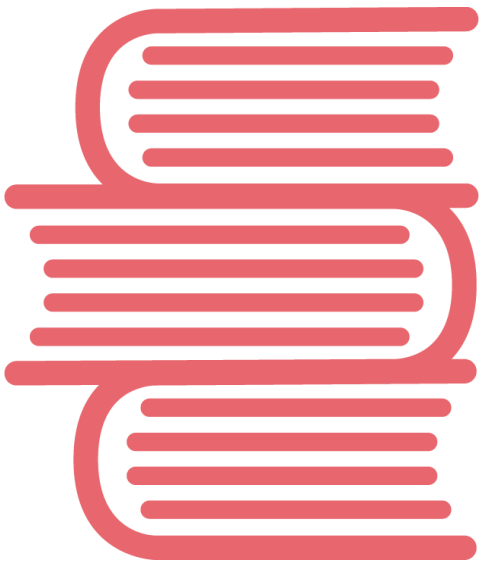
Teachers' pay and conditions: international comparisons

Commissioned by the Independent Welsh Pay Review Body

February 2023



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About the authors

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1. Executive summary

1.1. Background

The IWPRB is responsible for recommending reforms to the Minister for Education and Welsh Language on the pay and conditions of service for teachers and school leaders in Wales. This research aims to support the IWPRB in understanding: (i) the pay and conditions for teachers and school leaders in primary and secondary education across countries of the Organisation for Economic Co-operation and Development (OECD), and (ii) the correlation of pay and conditions with educational outcomes of pupils, and with teachers' recruitment, retainment and professional development. The research included three key activities: (i) benchmarking analysis, (ii) correlation analysis, and (iii) case studies.

1.2. Benchmarking analysis

We analysed data on the education systems of OECD countries to explore how Wales is performing across a wide range of indicators in comparison with other countries. The key findings of this exercise are listed below.

- Wales's investment in education as a percentage of GDP is among the highest in the OECD.
- During the academic year 2019/2020, teachers' statutory salaries at entry level in Wales were below the OECD average and at a similar level to those in England. However, actual salaries (including allowances and bonuses), were well above the OECD average.
- Teachers in Wales work long hours. Based on self-reported data, the time that teachers spent in the classroom is above the OECD average, and their overall weekly working time (including teaching and performing other duties) is the second highest, below only that of teachers in Japan.
- According to the National Education Workforce Survey, 76% of teachers in Wales work on permanent employment contracts, whereas the OECD average is 82%.
- Around 30% of pupils in Wales attend schools in which teaching is affected by a lack of teaching and assisting staff, according to school heads. This is below, but very close to the OECD average.
- According to a recent survey, more than 15% of teachers in Wales intend to leave the profession within the next three years.
- Wales has one of the highest percentages of pupils in villages and small towns (more than 40%), and one of the highest student-teacher ratios in the OECD (17 students for every one teacher).
- Performance in PISA 2018 was above the OECD average in science, and close to, although below the average in reading and maths.
- The share of students leaving secondary education without qualifications is below the OECD average, although above that in Ireland and England.

1.3. Correlation analysis

We used data collected during the benchmarking analysis to understand the correlation between key indicators, educational attainment and teachers' pay. The key indicators included educational spend, student educational outcomes, the rural-urban mix of schools, teachers' salaries, working and teaching time, professional development activities, teacher attrition and shortage, and the student-teacher ratio.

Our analysis involved a pairwise correlation across all key indicators and a cross-country multivariate correlation (i.e., regression analysis). The multivariate correlation analysis provided a closer estimate of the measures of association between key indicators of the teaching environment and educational outcomes, while controlling for all other factors. We estimated two alternative regression specifications, which provided consistent results.

It is important to note that correlations do not imply a causal relationship between variables or indicate the direction of causality. If X and Y are correlated, X could be driving Y, Y could be driving X, other variables (Z) could be driving both X and Y, or any combination of these options is possible.

The correlation analysis and the two alternative regression specifications showed that student educational attainment is:

- positively associated with the percentage of teachers with indefinite contracts,
- positively associated with teachers' salaries, and
- negatively correlated with the student-teacher ratio.

In other words, an increase in the share of teachers with indefinite contracts is correlated with an improvement in student educational attainment. Similarly, an increase in teachers' salaries is associated with better student outcomes, but a higher student-teacher ratio is associated with worse educational outcomes.

Teachers' professional development was also positively associated with student educational outcomes in one of our models, while statutory teaching time as a share of total statutory working time was negatively associated with student educational outcomes in one of our models. Finally, the correlation analysis showed that teachers' salaries are negatively correlated with teachers' intention to leave.

1.4. Case studies

Based on the findings from the benchmarking analysis and a desk-based review of studies, we identified five education systems that could provide best practice examples or insightful lessons learned. These were the education systems of Estonia, Poland, Ireland, Singapore, and the Basque Country (Spain). For each case study, we undertook targeted desk-based research to understand key drivers of good performance and important educational reforms. Additionally, we interviewed sector experts specialising in the teachers' pay and conditions in each country selected to fill in knowledge gaps, improve our understanding and confirm our findings from the literature.

The following themes were present in multiple case studies, highlighting the importance of these factors in creating a successful education system:

- Teaching profession sustaining social prestige.
- High salaries, compensation and rewards for teachers.
- Teacher and school autonomy (including pedagogical autonomy).
- Opportunities for professional development.
- Job stability and salary security.

Other interesting insights from case studies included:

- Per-pupil funding and additional funding for disadvantaged areas can be beneficial and support equity in education.
- Teacher autonomy shouldn't be a barrier to nationally introducing new pedagogical approaches or innovative tools.

- School heads' autonomy to set pay should be structured to ensure equal treatment of teachers across schools.
- Research and experts on multilingual education highlighted: (i) the importance of the social presence of each language for pupils' performance, (ii) that multiple language models in a country may reflect socio-economic groups and linguistic communities, and (iii) teacher training and professional development should focus on both subject-specific knowledge and language skills.

1.5. Overarching themes

The findings from the three different research activities complemented each other, without any contradictions identified. The correlation exercise indicated which factors are correlated with the educational outcomes of students. The case studies explored specific country examples, which broadly confirmed the importance of the factors highlighted by the correlation analysis. As the case studies included interviews with sector experts and a desk-based review of both academic and policy documents, they also allowed us to identify additional insights and lessons learned. Finally, the benchmarking exercise showed in which areas Wales's education system may benefit from additional investment or improvement. Combining the findings from the three research activities can help the IWPRB identify which elements should be prioritised by policymakers.

Below, we discuss the overarching themes emerging from our research.

Teachers' salaries

The correlation analysis showed that student educational attainment is positively associated with teachers' salaries, while teachers' salaries are negatively correlated with teachers' intention to leave. In line with the above findings, the case study on Singapore highlighted the importance of competitive pay for keeping attrition rates low, while Poland's case study highlighted how low salaries can contribute to staff shortages. Competitive salaries (together with education being among government priorities) may also contribute to the social prestige of the sector, and thus the attractiveness of the teaching profession, as discussed within the Ireland and Singapore case studies.

According to data referring to the 2019/2020 academic year, in Wales teachers' statutory salaries at entry level were below the OECD average. However, when average allowances and bonuses were added, then the average salary increased significantly and was well above the OECD average.

Professional development of teachers

Teachers' professional development was positively associated with student educational outcomes in one of our models, while the importance of professional development was highlighted by the Singapore, Poland, and Ireland case studies. Singapore provides a very interesting example of an alternative model of career progression, where teachers can choose among teaching, leadership, and specialist tracks for their career development. In Ireland and Poland, Initial Teacher Education (ITE) reforms introduced a requirement for a master's level of education for secondary education teachers and additional investment in CPD. It is worth noting that, according to the literature, the master's requirement in Ireland may have contributed to the current shortage of staff, but no evidence confirming this was found.

In Wales, CPD is a professional duty but without a minimum number of mandatory hours. In summary, professional development requirements and investment can affect positively both teachers and students, indicating that strengthening these in Wales could be beneficial.

Working hours and the student-teacher ratio

The statutory teaching time as a share of the total statutory working time was negatively correlated with student educational outcomes. According to the OECD, a larger proportion of statutory working time spent teaching could indicate that teachers end up performing other duties in their own time.

The benchmarking exercise showed that teachers in Wales work long hours. More particularly, based on self-reported data, the overall weekly working time for teachers in Wales is well above the OECD average and the second to highest across all OECD countries.

A characteristic of the class environment that directly affects teachers' workload is the student-teacher ratio, i.e. the number of students for every teacher in a school. The correlation analysis showed that student outcomes are negatively correlated with student-teacher ratio, with its coefficient being the strongest across all variables in both regression models. Wales has one of the highest student-teacher ratios in the OECD, indicating that this is an area that could be improved.

Permanent contracts

The benchmarking exercise highlighted that Wales is below the OECD average for teachers having permanent contracts. The pairwise correlations and the two alternative regression specifications showed that student educational outcomes are positively associated with the share of teachers with indefinite contracts. According to the literature, teachers without permanent contracts might experience higher job insecurity and become more likely to leave the profession, indicating that this area might be a potential policy priority for Wales.

2. Introduction

2.1. Institutional background

The Independent Welsh Pay Review Body (IWPRB) is responsible for recommending reforms to the Minister for Education and Welsh Language on the pay and conditions of service for teachers and school leaders in Wales. The IWPRB has submitted four reports to the Minister since 2019. The Fourth Remit Letter requires the IWPRB undertake a strategic review of pay, terms and conditions in Wales.

Pay and conditions of service for teachers are among the drivers of students' educational outcomes, the recruitment of high-quality teachers, and the development of the workforce.

2.2. Project objectives

This research aims to support the IWPRB in understanding the pay and conditions of school teachers and school leaders in primary and secondary education across OECD countries. The research focuses on the association of pay and conditions of teachers and school leaders with:

- the educational outcomes of pupils,
- the attraction and retainment of teachers and school leaders, and
- the continuous development of teachers and school leaders.

2.3. Methodology

To explore the themes mentioned above, we undertook three research activities.

1. **Benchmarking analysis:** We analysed data on the education systems of OECD countries to explore how Wales is performing across a wide range of indicators in comparison with other countries.
2. **Correlation analysis**: We used data collected during the benchmarking analysis to understand the correlation between key indicators, educational attainment and teachers' pay. The key indicators include educational spend, student educational outcomes, the rural-urban mix of schools, teachers' salaries, working and teaching time, professional development activities, teacher attrition and shortage, and the student-teacher ratio. Our analysis involved a pairwise correlation across all key indicators and outcomes of interest and a cross-country multivariate correlation (i.e., regression analysis). The multivariate correlation analysis provides a closer estimate of the measures of association between key indicators of the teaching environment and educational outcomes, while controlling for all other factors.
3. **Case studies**: Based on the findings from the benchmarking analysis and a desk-based review of studies, we identified five education systems that can provide best practice examples or insightful lessons learned. The education systems selected were those of Estonia, Poland, Ireland, Singapore, and the Basque Country (Spain). For each case study, we undertook targeted desk-based research to understand key drivers of good performance and important educational reforms. The desk-based research included an initial review of literature discussing the best-performing education systems and the characteristics of teachers' pay and conditions across the world, e.g., research published by the OECD, the National Center for Education and the Economy (NCEE), and the European Commission. Once the countries were selected, we searched, identified and reviewed academic literature, policy papers and

articles that addressed the key themes associated with each country. Additionally, we interviewed sector experts specialising in the teachers' pay and conditions of each country to fill in knowledge gaps, improve our understanding and confirm our findings from the literature. The sector experts interviewed included professors, lecturers and academic researchers working at universities located in the countries of interest. The academics interviewed are experts in topics related to educational policy and evaluation, educational leadership, academic achievement, and education in multilingual societies. Finally, our sample of interviewees also included the head of a school in one of the selected countries.

3. Benchmarking Analysis

The current section reviews teachers' salaries, working conditions, and the teaching environment to explore how Wales is performing across a wide range of indicators against other countries in the OECD.

Key findings from benchmarking analysis

- Wales's investment in education as a percentage of GDP is among the highest in the OECD.
- During the academic year 2019/2020, teachers' statutory salaries at entry level were below the OECD average and at a similar level to England.[1] However, actual salaries earned by teachers, i.e. including allowances and bonuses, were well above the OECD average.
- Teachers work long hours. Based on self-reported data, the time that teachers spent in the classroom is above the OECD average, and their overall weekly working time (including teaching and performing other duties) is second to highest, below only Japan.
- According to the National Education Workforce Survey, 76% of teachers in Wales work on permanent employment contracts, whereas the OECD average is 82%. Actual teaching attrition rates are significantly lower. However, it should be taken into account that the last measurement was in 2016.
- Around 30% of pupils in Wales attend schools in which teaching is affected by lack of teaching and assisting staff, according to school heads. This is below, but very close to the OECD average.
- According to a recent survey, more than 15% of teachers in Wales intend to leave the profession within the next three years.
- Wales has one of the highest percentages of pupils in villages and small towns (more than 40%), and one of the highest student-teacher ratios in the OECD (one teacher to every 17 students).
- Performance in PISA 2018 was above the OECD average in science, and close, although below, in reading and maths.
- The share of students leaving secondary education without qualifications is below the OECD average, although above Ireland and England.

3.1. Data sources and methodology notes

The data sources used in this section are the Programme for International Student Assessment (2018), OECD Education at a Glance (2021), the Teaching and Learning International Survey (TALIS) (2018), and some additional UK or Wales sources – such as the National Education Workforce Survey (2021), the Public Expenditure Statistical Analysis (2021), and the School Workforce Census (2021). Our benchmarking analysis included a review of academic and grey literature for those elements of

[1] Statutory salaries refer to teacher salaries according to official pay scales. The statutory salary at entry level is the gross salary per year for a full-time classroom teacher in state-funded institutions at the beginning of their career. Actual salaries earned by teachers and head teachers include additional allowances and bonuses that are not captured in the official pay scales.

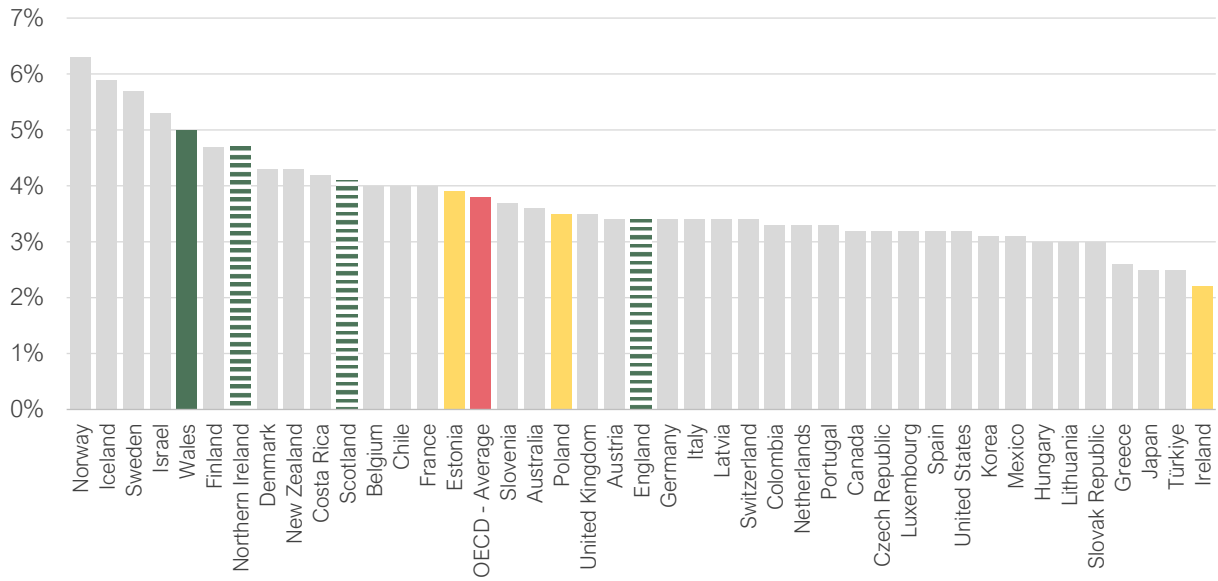
the teaching and learning environment that are not captured by quantitative data, such as the requirement to become a fully qualified teacher and the status of Continuing Professional Development.

The current analysis concerns data of state-funded schools. Within the PISA dataset, there were 5 countries that did not provide a breakdown for state-funded and private schools. For these countries, we report the country average estimates. These countries are Belgium, Ireland, Israel, Norway, Sweden.[2] This will be clarified for each variable.

3.2. Educational spend per GDP

Wales comes in fourth place in public expenditure as a percentage of GDP in pre-primary to secondary education. Expenditure is approximately 5% of GDP against an OECD average of 4%. Out of the four UK home nations, only England falls below the OECD average.

Figure 1. Educational expenditure (pre-primary to secondary education) as a percentage of the GDP



Source: OECD Education at a Glance (2021), Educational Finance Indicators. For England, Scotland, Wales, and Northern Ireland, the data source is the Public Expenditure Statistical Analysis (PESA, 2021) for data on expenditure in education, and the Gross Domestic Product data provided by the Office for National Statistics (ONS). Year of reference is 2018.

3.3. Student educational outcomes

3.3.1. Test scores

The Programme for International Student Assessment (PISA) tests pupils' knowledge and skills in mathematics, science, and reading. These tests aim to assess students' ability to think across subjects, think creatively to solve problems and demonstrate relevant learning.[3] Japan and Estonia are consistently among the top performers in all subjects. Pupils in Wales perform very close to the OECD average in maths (486), slightly better in science (485.6 vs 485.9) and slightly lower in reading (483.6 vs 482.3). Within the UK, Wales performs close to England and Scotland in mathematics and science

[2] We excluded the German-speaking community of Belgium due to its small population, as it could skew the distribution and bias the analysis.

[3] PISA 2018 Insights and Interpretations. OECD (2019). https://www.oecd.org/pisa/PISA%202018%20Insights%20and%20Interpretations%20FINAL%20PDF.pdf

but reading scores in state-funded schools are lower in Wales than in the rest of the UK (8 points difference). The differences between Wales and UK are less pronounced in state-funded schools than the country average (which includes private schools). For example, the average PISA reading score for Wales's state-funded schools is 482 versus 490 for the UK. On the other hand, the country average (including private schools) in Wales is 483, while for the UK is 504 [4] [5]

Figure 2. PISA maths score in state-funded schools

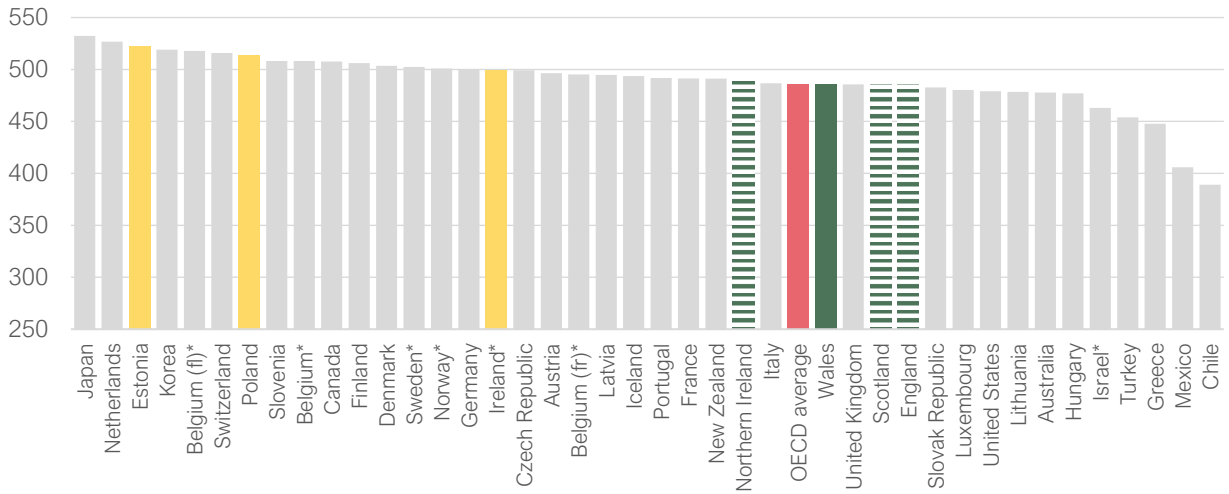
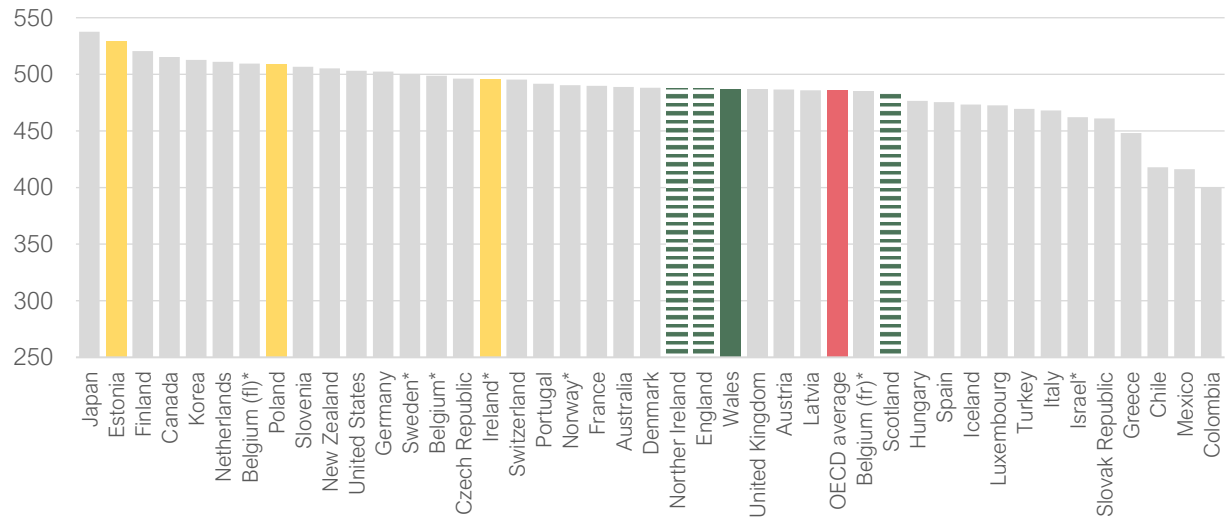


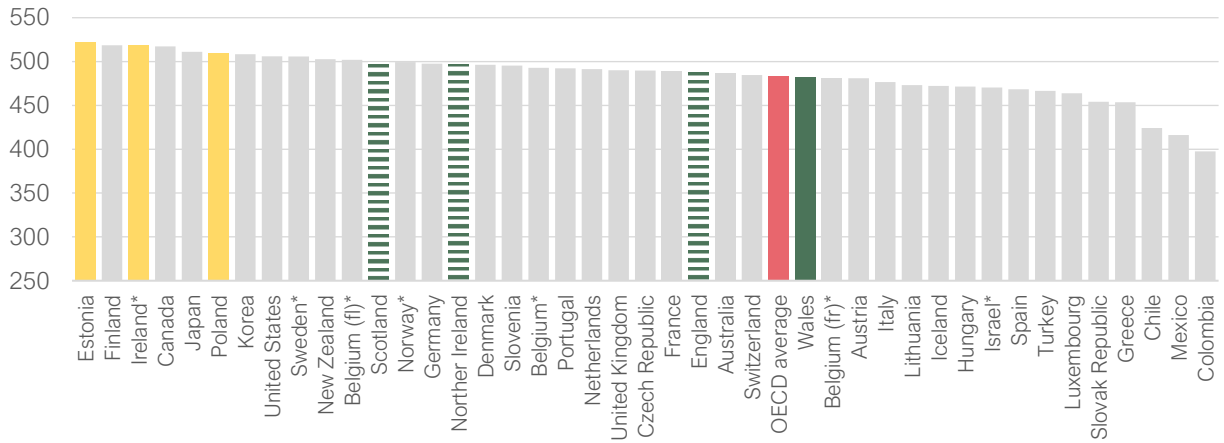
Figure 3. PISA science score in state-funded schools



[4] Achievement of 15-year-olds in England: PISA 2018 results. Sizmur et al. (2019)

[5] Asterisks (*) at the end of countries' names in each graph indicate that these countries did not provide data for public and private schools, separately. When this is the case, the country-average is reported. For PISA scores, this is the case for Ireland, Israel, Norway, Sweden, and Belgium.

