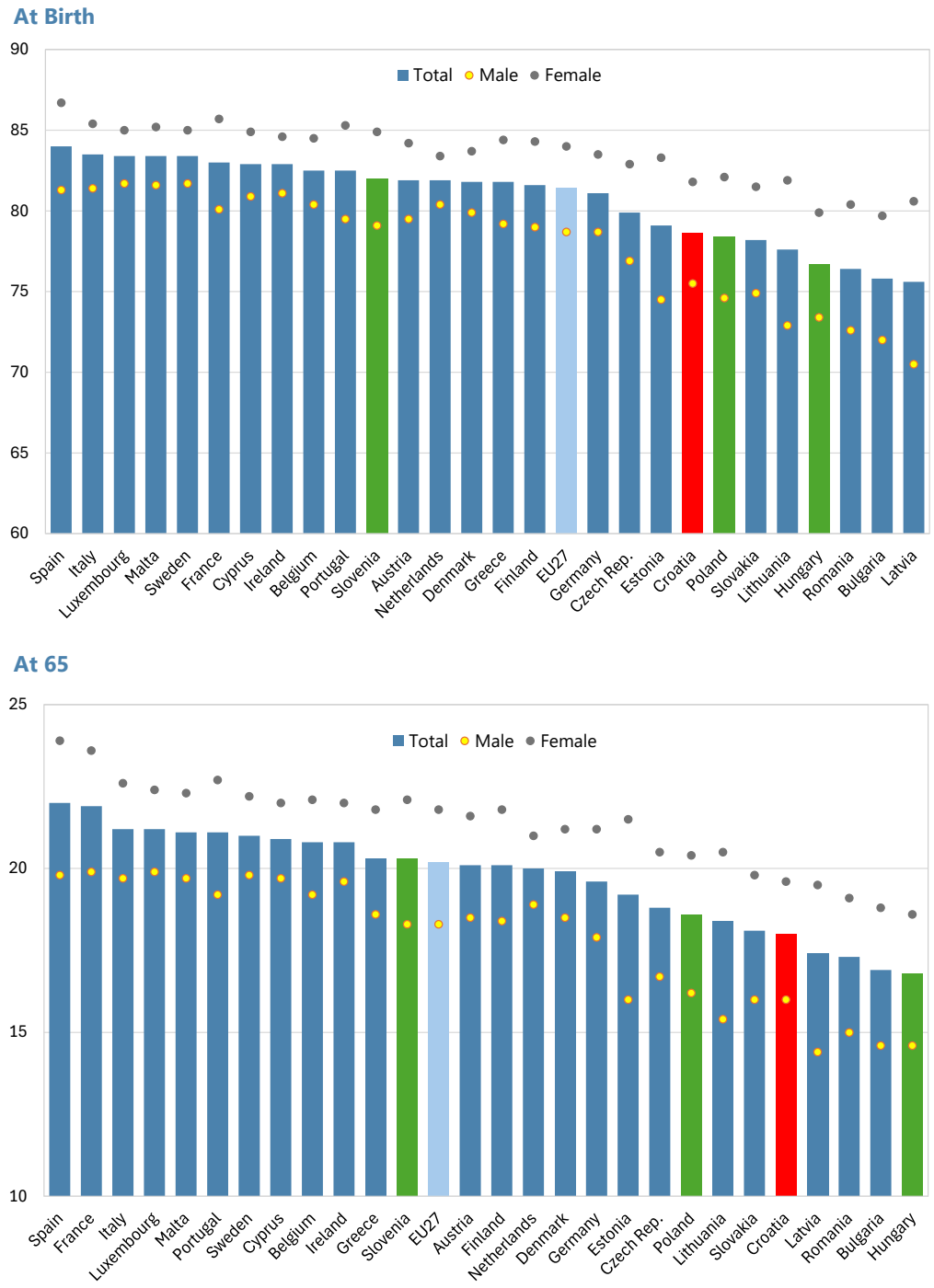
[37] Both HALE and HLY quantify healthy life expectancy. They rely on different data sources and methodologies and lead to different results and ranking among countries. The HLY measures the number of remaining years that a person of specific age is expected to live without any severe or moderate health problems. The notion of health problem is reflecting a disability dimension. The HALE measures the number of years of life lived in full health. It "is based on a much more complex approach that requires a large volume of data to describe the health status of the population, taking into account the overall burden of diseases and injuries, as well as some valuation (weighting) of the severity of disability related to all these diseases and injuries" (OECD-EC, 2024). For more details, see OECD-EC (2024) and Utkus and Mitchell (2025). In this paper both HALE and HLY are used to assess efficiency.

## Figure 29. Incidence of and Death from Cancer
(2022)



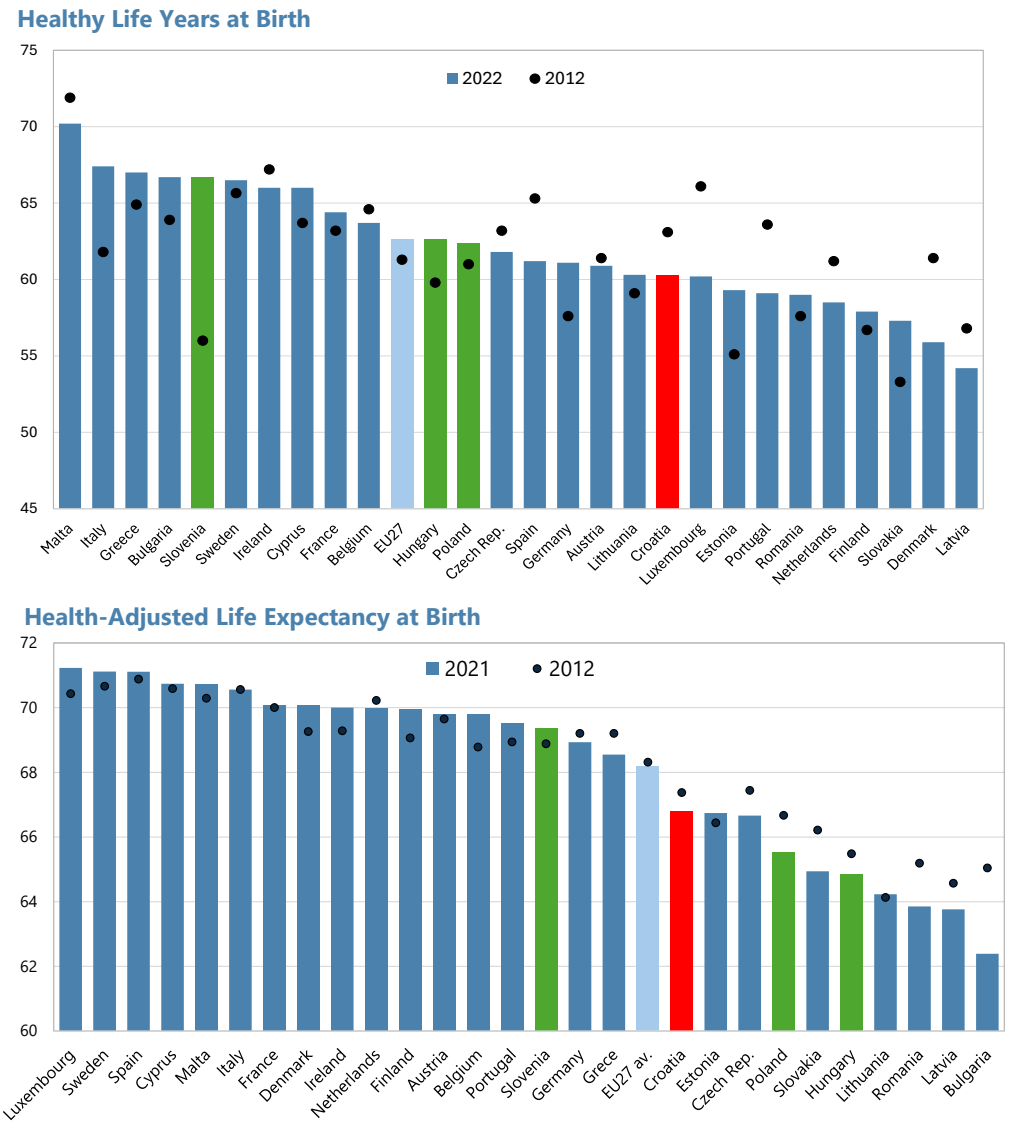

Sources: European Cancer Information System, Eurostat, and OECD.

**Figure 30. Life Expectancy**
(2023, years)




Source: Eurostat.

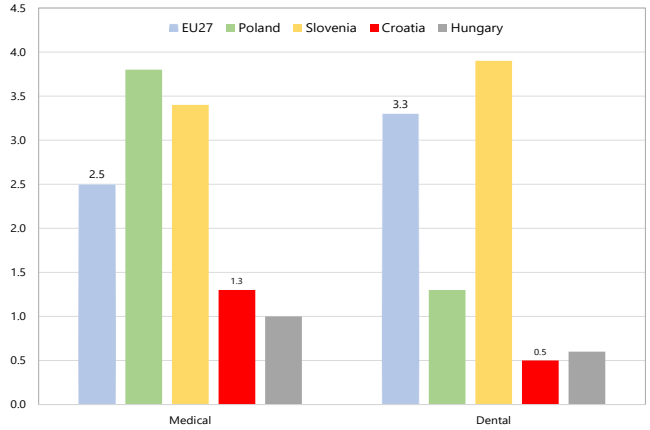
**Figure 31. Healthspan**




Sources: Eurostat and WHO.

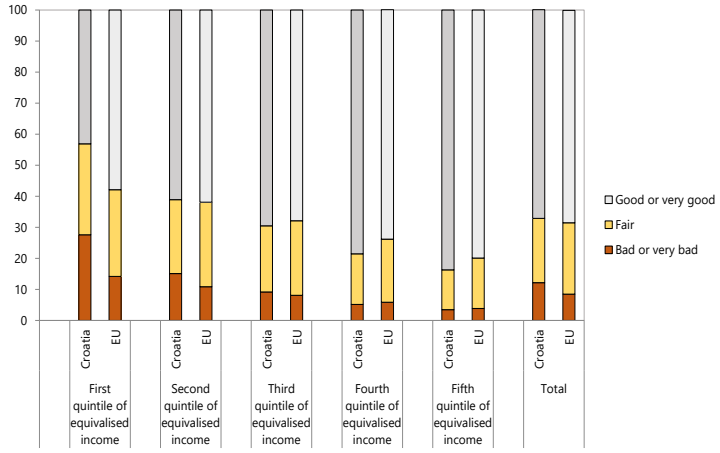
**34. However, self-reported unmet medical and dental needs are low.** The near universal healthcare insurance coverage and its generosity contribute to unmet medical needs due to the healthcare organization that are markedly lower than in peers (Figure 32). The self-perception of health status has improved in recent years and is now close to the EU27 average, though it remains more unequal (Figure 33). This may reflect more difficult access to health in remote and poorer areas of the countries (see below).

**Figure 32. Self-Reported Unmet Needs Due to Healthcare Organization**
(2024, percent, population 16 and older) [1/]




Source: Eurostat.
1/ Unmet needs because "Too expensive, or too far to travel, or waiting list."

**Figure 33. Self-Perception of Health by Level of Income**
(2024, percent) [1/]




Sources: Eurostat and IMF staff calculations.

## Potential Efficiency Gains

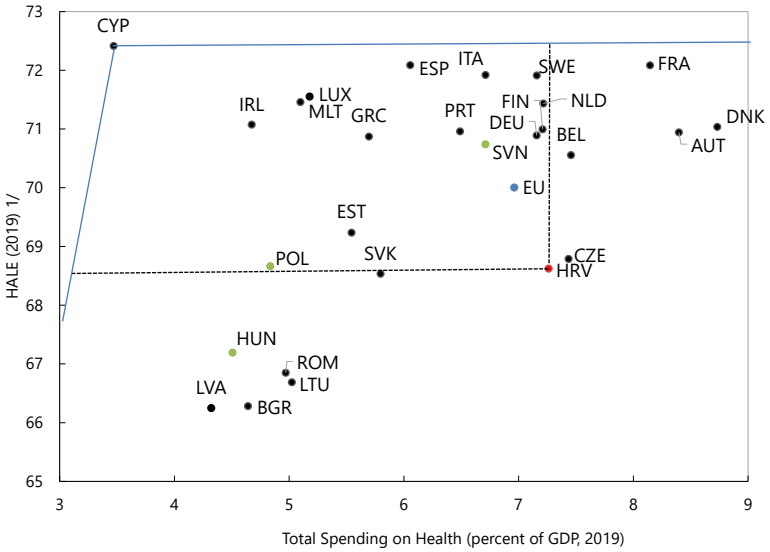
**35. That a higher level of spending than in most peers is not reflected in better outcomes points to lower spending efficiency.** If healthcare spending was as efficient as the best EU performers, Croatia could achieve higher health outcomes for the same level of spending (vertical dotted line on Figure 34) or achieve the same outcomes at a significantly lower cost (horizontal dotted line) (Figure 34 and Appendix V).[38] This benchmarking exercise highlights that potential efficiency gains are large and reforms can have a significant impact on both dimensions (Table 8).

[38] Figure 34 provides illustrates data for 2019 when both the HALE and the HLY are available and not distorted by the impact of the COVID-19 pandemic. Estimates for 2022 (not available for HALE) along with alternative indicators of outcome and input are provided in Annex V. They confirm that potential efficiency gains are sizable.

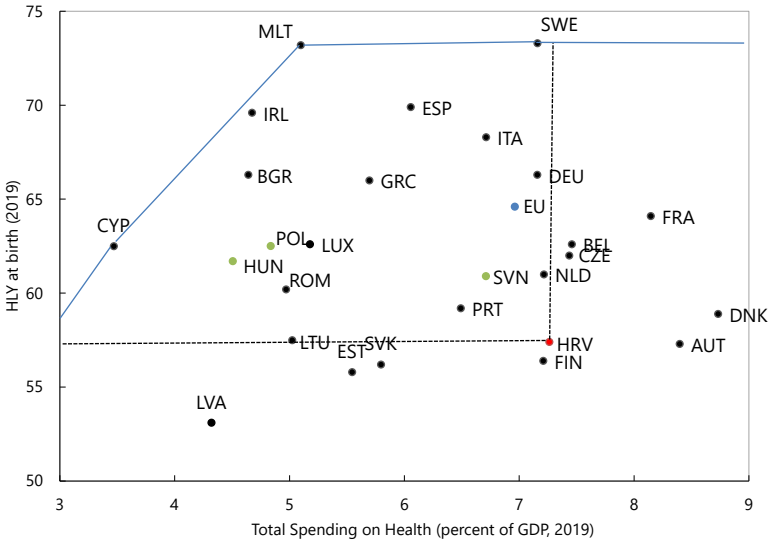
## Figure 34. Efficiency of Healthcare Spending

(2019)

### Health-Adjusted Life Expectancy




### Healthy Life Years [1/]




Sources: Eurostat, World Bank, WHO, and IMF staff calculations.
1/ See Appendix V for 2022.

**Table 8. Croatia: Potential Efficiency Gains in Healthcare**

| If Croatia's healthcare system was as efficient as | Fiscal saving (ppts of GDP) | |
|---|---|---|
| | HALE (2019) | HLY (2019/2022) |
| Hungary | 2.7 | 3.1 / 3.5 |
| Poland | 2.4 | 2.8 / 2.7 |
| Slovenia | 0.8 | 0.9 / 0.8 |
| EU | 0.4 | 1.1 / 0.5 |
| | Increase in healthspan (years) | |
| | HALE (2019) | HLY (2019/2022) |
| Hungary | 38 | 42 / 49 |
| Poland | 33 | 36 / 32 |
| Slovenia | 8 | 9 / 7 |
| EU | 4 | 10 / 4 |

Sources: Eurostat, World Bank, WHO, and IMF staff calculations.

## Efficiency-Increasing Reforms

**36. A combination of reforms could increase the efficiency of healthcare spending.** Increasing efficiency would free resources that could be invested in preparing the healthcare system for the challenges of an aging population and improving health outcomes and/or to reduce fiscal spending. Building on the substantial measures adopted in the past decade,[39] four types of structural reforms have the potential to increase spending efficiency: (a) reallocating resources to reduce regional disparities, (b) reviewing the role of hospital including preparing them for population aging, (c) increasing the focus on prevention, and (d) improving the use and distribution of pharmaceuticals. Due attention should be given to addressing potential distributional impacts in designing and implementing these reform measures.

### *Reallocating Resources to Reduce Regional Disparities*

**37. The availability of healthcare services varies significantly across regions.** Džakula and others (2024) argue that "while the overall numbers of health workers in Croatia are broadly sufficient, their geographical distribution varies considerably. The density of health workers is consistently greater in urban regions, reflecting the concentration of specialized services, and primary care practitioners are lacking in rural areas and on the islands." Notably, in 2023, the number of physicians per 100,000 inhabitants varied from 245 in the region of Sjeverna Hrvatska to

[39] See Džakula and others (2024) for an overview of recent reforms.

667 in the Zagreb region.[40] The difference (442 per 1000,000 inhabitants) exceeds the average number of physicians at the country level (401 per 1000,000 inhabitants). Access to hospitals is more limited in remote areas than in other EU countries. In 2023, the number of hospital beds by 100,000 inhabitants was 25 percent higher in the Zagreb region than the national average and 52 percent higher than in Sjeverna Hrvatska. While 83 percent of the EU population lived within 15 minutes driving time of a hospital, in about one third of the NUTS3 Croatian regions, the share was below 50 percent and in almost two third of the NUTS3 regions the share was below 65 percent (Eurostat, 2024).[41] In Jadranska Hrvatska less than 8 percent of the population lives within a 10-minute drive of the nearest health center compared to the EU average of about 29 percent (EC, 2025). Access to medicine is also unequal across regions as "pharmacies are mainly located in cities and towns, while the pharmacy network in rural and underdeveloped areas remains poorly developed" (Džakula and others, 2024).

**38. Regional inequality in access to healthcare contributes to low health outcomes.** 54 percent of the unmet medical needs due to the organization of the healthcare system are because service is "too far to travel." This is by far the largest share in the EU. The second largest share is in the Czech Republic at 20 percent (at the EU level it is 4 percent). This share falls to 20 percent for dental needs in part because the geographical accessibility of dental services is better than for medical services (Džakula and others, 2024). This remains, however, high and far above the Czech Republic at 8 percent (second largest share in the EU) and the EU level of 3 percent. Limited access to health services in some regions also affects mortality rates. According to the EC (2025), the mortality rates from cardiovascular disease and cancer are among the highest in the EU, which "reflects both a limited focus on disease prevention and the limited accessibility of the healthcare system."

**39. Therefore, a better geographical allocation of resources would improve the health outcomes and increase spending efficiency.** More than in any other peers, hospitals are at the core to the Croatian healthcare system (Figure 35). They provide more outpatient care and day care treatments than in most EU countries (Džakula and others, 2024; OECD-EC, 2024). This organization is not conducive to access to healthcare services in rural and remote areas. Measures that facilitate the transport of patients to the hospital, including helicopter emergency medical services (EC, 2025) should be complemented by measures to develop primary care outside of hospitals in rural and remote areas. This would likely require providing incentives for health professionals to practice in these areas.[42] Developing the use of telemedicine has the potential to increase access to healthcare in remote areas. The "share of the population using online health services (excluding the phone) instead of in-person consultations is one of the lowest in the EU" (EC, 2025). Though digital infrastructure and digital skills may be a bottleneck, the experience with the COVID19 pandemic suggests that it may not be severe. Croatia is indeed a country where the decline in in-person

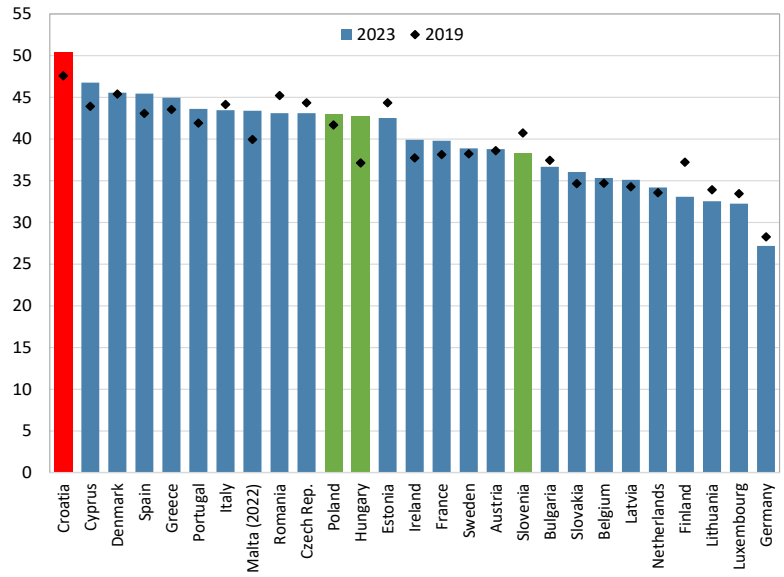
[40] Eurostat divides Croatia into four NUTS2 regions.

[41] Croatia has 21 NUTS3 regions.

[42] See Khoury and others (2025) for evidence of the impact of public policies that encourage (primary care) physicians to practice in underserved areas.

consultations during the pandemic was almost fully offset by an increase in teleconsultations. Since the end of the pandemic, the number of teleconsultations has declined but remained relatively high in 2022 (OECD-EC, 2024). As the population is now more used to teleconsultation and the development of electronic health records is well advanced (EC, 2025), promotion of telemedicine could be considered, while ensuring availability of healthcare professionals for remote consultations.[43]

**Figure 35. Hospital Spending**
(Percent of total current health expenditure)




Source: OECD.

***Reviewing the Role of Hospitals and Preparing them for the Challenge of Aging.***

**40. Hospitals are at the core of the healthcare system.** On the eve of the COVID-19 pandemic, hospitals accounted for a larger share of total healthcare spending than in any other EU countries. Nonetheless their share has increased more than in any other EU members except Hungary. As a result, in 2023, more than half of the total current healthcare spending was dedicated to hospitals (Figure 35).

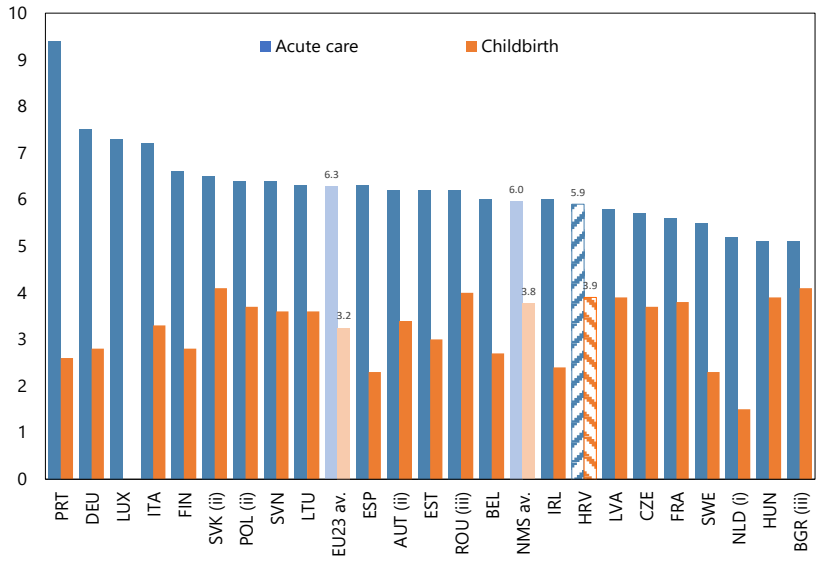
**41. The role of hospitals in the delivery of outpatient care should be reviewed.** Inpatient care is the main focus of hospitals. In some countries, such as Germany, Bulgaria and Greece, inpatient accounts for about 90 percent of hospital spending. In Croatia, inpatient care accounts for only 40 percent of hospital spending as outpatient care and day care activities, such as same-day elective surgeries or dialysis are often performed in hospital (OECD-EC, 2024). One reason is that the hospital system "has not been substantially modified in recent decades to match […] advancements in medicine that enable care provision on an outpatient or day care basis rather than using inpatient

[43] The RRP supports telemedicine services in remote and island areas (EC, 2025).

facilities." Another reason is the lack of trust in primary care physicians resulting in a larger number of referrals to secondary care than necessary (Džakula and others, 2024). This points to the need to review the way outpatient care is provided. Developing facilities by providing outpatient care outside hospitals could be more cost-effective and could help reduce both regional imbalances and unmet medical needs.