Figure 4. PISA reading score in state-funded schools

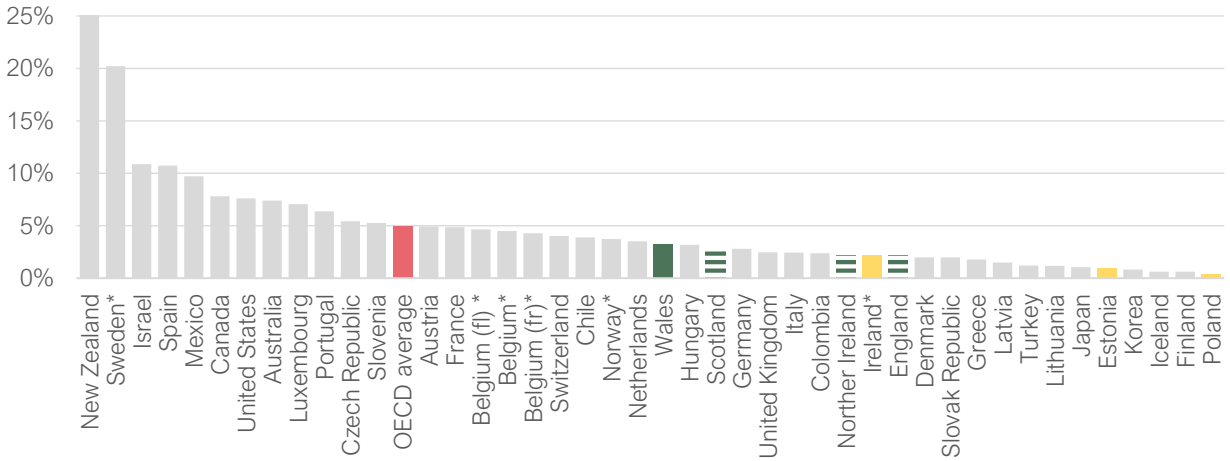


Source: Programme for International Student Assessment (PISA) 2018.

3.3.2. Leavers without qualifications

In Wales, around 3% of students in state-funded institutions leave school without the equivalent of the certificate that enables entry to post-school destinations such as university, technical, further, or vocational education, apprenticeships, or employment. This figure is below the OECD average (5%), and lower than countries such as Austria, Belgium, Norway and the Netherlands. Only 5 countries (Estonia, Korea, Iceland, Finland, and Poland) fall below 1%.[6] New Zealand scores the highest, with a disproportionate presence of leavers in Māori schools. [7] Sweden is the only European country with a percentage of students leaving school without a graduation certificate above 20%. According to the European Commission, Sweden records the biggest difference between private and state-funded schools among EU member States – which points to inequalities and segregation issues in schools.

Figure 5. Percentage of students who leave school without graduation qualifications, in state-funded schools.



Source: Programme for International Student Assessment (PISA) 2018. School questionnaire.

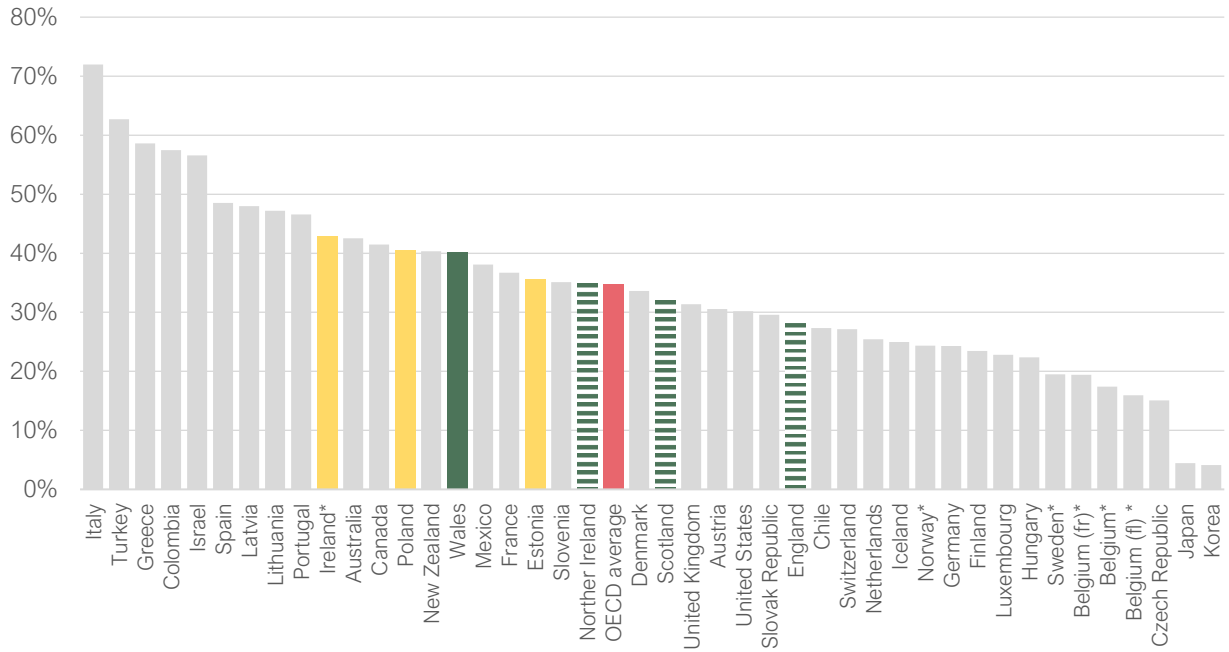
[6] Asterisks (*) at the end of countries' names in the graph indicate that these countries did not provide data for public and private schools, separately. When this is the case, the country-average is reported. In this section, this is the case for Ireland, Israel, Norway, Sweden, and Belgium.

[7] NCEA attainment rates fall, Māori schools buck trend. https://www.stuff.co.nz/national/115874781/ncea-attainment-rates-fall-mori-schools-buck-trend?rm=a

3.3.3. Student truancy

In Wales, almost 4 out of 10 students reported having skipped at least one class in the last three weeks in state-funded schools. This is slightly above the OECD average (3.5 out of 10), but below other EU countries such as Italy (7 out of 10), Greece (6 out of 10) and Spain (5 out of 10). Northern Ireland, and Scotland are below 4 out of 10, and England is just below 3.[8] It is worth highlighting here that the data analysed in this report refer to the period before COVID-19 pandemic. Student truancy is expected to have had significant fluctuations since the beginning of 2020, which are not reflected in this analysis.

Figure 6. Percentage of students who report having skipped at least one class in the last three weeks, in public schools.



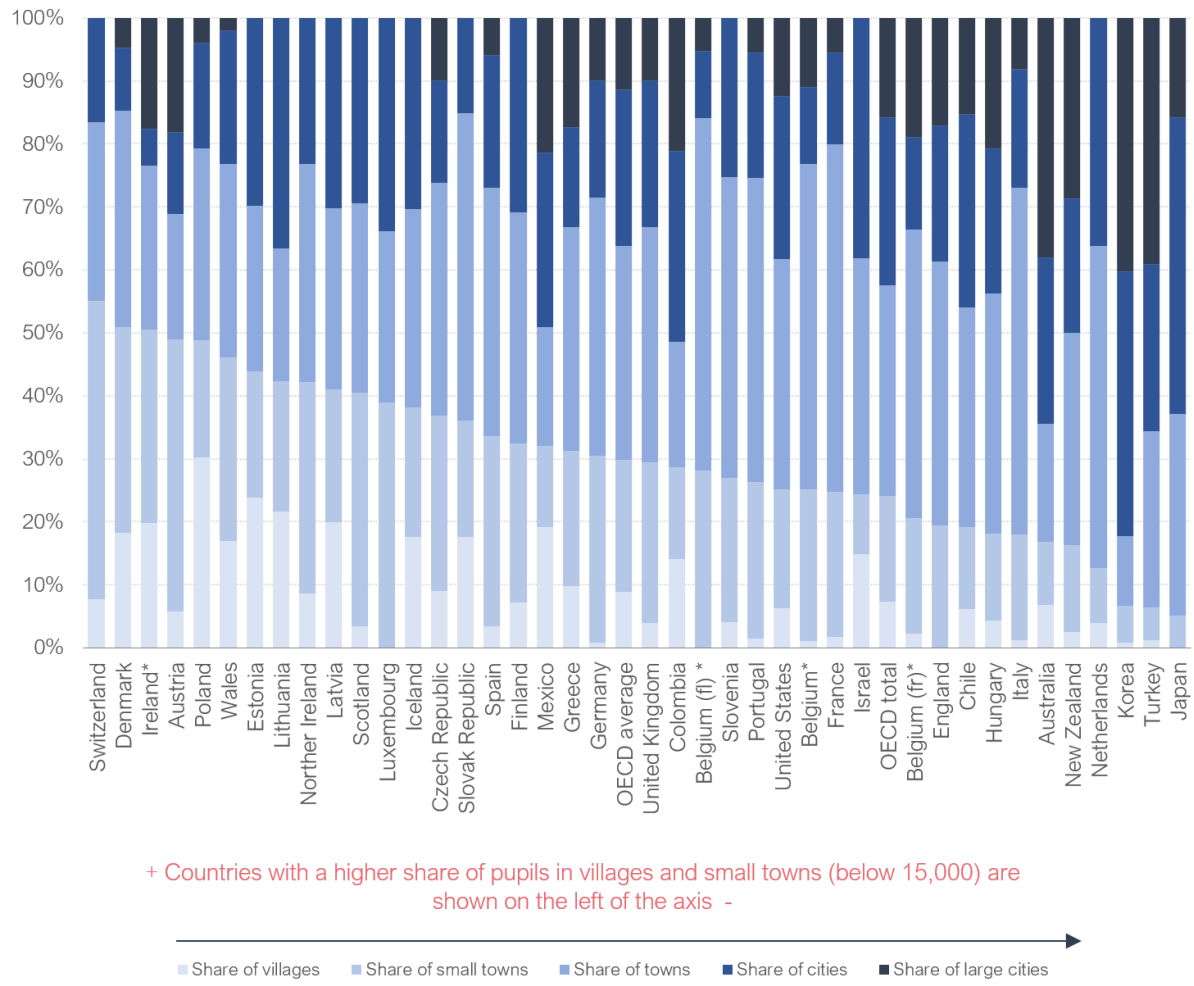
Source: Programme for International Student Assessment (PISA) 2018. Student questionnaire.

[8] Asterisks (*) at the end of countries' names in the graph indicate that these countries did not provide data for public and private schools, separately. When this is the case, the country-average is reported. In this section, this is the case for Ireland, Israel, Norway, Sweden, and Belgium.

3.4. Rural-urban mix of schools

Wales is one of the countries in the OECD with a larger share of pupils in villages (settlements with fewer than 3,000 inhabitants) and small towns (below 15,000 inhabitants). Almost 46% of the state-funded school population in Wales is in small community settings. Only Switzerland, Denmark, Ireland, Austria and Poland are above Wales on this metric. The share of pupils whose school is located in villages or small towns in the above countries ranges between 47% and 55%. The OECD average is 30%, and this figure in England is just above 20%. Scotland (40%) and Northern Ireland (42%) come closer to Welsh figures.[9]

Figure 7. Rural-urban mix of schools. Percentage of pupils whose school is located in different types of communities.



Source: Programme for International Student Assessment (PISA) 2018. School questionnaire.

[9] Asterisks (*) at the end of countries' names in each graph indicate that these countries did not provide data for public and private schools, separately. When this is the case, the country-average is reported. In this section, this is the case for Ireland, Israel, Norway, Sweden, and Belgium.

3.5. Pay and working conditions

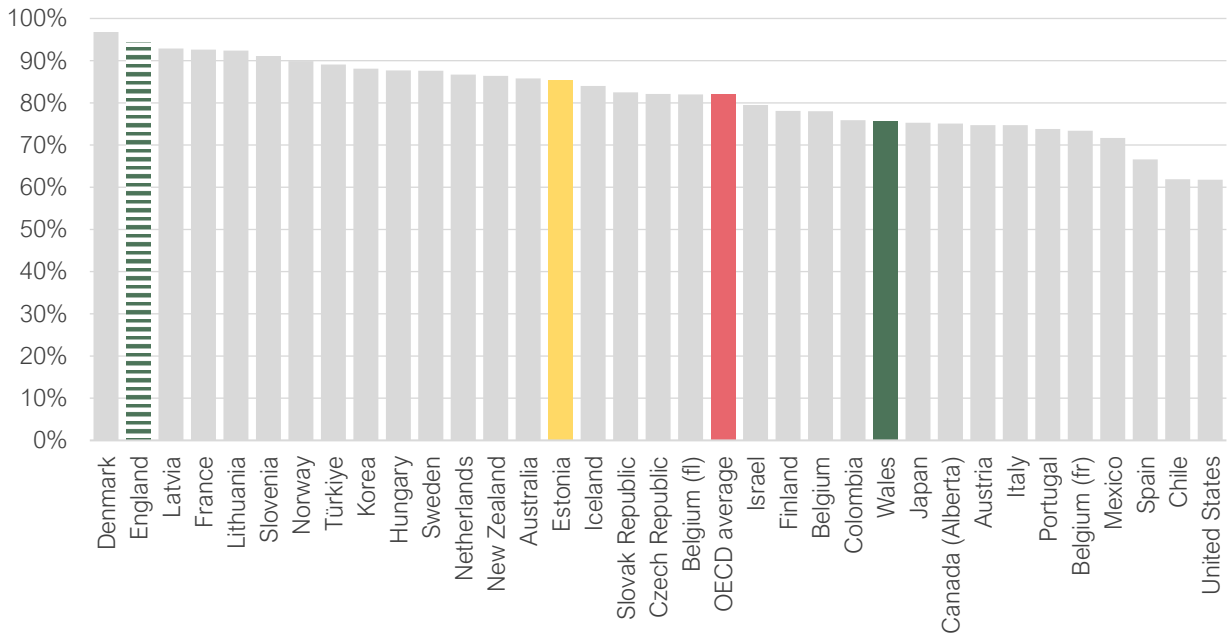
3.5.1. Type of contract

The vast majority of teachers in the OECD are employed in a permanent employment contract. The OECD average is over 80%. The dataset providing data for all OECD countries (TALIS, 2018) did not include data for Wales, and thus we used the National Education Workforce Survey (2021) for Wales. The definitions used in both datasets were checked for consistency and no concerns were identified.

In Wales, according to the National Education Workforce Survey (2021), 76% of school teachers were employed on a permanent contract, which is at the lower end of the distribution. In England, more than 90% of teachers were employed in a permanent contract.

The seemingly low figure for Wales, especially compared to the high percentage reported by England, might be partially explained by the fact that the National Education Workforce Survey has some limitations in terms of representativeness, for instance, in terms of age distribution of the sample.[10]

Figure 8. Percentage of teachers working in a permanent employment contract



Source: Teaching and Learning International Survey (TALIS) 2018. For Wales data, the data source is the National Education Workforce Survey (2021).

There was no explicit evidence addressing the differences in type of contracts between teachers in England and Wales. However, attrition rates are significantly greater for Welsh primary and secondary teachers in the early stages of their careers relative to England, according to research by the National Foundation for Educational Research. This finding might be explained by the way in which Newly Qualified Teachers (NQT) are employed: in Wales, 85% of NQTs are fixed-term or supply teachers, and short-term contracts are also common in the first years of teaching career. According to the authors, teachers might experience higher job insecurity and become more likely to leave the profession.[11]

[10] National Education Workforce Survey (2021).

[11] Comparative analysis of teacher attrition rates in England and Wales. National Foundation for Educational Research. https://www.nfer.ac.uk/media/5061/comparative_analysis_of_teacher_attrition_rates_in_england_wales-report_ntlm.pdf

3.5.2. Teachers' pay

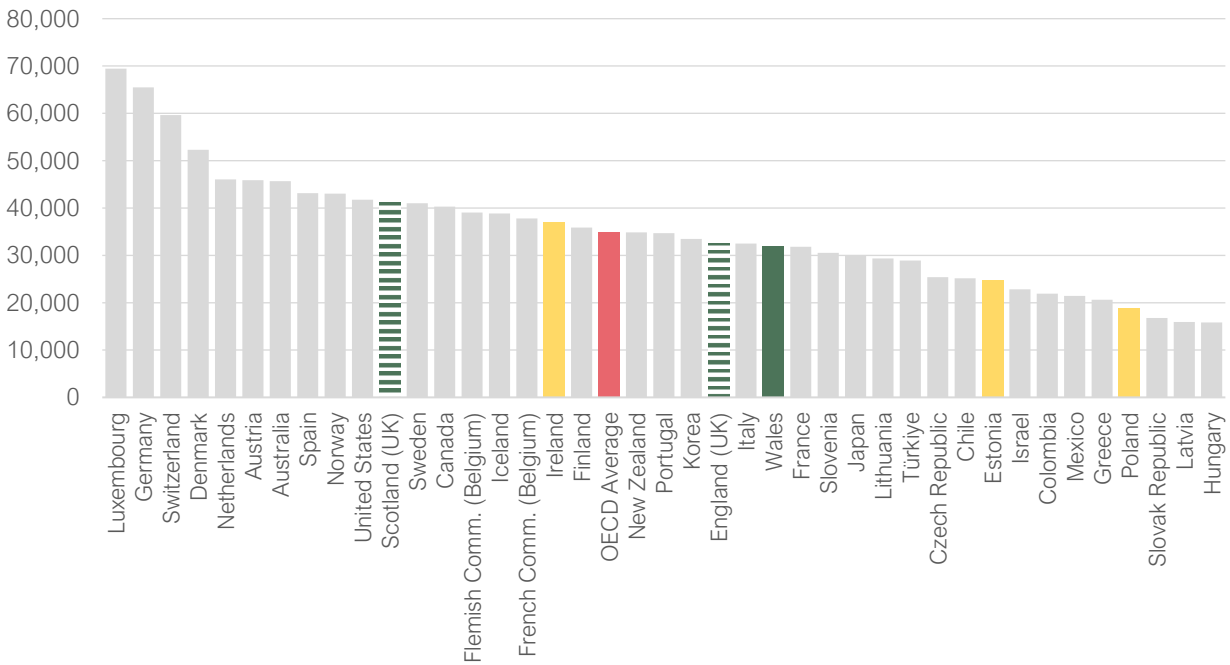
Teachers' salaries are measured in equivalent USD using Purchasing Power Parities (PPP) for private consumption. The PPP exchange rate compares different countries' currencies through a market basket of good. Therefore, the converted salaries are comparable across countries in terms of purchasing power, considering both nominal exchange rates and cost of living.[12] Additionally, it is worth noting that lower and upper secondary education are combined in Wales (and the UK). For this reason, we assigned the salary of secondary education teachers to both categories. Finally, it is worth noting that, as in the rest of the report, the data collection point is earlier than the publication date of the dataset. In this specific section, although the main data source is OECD Education at a Glance (2021), the data for the majority of countries (including Wales and England) refer to the academic year 2019/2020.

Teachers' statutory salaries at the start of their career

Statutory salaries refer to teacher salaries according to official pay scales. The starting salary is the gross salary per year for a full-time classroom teacher in state-funded institutions at the beginning of their career. The average statutory salary in the OECD at the beginning of the career changes across levels of education, between US$34,000 in primary education to almost US$38,000 in upper secondary education.

Teachers' starting salary in Wales is below the OECD average and just below England at every level. In France, teachers in primary education are paid below teachers in Wales, but this is not the case in secondary education. Luxembourg, Germany, Switzerland, and Denmark are consistently at the top of the distribution.