**42. The efficiency of the hospital system is difficult to assess due to incomplete data.** An evaluation of primary care and hospital efficiency is difficult because, though improving, data availability remains limited. For example, assessing the quality of hospital care is difficult when key data like up-to-date standardized 30-day hospital mortality rates for conditions such as acute myocardial infection or stroke are not available. Similarly, data on avoidable hospital admission are available for asthma, chronic obstructive pulmonary disease, and diabetes suggesting that primary care is comparatively well functioning, but data are not available for hypertension or congestive heart failure, which is a major source of avoidable hospital admissions in many countries (Džakula and others, 2024). The average length of stay in hospitals, often used as an indicator of efficiency, provides a mixed picture: while it is below the NMS and EU averages for acute care, it is above these averages for childbirth without complications (Figure 36). Moreover, some statistics such as a relatively high rate of death within a year of patients discharged for ischemic stroke suggest that there is scope for more and better integrated care (OECD-EC, 2024).

**Figure 36. Length of Hospital Stay**
(Average in days, 2022 unless otherwise specified)




Source: OECD.

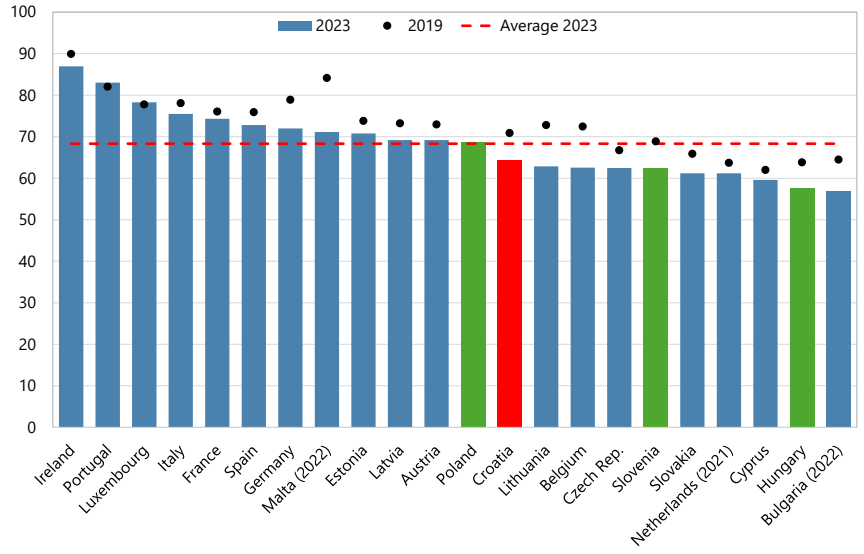
Notes:
* Data for 2022 except (i) 2021 for acute care, (ii) 2021 for childbirth, and (iii) 2021 for both acute care and childbirth.
* Data for acute care in Bulgaria: 2019.

**43. An adjustment in the hospital beds appears warranted.** Pointing to the scope for higher cost-effectiveness, the density of hospital beds is among the highest in the EU. With 565 beds per 100,000 inhabitants in 2023, the density is 11 percent higher in Croatia than the EU level and 40 percent more than in Slovenia, though it remains below the level of Hungary and Poland. Moreover, the occupancy rate of inpatient curative care beds is 4 ppts lower than the EU22 average. This points to a scope to reduce the curative beds (Figure 37).

**44. Hospitals should be reorganized to meet the challenges and fiscal cost of population aging**. Under its baseline scenario, the 2024 Ageing Report (EC, 2024a) projects that due to aging, health spending would increase 0.7 percent of GDP between 2025 and 2070 (0.8 percent if long-term care cost is added). Besides this direct cost, there is a need to reorganize hospitals for a change in demand for services related to aging. Notably, there will be an increase in demand for geriatric beds that European countries are often not able to meet easily. For example, in Belgium, more than a quarter of hospitalized patients older than 75 were in non-geriatric acute care units in 2011 (Deschodt, and others, 2015). In the United Kingdom, the National Health Service "lacks sufficient home care for the country's aging population, forcing 855,000 older people into hospitals each year—with huge economic costs and dire health consequences" (Fofack, 2025).[44] The expected increase in demand for hospital services also requires a reorganization of medical processes, which imply a fiscal cost, and increased cooperation. Elderly patients are usually associated with a higher risk of admission through the emergency department and with a longer hospital stay. Often, elderly patients are not admitted in geriatric units due to capacity problems but because they are admitted for several medical reasons, some of which are treated in non-geriatric units. As elderly patients suffer more from comorbidities than younger patients, their treatment is complex and will imply—in addition to greater utilization and reorganization of hospital resources and medical processes—a need for efficient coordination (Figure 38). This coordination goes beyond hospitalization as patient stay in hospital can be prolonged if the discharge is delayed due to a lack of coordination with rehabilitation institutions or nursing homes. This also highlights that, to reduce the aging pressure on hospitals, investment in long-term care facilities is needed (Hallaert, 2025b).

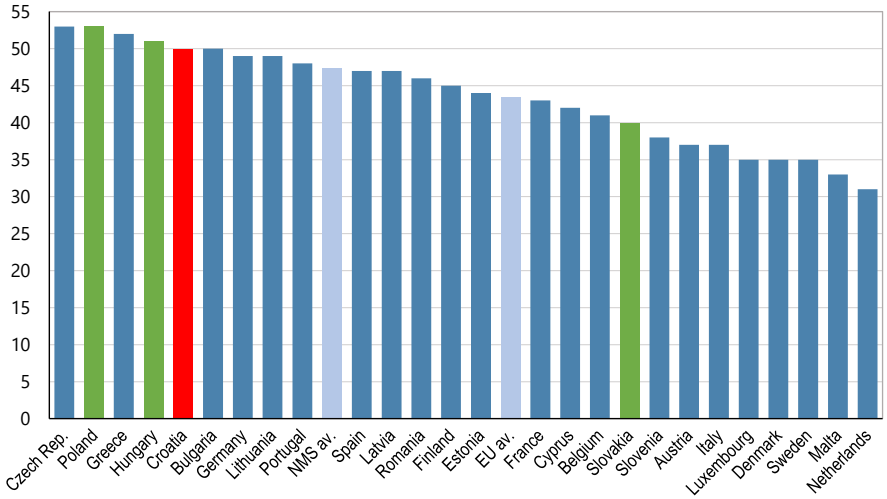
[44] Data are not available for Croatia.

**Figure 37. Inpatient Curative Care Bed Occupancy Rate**
(Percent)




Source: Eurostat.

**Figure 38. Multimorbidity Among Elderlies**
(Percent of people aged 65 or over reporting at least two chronic diseases, 2021-22)



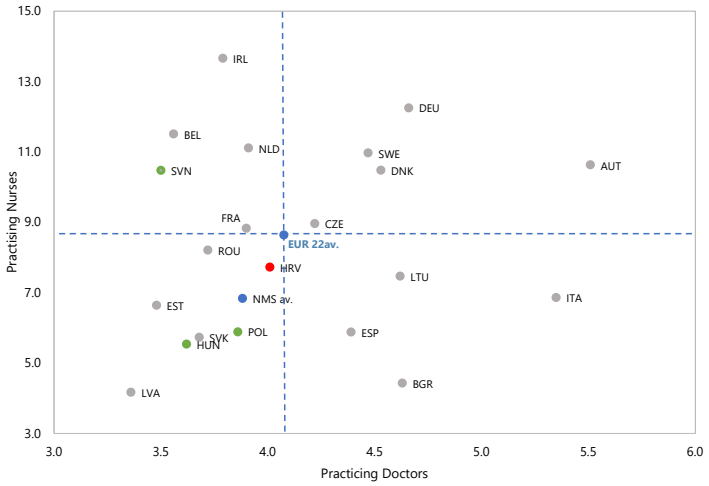

Source: OECD-EC (2024).

**45. Finally, there is a need to review the geographical distribution of hospitals.** As pointed by Džakula and others (2024) "the network of hospitals has not been substantially modified in recent decades to match migration patterns, the changing demographic structure of the population, or advancements in medicine that enable care provision on an outpatient or day care basis rather than using inpatient facilities." Such inertia may result in inadequate provision of services and increase the cost of healthcare.

**46. Shortages of healthcare professionals are limited.** Though regional imbalances and staffing issues in some hospitals in regions where doctors are scarce may give the impression of physician shortages, the overall number of doctors per 100,000 inhabitants is, actually, close to the EU average and higher than the NMS average and in the three comparators. The number of practicing nurses is, however, lower than the EU average and in Slovenia but higher than the NMS average (Figure 39) and has increased from 6.8 per 100,000 inhabitants in 2018 to 7.7 per 100,000 inhabitants in 2023.

**47. Retaining nurses would help catch up with the EU average.** Increasing the number of students in nursing education problem is an effective policy to increase the supply of nurses (OECD-EC, 2024). However, in the case of Croatia, which has already one of the highest rate of nursing graduates in the EU, a more efficient policy lever is to retain nurses in the country (Figure 40). Indeed, taking advantage of the 2005 Directive on the recognition of professional qualifications (Official Journal of the European Union, 2005) that facilitated mobility of health workers within Europe, some health professionals decided to move abroad to seize better job opportunities. For example, nurses from Croatia are among the 10th largest foreign-trained group in Switzerland in 2023 (OECD-EC, 2024). Retaining nurses may require an increase in wages as the hospital nurses' remuneration was only 1.1 times the national average wage in 2022, which was lower than 1.2 in the EU, 1.3 in Hungary, and 1.4 in Slovenia (OECD-EC, 2024). The large increases in the public sector wages (including in the healthcare sector) that took place in 2024 may have changed the situation. Another policy may be to build on the current immigration policy to increase the number of foreign-born nurses in Croatia which, in 2023, accounted for 1.2 percent of nursing workforce compared to the EU19 average of 19 percent and 4.0 percent in Slovenia. This is a policy implemented in Ireland, which facing emigration of Irish-trained nurses and a persistent shortage has undertaken active recruitment in countries that have a well-established diaspora (e.g., India and the Philippines). In 2023, 51.3 percent of the nursing workforce in Ireland was foreign-trained (OECD-EC, 2024).

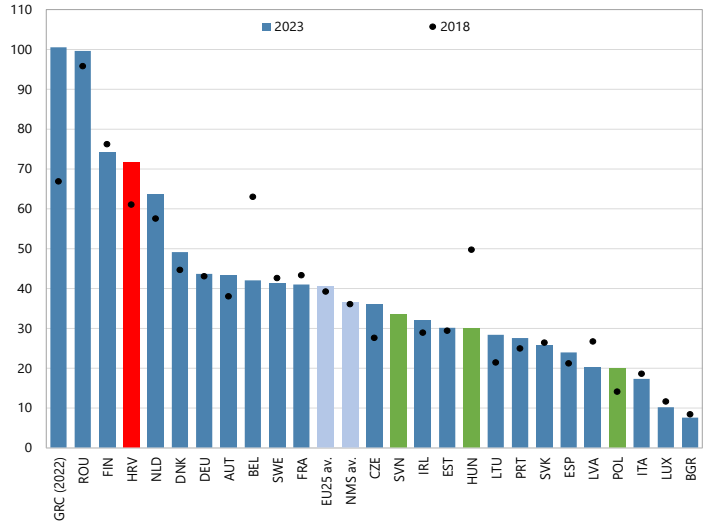
**Figure 39. Practicing Health Professionals**
(2023 or latest, per 100,000 inhabitants)




Source: OECD.

**48. Reforming the training of healthcare professionals should be a priority.** Surveys point to inadequacy in the qualification of health associates professionals (Annex IV) and Pažur Aničić et al. (2023) highlights that graduates in the biomedical and health sciences had large deficits in practical knowledge and its application, as well as in adaptability, entrepreneurial spirit, and leadership. The training reform should also prepare graduates for the health needs of an aging population. As the number of elderly patients increases and aging intensity rises, it will be crucial to avoid a shortage of physicians and nurses with expertise in elderly care. Therefore, although they entail a cost in the short-term, training policies need to be implemented rapidly so that the increase in geriatric demand is met (Hallaert, 2025b).

**Figure 40. Nursing Graduates**
(2023, per 100,000 inhabitants)




Source: OECD.

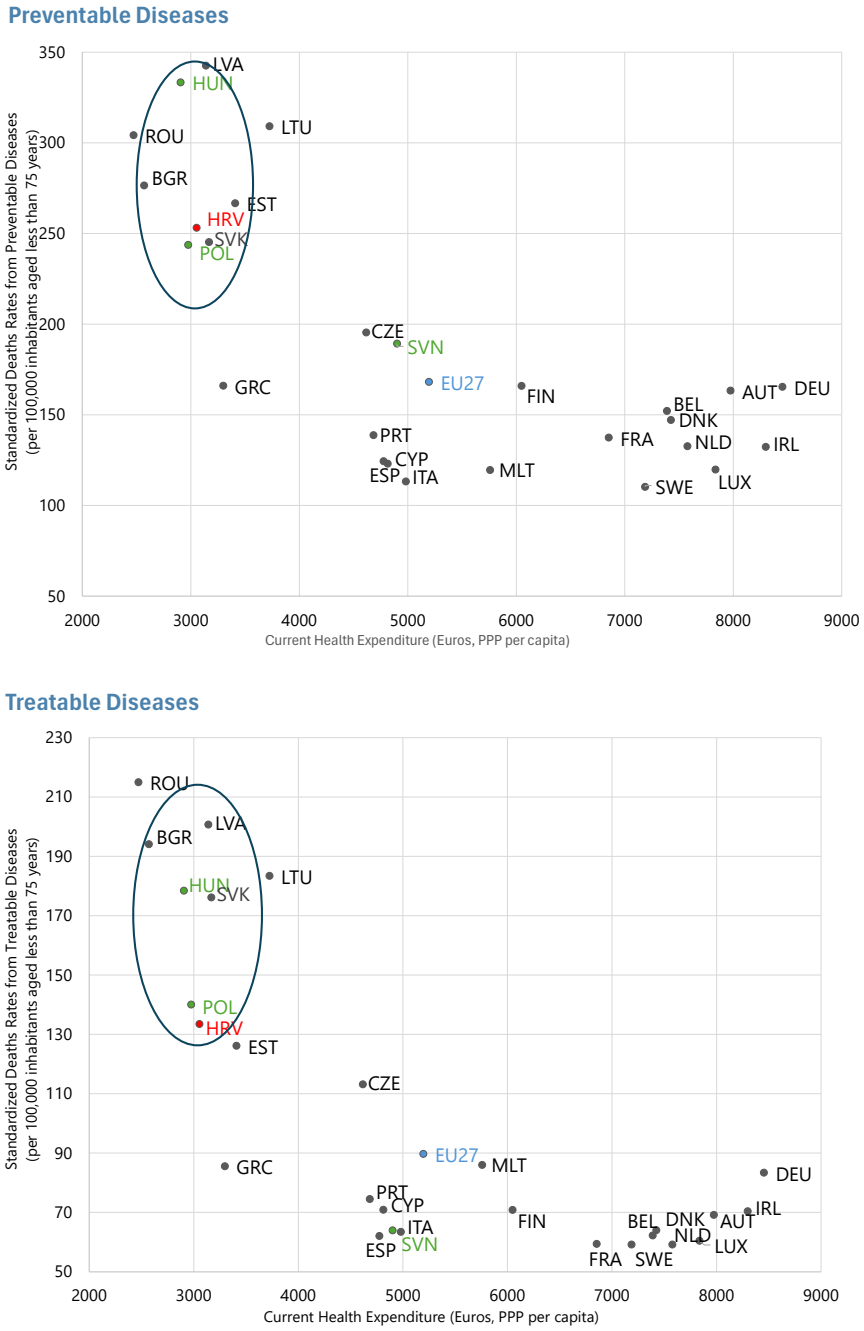
***Increasing the Focus on Prevention***

**49. Death from preventable disease remain high.** At an aggregated level, death rates from both treatable diseases (a proxy for the efficiency of the healthcare system as it measures the number of deaths that can be mainly avoided through timely and effective health care interventions) and from preventable diseases (deaths that can be mainly avoided through effective public health and primary prevention interventions) are both higher than the EU levels. However, while the death rates from treatable disease compares well to countries with comparable levels of health spending, this is less the case for death rates from preventable diseases (Figure 41).

**50. Unhealthy lifestyles are a major reason for the high level of preventable deaths.** Smoking, diet, harmful consumption of alcohol, lack of physical activities, and obesity are the root

causes of many chronic diseases and contribute to premature and preventable deaths, disability, and to lower healthspan.[45] On all these dimensions, Croatia compares poorly to European peers:

**Figure 41. Healthcare Expenditure and Death Rates from Avoidable Diseases**
(2022)



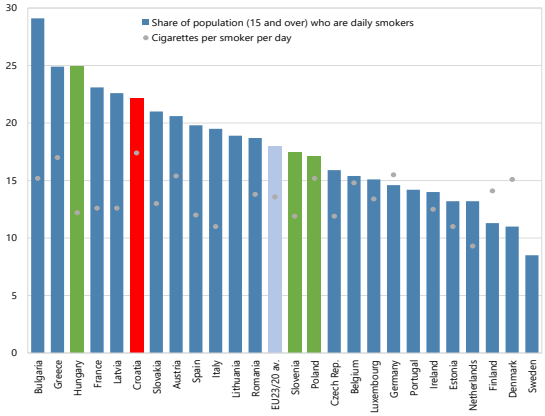

Source: Eurostat.

[45] For a review of evidence, see Utkus and Mitchell (2025).

- ***Smoking.*** Not only Croatia has a high share of the population aged 15 and over that smokes but smokers smoke more intensively than in any European peers (Figure 42). Moreover, tobacco consumption is more widespread among adolescents than in most other EU countries (Figure 43). This elevated level of tobacco consumption contributes to the comparatively high rates of incidence of and death from cancer (Figure 29). Lung cancer accounts for 5.6 percent of deaths in Croatia (1 ppt more than in the EU or NMS) and is the main source of death from cancer (it accounts for 22 percent of death from cancer in Croatia which is 2.2 ppts more than in the EU27 and 1.4 ppts more than in the NMS). Colorectal cancers[46] (90 percent of them are thought to be preventable) are also associated with smoking (University of California San Francisco). It is a cause of death more than in any other European peers (accounting for 3.9 percent of deaths which is more than 1 ppt higher than in the EU or NMS) and accounts for a larger share of death from cancer (15.3 percent which is 4 ppts more than in the EU).

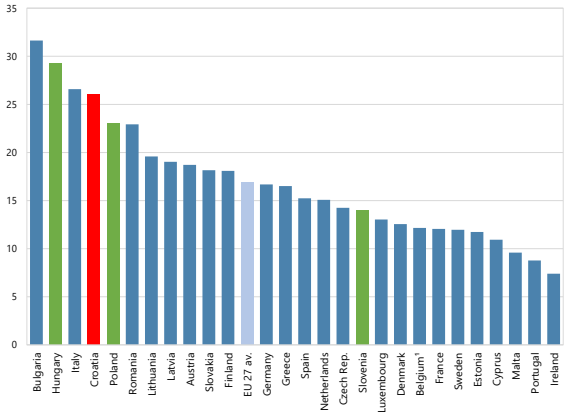
- ***Diet.*** Adequate eating of fruits, vegetables, and whole grains is also associated with reduced risks of some preventable disease (colorectal cancer is again an example). In this domain, reported consumption is below the EU27 level (Figure 44).

**Figure 42. Tobacco Consumption**
(2024 or most recent)




Sources: OECD and IMF staff calculations.
Note: Data on the cigarettes consumed per day are not available for Lithuania, Portugal, and Sweden.

**Figure 43. Adolescent Consumption of Tobacco**
(2022, percent of 15-year-olds reporting consumption in the last 30 days)




Source: OECD-EC (2024).

1/ Unweighted average of Flanders and Wallonia.

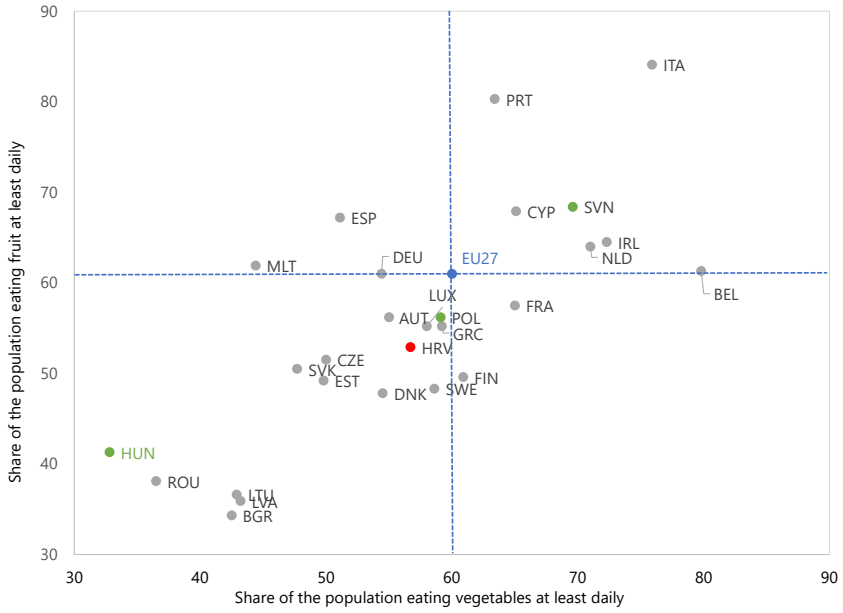
- ***Obesity.*** Obesity contributes to Type 2 diabetes and other disorders of the liver, heart, and guts as well as lower healthspan (Utkus and Mitchell, 2025). Croatia has the largest share of population reporting being obese in the EU (24 percent) and the second largest share of population reporting being obese and overweight (Figure 45).

- ***Alcohol.*** Excessive alcohol consumption contributes significantly to premature mortality and disability. It is the root cause for various chronic diseases including cardiovascular diseases, liver

[46] More precisely malignant neoplasm of colon, rectosigmoid junction, rectum, anus and anal canal.

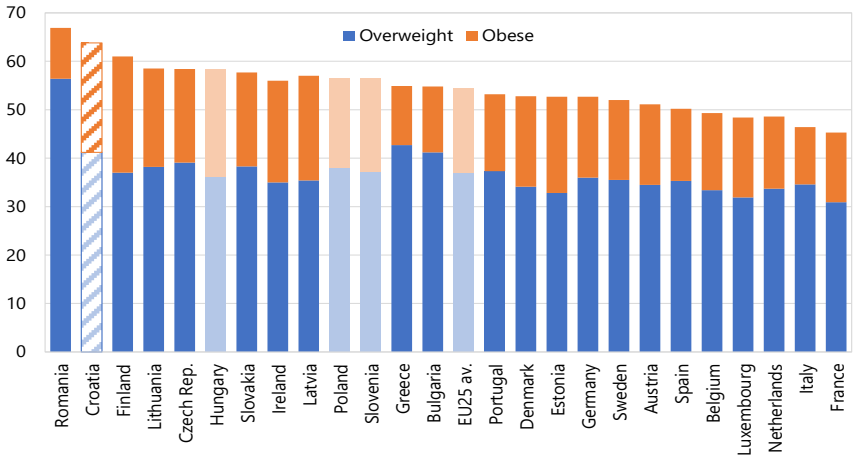
cirrhosis, and several types of cancer. While episodes of heavy drinking are less frequent in Croatia than in the EU27 and overall consumption of alcohol has declined significantly in the past decade and is now lower than the EU average and in any of the three comparators, adolescent consumption of alcohol is more frequent than in most EU peers (Figure 46; OECD-EU, 2024).

**Figure 44. Daily Consumption of Fruits and Vegetables**
(2022, percent)




Source: OECD-EC (2024).