Figure 9. Teachers statutory starting salary in primary education



[12] Data on subnational regions are adjusted using national PPPs. This means that salaries for teachers in Wales are computed based on the UK average cost of living. Future work on the cost of living at subnational level would be required to fully adjust salaries in this section. Source: OECD Education at a Glance 2021.

Figure 10. Teachers statutory starting salary in lower secondary education

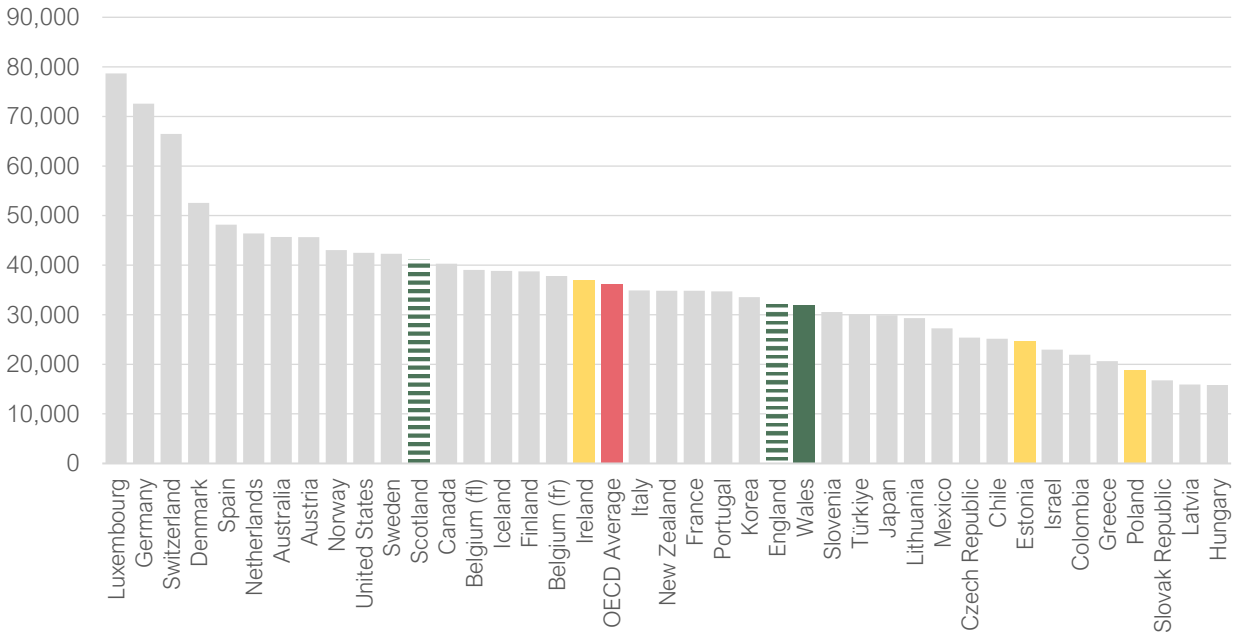
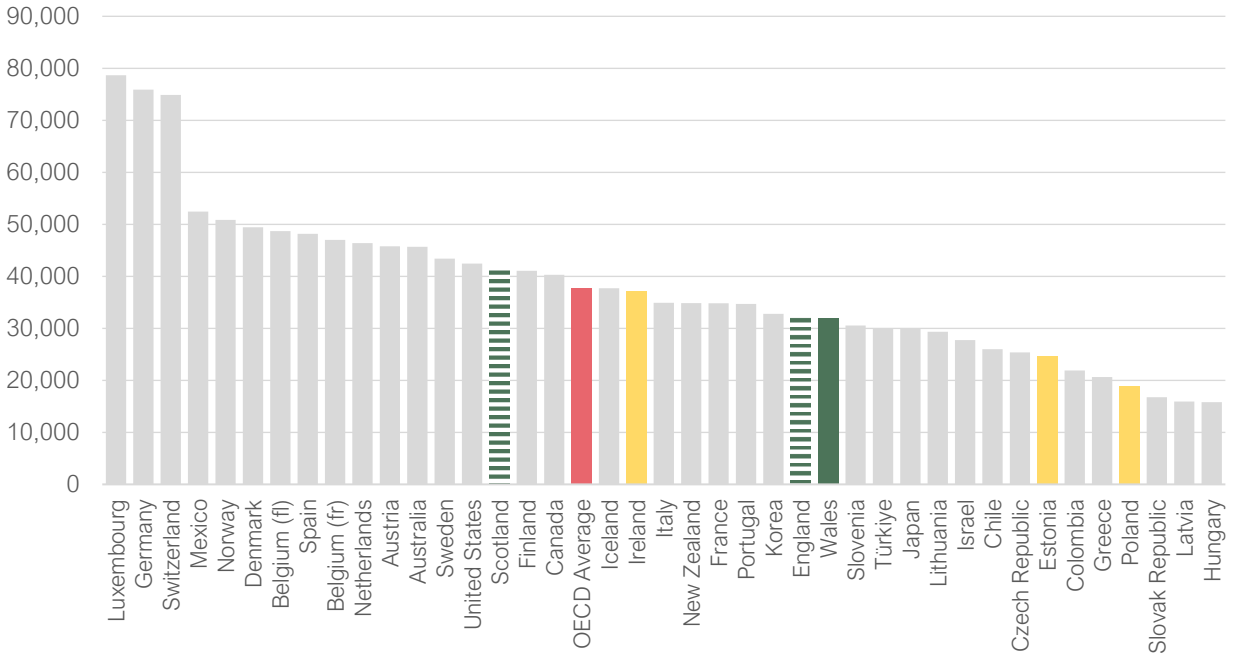


Figure 11. Teachers statutory starting salary in upper secondary education



Source: OECD Education at a Glance (2021). Teachers and the learning environment.

Teachers' actual salaries

Data on actual salaries of teachers refers to salaries of full-time teachers in state-funded institutions, including bonuses and allowances. It captures the gross salary from the employee's point of view. Hence, work-related payments such as annual or result-related bonuses, extra pay for holidays and sick-leave pay are also included.[13] The figures reported by the OECD on Welsh teachers' salaries did

[13] OECD Handbook for Internationally Comparative Education Statistics (2018).

not seem consistent with this definition, as they did not report any increase in salaries between primary and secondary education, despite the share of teachers receiving pay allowances being much higher in final schooling years. For this reason, teachers' actual salaries in Wales were calculated based on data from the School Workforce Annual Census (SWAC). We used the average wage of classroom teachers at each level (primary and secondary education), and we added the average allowance amount received by teachers (we used the share of teachers that receive each type of allowance to calculate this number). It should be noted that since regulations, definitions and levels of bonuses, allowances and other forms of additional earnings can vary significantly across countries and can be much more complicated to capture in the data than statutory salaries, there is a possibility of inaccuracies in other countries' data as well. To compare Welsh salaries with other countries, we used the USD exchange rate with PPP for private consumption reported by the OECD.

Based on these calculations, salaries in Wales are above the OECD average for primary education (US$48,721 in Wales, US$45,687 in OECD). Average salaries in Wales increase from primary to secondary education.

Salaries of teachers in upper secondary education in Wales (US$52,016) are just above the OECD average (51,749 USD), but below Northern Ireland, France, and Norway. Teachers in Germany, at the top of the scale, are paid more than 60% more than in Wales, even considering Purchasing Power Parities. Germany, the Netherlands, and Austria offer the highest teacher wages across the OECD in primary and secondary schools. The Slovak Republic, Hungary, Latvia, and Greece offer the lowest. Estonia is also below the OECD average across education levels.

Figure 12. Primary schools - Teachers' annual actual salaries.

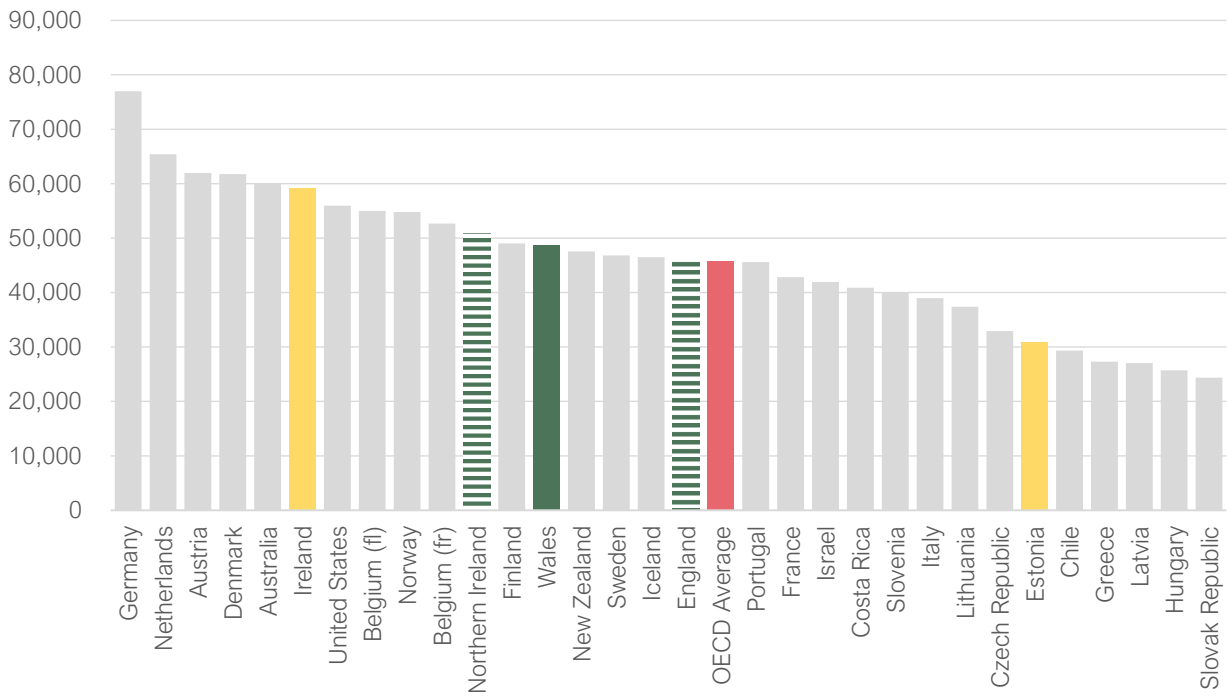


Figure 13. Lower secondary education - Teachers' annual actual salaries.

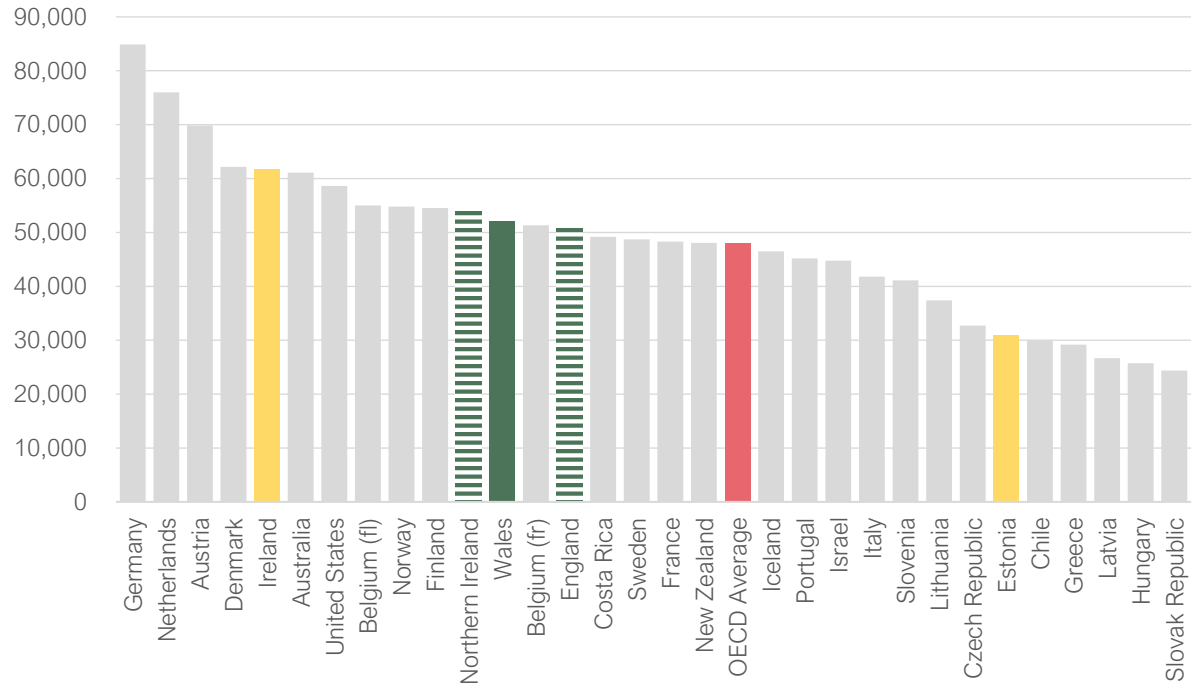
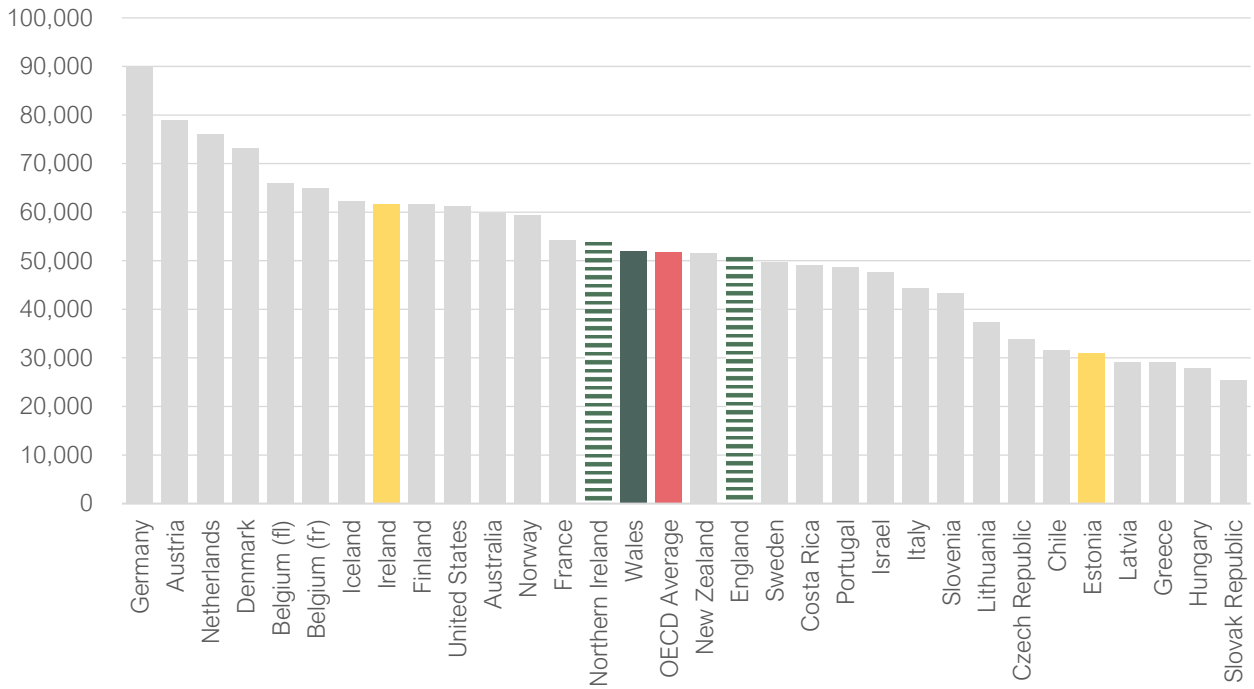


Figure 14. Upper secondary education - Teachers' annual actual salaries.



Source: OECD Education at a Glance (2021). Teachers and the learning environment.

School heads' actual salaries

School heads' salaries in Wales are consistently above the OECD average at different educational levels. The average salary in secondary schools is more than 40% higher than that in primary schools in Wales. Only England is above Wales across the three levels of education. Latvia, Hungary, Estonia, and Greece are at the lower end of the distribution.

Figure 15. Primary schools - School heads' actual salaries

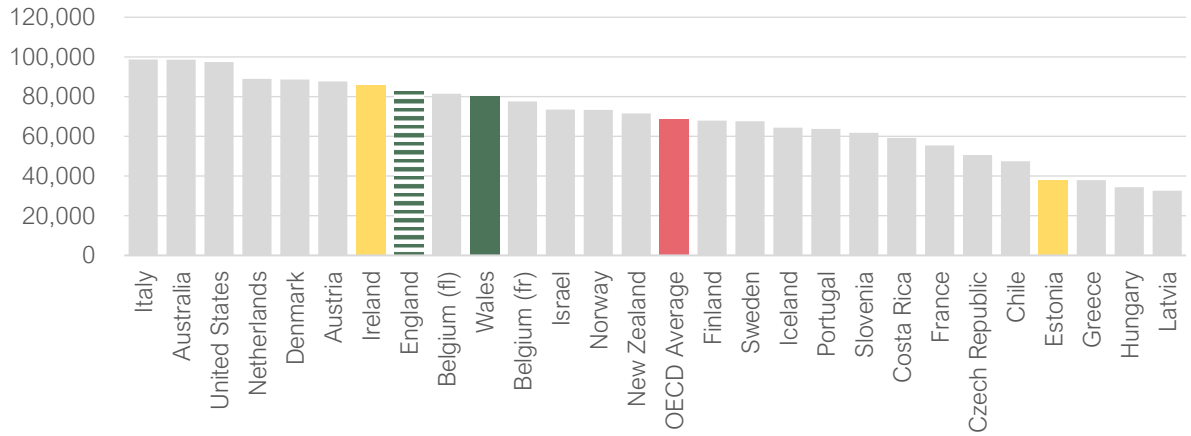


Figure 16. Lower secondary school - School heads' actual salaries

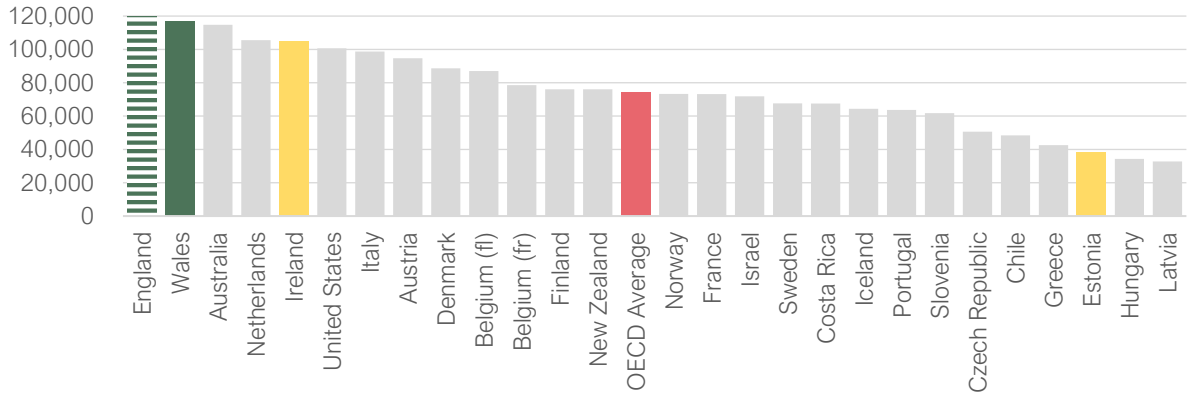
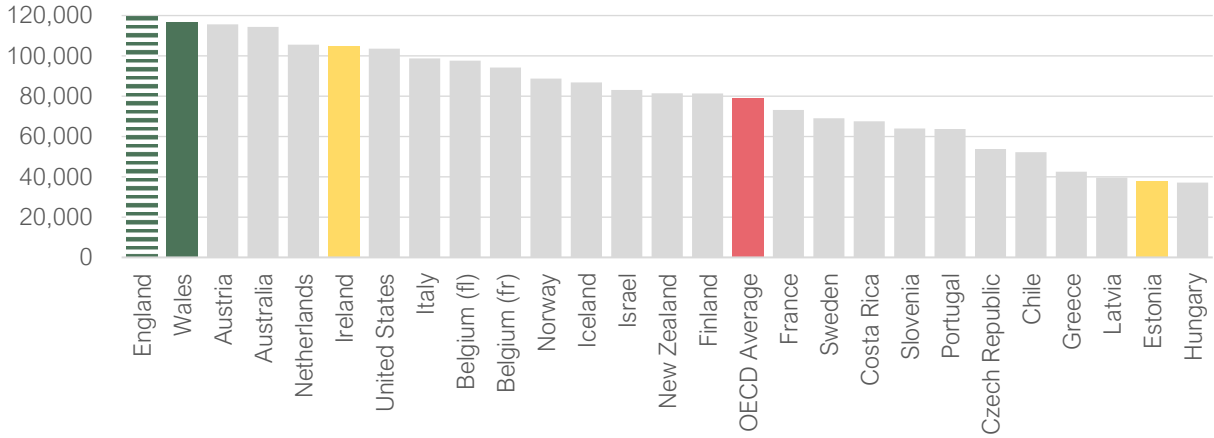


Figure 17. Upper secondary school - School heads' actual salaries



Source: OECD Education at a Glance (2021). For Wales, the data source is the School Workforce Annual Census (SWAC). The estimate includes the average allowance received by teachers proportional to the share of teachers that receive each allowance.

3.5.3. Teachers' statutory working and teaching time

Statutory and actual working and teaching time.

Teachers in state-funded schools across the OECD are required to *work* for a certain amount of time, according to country regulations and agreements, which may include a certain amount of *teaching* time. These are the statutory requirements. Note that not all countries define statutory teaching and working time.

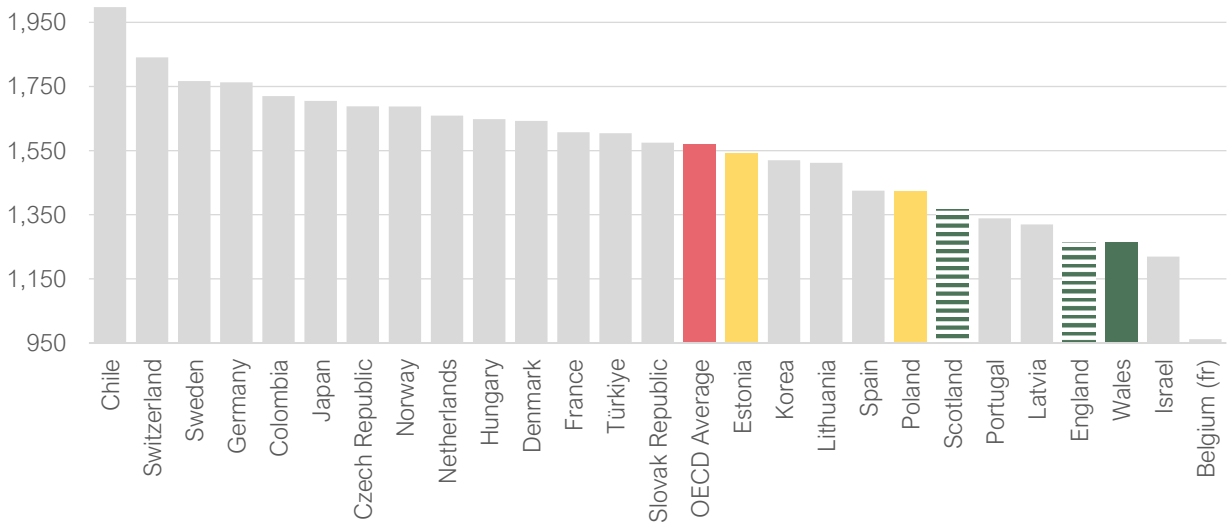
Statutory working and teaching hours do not fully represent the actual workload of teachers and school heads. Teaching workload might exceed the statutory requirements. Time performing other duties, including preparation, assessment, or engagement with parents might also result in higher actual working hours.

In this section, we discuss both the statutory requirements, if available, as well as the actual teaching and working time. For the latter, we rely on teachers' self-reported working and teaching time to measure their actual workload, based on the National Education Workforce Survey (2021) for Wales, and the Teaching and Learning International Survey (2018), elsewhere.

According to the School Teachers' Pay and Conditions (Wales) Document 2020, a teacher employed full-time must be available to perform their duties for 1,265 hours per year. The only education systems below this number are Israel (1,220) and the French-speaking community in Belgium (962).

Chile has the highest total statutory working time for teachers, with 1,997 hours a year. In the second place, Switzerland's statutory requirements include 1,841 yearly working hours of school teachers, and Sweden is slightly above 1,750. However, teachers in Wales *must work such reasonable additional hours as may be necessary to enable the effective discharge of their professional duties,* according to the Statutory Teachers' Pay and Conditions (Wales) Document 2020.

Figure 18. Total statutory working time of full-time school teachers

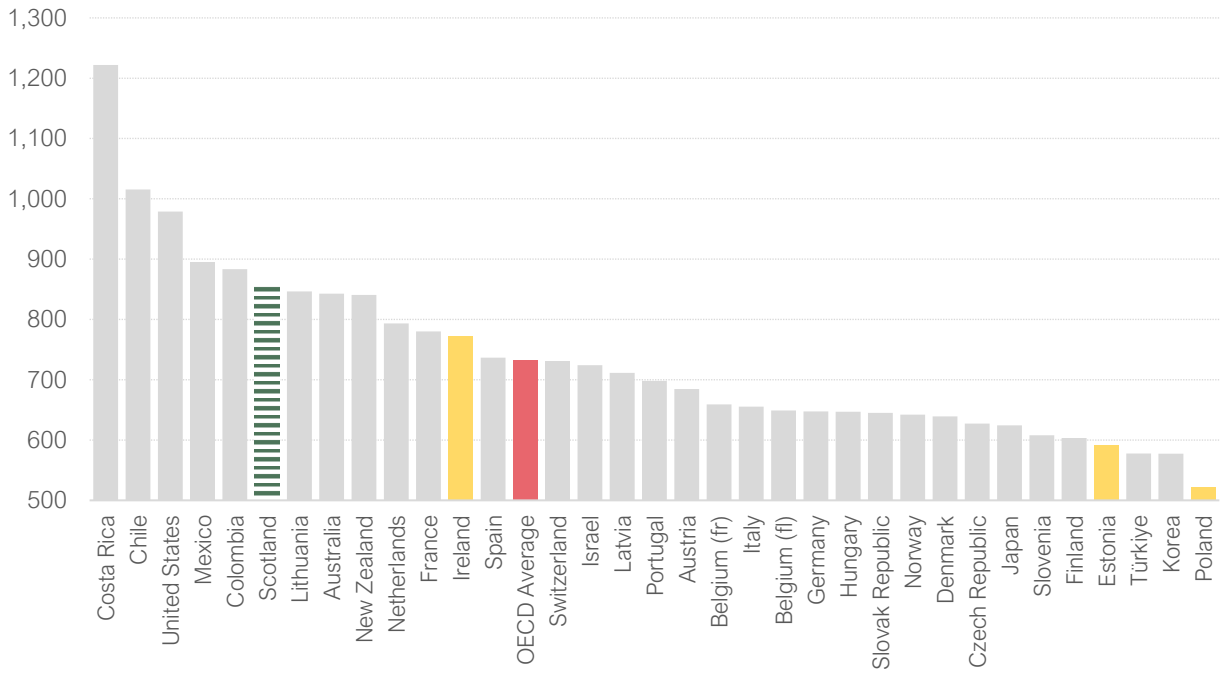


Source: OECD Education at a Glance (2021), and, for Wales, School Teachers' Pay and Conditions (Wales) Document 2020.

In the figure above, the statutory working hours of education staff are those needed to meet the requirements according to the official national policies or laws of full-time employment.

Based on official regulations or agreements, across the OECD, teachers are required to teach, on average, 784 hours at primary level, 711 at lower secondary level (general programmes) and 684 hours at upper secondary level (general and vocational programmes). The overall OECD average is at 773. Only Costa Rica (1,222), Chile (1,015), and the USA (979) have average values above 900 hours per year. Wales does not have a statutory net teaching time. However, it is required that teachers must be provided with time for Planning, Preparation, and Assessment (PPA) which must amount to not less than 10% of the teacher's timetabled teaching time.[14]

Figure 19. Statutory net teaching time of full-time teachers



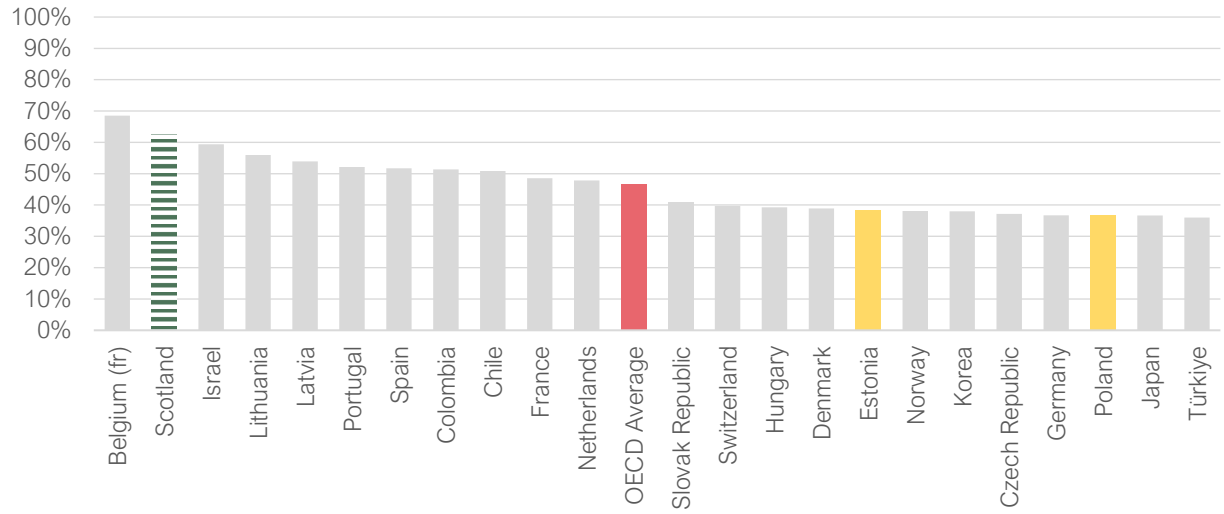
Source: OECD Education at a Glance (2021).

Teaching over working time

For those countries that reported both statutory working and teaching time, we computed the share of time spent teaching as a proportion of statutory working time. This variable provides an estimate of the time teachers have left for preparation, planning, and assessment of teaching materials and other duties. According to the OECD, a larger proportion of statutory working time spent teaching could also indicate that teachers end up performing these duties in their own time. Only teachers in Scotland and the French community in Belgium are required to teach more than 60% of their working time, and there is no country in which this time is below 30%. The OECD average is at 46%. Wales is not presented in this section, as there is no statutory net teaching time.

[14] Statutory Pay and Conditions (Wales) Document 2022.

Figure 20. Statutory teaching time as a share of the statutory working time



Source: Alma Economics calculations based on the OECD Education at a Glance (2021).

3.5.4. Teachers' actual teaching and working time

Often, teachers perform their duties for longer hours than the statutory requirements. In an average week, teachers in Wales reported working for more than 50 hours, and 21 of them were devoted to teaching. For the last complete calendar week, the average across OECD countries is 39 hours of working, and 20 hours of teaching. Only Japanese teachers reported working longer hours (56) than teachers in Wales, while Italy is at the lower end of the distribution in both cases. Teachers in Norway report working longer hours than the average across the OECD, but the lowest teaching time in this sample. The dataset providing data for all OECD countries (TALIS, 2018) did not include data for Wales, and thus we used the National Education Workforce Survey (2021) for Wales. The definitions used in both datasets were checked for consistency and no concerns were identified.

Besides teaching, teachers perform other duties such as individual planning and preparation, correcting students' assessments, participating in school management, and engaging with parents. The ratio of teaching time over working time gives an idea on how much time teachers devote to these other duties. In this case, non-European countries have higher teaching-to-working time ratios. Based on the National Education Workforce Survey, teachers in Wales devote less than half of their time to teaching (42%). The OECD average is at 53%.

Figure 21. Teachers' self-reported working hours per week

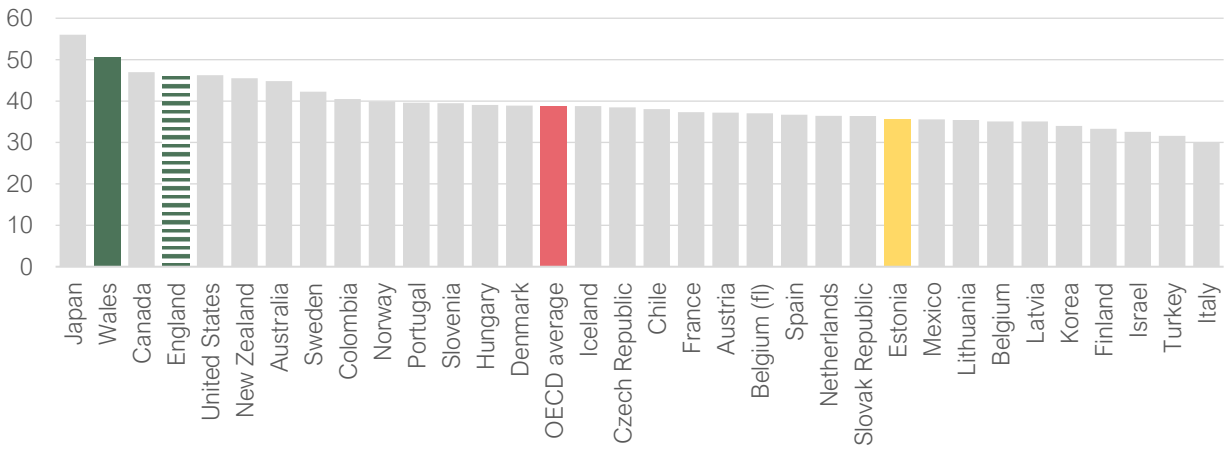


Figure 22. Teachers self-reported teaching hours per week

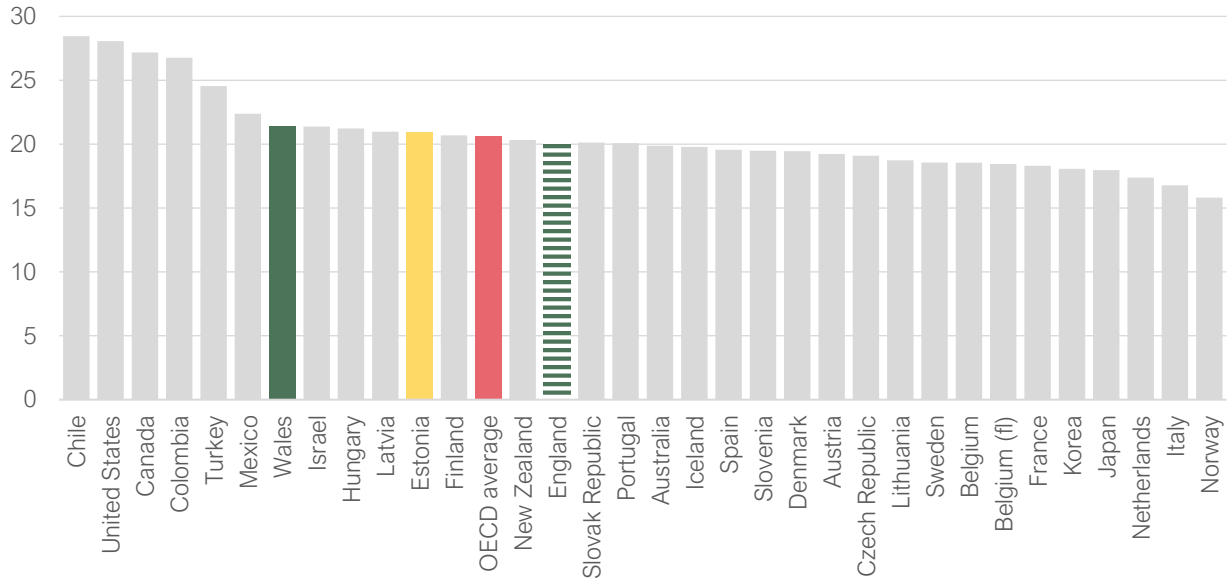
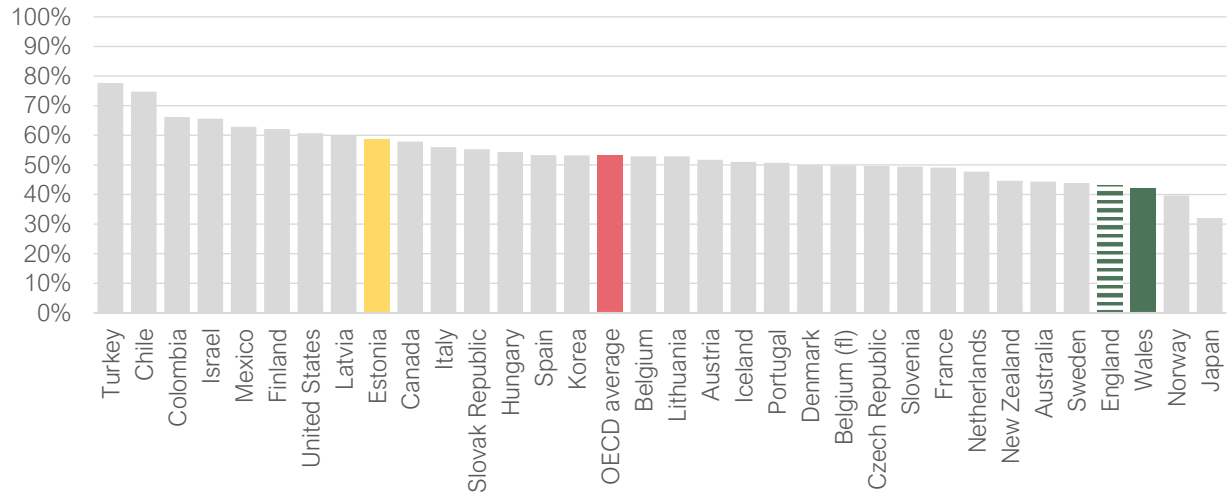


Figure 23. Share of teaching over working time

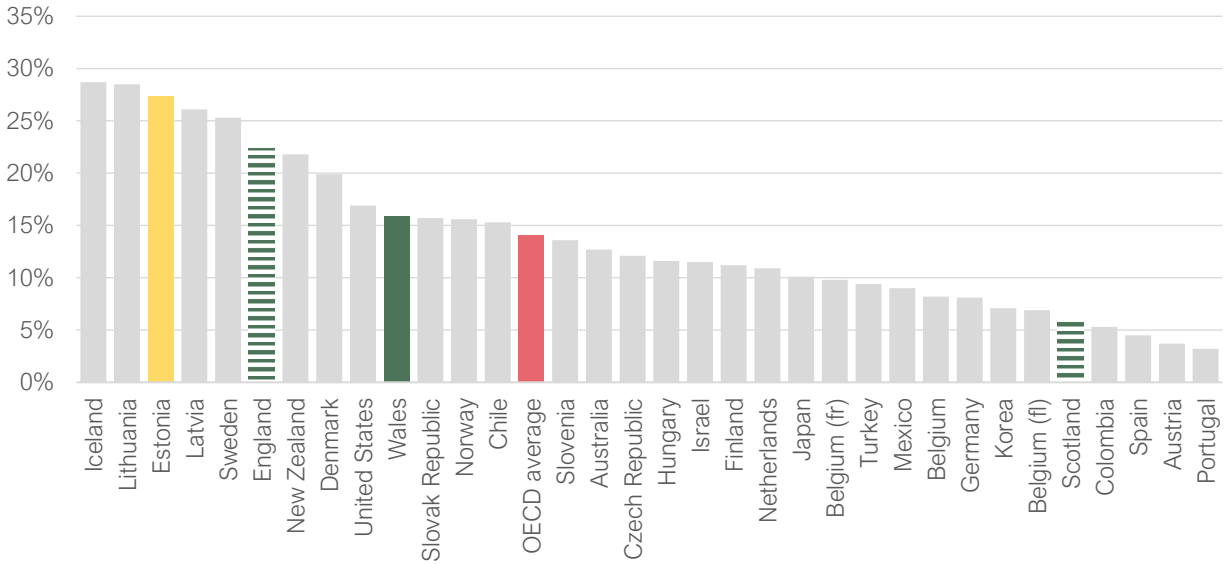


Source: Alma Economics calculations based on Teaching and Learning International Survey (2018). For Wales, National Education Workforce Survey (2021).

3.5.5. Teacher attrition, intention to leave, and shortage

More than 15% of teachers in Wales have the intention to leave their profession within the next 3 years. Across OECD countries, teachers in Iceland and Lithuania (28%) and Estonia (27%) report the highest rates of intention to leave. Numbers in the OECD are not directly comparable, because they consider only teachers below the age of 50, and a 5-year time horizon. However, they still provide a good indicator of the risk of attrition. On average, 14% of teachers in the OECD intend to leave the profession within the next 5 years. Ten countries are below 10%, and three of them (Spain, Austria and Portugal) are below 5%.

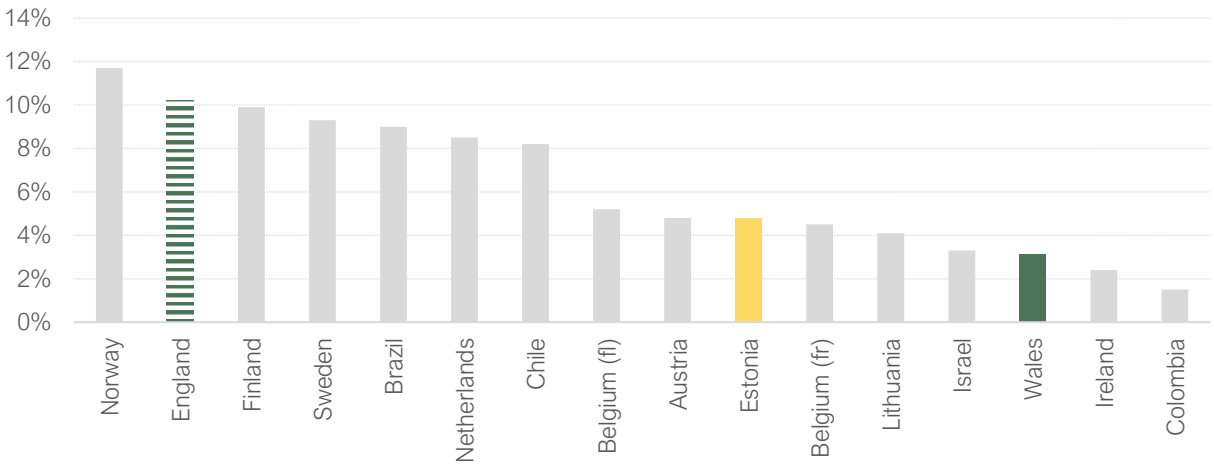
Figure 24. Teachers' intention to leave the profession within the next 5 years



Source: Teaching and Learning International Survey (2018) and, for Wales, the National Education Workforce Council (2021).

Actual teaching attrition rates are significantly lower. However, it should be taken into account that the last measurement was in 2016. These were highest in Norway (12%) and England (10%). Wales performed relatively well (3%) compared to other countries.