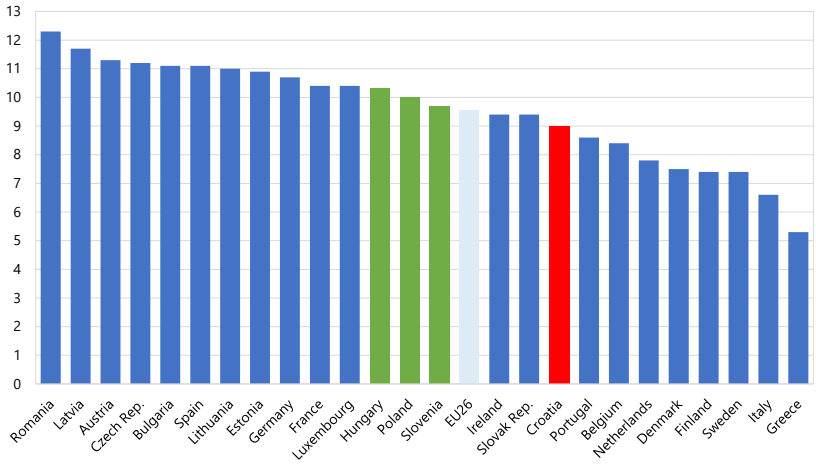
**Figure 45. Share of Population Who Is Overweight or Obese**
(Percent, most recent data)



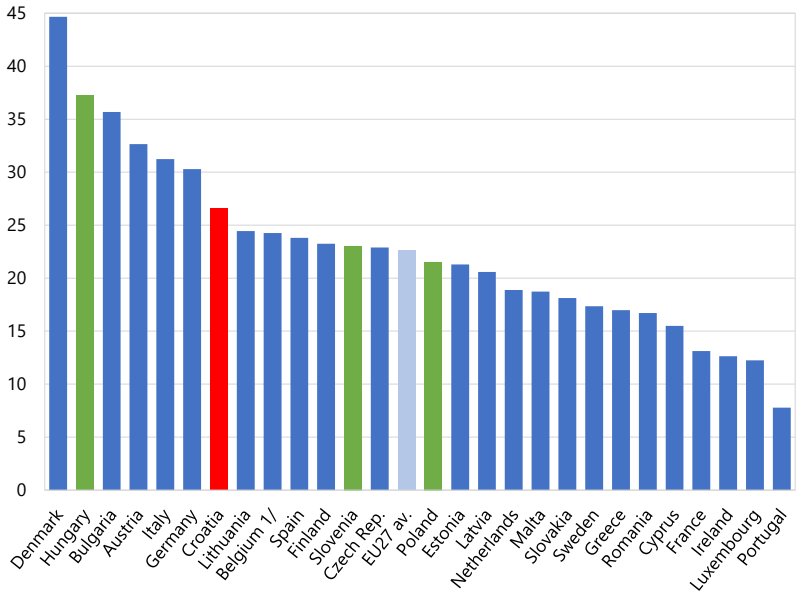

Sources: OECD and IMF staff calculations.

**Figure 46. Alcohol Consumption**

**Liters Per Person 15 and Over**
(2024 or most recent)




**15-Year-Olds Reporting Having Been Drunk More Than Once in Their Life**
(2022, percent)



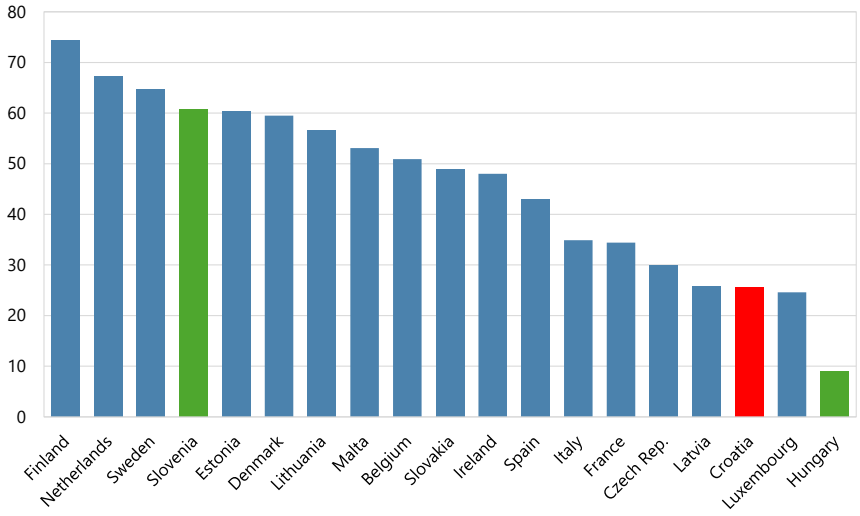

Source: OECD.
1/ Unweighted average of the Flanders and Wallonia.

- ***Physical activities.*** While the share of the 11-year-olds and 15-year-olds reporting meeting the WTO recommended daily physical activity is among the highest in the EU for both girls and boys, the share of the population performing (non-work-related) physical activities is below the EU levels and 56 percent of adults never perform physical activity outside working time.

**51. A better allocation of prevention spending would improve health outcomes and reduce fiscal spending.** Until the COVID19 pandemic, Croatia has dedicated to prevention a slightly

larger share of its current healthcare spending than the EU27 as a whole. Nevertheless, the allocation of prevention spending can still be improved. For example, despite having a higher share of death from colorectal cancer, preventive colorectal cancer screening is among the lowest in the EU (Figure 47). Prevention should also focus more on risk factors that have a significant impact on health, such as obesity. The fight against overweight and obesity would be particularly cost effective as, in many countries, average total healthcare expenses for people with overweight and obesity are significantly higher than those observed in the rest of the population. In addition, comorbidity related to obesity and overweight results in increased absenteeism that costs the economy.[47]

**Figure 47. Preventive Colorectal Cancer Screening**
(2023, percent) [1/]




Source: Eurostat.

1/ Malignant neoplasm of colon, rectosigmoid junction, rectum, anus and anal canal.

**52. Advocacy and regulatory reforms aimed at reducing unhealthy lifestyles would improve the well-being of the population, reduce the need for fiscal spending, and, eventually, mitigate the fiscal cost of aging.** Building on the successful policy to promote oral hygiene in schools,[48] a campaign to raise awareness among younger teenagers of the health impact of smoking and excessive alcohol consumption as well as the benefit of proper diets could have a significant impact.[49] These campaigns should be accompanied by regulatory changes. Notably, anti-smoking policies could be strengthened in Croatia as they remain comparatively lenient. There is also scope to strengthen alcohol control policies (Džakula and others, 2024; EC, 2023b and 2025). These measures would entail limited costs and would eventually improve the health status of the

[47] For example, in Belgium, the additional annual healthcare cost of overweight and obesity is estimated at 0.6 percent of GDP, and the cost of absenteeism is estimated at 0.2 percent of GDP (Gorasso and others, 2022).

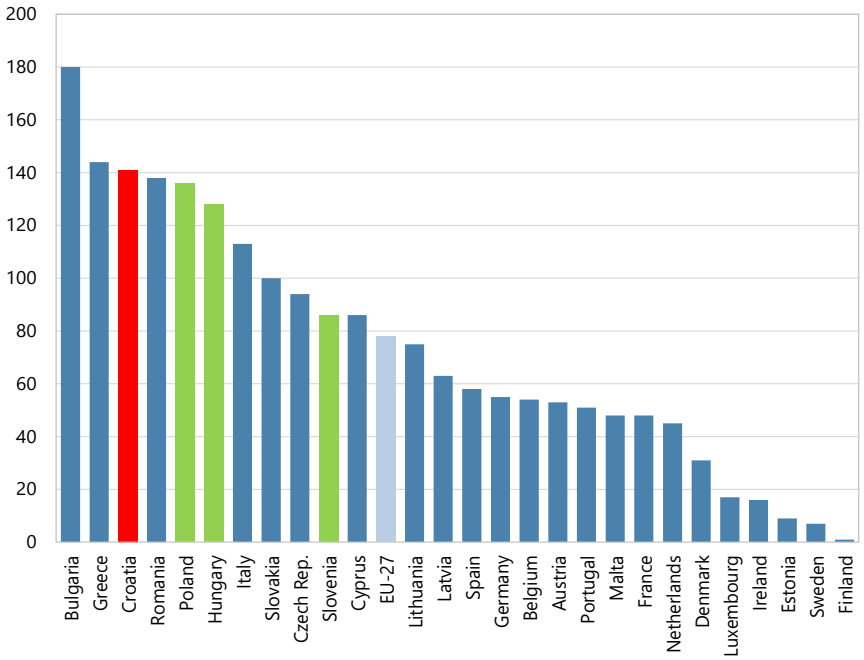
[48] A program targeting kindergarten and elementary school children promotes effective oral hygiene habits, guiding children to integrate toothbrushing into their daily routines under teacher supervision (OECD-EC, 2024).

[49] See Utkus and Mitchell (2025) for a review of international experience with policies and regulations aiming at improving nutrition.

population, help increase health span, and promote healthy aging, therefore reducing fiscal spending on healthcare including the expected fiscal cost of aging. The Ageing Report (EC, 2024a) estimates that the healthcare dimension of the fiscal healthcare cost of aging would be reduced from 0.7 percent of GDP between 2025 and 2070 to 0.4 percent of GDP under an "healthy aging" scenario.[50]

**53. Policies aimed at reducing preventable deaths should also address issues related to the exposure to toxins.** Notably, despite a decline, the prevalence of premature deaths attributable to air pollution in Croatia remains one of the highest in the EU suggesting that the green transition, insofar as it reduces air pollution, could also improve health outcomes (Figure 48).[51]

**Figure 48. Premature Deaths Due to Air Pollution**
(2022, per 100,000 inhabitants aged more than 30) 1/




Source: European Environment Agency.

1/ Premature deaths attributable to exposure to annual PM2.5 concentrations above 5µg/m3.

***Improving the Use and Distribution of Pharmaceuticals.***

**54. Lowering the cost of pharmaceuticals would reduce costs for the budget and the population.** In 2023, Croatia dedicated about 16½ percent of healthcare spending to pharmaceuticals. This is 1.7 ppts more than the average for the 18 EU countries for which data is

[50] The healthy aging scenario "assumes that the number of years spent in poor health during a lifetime remains constant over the projection period. This means that all future gains in life expectancy are assumed to be spent in good health" (EC, 2024b).

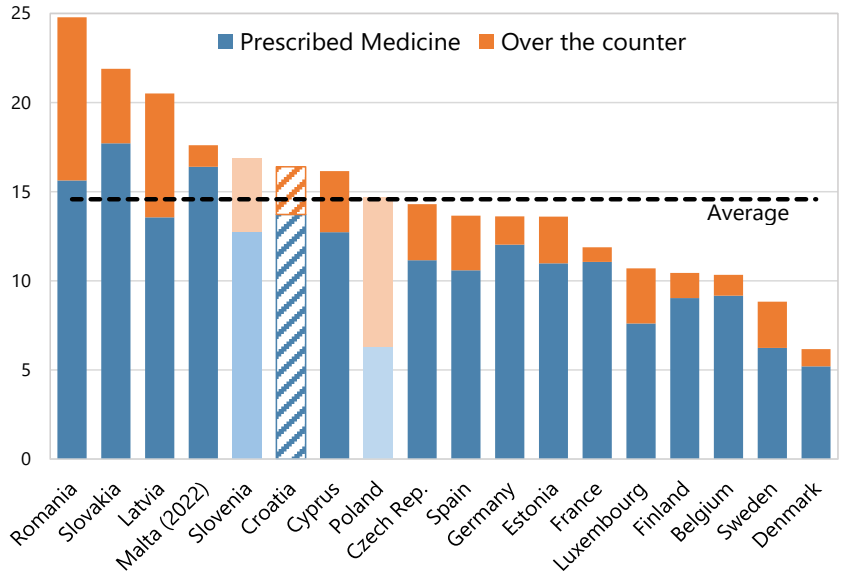
[51] Air pollution is also associated with the incidence and prevalence of diabetes (Utkus and Mitchell, 2025; Yang and others, 2020).

available (Figure 49). Moreover, pharmaceuticals represent the largest share of out-of-pocket spending. In 2021, pharmaceuticals represented one-third private out-of-pocket payments. This was the largest share before dental care (28 percent) and outpatient medical care (18 percent) (Džakula and others, 2024).