Figure 25. Teacher attrition rates in state-funded institutions



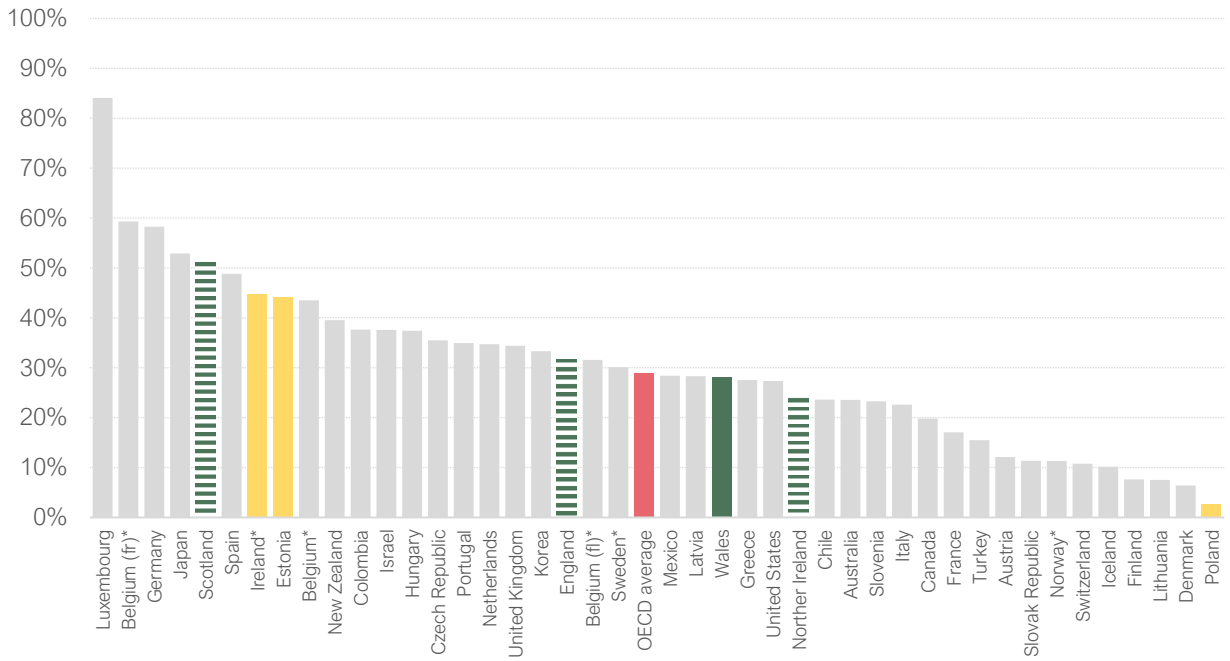
Source: OECD Education at a Glance (2021). The reference year is 2016.

The comparison of teacher attrition rates between England and Wales was studied by Faulkner-Ellis and Worth (2022). According to their research, for teachers with less than one year of experience, the attrition rate was significantly higher among teachers in England in secondary education – which might be explained by higher starting salaries in Wales in recent years. However, in primary education, teachers in Wales had significantly higher attrition rates across low, medium, and high levels of experience (1 to 2, 3 to 4, and 11 to 15 years of experience).

3.5.6. Teaching and assisting staff shortage

The Programme for International Student Assessment asked school heads to what extent teaching quality was hindered by a lack of teaching and assisting staff. Around 30% of pupils across the OECD attend schools where staff shortage affects teaching quality to some extent (34% of pupils attend schools with reported assisting staff shortage, and 28% with teaching staff shortage). Wales is just below the average in both cases (33% for assisting staff, and 28% for teaching staff).

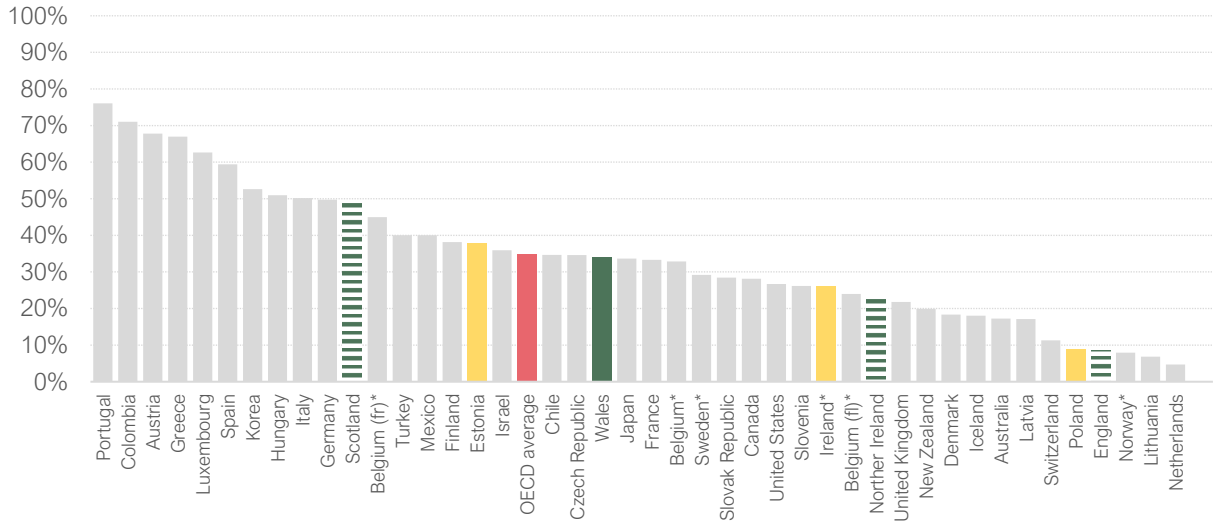
Figure 26. Percentage of pupils in schools whose heads reported lack of teaching staff.



The number of reported shortages by school leads serves as a headline figure, but it should be noted that different countries face different challenges that lead to staff shortages. For example, Finland school heads did not often report lack of teaching staff, but they reported a higher concern over lack of assisting staff. On the other hand, in the Netherlands, 34% of pupils attend schools where, according to school head teachers, lack of teaching staff affects quality of teaching and learning. However, for assisting staff, this is the case for only 4% of pupils.[15]

[15] Asterisks (*) at the end of countries' names in each graph indicate that these countries did not provide data for public and private schools, separately. When this is the case, the country-average is reported. In this section, this is the case for Ireland, Israel, Norway, Sweden, and Belgium.

Figure 27. Percentage of pupils in schools whose school heads reported lack of assisting staff.

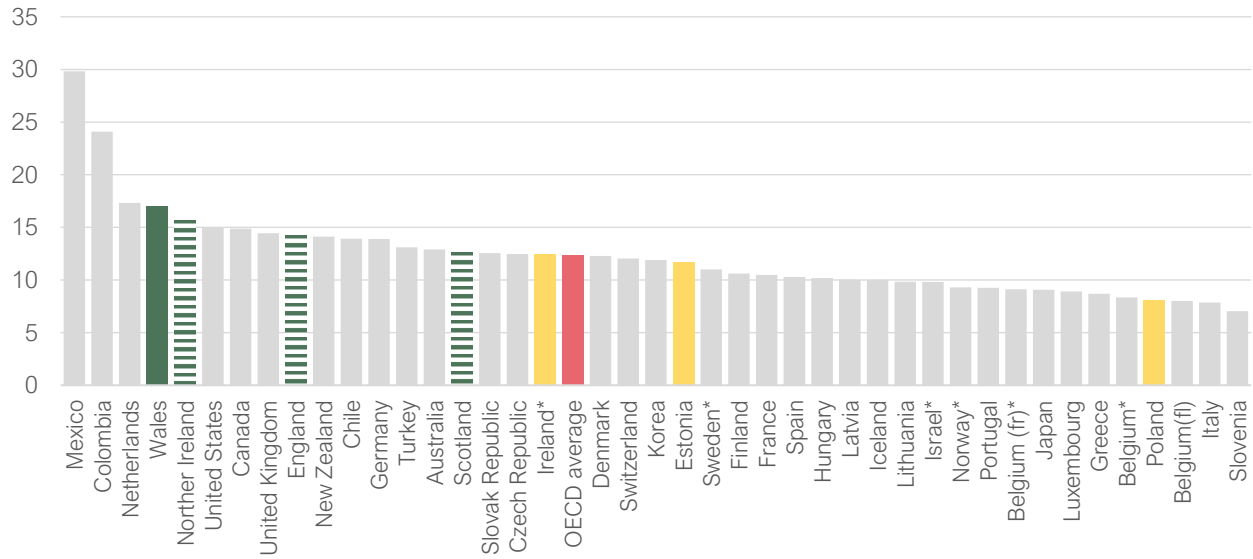


Source: Source: Programme for International Student Assessment (PISA) 2018. School questionnaire.

3.5.7. Student-teacher ratio

The ratio of students to teaching staff is an indicator of the level of resources available in a country relative to its student population. However, smaller ratios should be considered against salaries, and professional development to comprehensively understand resource allocation in high-quality teaching.[16]

Figure 28. Student-teacher ratio in public schools, across levels, reported by school heads.



Source: OECD Education at a Glance (2021). Results based on school head reports in PISA 2018. The overall number is computed as the sum of all students in the school divided by the sum of all teachers.

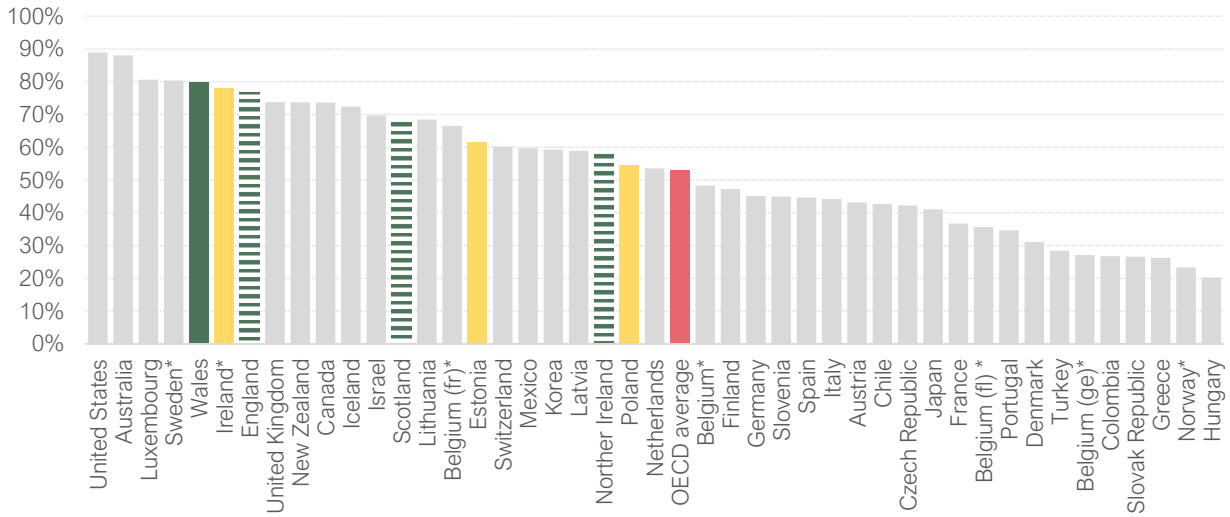
[16] Education at a Glance. OECD Indicators. 2021. (p.347).

In this case, Wales (17) is the country with the fourth-highest ratio in state-funded schools, just behind Mexico (30), Colombia (24) and the Netherlands (17). The OECD average is 12.4, and 14 countries reported ratios below 10, including Norway and Portugal (9.3), Greece, Belgium, and Poland (8.7, 8.3, and 8.1), and Italy and Slovenia (7.9 and 7). The ratio within the UK is 14.4, with Northern Ireland (15.8) being the closest to Wales.[17]

3.5.8. Professional development

There are 23 countries in the OECD in which professional development activities are mandatory for teachers. PISA defines professional development as formal programmes designed to enhance skills or practices. They may not lead to recognised qualifications, but they must last at least one day in total.[18] Following this definition, in-service training (INSET) days in Wales would be considered in scope of professional development activities. INSET days in the United Kingdom are teacher training days in which teachers are required to go to school without any student present to pursue professional development programmes and training. The entitlement to non-teaching/inset days, for a teacher employed full-time, is part of the statutory pay and conditions of teachers.

Figure 29. Percentage of teaching staff who had attended a programme of professional development in the last three months, reported by school heads.



Source: Programme for International Student Assessment (PISA) 2018.

More than half of school teachers across the OECD attended a programme of professional development within the three months prior to the survey, according to their school heads. Wales (80%) was the country with the fifth highest rate of attendance, just behind the USA, Australia, Luxembourg, and Sweden, all of them between 80 and 90%. England, Scotland, and Northern Ireland (76, 68, and 58, respectively) are also above the OECD average (52%). Countries with the lowest rates of attendance are Hungary, Norway, Greece, Slovakia, Colombia, and Turkey, all of them below 30%.[19]

[17] Asterisks (*) at the end of countries' names in each graph indicate that these countries did not provide data for public and private schools, separately. When this is the case, the country-average is reported. For PISA scores, this is the case for Ireland, Israel, Norway, Sweden, and Belgium.

[18] School Questionnaire for PISA 2018. Main survey version.

[19] Asterisks (*) at the end of countries' names in each graph indicate that these countries did not provide data for public and private schools, separately. When this is the case, the country-average is reported. For PISA scores, this is the case for Ireland, Israel, Norway, Sweden, and Belgium.

3.5.9. Teacher qualifications, recruitment, and professional development

There are three elements that shape recruitment and quality of teachers in every country: the qualifications required to enter the profession, the methods of recruitment for teachers, and the status of professional development in the sector. The main source for the following section is the Eurydice Report on Teaching Careers in Europe: Access, Progression, and Support.[20]

Official requirements for becoming a fully qualified teacher

Initial Teacher Education (ITE) is the starting process of professional development within the teaching profession. In most European countries, higher education institutions are responsible for providing ITE programmes,[21] and in nearly half of them, graduating from ITE is the only condition to become a fully qualified teacher. In these countries, ITE institutions deliver full teaching qualifications, which include graduates' level of attainment, but also certification of teachers' ability to teach.

In 23 other education systems, ITE graduates must meet additional requirements to be considered fully qualified. The additional requirements might vary in nature: either a competitive examination or a confirmation of professional competency. In six out of these 23 countries, teachers must pass a competitive examination to obtain their full qualification. This competitive examination can include different stages, such as written tests, but also interviews and observation of practice. Succeeding in this examination usually gives access to permanent employment positions as teachers. This system exists in Spain, France, and Italy. In the remaining 17 education systems graduates from ITE must confirm their ability to teach by going through a structured mandatory process. For instance, in Germany, Croatia, and Slovenia, teachers must pass a professional examination (usually called state or national examination). In other systems, this confirmation takes the form of a formal registration or accreditation process. While in Ireland starting teachers are evaluated against professional standards, in Sweden teachers only have to provide evidence of obtained qualifications to certify which subjects they are fully qualified to teach. Only registered teachers are allowed to grade pupils and obtain permanent contracts.

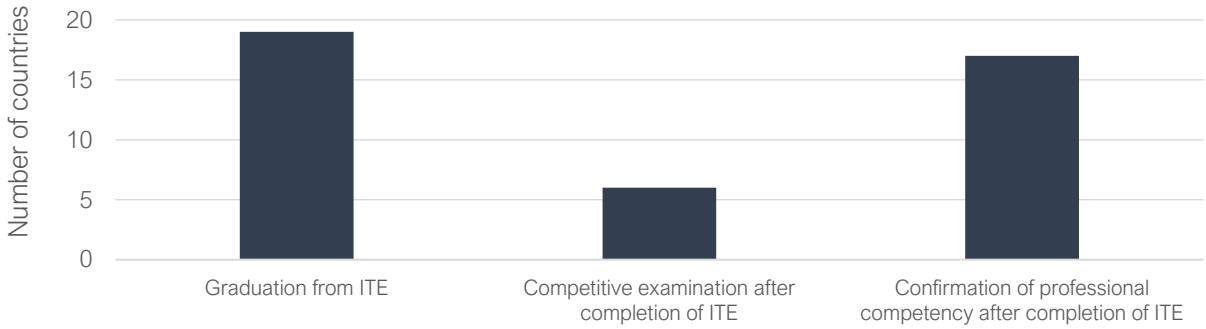
In England and Wales, teachers must achieve Qualified Teacher Status (QTS). To take on a teaching role in a maintained school, teachers must complete their Initial Teacher Education and gain the QTS by meeting the Professional Standards for teaching and leadership. To start teaching in maintained schools in Wales they must also register as school teachers with the Education Workforce Council.[22]

[20]European Commission/EACEA/Eurydice, 2018. Teaching Careers in Europe: Access, Progression and Support. Eurydice Report. https://eurydice.indire.it/wp-content/uploads/2018/02/Teaching-Careers-in-Europe.pdf

[21] European Commission/EACEA/Eurydice, 2021. Teachers in Europe: Careers, Development and Well-being. Eurydice report. Luxembourg: Publications Office of the European Union

[22] Qualified Teacher Status. Welsh Government. https://gov.wales/qualified-teacher-status-qts

Figure 30. Official requirements for becoming a fully qualified teacher

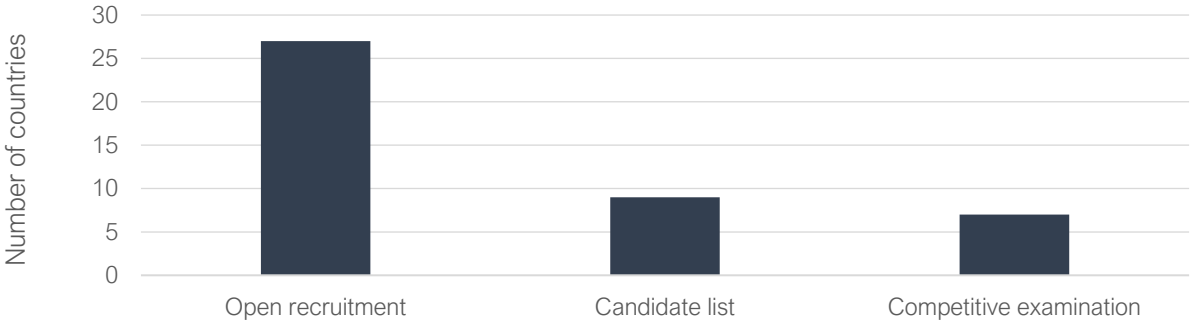


Main methods of recruiting fully qualified teachers

Open recruitment is the dominant method, with responsibility for advertising vacant posts, requesting applications, and selecting the best candidates all decentralised. This is the case in Wales, as well as in Ireland, Nordic countries, Belgium, the Netherlands, Switzerland, Baltic republics, and most of the Balkans.

In the other nine countries, candidate teachers submit applications to a top- or intermediate-level authority which ranks candidates according to defined criteria (Germany and some smaller states). This method is known as 'candidate list'. Teachers are sometimes able to submit an application directly to the school (Germany, Albania), but the appointment is made by the Ministry or the correspondent school authority. In Portugal, the candidate list is the main method to recruit fully qualified teachers, but schools are allowed to reach teachers through open recruitment to fill in temporary vacancies or recruit subject specialists if there are no candidates left in the list.

Figure 31. Main methods to recruit teachers



Finally, in seven education systems recruitment is based on competitive examinations organised by public authorities centrally or at regional or local levels. Only a certain number of candidates, usually for a limited number of positions, are selected. This is the case in Spain, France, Romania, Liechtenstein, and Turkey.

Status of Continuing Professional Development

In the last Teaching and Learning International Survey (2018), 94% of teachers across the OECD reported having participated in continuous professional development activities over the past 12 months.[23] According to Eurydice, the time teachers spent in CPD is higher in countries where it is mandatory, and the most common barriers are conflicts with working time and lack of incentives.[24]

[23] OECD Education at a Glance 2021.
[24] Teaching Careers in Europe: Access, Progression, and Support.

In 25 education systems in Europe, schools must have a CPD plan for their workforce, including Spain, Italy, England, Scotland, Belgium, and Poland. However, not all teachers in these countries must attend professional development programs.

Mandatory Continuing Professional Development (CPD) includes a minimum number of hours that all teachers must complete. This is the case in 21 education systems, including France (only in primary education), Scotland, Belgium, Portugal, Switzerland, and several Balkan countries. The minimum time required ranges from 9 hours (France), 35 hours in Scotland, 50 in Portugal, and up to 120 and 150 hours in Hungary and Iceland. In Romania there is a minimum number of 90 credits of professional development.

In certain countries, CPD is one of teachers' statutory duties according to regulations, but there is not a required minimum time. In some of these countries, however, it is a requirement for promotion (Croatia, Poland, and Slovakia), and in Spain it is required for salary progression. According to the report by Eurydice, CPD for teachers in Wales is also a professional duty but without a minimum number of mandatory hours. However, it is worth noting that there is a requirement for In Service Training (INSET) days, days on which pupils do not attend school, but staff is required to attend for training. The number of working but non-teaching days is set out in the School Teachers' Pay and Conditions (Wales) Document.[25]

Lastly, in a few countries, professional development is optional for teachers. This is the case in Ireland, Netherlands, Greece, Denmark, Norway, and Sweden. In the case of France, CPD is optional for secondary education teachers, but it is still a requirement for career progression. In Sweden, authorities have the legal obligation to provide opportunities for CPD, but teachers can decide not to attend.

Figure 32. Status of Continuing Professional Development

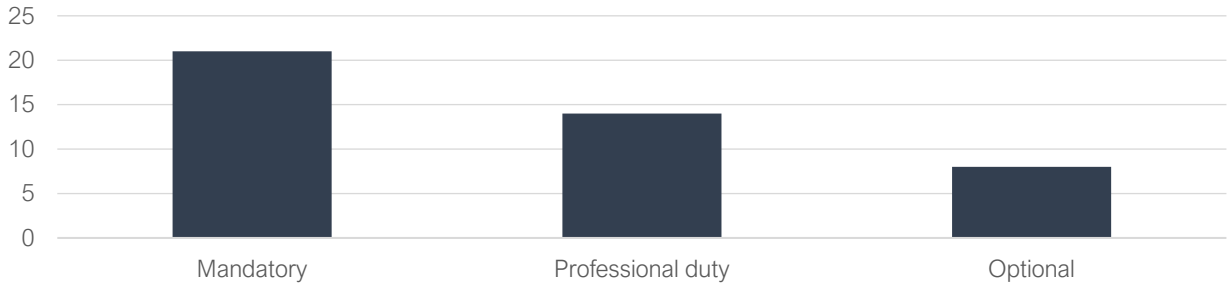


Figure 33. Is it necessary for salary or career progression?

[25] Additional national professional learning in service training (INSET) days 2022 to 2025. Welsh Government. https://gov.wales/additional-national-professional-learning-service-training-inset-days-2022-2025-html

4. Correlation exercise

In this section, we used the data collected for the benchmarking analysis to investigate the correlation between key indicators of working conditions and the teaching environment with educational attainment and teachers' pay. In the following pages we present a two-step process. Firstly, we present the results of pairwise correlations across the dataset, to identify patterns across variables. Secondly, we present the results of a regression analysis to estimate the correlation of student educational outcomes with key indicators of the educational and working environment, to understand which correlations remain strong and statistically significant when controlling for all the variables in our dataset.

Key findings from the correlation exercise

- Correlations do not imply a causal relationship between variables or indicate the direction of causality.
- A positive correlation indicates that an increase in the independent variable of interest (e.g., teachers' salaries) is associated with an increase in the dependent variable (e.g., student educational outcomes). On the other hand, a negative correlation shows that an increase in the independent variable (e.g., student-teacher ratio) is correlated with a decrease in the dependent variable (e.g., student educational outcomes).
- The correlation analysis and the two alternative regression specifications have shown that student educational attainment is:
    - positively associated with the percentage of teachers with indefinite contracts,
    - positively associated with teachers' salaries, and
    - negatively correlated with the student-teacher ratio.
- Teachers' professional development was also positively associated with student educational outcomes in one of our models.
- Teaching time as a share of working time was negatively associated with student educational outcomes in one of our models, i.e., an increase in the share of working time spent in class is shown to be correlated with worse student educational outcomes.
- Additionally, the correlation analysis showed that teachers' salaries are negatively correlated with teachers' intention to leave.

4.1. Groups of variables

Our dataset includes variables that are correlated with each other and represent similar indicators of the teaching and learning environment. To minimise the number of variables and focus on strong and relevant statistical relationships, we grouped some of these indicators together. We grouped teachers' salaries (average in primary and secondary education), school heads' salaries (average in primary and secondary), and PISA scores (average of maths, science, and reading) for the analysis that follows. In the tables below we present the pairwise correlations across the groups of variables. Correlation coefficients are above 0.85 in all cases.

Table 1. Correlations – educational attainment (PISA scores)

	Maths	Science	Reading
Maths	1.00		
Science	0.93	1.00	
Reading	0.88	0.95	1.00

Table 2. Correlations – teachers' salaries

	Teachers' salaries primary	Teachers' salaries lower sec.	Teachers' salaries up. sec.
Teachers' salaries primary	1.00		
Teachers' salaries lower sec.	0.99	1.00	
Teachers' salaries upper sec.	0.97	0.97	1.00

Table 3. Correlations – head teachers' salaries

	School heads' salaries primary	School heads' salaries lower sec.	School heads salaries upper sec.
School heads' salaries primary	1		
School heads' salaries lower sec.	0.92	1	
School heads' salaries upper sec.	0.94	0.97	1

4.2. Pairwise correlations

The following tables show the pairwise correlation of educational attainment and teacher average salaries with key indicators of the teaching and learning environment. The variables used in the following tables include the grouped variables discussed above – PISA score, teachers' salaries, school heads' salaries, and the average value of teaching and assisting staff shortages (correlation coefficient 0.39, significant at 99% confidence level). In the analysis, we used the statutory requirements for teaching and working time, instead of the self-reported actual teaching and working time for two main reasons. First, self-reported data is always subject to mistakes and biases; and second, statutory requirements give a sense of baseline working conditions – how much time teachers are supposed to devote to different tasks, and whether they are likely to be pushed to perform other duties in their own time (OECD, 2021). The share of teaching time is the ratio of statutory teaching hours over statutory working hours in primary and secondary education.

Cross-country pairwise correlation analysis shows significant positive correlations of PISA scores with the percentage of teachers with indefinite contracts and teachers' salaries. While both teachers' and school heads' salaries are positively correlated with PISA scores, the correlation of PISA scores with teachers' salaries is stronger than that with school heads' salaries, both in magnitude (0.46 versus 0.23) and statistical significance (see Annex 2). The pairwise correlation exercise also shows significant negative correlations of PISA scores with students' absences in class (truancy), and the student-teacher ratio. The correlation with student-teacher ratios and salaries is particularly strong. Teaching time, and the share of teaching time over working time, are also negatively correlated with scores in PISA assessments, although the latter is not significant at the 10% level.

In the second table we observe a negative and significant correlation between teachers' salaries and teachers' intention to leave. The positive correlation between teachers' salaries and the student-teacher ratio is also strong and statistically significant at the 10% level. Finally, the correlation coefficient between salaries and students leaving school without qualifications is negative, but not statistically significant.

Interpretation of pairwise correlations

Correlations do not imply a causal relationship between variables or indicate the direction of causality. If X and Y are correlated, X could be driving Y, Y could be driving X, other variables (Z) could be driving both X and Y, or any combination of the above is possible.

Table 4. Pairwise correlations – educational attainment (PISA score)

	Coefficient	Observations
Truancy	-0.43	44
Leavers without qual.	-0.02	44
Indef. contracts	0.33	34
Student-teacher ratio	-0.51	43
Staff shortage	-0.21	44
Villages and small towns	0.05	42
Cities	-0.16	42
Prof. development	0.21	44
Attrition[26]	0.29	15
Intention to leave	0.15	33
Working time	-0.16	26
Teaching time	-0.54	34
Share of teaching time	-0.34	23
Teachers' salaries	0.42	30
Heads' salaries	0.23	26
Expenditure/GDP	0.12	41

[26] The sample of attrition is much smaller than other variables and thus correlation coefficient between attrition and other variable might be misleading.

Table 5. Pairwise correlations – teacher average salaries

	Coefficient	Observations
Truancy	-0.26	30
Leavers without qual.	0.06	30
Indef. contracts	-0.04	26
Student-teacher ratio	0.33	29
Staff shortage	-0.01	30
Villages and small towns	0.03	28
Cities	-0.03	28
Prof. development	0.22	30
Attrition	0.06	14
Intention to leave	-0.39	25
Working time	0.00	18
Teaching time	0.03	25
Share teaching time	-0.05	15
Score	0.46	30
Head salaries	0.83	26
Expenditure/GDP	0.22	28

4.3. Regression analysis

We used two different specifications of an ordinary least squares model to identify the strongest measures of association, controlling by confounding factors such as the expenditure in education or the rural-urban mix of countries. The dependent variable in both models is the average score of pupils in each country across the fields of science, maths, and reading skills in the last available PISA cycle (2018). The specification of independent variables depends on the approach of the model, explained below, and in both cases it includes a mix of indicators of teachers' working conditions and control variables.

Our model specifications include a logarithmic transformation to facilitate the interpretation of these measures of association. A log-log linear regression means that coefficients should be interpreted as an elasticity. A 1% change in the independent variable reported is correlated with an x% change in the dependent variable (students' performance), e.g., in Model 1's main specification, the 0.06 coefficient on salaries indicates that a 1% increase in salaries is associated with a 0.06% increase in attainment.

Interpretation of regression analysis results

A key challenge with identifying the effect of various factors on educational attainment is the existence of many variables affecting both educational outcomes and characteristics of the learning environment at the same time. Some of those factors are observed and some of them are not. Additionally, our sample is country-level, concealing a lot of country-specific information and limiting the sample. Consequently, we do not intend to interpret the findings below as causal effect.

As discussed in the pairwise correlation, correlations do not imply a causal relationship between variables or indicate the direction of causality. If X and Y are correlated, X could be driving Y, Y could be driving X, other variables (Z) could be driving both X and Y, or any combination of the above is possible.

We present measures of association that are strong following a systematic removal of non-significant variables, and we use the academic and grey literature to inform potential mechanisms behind the coefficients of each regression.

The table below shows the summary statistics for the variables in our regression – number of observations, mean, standard deviation, and minimum and maximum values.

4.3.1. Summary statistics

Table 6. Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
PISA score	44	486.07	27.59	392.01	527.02
Unqualified	44	4.67	4.85	0.40	25.49
Truancy	44	0.34	0.15	0.04	0.72
Indef. contracts	34	81.58	9.02	61.80	96.80
Student/Teacher	43	12.16	4.25	7.04	29.83
Teacher shortage	44	0.31	0.17	0.03	0.84
Assistant shortage	44	0.34	0.18	0.05	0.76
Villages and towns	42	0.31	0.13	0.05	0.55
Cities	42	0.34	0.16	0.00	0.82
Prof. development	44	53.77	19.45	20.29	88.91
Attrition	15	6.10	3.22	1.50	11.70
Intent. leave	33	13.77	7.49	3.20	28.70
Working time	26	1,541	227	962	1,998
Teaching time	34	724	124	522	1016
Teaching/Working	23	0.46	0.09	0.36	0.69
Teacher salaries	30	48,769	14,730	24,688	83,894
Expenditure	41	3.16	0.69	2.10	4.90

4.3.2. Model 1

Our analysis starts with a regression of PISA scores on all our variables and then a one-by-one removal of the variable that is least statistically significant (i.e. has the highest p-value). The first specification produces a regression with only 17 observations.

Table 7. Model 1 results – initial specification [Dependent variable: Educational attainment (PISA score)]

	Coef.	Std. Err.	t	P>t	[95% Conf. Interval
Teacher salaries	0.09	0.08	1.07	0.34	-0.14, 0.32
Student/Teacher	-0.13	0.07	-1.89	0.13	-0.32, 0.06
Teaching/Working	-0.21	0.17	-1.22	0.29	-0.68, 0.27
Expenditure	-0.07	0.12	-0.60	0.58	-0.41, 0.27
Indef. contracts	0.25	0.19	1.31	0.26	-0.27, 0.76
Truancy	-0.01	0.03	-0.36	0.74	-0.09, 0.07
Prof. development	0.08	0.07	1.05	0.35	-0.13, 0.28
Villages and towns	0.02	0.03	0.51	0.64	-0.07, 0.10
Staff shortage	0.03	0.06	0.60	0.58	-0.13, 0.19
Intent. leave	0.01	0.06	0.13	0.90	-0.16, 0.18
Unqualified	0.01	0.03	0.31	0.77	-0.08, 0.10
constant	4.12	1.02	4.03	0.02	1.28, 6.96

We sequentially removed those variables that were least statistically significant. For instance, In the first step, we removed teachers' intention to leave (p-value = 0.95).[27] Our final specification (see Table below) showed the following correlations:

- A 1% increase in salaries is associated with 0.06% increase in test scores.
- A 1% increase in the student-teacher ratio is associated with 0.14% decrease in test scores.
- A 1% increase in teaching time as a share of working time is associated with 0.23% decrease in test scores.
- A 1% increase in the percentage of teachers with indefinite contracts is associated with 0.15% increase in test scores.
- A 1% increase in the percentage of teachers who undertake professional development activities is associated with 0.08% higher test scores.

The regression coefficients can also be interpreted with respect to the standard deviations of each of the independent variables. The standard deviation of a variable is a measure of dispersion of the values (i.e., countries) around the mean – a very low value indicates that countries are closer to the mean, whereas a larger value indicates higher dispersion or variation. The standard deviation of each

[27] The full results of specification are presented in Annex 3.

variable can be seen in the first summary table of this section. Using this interpretation, our specification shows the following correlations:

- A one standard deviation increase in salaries is associated with 1.8% increase in test scores.
- A one standard deviation increase in student-teacher ratio is associated with 4.9% decrease in test scores.
- A one standard deviation increase in teaching time as a share of working time is associated with 4.5% decrease in test scores.
- A one standard deviation increase in the percentage of teachers with indefinite contracts is associated with 1.7% increase in test scores.
- A one standard deviation increase in the percentage of teachers who undertake professional development activities is associated with 2.9% increase in test scores.

Based on this specification, the expenditure spent on education as a percentage of GDP is not significantly correlated with student attainment. However, the student-teacher ratio is an indicator of resources available in education (OECD, 2021), and it is positively correlated with our dependent variable. Smaller ratios are often seen as beneficial, because they allocate higher staff resources per student and allow higher focus and closer relationships between teachers and pupils.[28]

The teaching-to-working time ratio provides information about how much time teachers have to perform other important duties, such as planning, preparation, and assessment, engagement with families, and professional development. We used the statutory requirements, instead of the actual teaching and working time, for two main reasons: first, self-reported data is always subject to mistakes and biases; and second, statutory requirements give a sense of baseline working conditions – how much time teachers are supposed to devote to different tasks, and whether they are likely to be pushed to perform other duties in their own time (OECD, 2021). These findings suggest that a high teaching workload, compared to statutory working hours, is negatively related to student attainment.

Teachers' average salaries are also positively correlated with educational outcomes. Salaries vary widely across the OECD, from US$23,000 to US$83,000 (using PPP), and teachers might be subject to different performance-pay or incentives structures. Dolton and Marcenaro Gutierrez (2011) use teacher salaries as a proxy for quality teaching. Their cross-country analysis also suggested that teacher salaries were positively correlated with student attainment, both in real terms and relative to the country income distribution.[29]

The share of teachers attending professional development programmes within the last three months ranges from 20% up to more than 80% in some countries, with an average value of 53%. This variable is positively correlated with student attainment in PISA. Continuing professional development is not mandatory in all countries, but our analysis did not find systematic differences in attendance between countries where it is mandatory and countries where it is not.[30]

Lastly, the share of teachers with an indefinite contract is positively correlated with student attainment in both our first and second specifications. Job security, expressed through an indefinite employment contract, is quite high in the teaching profession, ranging from 61% to 96%, with a mean value of 81% of teachers holding a permanent contract across OECD countries in our sample. According to the National Education Workforce Survey (2021), 76% of school teachers in Wales work under a

[28] Education at a Glance 2021. OECD Indicators.
[29] Dolton and Marcenaro (2011). If you pay peanuts do you get monkeys? A cross-country analysis of teacher pay and pupil performance.
[30] See Annex 3.

permanent work contract.[31] Based on the analysis of the Teaching and Learning International Survey (2018), teachers working on fixed-term contracts are less likely to participate in professional development and engage in professional collaboration, and those with contracts of less than one year report significantly lower levels of self-efficacy.[32]

Table 8. Model 1 – Main specification's results

Source	SS	df	MS	Number of obs = 19
				F(5, 13) = 11.77
Model	0.08	5	0.02	Prob > F = 0.00
Residual	0.02	13	0.00	R-squared = 0.82
				Adj R-squared = 0.75
Total	0.10	18	0.01	Root MSE = 0.04

Dependent variable - educational attainment (PISA score)

	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
Teacher salaries	0.06	0.03	2.38	0.03	0.01, 0.12
Student/Teacher	-0.14	0.04	-4.09	0.00	-0.22, -0.07
Teach/Work	-0.23	0.06	-4.01	0.00	-0.35, -0.10
Indef. contracts	0.15	0.08	1.87	0.09	-0.02, 0.32
Development	0.08	0.03	3.00	0.01	0.02, 0.14
constant	4.71	0.44	10.52	0.00	3.74, 5.67

[31] 2021 National Education Workforce Survey Report.
[32] TALIS 2018. Results (Volume II): Teachers and School Leaders as Valued Professionals.

4.3.3. Model 2

To test different specifications, we followed an alternative process. In this case, we ran a regression including only the variables with a number of observations above 40. We sequentially removed those variables that were least statistically significant (higher p-values).

Table 9. Model 2 – initial specification [Dependent variable: Educational attainment (PISA score)]

	Coef.	Std. Err.	t	P>t	[95% Conf. Interval
Student/Teacher	-0.10	0.03	-3.33	0.00	-0.16, -0.04
Expenditure	0.01	0.04	0.34	0.74	-0.07, 0.10
Truancy	-0.04	0.02	-2.42	0.02	-0.07, -0.01
Development	0.05	0.02	2.23	0.03	0.00, 0.10
Villages	0.00	0.02	-0.06	0.95	-0.04, 0.03
Staff shortage	-0.02	0.02	-1.16	0.26	-0.05, 0.01
constant	6.12	0.11	54.88	0.00	5.90, 6.35

After sequential removal of non-significant variables, we added teachers' salaries and indefinite contracts. The final specification of this model shows that:

- 1% increase in student-teacher ratio is associated with 0.10% decrease in PISA scores.
- 1% increase in students' truancy is associated with 0.03% decrease in PISA scores.
- 1% increase in salaries is associated with 0.09% increase in PISA scores.
- 1% increase in the percentage of teachers with indefinite contract is associated with 0.16% increase PISA scores.

As before, we analyse the regression coefficients with respect to the standard deviation of the independent variables. These estimates provide a closer picture of the changes in test scores depending on each variable sample variation. The final results of this specification suggest that:

- One standard deviation increase in the student-teacher ratio is associated with 3.5% decrease in test scores.
- One standard deviation increase in student truancy is associated with 1.3% decrease in test scores.
- One standard deviation increase in salaries is associated with 2.7% increase in test scores.
- One standard deviation increase in the percentage of teachers with indefinite contracts is associated with 1.8% increase in test scores.
-

Table 10. Model 2 – Main specification's results

Source	SS	df	MS	Number of obs = 32
				F(4, 27) = 9.15
Model	0.08	4	0.02	Prob > F = 0.00
Residual	0.06	27	0.00	R-squared = 0.58
				Adj R-squared = 0.51
Total	0.14	31	0.00	Root MSE = 0.05

Dependent variable - educational attainment (PISA score)

	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
Student-teacher ratio	-0.10	0.03	-3.35	0.02	-0.15, 0.04
Student truancy	-0.03	0.01	-2.08	0.05	-0.06, 0.00
Teacher salaries	0.09	0.03	2.80	0.01	0.02, 0.15
Indef. contracts	0.16	0.07	2.11	0.04	0.00, 0.31
constant	4.77	0.49	9.80	0.00	3.77, 5.77

4.3.4. Comparison of Model 1 and Model 2 results

The second specification is well aligned with the first approach. The second approach finds similar effects, in size and sign, for common variables – namely, student-teacher ratio, teacher salaries, and share of teachers with indefinite contracts, which measure resources in education and teachers' working conditions.

The share of teachers in professional development appeared as not significant in the second specification. In this case, student truancy is negatively correlated with educational attainment across OECD countries. Our measure of student truancy is the share of students who report having skipped at least one class in the last three weeks. This measure varies widely across countries, from 4% to 72%, with a mean value of 34% of pupils. According to the OECD, not all students are equally likely to skip classes, and PISA has repeatedly found that truancy has an effect on educational performance. However, reasons to skip school can be multiple, including school safety, index of value of school, exposure to disruptive behaviour, family support, and social connectedness.[33]

[33] PISA 2018 Results (Volume III): What School Life Means for Students' Lives.

5. Case studies

5.1. Estonia

- Students' performance in PISA is among the highest compared to other OECD countries.
- Estonia has a very high degree of equality in funding per student, and good quality settings across the country. The per-pupil funding allocation scheme provides everyone equal access to education, and the government provides additional resources to fund staff in rural areas, such as displacement bonuses, and schools with special needs. Funding is decentralised – the central government provides funding to municipalities, which in turn allocate resources to primary and secondary schools.
- Teachers have a large degree of pedagogical autonomy, which is a fulfilling element of the profession. However, teacher autonomy creates barriers to increasing system-wide uptake of new pedagogical approaches or innovative tools.
- School heads have autonomy to allocate allowances and pay raises among teachers. Although this is considered a benefit, there is not a standard framework to assign pay raises, which results in pay differences. Those differences are not properly explained by years of experience, professional capacity, or performance. Current government plans include introducing an education strategy which will link career progression to salaries.
- Estonia struggles to recruit new teachers mainly due to low teachers' pay, although salaries have increased significantly in the last years. Teachers' salaries are currently above the country average, but they are below comparable jobs and those of similarly educated professionals in other sectors.

5.1.1. The education system

The education system in Estonia is high-performing and technology-oriented, as all schools in the country are equipped with computers and have internet access.[34] Students' performance in PISA scores is among the highest in the OECD. In 2018, Estonia was ranked 4th out of 77 countries in reading and science and 8th out of 77 countries in mathematics.[35] The country was ranked first among European countries in all three subjects in the same year.[36]

Additionally, the socio-economic background of students in Estonian secondary education has a smaller impact on students' performance compared to other OECD countries. However, there are still concerns about students' performance in Russian language schools, as there seems to be an achievement gap between Estonian and Russian language schools (Santiago et al., 2016). Around 14% of primary and secondary schools in Estonia teach in Russian, while more than 25% of households in the country use Russian as a primary language at home.[37]

[34] NCEE – Top-performing countries. "Estonia". Available at: https://ncee.org/country/estonia/
[35] OECD – Education GPS. "Estonia". Available at: https://gpseducation.oecd.org/CountryProfile?primaryCountry=EST&treshold=10&topic=PI
[36] NCEE – Top-performing countries. "Estonia". Available at: https://ncee.org/country/estonia/
[37] NCEE – Top-performing countries. "Estonia". Available at: https://ncee.org/country/estonia/

5.1.2. School autonomy

Estonia has developed a national curriculum which is adapted to the needs of a changing economy. In 1996, inspired by similar Finnish reforms, a reform was introduced in the country which allows schools to make decisions about their curriculum following the principles of the national curriculum. This reform focused on what students should know and be able to do rather than specifying what teachers should teach (Tire, 2021). In 2014, the Lifelong Learning Strategy 2020 was adopted, focusing on developing learning skills and digital lifelong learning opportunities for everyone, as well as increasing teachers' and school leaders' competency and motivation.[38]

Specialists engaged in our research suggested that there are three main elements that help explain teaching quality in Estonia. First, a strong work ethic. Teachers take pride in, and responsibility for their profession, which is still highly valued in society. Second, school heads can determine administrative and technical aspects of schools – including salaries, teaching hours and professional development. Finally, teachers have pedagogical autonomy and professional agency. Teachers are able to adapt their daily practice, and this makes teaching a fulfilling profession.