**55. It is worth reviewing if increasing competition in the distribution of pharmaceuticals could help reduce the cost of medicine.** In Croatia, counties are responsible for the organization and management of pharmacies and pharmaceuticals are provided by pharmacies contracted by the CHIF (Džakula and others, 2024). As a result, competition is limited in the retail sale of medicine, which may result in higher prices of non-prescription drugs (Figure 50).

**56. Promoting the use of generics and better use of medicine could reduce spending.** Though the share of generics is comparatively high, international comparison suggests there is scope to increase it, helping reduce the cost of medicine (Figure 51). The Ministry of Health aims to increase the use of generic drugs but also reduce waste in pharmaceutical spending through joint public procurements with other EU Member States and better control over the consumption of expensive medicines (Džakula and others, 2024). These measures could be complemented by measures to avoid over (or inadequate) prescriptions of some drugs (World Bank, 2021).[52] Together, this would tackle an important source of hospitals arrears (World Bank, 2021).

**Figure 49. Spending on Pharmaceuticals**
(2023, percent of current expenditure) 1/

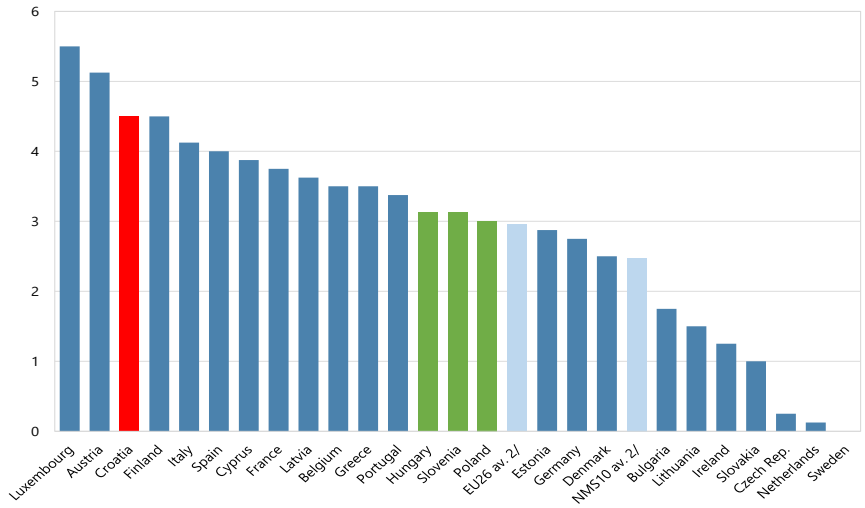



Source: OECD.

[52] "Treatment guidelines [...] are produced and endorsed by different medical professional societies. There are treatment guidelines [...] but are not regularly updated. Importantly, however, there are no national, evidence-based treatment guidelines (which would include pharmacotherapy guidelines) that are universally endorsed and applied in Croatia as well as readily available in all public health practices (e.g., hospitals)" (World Bank, 2021).

## Figure 50. Regulation of Retail Sales of Medicines

(2023, index) [1/]

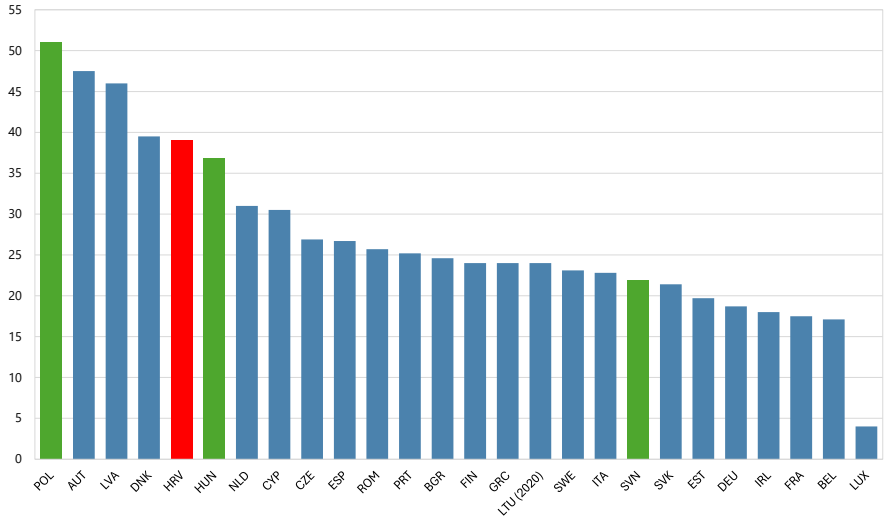



Sources: OECD and IMF staff calculations.

1/ The index ranges from 0 to 6, with a with lower values indicating a more competition-friendly regulatory environment. 0 reflects the best international practices.
2/ No data for Romania.

## Figure 51. Market Share of Generics and Biosimilars

(2023, percent) [1/]




Source: European Federation of Pharmaceutical Industries and Associations.

1/ Market definition differs across countries
* Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, Hungary, Netherlands, and Slovenia: share of generics in pharmacy market sales.
* Ireland, Latvia, Lithuania, Luxembourg, Poland, Romania, Serbia, Slovakia, and Sweden: share of generics in total market sales.
* Austria, Belgium, Cyprus, France, Germany, Greece, Italy, Portugal, Spain: share of generics in reimbursable pharmacy market sales.

## D. Conclusions

**57. The potential to enhance the efficiency of public spending on education and healthcare is large.** Increased efficiency could increase the outcomes in both sectors. Improved outcomes will help boost the formation of human capital supporting productivity and, ultimately, fostering higher potential growth, which is necessary for a faster income convergence with EU partners. Increased efficiency could also free fiscal resources to finance other needs or to support the planned fiscal consolidation. The distribution between better outcome and lower fiscal spending is, ultimately, a social choice but the potential efficiency gains are large enough to do both.

**58. Increasing efficiency will take time as it requires reforms.** The structural reforms that would underpin efficiency enhancement often take time to develop, implement, and bear fruits. Moreover, they could have important distributional impacts which should be carefully considered in their design and implementation.

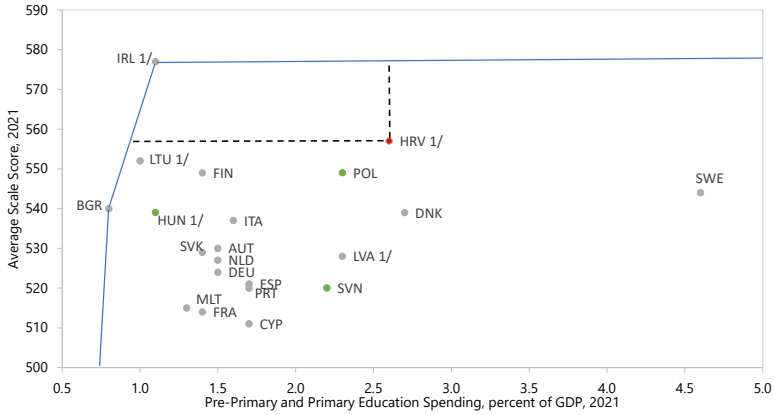
**59. The main purpose of the educational reform should be to increase educational outcomes and reduce the skills mismatch.** Despite comparatively high public spending on education, educational outcomes are, at best, comparable to those of peers and are particularly weak in mathematics. Improving educational outcomes would require (i) a reorganization of the educational system to increase the mandatory teaching time in order to improve the acquisition of basic skills; (ii) a revision of the curricula to better align education with labor market needs; and (iii) a promotion of tertiary education that is increasingly needed to acquire the skills needed in an information-based economy and to adjust to rapid technological changes. These reforms would eventually increase employment, creation and diffusion of innovation, and productivity. A consolidation of small schools has the potential to reduce staff shortages and fiscal spending without reducing educational outcomes.

**60. Reform in the healthcare sector should aim at improving health outcomes and access to healthcare for the population in remote and rural areas.** Croatia dedicates a larger share of its resources to healthcare than peers, but outcomes are lower. Efficiency-increasing reforms should focus on reducing the geographical inequality in access to healthcare services as remote and rural areas are facing inadequate access to medical services. This could be achieved by developing telemedicine and primary care outside hospitals. This would help improve health outcomes and reduce inequality in health status. The central role of hospitals in the healthcare system should be reviewed, notably in the provision of outpatient care. This would help reduce costs and free resources to prepare for the reorganization of hospitals that is needed to respond to the needs of an aging population. A stronger focus on prevention has the potential to significantly improve the population well-being and health outcomes while, eventually, reducing spending and mitigating the fiscal cost of aging by fostering healthy aging. A healthier population and longer healthspan would improve the population's well-being and boost workforce productivity and the supply of labor by reducing disease burden and the need to care for disabled elderly relatives. Finally, better use and distribution of pharmaceuticals could reduce the healthcare cost for both public finances and the population.

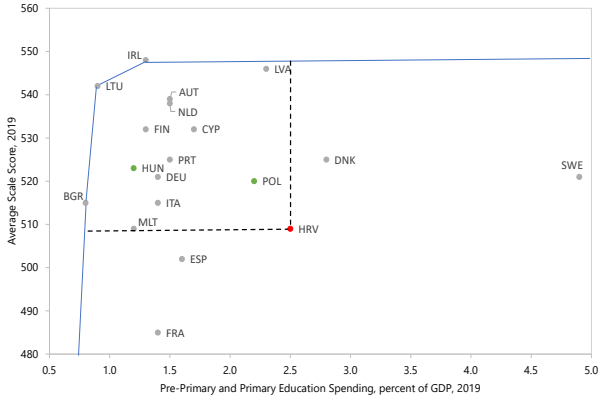
# Annex I. Alternative Measures of Efficiency Gains: Primary and Secondary Education

## Annex I. Figure 1. Test Scores at Primary Level (4th Graders)

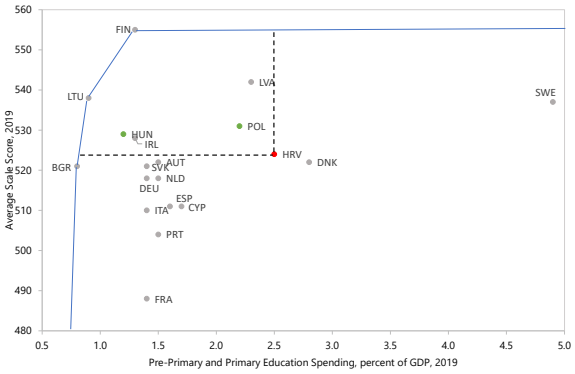
### PIRLS Score (Reading) and Pre-Primary to Primary Education Spending 1/




### TIMSS Score on Mathematics and Pre-Primary to Primary Education Spending




### TIMSS Score on Science and Pre-Primary to Primary Education Spending

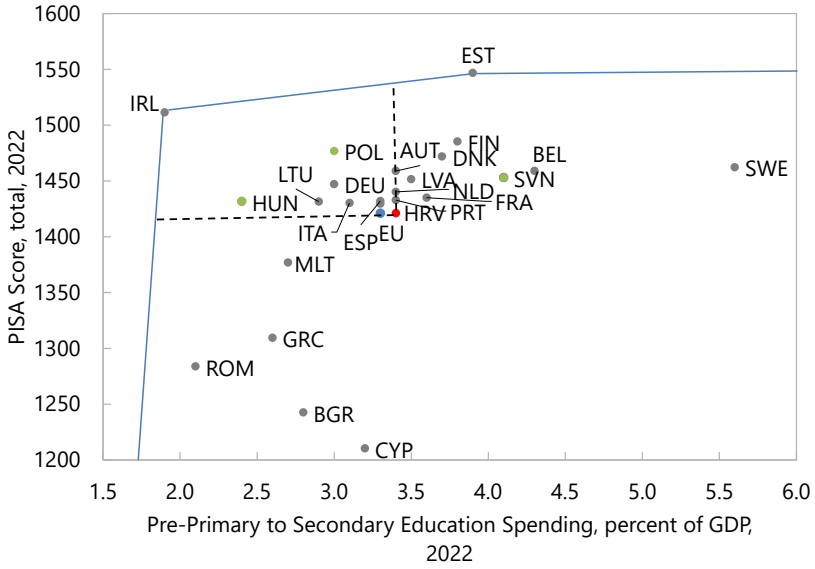



Sources: Eurostat, PIRLS, and TIMSS.