According to sector experts, there are three main downsides of the Estonian system. First, teacher autonomy makes it hard to introduce system-wide innovative pedagogical practices and tools to further enhance learning. Additionally, there is a low level of collaboration among professionals and specialists across subjects. Finally, teachers' working time is regulated by law, but the net teaching time is not regulated by law since the last policy changes in 2013. This often results in teachers taking on significant teaching workloads without having adequate paid time for preparation, planning, or family engagement.

5.1.3. Governance and finance

Estonia's Ministry of Education and Research oversees the overall education system, being responsible for funding and the national curriculum. A municipal education office in each Estonian county oversees the schools in the region and manages the schools' resources, including staff and facilities. Although the municipal office manages the county's schools, a law was introduced in 2013 requiring the central government to be responsible for all upper secondary schools in all Estonian municipalities. This law aims to promote consistency in the management of all the upper secondary schools, as well as to consolidate schools with small classes across the country. By 2023, the central government will be in charge of at least one upper secondary school per county.[39]

Funding is provided on a per-pupil basis to ensure that all students have access to education. The central government provides municipalities with 80% of schools' funding; municipalities then allocate funding to primary and secondary schools in the county. Additionally, Estonia makes efforts to provide access to early education to everyone in the country, without neglecting rural areas.

Although the number of students has been decreasing over time, the number of schools and teachers has not adjusted to this decrease. Thus, there are many schools with small classes across the country, which ensures access to education for everyone (Santiago et al., 2016). Additionally, according to sector experts, smaller student-teacher ratios provide an opportunity for personalised learning. However, the existence of schools with small classes and the per-pupil funding formula has put more pressure on the municipalities to increase school consolidation. The government intends to consolidate secondary education by creating new institutions in every county capital. Investment plans include covering costs of transportation and dormitories for students commuting from other areas (Santiago et al., 2016).

According to specialists engaged in our research, Estonia utilises European funding to establish high-

[38] NCEE – Top-performing countries. "Estonia". Available at: https://ncee.org/country/estonia/
[39] NCEE – Top-performing countries. "Estonia". Available at: https://ncee.org/country/estonia/

quality school settings, and the per-pupil funding has ensured equitable funding across the country. The government provides additional funding for teachers in schools with special circumstances. For instance, they provide displacement bonuses for teachers moving to schools in rural areas, and pay additional specialist teachers if necessary (e.g., foreign language experts).

5.1.4. Teachers' pay and conditions

The Ministry of Education and Research, in cooperation with local government and teacher associations as well as private school owners, define teachers' minimum wages.[40] However, teachers' actual salaries are set at the school level, based on each teacher's experience and qualifications, and schools have autonomy in deciding most of the allowances.[41] [42] However, specialists engaged in our research suggested that it is hard to observe standardised criteria to pay allowances. Wage-setting is based on private negotiation between teachers and school heads. This system led to large differences in teachers' pay and working conditions within and across schools, that are not explained by any performance or experience indicators.

Although teachers' salaries have increased over the years, they are still at least 10% lower than those of other comparable professions across the country. Estonian teachers' salaries are also among the lowest compared to other OECD countries. The low pay is the main reason Estonia struggles to attract and recruit new teachers.[43] In September 2022, the Minister of Education and Research and the head of the Estonian Education Personnel Union negotiated for increases in teachers' pay.[44] Following protests and threats of strikes over salaries, the Minister announced an approximate 24% increase in teachers' salaries in 2023.[45]

5.1.5. Teachers' career structure

The career structure for teachers in Estonia has three levels: teacher, senior teacher and master teacher. Progressing on the career ladder is voluntary, but there are no regulations that link career levels to teachers' pay (European Commission/EACEA/Eurydice, 2021; Santiago et al., 2016). The three levels are defined in a multi-stage competency framework developed in 2013 following national professional standards.[46] A teacher can move on the career ladder after they show specific competencies during an occupational certification process, for which the Estonian Association of Teachers is responsible (European Commission/EACEA/Eurydice, 2021; Santiago et al., 2016). There is also a plan to introduce a new education strategy that will link career levels to salaries and Continuing Professional Development (European Commission/EACEA /Eurydice, 2021). According to sector experts, currently school heads are able to create middle-management roles that lead to salary raises, such as subject heads or coordinators, but the country needs additional clear ways to measure competency acquisition, and standard approaches to making decisions on career progression.[47] [48]

[40] European Commission. "Estonia. Teachers and education staff. Conditions of service for teachers working in early childhood and school education". Available at: https://eurydice.eacea.ec.europa.eu/national-education-systems/estonia/conditions-service-teachers-working-early-childhood-and-school

[41] National Center on Education and the Economy. Estonia. https://ncee.org/country/estonia/

[42] Teachers' and School Heads' Salaries and Allowances in Europe - 2020/2021. Eurydice (2022).

[43] NCEE – Top-performing countries. "Estonia". Available at: https://ncee.org/country/estonia/

[44] ERR News, 2022. "Minister promises to avoid strike when fighting for teachers' pay rise". Available at: https://news.err.ee/1608707755/minister-promises-to-avoid-strike-when-fighting-for-teachers-pay-rise

[45] ERR News, 2022. "Teachers' average monthly wage rises to over €2,000 for 2023". Available at: https://news.err.ee/1608724543/teachers-average-monthly-wage-rises-to-over-2-000-for-2023

[46] NCEE – Top-performing countries. "Estonia". Available at: https://ncee.org/country/estonia/

[47] European Commission/EACEA/Eurydice, 2021. Teachers in Europe: Careers, Development and Well-being. Eurydice report. Luxembourg: Publications Office of the European Union

[48] Santiago, P. et al. (2016), OECD Reviews of School Resources: Estonia 2016, OECD Reviews of School Resources, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264251731-en.

5.2. Poland

- Poland was among the top performing countries in the last PISA cycle. The literature highlights the importance of the lower secondary education system established in 1999, and sector experts point towards teacher professional development and motivation. However, most of the 1999 reforms have been recently reversed, and it is still unclear how pupils' performance will be affected in the next PISA cycle.
- Teachers and schools were given significant autonomy to determine teaching content and methods, which resulted in increased teacher engagement and motivation. Additionally, higher qualifications were required to become a secondary school teacher. Today, school principals still retain autonomy to recruit teachers through an open process, as well as to assign performance bonuses. Upon agreement with Local Authorities, they also determine resource allocation.
- Poland has a relatively large rural population and number of small schools. This is positive in terms of teacher-student relationships, and the student-teacher ratio is low. However, schooling can be hard to fund and manage. In 1999, Poland established larger lower secondary institutions aimed at increasing opportunities for traditionally excluded students (socially and geographically), and the country made an effort to cover commuting expenses for pupils to attend lower secondary education.
- Nowadays, many reforms have been reversed and there is a large shortage of teachers due to: (i) low social prestige for the teaching profession, (ii) poor professional environment (bureaucracy, paperwork, monitoring systems, and low professional autonomy), and (iii) very low salaries and resources (teachers' salaries in Poland, after 15 years of experience, are among the lowest across the OECD).

In 1999, Poland undertook a remarkable reform of the school system to increase the quality and effectiveness of teaching. The most significant elements of the reform that affected teachers' working conditions were related to:

- setting a national core curriculum, with broad learning goals, providing teachers and schools with extensive responsibility over the teaching content and materials, and
- a reform of schooling years. They reduced the number of years in primary school (from 8 to 6) and introduced a new lower secondary school (3 years).

5.2.1. Small and rural schools

Poland had, and still has, a lot of small schools across the country. The reform in schooling years in 1999 involved the closing of some small, rural schools, which were usually underfunded. New schools were to be larger to make it sustainable to hire expert teachers and fund adequate equipment (Wisniewski and Zahorska, 2020).[49] According to sector experts, the main priority of the reform was to increase educational opportunities for those who had been historically excluded from educational opportunities, due to social and geographic characteristics. Alongside the new lower secondary education, the country made an effort to fund transport services for those students who had to commute to new larger institutions.

[49] Wiśniewski, J., Zahorska, M. (2020). Reforming Education in Poland. In: Reimers, F.M. (eds) Audacious Education Purposes. Springer, Cham. https://doi.org/10.1007/978-3-030-41882-3_7

Nowadays, 30% of Polish students are still enrolled in primary and secondary education in villages with fewer than 3,000 people. According to experts on the Polish education system, on the one hand small schools allow for close relationships between students, teachers, and families. Poland has, in fact, one of the lowest student-teacher ratios in the OECD. However, on the other hand small schools can be difficult to manage and fund appropriately.

5.2.2. Teacher requirements and school autonomy

According to sector experts engaged in our research, Poland made a high investment in professional development during and after the reforms in 1999 – teachers were trained, developed new teaching methods and curricula, and received new tools. They also introduced higher requirements for teachers in the newly created lower secondary schools (university degree). Now, according to the National Center on Education and Economy, all Polish teachers, across levels and subjects, are required to hold a master's degree as well as teaching qualifications.[50]

The reform in 1999 gave teachers and schools extensive autonomy and responsibility for teaching content and materials. At that time, most teachers held positive views over the autonomy to select textbooks and grading scales (Wisniewski and Zahorska, 2020).[51] According to sector experts engaged in our research, higher levels of autonomy and the reform in schooling years increased teacher engagement and motivation. However, the new curriculum and structure developed a relatively poor public reputation, which Wisniewski and Zahorska (2020) attribute to the short timeline of the implementation. In 2008, the government introduced new reforms aimed at further enforcing teacher autonomy and promoting interdisciplinary teaching and learning (Jakubowski, 2021).[52]

Reforms related to teacher autonomy and the new lower secondary education were the subject of strong political and social controversy (Jakubowski, 2021). Today, many reforms have been reversed. Teachers face a decreasing level of autonomy, and sector experts point towards an overloaded curriculum, excessive bureaucratisation of the profession, and close monitoring. Teachers are still employed by school principals in an open recruitment procedure, and school principals have legal autonomy to determine elements such as the class size or number of study groups, in negotiation with local authorities. However, according to sector experts, principals have very limited practical autonomy due to strict budgetary constraints.

5.2.3. Current teacher shortage

According to sector experts, there are four main reasons behind the current shortage: (i) very low social prestige and bad stereotypes associated with the profession, (ii) poor professional environment – bureaucracy and paperwork, monitoring systems, and low professional autonomy, (iii) low salaries and scarce and inefficiently spent resources for quality teaching, and (iv) behavioural problems in classes and poor climates in schools (including relationships between teachers and pupils and working conditions).

Teachers' salaries in Poland, after 15 years of experience, are among the lowest across the OECD. The government determines the basic salary for teachers.[53] They recently eliminated teachers' housing benefits and bonuses paid at the end of their first two years, and the time required before

[50] National Center on Education and the Economy. Top-performing countries. Poland. https://ncee.org/country/poland/

[51] Wiśniewski, J., Zahorska, M. (2020). Reforming Education in Poland. In: Reimers, F.M. (eds) Audacious Education Purposes. Springer, Cham. https://doi.org/10.1007/978-3-030-41882-3_7

[52] Jakubowski, M. (2021). Poland: Polish Education Reforms and Evidence from International Assessments. In: Crato, N. (eds) Improving a Country's Education. Springer, Cham. https://doi.org/10.1007/978-3-030-59031-4_7

[53] Eurydice. Poland. Conditions of service for teachers working in early childhood and school education, https://eurydice.eacea.ec.europa.eu/national-education-systems/poland/conditions-service-teachers-working-early-childhood-and-school

securing promotions for length-in-service has been extended. However, they introduced a merit pay – a monthly allowance to teachers' earning outstanding grades in regular performance appraisals (every three years).[54] School principals are responsible for assigning performance bonuses, but according to sector experts engaged in our research, assessment criteria are not well described or regulated. Low salaries often push teachers and leaders to work in more than one school, which in turn affects the ability to develop tailored school plans.

5.2.4. Educational performance

Polish students made significant progress in the PISA cycles between 2000 and 2018. In 2018, the country appeared as one of the top performers, and students in Poland scored above the OECD average across all fields. Polish students ranked 10/77 in reading and mathematics scores, and 11/77 in science. In Europe, only Estonia and Finland obtained better scores.[55]

Students benefited from the additional year of general education and better education in rural areas (Wisniewski and Zahorska, 2020). According to Jakubowsky et al. (2010), the main factor behind improved test scores was the reform in schooling years. Reducing the number of years in primary school and introducing a new lower secondary school (3 years), delayed the entrance to vocational and technical studies. Now, pupils took maths, reading, and science classes for a longer period, instead of choosing vocational courses at an early age.

According to sector experts engaged in our research, improved performance was also due to Poland making a high investment in professional development – training, developing new teaching methods and curricula, and providing new tools. Students being educated under the latest policy changes have not been assessed yet. Consequently, the impact of the reversal of the schooling years reform and reduced school and teacher autonomy will be visible in the next PISA results.

5.3. Ireland

- Ireland is currently performing above the OECD average in reading, mathematics, and science. The percentage of low performers is one of the lowest among PISA-participating countries.
- The teaching profession has sustained social prestige. Salaries are higher than in other professions, progression up the pay scale is automatic, and teachers have significant pedagogical autonomy. All these factors have contributed to successful recruitment of highly skilled teachers and educational outcomes.
- The performance gap between students from advantaged and disadvantaged backgrounds is small, compared to other OECD countries. Open teacher recruitment, additional funding for disadvantaged schools, and school autonomy are used to attract teachers and improve access to education.
- Initial Teacher Education has undergone important reforms. These reforms were aimed at upgrading skills among the workforce by introducing masters level education for secondary education teachers. There is also significant investment in Continuing Professional Development.

[54] National Center on Education and the Economy. Top-performing countries. Poland. https://ncee.org/country/poland/
[55] PISA 2018 Results (Volume 1).

- Ireland faces significant teacher shortages. The reform in ITE, although important for maintaining and improving teaching quality, increased barriers to entry (higher cost and duration of teacher education). Other factors contributing to the teacher shortage include career breaks (although they help teachers gain experience and knowledge) and choosing industry over teaching as a career.

The majority of schools in Ireland are owned by local organisations or religious groups. None of the primary schools and very few secondary schools in Ireland are owned by the State. However, national government funding covers the main building and running costs, as well as teachers' salaries, for all schools. Boards of primary and post-primary schools appoint their own staff, within the approved budget, and they are responsible for assigning duties across the school (Eurydice).

Interestingly, 50% of the student population in Ireland is in small villages or small towns (below 15,000 inhabitants) and the country has a very large number of small schools: out of the 3,250 primary schools, 600 have 4 teachers or fewer (Eurydice). According to sector experts, having schools within each community is very important in the Irish system. Resources are available for big and small schools, and teachers also have the same salaries regardless of the number of pupils.

5.3.1. Teachers' salaries and status

Many teachers spend a few years in part-time contracts. However, once they achieve a permanent contract, teachers have the security of tenure.[56] Teachers' salaries at the entry-level are higher than in other professions in the country, annual increments take place during the first 15 years, and then three further pay rises occur. The ratio of teachers' salaries to earnings of full-time workers with tertiary education is one of the highest among the OECD, both for primary and secondary education teachers. For instance, lower secondary teachers earn 3.1% more than other workers with tertiary education.[57]

There is a common salary scale for all qualified and permanently employed teachers. Once on this scale, progression up the ladder is automatic. Teachers do not receive lower pay rises for below average performance, and they do not benefit from performance-based bonuses.[58] Teachers' unions strongly support.[59]

There are school-level evaluations, but according to sector specialists engaged in our research, the absence of performance reviews provides, first, a sense of equality among the workforce, and second, a comfortable working environment, free of pressure.[60]

After the austerity measures in 2011, new entrants to the teaching profession saw a significant reduction in earnings (O'Doherty and Harford, 2018; Hyland, 2018), although, according to sector experts, this has been amended.[61] [62] According to O'Doherty and Harford (2018), in Ireland the

[56] Eurydice. Ireland. Conditions of service for teachers working in early childhood and school education.

[57] OECD GPS. Ireland. https://gpseducation.oecd.org/CountryProfile?plotter=h5&primaryCountry=IRL&treshold=5&topic=EO

[58] Eurydice. Ireland. Teachers and education staff. Conditions of service for teachers working in early childhood and school education. https://eurydice.eacea.ec.europa.eu/national-education-systems/ireland/conditions-service-teachers-working-early-childhood-and-school

[59] Eurydice. Ireland. Teachers and education staff. Conditions of service for teachers working in early childhood and school education. https://eurydice.eacea.ec.europa.eu/national-education-systems/ireland/conditions-service-teachers-working-early-childhood-and-school

[60] Eurydice. Ireland. Teachers and education staff. Conditions of service for teachers working in early childhood and school education. https://eurydice.eacea.ec.europa.eu/national-education-systems/ireland/conditions-service-teachers-working-early-childhood-and-school

[61] O'Doherty, Teresa, and Judith Harford (2018). Teacher Recruitment: Reflections from Ireland on the Current Crisis in Teacher Supply. European Journal of Teacher Education 41, no. 5. 654–69. https://doi.org/10.1080/02619768.2018.1532994.

[62] Hyland, Aine (2018). Teacher Education Reform in Ireland: Policy and Process. Education Research and Perspectives 45, 4-24. https://www.erpjournal.net/wp-content/uploads/2020/01/01_ERPV45_Hyland.pdf

teaching profession carries social prestige and recognition, and is attractive for young people. For instance, in 2015, Ireland was the country in the OECD with the highest percentage of 15-year-old pupils who wanted to be teachers – 11.8% (PISA Report 2018). This was confirmed by sector experts engaged in our research who stated that highly skilled students choose teaching as a profession, and selection into teacher education is highly competitive.

5.3.2. Disadvantaged pupils and equitable opportunities

Ireland is currently performing above the OECD average in reading, mathematics, and science. The percentage of low performers is one of the lowest among PISA-participating countries. Ireland also has among the smallest percentages of low performers among students from disadvantaged socio-economic backgrounds and with immigrant backgrounds. Lastly, the difference between advantaged and disadvantaged students in reading is below the OECD average (OECD).

Ireland's DEIS Plan (Delivering Equality of Opportunities in Schools) provides additional resources for equipping and staffing disadvantaged schools and limiting class sizes, and the Department of Education is exploring sabbatical leave schemes for teachers in disadvantaged schools.[63] School leaders have the capacity to adapt teachers' working conditions to reflect the difficulty of tasks and levels of responsibility. This allows leaders to attract talented teachers to schools and classes with additional challenges.[64]

Schools have autonomy to use resources flexibly, depending on their needs. For instance, they can assign staff members the responsibility of engaging with families. Experts highlighted that schools are nested in the community, and teachers have not only autonomy, but agency to produce successful and equitable results. Teachers are aware of the learning outcomes required, but they are able to decide how to teach and how to engage with pupils. According to sector experts, pedagogical autonomy is one of the elements that attracts skilled professionals into teaching. According to the OECD, the case of Ireland shows how school autonomy, with compensatory funding, can produce equitable access to education and improve teaching quality.[65]

5.3.3. Teacher education and development

Training quality teachers has been at the forefront of the policy agenda, and Initial Teacher Education (ITE) has recently gone through a remarkable reform (European Commission/EACEA/Eurydice, 2021). ITE programmes have been extended, and some of them changed to master's level studies. In fact, master's level studies have become the minimum requirement in lower secondary schools. New ITE programmes upgrade skills among the Irish teaching workforce and promote a focus on research during teacher training. Master's level requirements are intended to support teachers using educational research to inform their daily work in schools (O'Doherty and Harford, 2018). Teacher Continuing Professional Development (CPD) is also very important – according to sector experts, investment is even higher than in Initial Teacher Education, and often even teachers themselves pay for additional CPD. For instance, almost all primary school teachers attend summer schools alongside the standard courses provided.

[63] Delivering Equality of Opportunity in Schools (2017).

[64] Effective Teacher Policies. Insights from PISA. https://www.oecd-ilibrary.org/education/effective-teacher-policies_9789264301603-en;jsessionid=ws2wjt5Hv4yqSUMzI3jFC9IvbKZS11Gn2xV8CBgP.ip-10-240-5-24

[65] Effective Teacher Policies. Insights from PISA. https://www.oecd-ilibrary.org/education/effective-teacher-policies_9789264301603-en;jsessionid=ws2wjt5Hv4yqSUMzI3jFC9IvbKZS11Gn2xV8CBgP.ip-10-240-5-24

5.3.4. Teacher shortage

According to O'Doherty and Harford (2018), following the austerity measures in 2011 and the extension of ITE, teacher supply became an issue of concern in Ireland. Almost 50% of students attend schools in which their capacity is hindered by the lack of teaching staff, according to school principals in the country (PISA 2018). Firstly, a better economic context promoted, to some extent, choosing industry over teaching as a career after the financial crisis. Additionally, changes in ITE programmes increased the barriers to entry for the profession – the last reform increased the duration, but also the cost, of becoming a teacher (O'Doherty and Harford, 2018; Hyland, 2018). However, experts engaged in this research suggested that maintaining and improving the quality of teachers is essential in the Irish education system. And third, international mobility is also an important contributing factor to the current problem of teacher shortages (O'Doherty and Harford, 2018). According to sector experts, career breaks to gain experience abroad are a valuable element of teachers' careers in Ireland, but they also contribute to the current shortage that the country is facing.

5.4. Singapore

- Singapore has repeatedly been among the top performers on PISA since 2009. Education has been at the core of the government's development strategy since soon after Singapore gained independence in 1965.
- Singapore is a highly centralised country. The Ministry of Education directly determines or oversees all the stages of teaching and learning: curriculum, assessments, teacher training, recruitment, and development, and school funding.
- The profession is highly valued in the country, both in terms of recognition (education is key in the government development plans, and teachers have a strong sense of mission) and pay (salaries are competitive, and teachers have opportunities for professional development). The attrition rate is very low, and Singapore is the country with the second highest percentage of teachers feeling valued by society. Key drivers of low attrition include a cultural sense of mission, good compensation and rewards, and opportunities for professional development.
- The key element of teacher development is a three-track career ladder. After three years in service, teachers choose among three streams for progression: teaching, leadership, and the specialist track.
- The teaching track allows teachers to keep teaching without sacrificing career progression. Teachers broaden the scope of their impact beyond the school, but do not have to move towards administrative or management positions if they do not want to. Teachers can choose which track they want to follow, but the education system is centralised in nature.