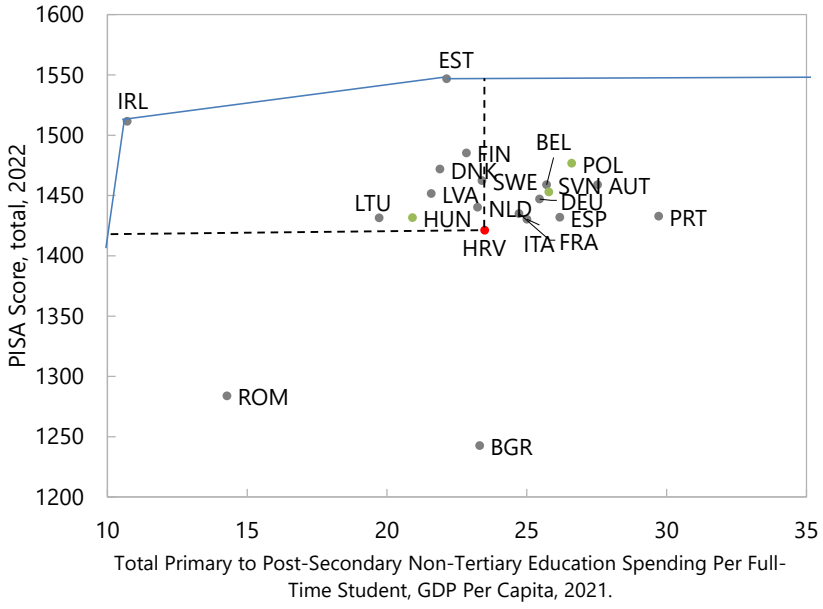
1/ For Croatia, Hungary, Ireland, Latvia, and Lithuania, the PIRLS assessment of fourth grade cohort at the beginning of fifth grade instead of end of fourth grade.

## Annex I. Figure 2. Test Scores at Secondary Level (15-Year Olds)

### PISA Score and Pre-Primary, Primary, and Secondary Education Spending [1/]



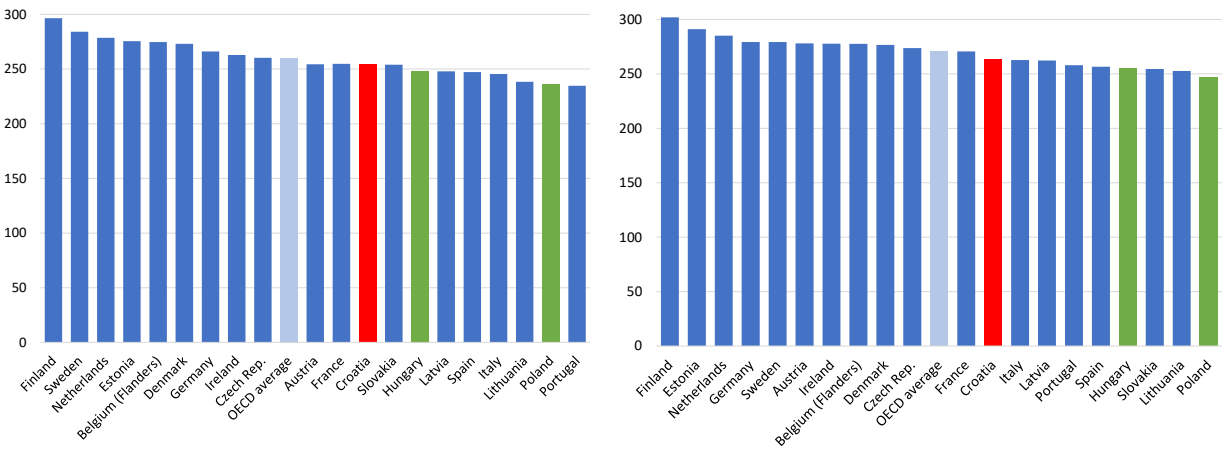

### PISA Score and Total Primary to Secondary Spending Per Student




Sources: Eurostat, OECD.
1/ For Belgium: average of the Flemish and French communities scores.

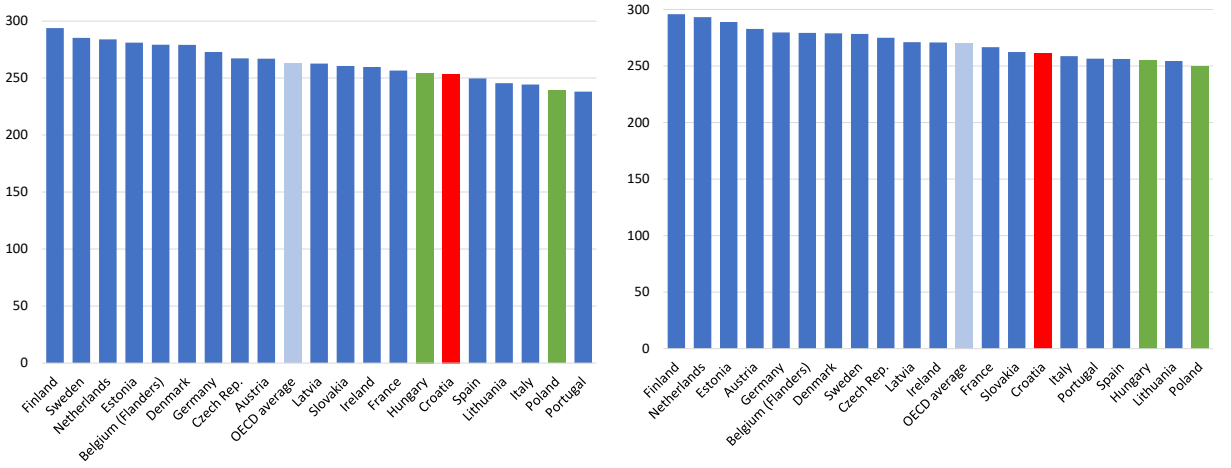
# Annex II. Adult Skills
## (2022–23, PISA Score)

### Annex II. Figure 1. Mean Performance in Literacy



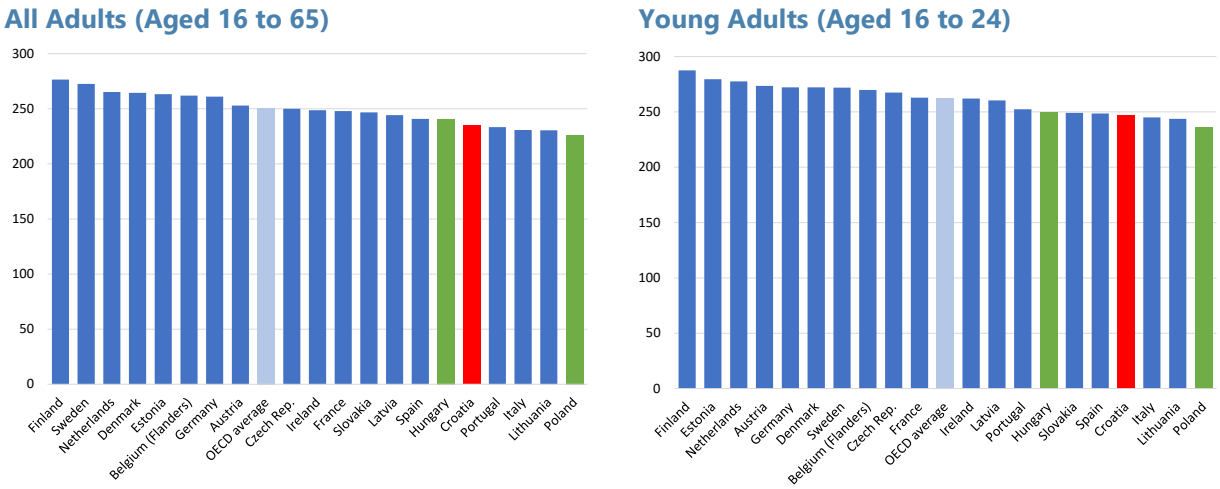

Source: OECD.

### Annex II. Figure 2. Mean Performance in Numeracy




Source: OECD.

## Annex II. Figure 3. Mean Performance in Adaptative Problem Solving




Source: OECD.

Notes:

As education and training have changed in quantity and quality over time, results for young adults compare better with the PISA results discussed in the paper. They also provide an indication of the impact of tertiary education.

In Croatia, 4316 adults participated in the survey. The sample was drawn to be representative of about 2.5 million 16-to-65-year-olds residing in the country at the time of data collection. For more details on the survey and results, see OECD (2024b).
Caution is required in interpreting results for Poland due to the high share of respondents with unusual response patterns.

# Annex III. School Size by County

**Annex III. Figure 1. Primary Education**
(2022)

| Region | County | Students per school | Teacher per school |
|---|---|---|---|
| Istria and Kvaner | Istarska | 155.9 | 19.8 |
| | Primorsko-goranska | 184.7 | 22.1 |
| | Ličko-senjska | 68.7 | 11.5 |
| Dalmatia | Zadarska | 116.6 | 13.7 |
| | Šibensko-kninska | 145.5 | 18.6 |
| | Splitsko-dalmatinska | 180.7 | 20.4 |
| | Dubrovačko-neretvanska | 149.2 | 19.6 |
| Continental Croatia | Međimurska | 158.1 | 18.4 |
| | Varaždinska | 175.1 | 20.6 |
| | Krapinsko-zagorska | 113.4 | 13.6 |
| | Koprivničko-križevačka | 92.3 | 11.5 |
| | Bjelovarsko-bilogorska | 82.6 | 11.0 |
| | Zagrebačka | 207.9 | 20.8 |
| | Sisačko-moslavačka | 118.0 | 15.9 |
| | Karlovačka | 115.8 | 15.0 |
| Slavonia | Virovitičko-podravska | 73.2 | 8.8 |
| | Požeško-slavonska | 87.9 | 10.4 |
| | Brodsko-posavska | 93.5 | 11.8 |
| | Osječko-baranjska | 110.0 | 14.0 |
| | Vukovarsko-srijemska | 128.3 | 19.2 |
| *Memorandum item* | | | |
| Total | | 132.4 | 16.1 |
| Istria and Kvaner | | 152.4 | 19.3 |
| Dalmatia | | 154.3 | 18.2 |
| Continental Croatia | | 134.4 | 15.9 |
| Slavonia | | 101.6 | 13.2 |

Sources: Croatian authorities and IMF staff calculations.

**Annex III. Figure 2. Secondary Education**
(2022)

| Region | County | Students per school | Teacher per school |
|---|---|---|---|
| Istria and Kvaner | Istarska | 155.2 | 18.2 |
| | Primorsko-goranska | 165.3 | 21.9 |
| | Ličko-senjska | 102.5 | 27.8 |
| Dalmatia | Zadarska | 187.2 | 23.9 |
| | Šibensko-kninska | 140.1 | 21.4 |
| | Splitsko-dalmatinska | 201.0 | 25.7 |
| | Dubrovačko-neretvanska | 158.6 | 19.7 |
| Continental Croatia | Međimurska | 174.0 | 28.9 |
| | Varaždinska | 194.0 | 33.7 |
| | Krapinsko-zagorska | 186.3 | 21.1 |
| | Koprivničko-križevačka | 202.3 | 22.3 |
| | Bjelovarsko-bilogorska | 158.0 | 18.9 |
| | Zagrebačka | 193.8 | 24.1 |
| | Sisačko-moslavačka | 138.3 | 17.8 |
| | Karlovačka | 136.0 | 22.5 |
| Slavonia | Virovitičko-podravska | 149.5 | 21.9 |
| | Požeško-slavonska | 165.2 | 21.5 |
| | Brodsko-posavska | 274.1 | 37.2 |
| | Osječko-baranjska | 194.9 | 25.6 |
| | Vukovarsko-srijemska | 200.8 | 31.0 |
| *Memorandum item* | | | |
| Croatia | | 177.4 | 24.1 |
| | Istria and Kvaner | 155.1 | 21.0 |
| | Dalmatia | 183.5 | 23.8 |
| | Continental Croatia | 172.2 | 23.9 |
| | Slavonia | 197.2 | 27.3 |

Sources: Croatian authorities and IMF staff calculations.

# Annex IV. Mismatches Between Job Qualifications and Requirements

## Annex IV. Figure 1. Score 1to 4 [1/]

| | | Croatia | EU27 | Hungary | Poland | Slovenia |
|---|---|---|---|---|---|---|
| High-skilled occupations | | | | | | |
| | Health associate professionals | 3 | 1 | 2 | 3 | 1 |
| | Health professionals | 1 | 1 | 4 | 4 | 1 |
| | Teaching professionals | 1 | 1 | 4 | 4 | 1 |
| | Administrative and commercial managers | 1 | 1 | 4 | 4 | 1 |
| | Business and administration associate professionals | 1 | 1 | 4 | 3 | 1 |
| | Business and administration professionals | 1 | 1 | 4 | 4 | 1 |
| | Chief executives, senior officials and legislators | 1 | 1 | 4 | 4 | 1 |
| | Hospitality, retail and other services managers | 2 | 3 | 3 | 3 | 2 |
| | Information and communications technicians | 2 | 1 | 3 | 4 | 1 |
| | Information and communications technology professionals | 1 | 1 | 4 | 4 | 1 |
| | Legal, social and cultural professionals | 1 | 1 | 4 | 4 | 2 |
| | Legal, social, cultural and related associate professionals | 2 | 2 | 3 | 4 | 2 |
| | Production and specialised services managers | 2 | 2 | 4 | 4 | 2 |
| | Science and engineering associate professionals | 2 | 2 | 3 | 2 | 2 |
| | Science and engineering professionals | 1 | 1 | 4 | 4 | 1 |
| Medium-skilled, non-manual, occupations | | | | | | |
| | Customer services clerks | 3 | 2 | 3 | 2 | 2 |
| | General and keyboard clerks | 3 | 2 | 3 | 3 | 2 |
| | Numerical and material recording clerks | 3 | 2 | 2 | 2 | 3 |
| | Personal care workers | 2 | 3 | 2 | 2 | 3 |
| | Personal service workers | 4 | 3 | 1 | 3 | 3 |
| | Sales workers | 4 | 3 | 1 | 1 | 2 |
| | Other clerical support workers | 4 | 2 | 3 | 2 | 2 |
| | Protective services workers | 4 | 2 | 2 | 2 | 3 |
| Medium-skilled, manual, occupations | | | | | | |
| | Assemblers | 3 | 3 | 3 | 1 | 4 |
| | Building and related trades workers (excluding electricians) | 3 | 4 | 1 | 1 | 3 |
| | Drivers and mobile plant operators | 4 | 4 | 1 | 1 | 3 |
| | Electrical and electronics trades workers | 4 | 2 | 1 | 1 | 2 |
| | Food processing, woodworking, garment and other craft and related trades workers | 4 | 3 | 1 | 1 | 3 |
| | Handicraft and printing workers | 4 | 3 | 2 | 1 | 3 |
| | Market-oriented skilled agricultural workers | 2 | 4 | 2 | 2 | 4 |
| | Market-oriented skilled forestry, fishery and hunting workers | 3 | 4 | 2 | 4 | 4 |
| | Metal, machinery and related trades workers | 4 | 3 | 1 | 1 | 3 |
| | Stationary plant and machine operators | 4 | 4 | 1 | 1 | 4 |
| Elementary occupations | | | | | | |
| | Cleaners and helpers | 2 | 4 | 2 | 2 | 4 |
| | Labourers in mining, construction, manufacturing and transport | 3 | 4 | 2 | 3 | 4 |
| | Refuse workers and other elementary workers | 2 | 4 | 3 | 3 | 4 |
| | Street and related sales and services workers | 1 | 4 | 1 | 1 | 4 |
| | Agricultural, forestry and fishery labourers | 2 | 4 | 3 | 3 | 4 |
| | Food preparation assistants | 3 | 4 | 2 | 3 | 4 |
| Average | High-skilled occupations | 1.5 | 1.3 | 3.6 | 3.7 | 1.3 |
| | Medium-skilled, non-manual, occupations | 3.4 | 2.4 | 2.1 | 2.1 | 2.5 |
| | Medium-skilled, manual, occupations | 3.5 | 3.4 | 1.5 | 1.4 | 3.3 |
| | Elementary occupations | 2.2 | 4.0 | 2.2 | 2.5 | 4.0 |

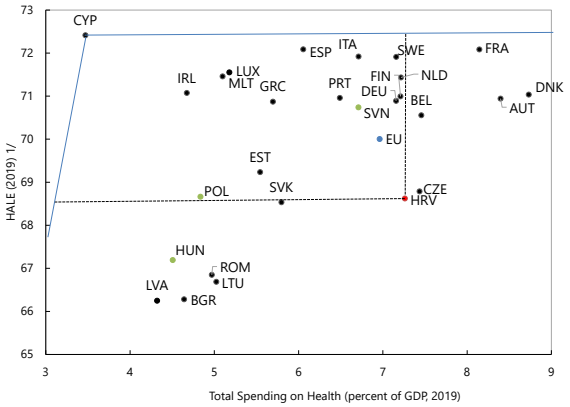
Sources: CEDEFOP Labour and Skills Shortage Index 2024 and IMF staff calculations.

1/ Imbalance shortage indicator of the labor and skill shortage index. A score of 1 indicates no shortage or surplus and 4 an intense shortage.

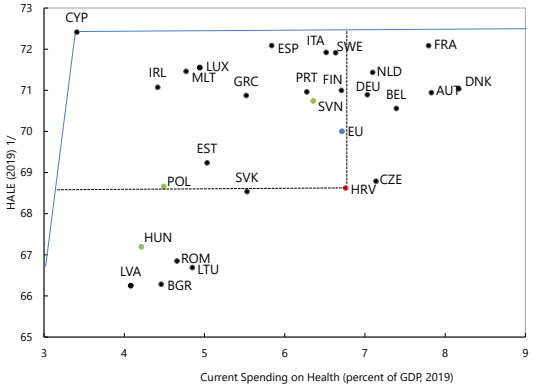
# Annex V. Alternative Measures of Efficiency Gains: Healthcare

## Annex V. Figure 1. Health Adjusted Life Expectancy and Spending in Percent of GDP (2019)

### HALE and Total Spending

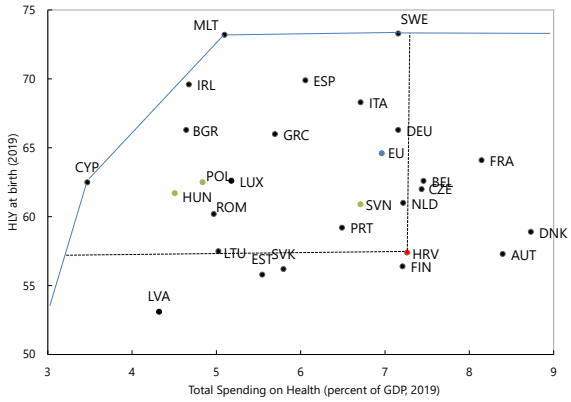



### HALE and Current Spending

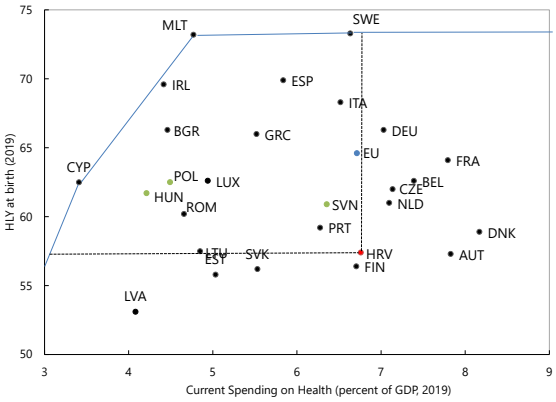



## Annex V. Figure 2. Healthy Life Years and Spending in Percent of GDP (2019)

### HLY and Total Spending

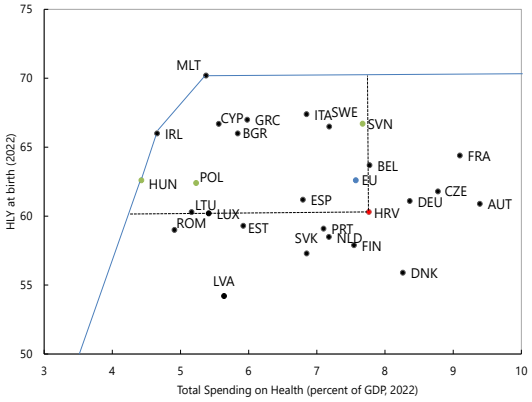



### HLY and Current Spending

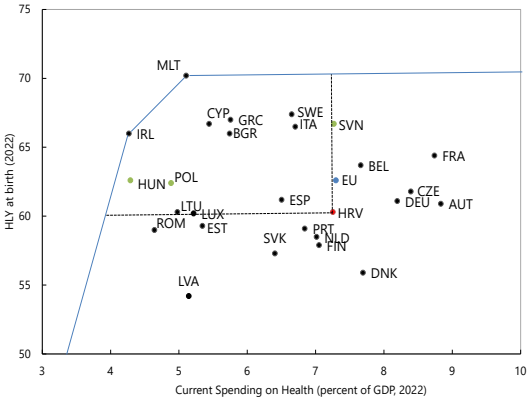



## Annex V. Figure 3. Healthy Life Years and Spending in Percent of GDP (2022)

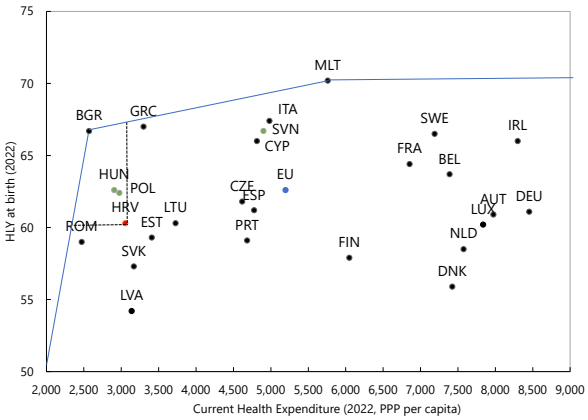
### HLY and Total Spending



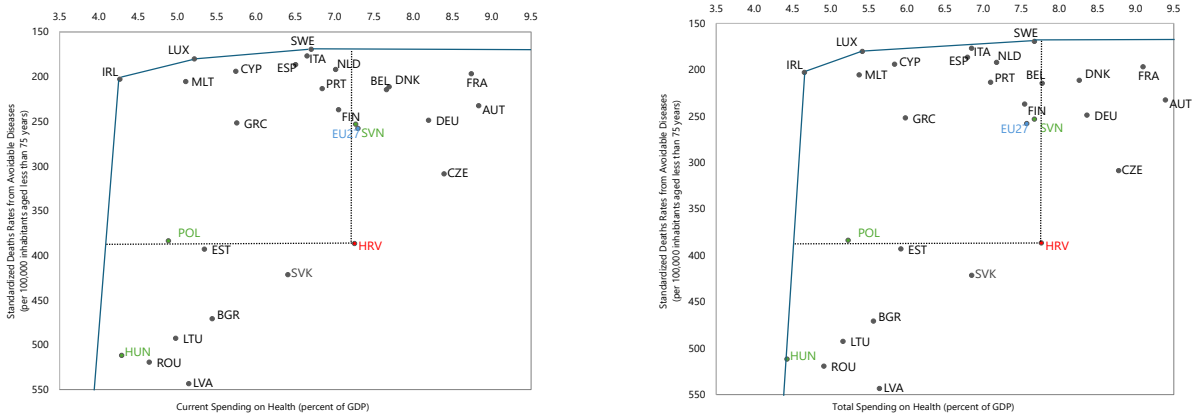

### HLY and Current Spending



## Annex V. Figure 4. Healthy Life Years and Current Spending Per Capita PPP (2022)




## Annex V. Figure 5. Avoidable Death Rate and Spending in Percent of GDP (2022)[1/]




Sources: Eurostat, WHO, World Bank, and IMF staff calculations.

1/ Rate of avoidable death is the sum of the preventable and treatable death rates.

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