Singapore has repeatedly been among the top performers on PISA since 2009, when they first participated in the Programme. In 2015, the country was first in the world in all subjects. Some of the important factors that drive this success are (i) getting the right people into teaching, (ii) developing them as effective teachers, and (iii) delivering the best possible instruction (Low and Tan, 2017). Sector experts engaged in our research stressed the importance of cultural elements. Teachers are highly respected in the country, and they hold a high social status.

According to Deng and Gopinathan (2016) the type of instruction and teaching content play an important role. First, the national curriculum stresses competence in mathematics, sciences, and

languages – the three subjects tested in PISA. Second, a system of high stakes examinations streams students into school types and curriculum tracks based on their results. This system shapes classroom practice towards traditional didactics and pedagogical practice, with whole-class teaching being largely predominant, and it encourages a system-wide effort on academic performance. And third, such is the pressure to excel, that parents spent a billion Singapore dollars on enrichment and private tuition classes (Deng and Gopinathan, 2016). According to sector experts, private tutoring is most commonly used when families want to secure excellent performance.

The country has undertaken important reforms, focused on creativity and innovation among students since the 1990s. In 2004, the government launched the "Teach Less, Learn More" initiative. This programme moved instruction towards a more problem-based approach, abandoning repetitive tasks. The country also moved away from ability-based tracks. Now, schools in Singapore sort students into three different bands in secondary schools, based on their ultimate educational goal. However, students can take classes in other bands depending on their interests and aptitudes in specific subjects.[66] [67]

5.4.1. Governance and structure

The education system in Singapore is highly centralised. The Ministry of Education provides direct funding to schools, and it defines courses' syllabi and national exams. Funding is allocated based on the numbers of pupils at each school, although there is a specific additional grant that schools can use for their low-income students and ethnic minority groups.[68]

The Ministry hires and assigns both principals and teachers, and it manages their career progression. Only one institution (the National Institute of Education) is allowed to prepare teachers. Each year, they calculate the number of teachers that the country will need, and they open the corresponding number of places in the training programmes. The selection process is highly competitive. The Ministry recruits teachers from the top one-third of each cohort that qualified for tertiary education, and only one out of eight applicants is successful (Low and Tan, 2017). The recruitment process also includes panel interviews focused on values and skills, reviews of academic records, and contributions to the school and community.[69]

5.4.2. Teachers' pay, working conditions, and career progression

Once accepted, during their training, teacher candidates receive a monthly allowance equivalent to 60% of a starting teachers' salary. Their tuition at the University is also covered by the Ministry, but they must commit to three full years on the job. Once enrolled in the workforce, the Ministry of Education monitors teacher salaries compared to other professionals in the country and adjusts them regularly to ensure they remain competitive. For the first three years in the profession, all teachers receive annual raises. After that, they might receive pay raises in order to keep up with increases in the cost of living. Successful teachers can earn retention bonuses (every three to five years) and performance bonuses, which can make up to 30 percent of their salary, and which are determined in their annual evaluations. To receive further substantial pay raises, teachers must be promoted along the career track (13 stages which offer salary raises, gained based on principals' recommendations).[70]

[66] Their goal is to achieve a full subject-based format, in which students can match classes from different bands by 2024.
[67] National Center on Education and the Economy. Top-performing countries. Singapore.
[68] National Center on Education and the Economy. Top-performing countries. Singapore.
[69] National Center on Education and the Economy. Top-performing countries. Singapore. https://ncee.org/country/singapore/
[70] National Center on Education and the Economy. Top-performing countries. Singapore. https://ncee.org/country/singapore/

According to experts interviewed, good base salaries are more important than performance-related pay. Additionally, while good salaries are necessary for high-quality teaching, they are not sufficient. The sense of mission, and teaching being a respected profession in society, incentivise and motivate teachers. Regarding the impact of performance bonuses, experts interviewed highlighted that those are aimed at just rewarding teachers and that motivation usually comes from a combination of the whole remuneration package, interest in teaching and education, and a sense of mission.

The process of teachers' evaluation includes a self-appraisal and an evaluation by supervisors against different competencies. Evaluations are qualitative, and they contain written feedback instead of numeric indicators.[71] However, the key element of teacher development is a three-track career ladder. After three years in service, teachers choose among three streams for progression: teaching, leadership, and the specialist track. In the teaching track, extra responsibilities linked with career progression are mostly pedagogical – teachers' progression entails leading teaching workshops, designing content and curriculum, supporting young teachers, and becoming pedagogical experts. On the leadership track, teachers are promoted to leadership positions in their department, school, or up to higher official positions. Lastly, in the specialist track, teachers are focused on research and teaching policies (Crehan, 2016). According to specialists engaged in our research, one core element of this system is that good teachers can remain closer to pupils and classes, if they wish to do so. The teaching track allows teachers to keep teaching without sacrificing career progression. Along this track, teachers broaden the scope of their impact beyond the school, but do not have to move towards administrative or management positions.

Teachers can choose which track they want to follow, but the education system is centralised in nature – it needs to balance individual desires with system needs. There are no explicit incentives to follow any of these tracks, but the opportunities to pursue career goals depend on system needs. According to the experts, most of the teachers are satisfied with their career track. The profession is demanding, and teachers bear a large workload. However, aside from pay, cultural and symbolic elements help keep teachers in the profession – people who want to become teachers truly care for children, and teachers feel appreciated both by society and lawmakers.

72% of teachers in the country agree (or strongly agree) that their profession is valued in society (ranked 2/50 in TALIS 2018), and they are generally satisfied with the salary they receive for their work (72%. Ranked 4/50).[72] Attrition rate in Singapore is below 3%, and according to the Ministry of Education of the country, the main reasons for teachers staying in service are a cultural sense of mission, good compensation and rewards, and opportunities for professional development (Darling-Hammond, 2013).

[71] National Center on Education and Economy. Top-performing countries. Singapore.
[72] Education GPS. Singapore. Teachers and teaching conditions (TALIS 2018).

5.5. The Basque Country (Spain)

- In the Basque Country, there are three linguistic models with different mediums of instruction (Spanish, Basque, or both). Most students are enrolled in schools with Basque as the medium of instruction, which has significantly increased the number of Basque-speakers, but the other models have not been as successful.
- Forty years ago, there was a large political consensus and financial investment to increase Basque language proficiency among the teaching workforce. Teachers were offered paid immersive training programmes to gain competencies, and now mandatory courses across university degrees must be offered in Basque (they can be offered also in Spanish).
- Pupils with Basque as their family language who were taught in Basque displayed the same level of competence in both languages of examination. Children with Spanish as their family language who were taught in Basque performed worse in exams written in Basque. These differences point towards the importance of the social presence of each language. According to expert opinion, there are two elements to be considered. On one hand, pupils must learn Basque and subject-specific content at the same time. And on the other hand, many pupils see Basque as a purely school-based language, which they do not need or use outside of class. This restrains their engagement and proficiency in the language.
- The main challenge of this model is that it reflects socio-economic groups and linguistic communities. Also, Model A (Spanish) and, to a certain extent, Model B (both languages), did not succeed in teaching the required level of Basque. Overall, the six-layer model poses challenges in terms of equity, language proficiency, and educational attainment.
- The new Basque Education Bill aims to give autonomy to schools to define the medium of instruction following the needs of the community. Experts expect that it will give opportunities to learn Basque to pupils that had been traditionally excluded, such as children from immigrant families, and it will also contribute to erasing linguistic communities' segregation.
- Experts suggest that teacher training and professional development should focus on both subject-specific knowledge and language skills (i.e., the ability to teach the Basque language).

The Basque Country is an autonomous community in northern Spain. The education system is subject to Spanish regulation for general norms, but it is managed by the Basque regional government and funded through its own tax system (Gortazar, 2018).

In Spain, autonomous communities are responsible for establishing the curriculum, determining school timetables, and issuing diplomas of regulated studies. Authorities determine funds for each public institution based on educational stage, size, services provided, characteristics of the population, and needs identified by the management team of the school. Schools retain pedagogical, organisational, and managerial autonomy for their resources, and they also develop and complete the curriculum at each stage of the cycle.[73]

[73] Eurydice. Spain. https://eurydice.eacea.ec.europa.eu/national-education-systems/spain/spain

5.5.1. Teacher recruitment and working conditions

In the Basque Country, the system is organised around two distinct school networks of similar size. Public schools are publicly funded and managed, whereas private schools are privately managed, but publicly funded. Charging fees is not legal, but private schools expect families to contribute with voluntary private donations. This acts, *de facto*, as a barrier for many families, and private schools end up serving, on average, more socially advantaged population groups, and a smaller share of immigrant children (Gortazar, 2018).

In public schools, teachers are civil servants, which are appointed following competitive examination, regulated by the Spanish Ministry of Education. The minimum qualification for pre-primary and primary education is a bachelor's degree, whereas for secondary school teachers it is a master's level degree.

Following state regulations, continuing teacher training is optional, but it adds merits in public competitive examinations to achieve permanent employment positions and additional payments.[74] However, according to specialists engaged in our research, incentives are not well designed. Teachers receive merits just for attending any programme, without further alignment with school projects or development plans.

Once in a permanent contract, there are no formal career levels, and career progression includes only advancing on a public-system salary scale. Teachers in the Basque Country receive the highest salaries in public education across Spanish regions[75], but, according to sector experts, salaries do not play a significant role in increasing teacher recruitment. Professionals in Spain are not as mobile as they are in the UK, and the requirement to learn Basque acts as an additional barrier for people from other regions. However, specialists engaged in our research agreed that the opportunity to obtain a permanent contract is a key factor in attracting people into teaching in the public sector.

5.5.2. Language policies and medium of schooling

According to the regional government, 33.9% of the population of the Basque Autonomous Community knew Basque in addition to Spanish in 2016.[76] In the last four decades there has been an increasing recognition of regional languages in Spain. New status came along a variety of educative systems across regions with a language different from Spanish (Catalan, Occitan, Valencian, Galician, and Basque).[77]

In the Basque Country, since 1983, there are three different education models, depending on the medium of instruction. In Model A, Spanish is the medium of instruction, except for the Basque language course. Among schools in model B, there are different degrees of distribution of medium of instruction between Basque and Spanish. Lastly, in model D, the Basque language is the medium of instruction in all the subjects except for the course of Spanish language (Monzon and Luna, 2020). In 1990, 21% of students in non-university studies studied under model D. By 2017 the number had increased to 65%, 17% of students were enrolled in Model A (62% in 1990), and 18% in model B (16% in 1990) (Le Pichon-Vorstman et al., 2020).

[74] Eurydice. National Education Systems. Spain. Teachers and education staff. https://eurydice.eacea.ec.europa.eu/national-education-systems/spain/continuing-professional-development-teachers-working-early

[75] Retribuciones Docentes en la Enseñanza Pública 2022. https://www.ugt-sp.es/images/PDF/ensenanza/P%C3%BAblica/boletin-retribuciones-ensenanza-publica-2022.pdf

[76] VI Encuesta Sociolingüística. Comunidad Autonoma de Euskadi. https://www.euskadi.eus/contenidos/informacion/ikerketa_soziolinguistikoak/es_def/adjuntos/VI%20_INK_SOZLG_EAE_Presentacion_publica_20161014.pdf

[77] Doncel and Cabrera-Alvarez (2019). Bilingual autonomous communities, identities and educational achievement according to PISA 2015

Table 11. Students attending different linguistic models in the Basque Country

	1990	2017
Model A (Spanish as medium of instruction)	62%	17%
Model B (Spanish and Basque as mediums of instruction)	16%	18%
Model D (Basque as medium of instruction)	21%	65%

Source: Le Pichon-Vorstman, E.; Siarova, H., and Eszter, S. (2020). The future of language education in Europe: case studies of innovative practices.

The Basque Institute for Research and Evaluation in Education (ISEI-IVEI) conducted research to address the influence of language in PISA results. Teenagers in Model D (with Basque as medium of instruction, but from both Spanish- and Basque-speaking families), were examined both in Spanish and Basque following a randomised experiment. Pupils with Basque as a family language displayed the same level of competence in both languages of examination. However, children with Spanish as their family language performed worse in exams written in Basque, even though it was their medium of instruction. Given that all these pupils were studying the same curriculum, in the same language, according to the authors, these differences point towards the importance of the social presence of each language.

According to experts engaged in our research, pupils' language proficiency is not evenly distributed. Pupils from Basque-speaking families have developed competencies in Spanish inside and outside school and are able to demonstrate subject-specific competency in this language. However, for many students, Basque is only the language of school, and pupils from Spanish-speaking families learn content and language at the same time. According to one of our specialists, teachers should be responsible for their subject, but also for language skills acquisition. All teachers, across models, are required to be fully proficient in Basque, but the ability to teach the Basque language should also be considered in their training and professional development.

In 1980, only 5% of teachers in public schools had professional competency in the Basque language. Now nearly all of them do (Monzon and Luna, 2020). According to sector specialists, there was a huge consensus at that time about increasing Basque proficiency among the teaching workforce. Even though the training process required time and resources, teachers were granted paid leave to undertake immersive training programmes. Now, all the mandatory courses across university degrees are offered in Basque, which has significantly increased the pool of potential candidates with the required level of proficiency.

5.5.3. Current challenges and the new education bill

Monzon and Luna (2020) define Basque education as a system of six layers: 3 linguistic models (A, B, and D), and two networks of similar presence (public and private). The main challenge that comes with these layers is that they became a reflection of socio-economic strata and linguistic communities; and Model A, and to a certain extent, B, have not succeeded in teaching the required level of Basque. The Basque Parliament is currently debating a new education bill to give schools autonomy to create their own linguistic model. Schools will be able to adapt the medium of instruction to reflect the needs of the area. According to sector experts, this should enable students from traditionally excluded backgrounds, such as low-income immigrants from Latin American countries, to achieve a good level of Basque, but also contribute to erase segregation across schools.

6. Conclusions

The IWPRB is responsible for recommending reforms to the Minister for Education and Welsh Language on the pay and conditions of service for teachers and school leaders in Wales. This research aims to support the IWPRB in understanding: (i) the pay and conditions of school teachers and school leaders in primary and secondary education across the OECD countries, and (ii) the correlation of pay and conditions with educational outcomes of pupils, and teachers' recruitment, retainment and professional development. The research included three key activities: (i) benchmarking analysis, (ii) correlation analysis, and (iii) case studies.

The findings from the three different research activities complemented each other, without any contradictions identified. The correlation exercise indicated which factors are correlated with the educational outcomes of students. The case studies explored specific country examples, which broadly confirmed the importance of the factors highlighted by the correlation analysis. The case studies, as they included interviews with sector experts and a desk-based review of both academic and policy documents, also allowed us to identify additional insights and lessons learned. Finally, the benchmarking exercise showed in which areas Wales's education system may benefit from additional investment or improvement. Combining the findings from the three research activities can support the IWPRB to identify which elements should be prioritised by policymakers.

The importance of the level of **teachers' salaries** emerged as a key theme both in the correlation analysis and case studies. The correlation analysis showed that student educational attainment is positively associated with teachers' salaries, while teachers' salaries are negatively correlated with teachers' intention to leave. In line with the above findings, the case study on Singapore highlighted the importance of competitive pay for keeping attrition rates low, while Poland's case study highlighted that low salaries can contribute to staff shortages. Interestingly, sector experts from Singapore suggested that good base salaries are important for teachers and can increase motivation more than performance-related pay and bonuses (although this view should be confirmed through an evaluation of performance-related pay and bonuses in Singapore). According to data from the academic year 2019/2020, in Wales, teachers' statutory salaries at entry level were below the OECD average. However, when average allowances and bonuses were added, then the average salary increased significantly, and it was well above the OECD average.

A related topic mentioned in multiple case studies is the importance of the **social prestige** of the teaching profession, which can improve the attractiveness of the sector. Competitive salaries and education being part of government priorities were described within the Ireland and Singapore case studies as contributing factors to the social prestige of the sector.

The **professional development** of teachers is another key element of teachers' pay and conditions that can contribute to both better quality of education but also teachers' motivation and retainment. Teachers' professional development was positively associated with student educational outcomes in one of our models, while the importance of professional development was showcased in the Singapore, Poland and Ireland case studies. Singapore provides a very interesting example of an alternative model of career progression, where teachers can choose among three career ladders: teaching, leadership, and the specialist track. In Ireland and Poland, ITE reforms introduced a requirement for a master's level of education for secondary education teachers and additional investment in CPD. It is worth noting that, according to the literature, the master's requirement in Ireland may have contributed to the current shortage of staff, but no evidence confirming this was found. In Wales, CPD is a professional duty but without a minimum number of mandatory hours. In summary, professional development requirements and investment can affect positively both teachers and students, indicating that strengthening those in Wales could be beneficial.

Apart from pay and professional development, **working hours and workload** are also extremely important for teachers and may also result in affecting student outcomes. The benchmarking exercise showed that teachers in Wales work long hours. More particularly, based on self-reported data, the overall weekly working time for teachers in Wales is well above the OECD average and the second to highest across all OECD countries.

The statutory teaching time as a share of the total statutory working time was negatively correlated with student educational outcomes. While interpretation of this result is not straightforward, it indicates that a lower amount of time available for teachers to spend outside the classroom is not beneficial. According to the OECD, a larger proportion of statutory working time spent in teaching could also indicate that teachers end up performing these duties in their own time.

A characteristic of classroom environments that also directly affects teachers' workloads is the **student-teacher ratio**, i.e. the number of students for every teacher in a school. The student-teacher ratio indicates how much workload teachers have, but also how much time they can devote to each student. The correlation analyses showed that student outcomes are negatively correlated with student-teacher ratio, with its regression coefficient being the strongest across all variables in both regression models. Wales has one of the highest student-teacher ratios in the OECD, indicating that this is an area where significant improvements could be made.

The benchmarking exercise highlighted that Wales is below the OECD average for teachers having **permanent contracts**. The correlation analysis indicated that permanent contracts can be beneficial. More particularly, the pairwise correlations and the two alternative regression specifications showed that student educational outcomes are positively associated with the share of teachers with indefinite contracts, i.e. a higher share of teachers with permanent contracts is correlated with higher PISA scores. According to the literature, teachers without permanent contracts might experience higher job insecurity and become more likely to leave the profession.

To conclude, it is essential to highlight that this report did not explore the causal relationship between teachers' pay and conditions and educational outcomes. Additionally, the scope of the exercise did not include a comprehensive review of policy evaluations of the reforms discussed in the case studies. This report serves as a first exploration of the broad research questions indicating areas that researchers and policymakers in Wales may need to prioritise. If this topic is explored further, future research could target evidence on robust policy evaluations and econometric analysis of the impact of pay and conditions on educational outcomes.

7. Annex 1

List of indicators and sources

Educational expenditure as a percentage of GDP: OECD Education at a Glance. Public Expenditure Statistical Analysis (for England, Scotland, Wales, and Northern Ireland), and GDP from the Office for National Statistics. Expenditure that was not assigned to any specific level was distributed across levels of education proportionally to the number of pupils enrolled at each level. We used GDP deflators in Annex of the Country and Regional Analysis to compute expenditure as a percentage of GDP in England, Scotland, Wales, and Northern Ireland.

Maths score: Country-level PISA score for public schools. PISA 2018.

Science score: Country-level PISA score for public schools. PISA 2018.

Reading score: Country-level PISA score for public schools. PISA 2018.

Leavers without qualifications: Proportion of students in schools' final grade who left school without a certificate that allows them to enter post-school destinations such as university, technical, further or vocational education, apprenticeships or employment. PISA 2018.

Indefinite contracts: Proportion of teachers working with a permanent employment contract. For OECD countries, the source is the Teaching and Learning International Survey (TALIS) 2018. For Wales, the National Education Workforce Council (2021).

Student-teacher ratio: The student-teacher ratio is obtained by dividing the total number of students in the target population by the total number of teachers in the target population. The overall ratios are computed by first computing the numerator and denominator as the (weighted) sum of school-level totals, then dividing the numerator by the denominator. Our source is OECD Education at a Glance (2021).

Teaching staff shortage: Proportion of pupils in public schools in which instruction is hindered by a lack of teaching staff *a lot* or *to some extent* (reported by school heads). PISA 2018.

Assisting staff shortage: Proportion of pupils in public schools in which instruction is hindered by a lack of assisting staff *a lot* or *to some extent* (reported by school heads). PISA 2018.

Villages and small towns: Proportion of pupils in schools in villages or small towns (below 15,000). PISA 2018.

Cities: Proportion of pupils in schools in cities and large cities (above 100,000). PISA 2018.

Professional development: Percentage of teaching staff in school that attended a programme of professional development in the last three months, reported by school heads. PISA 2018.

Attrition (2016): Proportion of teachers (between pre-primary and upper secondary levels of education) leaving the teaching profession during their career. This indicator focuses on an indirect measure of attrition, computing attrition based on the number of teachers in two successive reference years and the number of teachers who entered the teaching profession between these two reference years. OECD Education at a Glance (2021).

Teachers' intention to leave: For OECD countries, the Teaching and Learning International Survey (TALIS) 2018. For Wales, the National Education Workforce Council (2021). Comparability should be made with caution: TALIS measured the intention of teachers aged 50 or less to leave the profession within the next 5 years. Wales did not take part in this survey. Data for teachers in Wales shows

intention of teachers (without age limit) to leave within the next 3 years. We believe both variables draw reasonable and comparable estimates of potential attrition within the teaching profession.

Working time: Statutory working time. OECD Education at a Glance (2021).

Teaching time: Statutory net teaching time. OECD Education at a Glance (2021).

Teaching over working time: Researchers' calculations based on countries' data with both statutory teaching and working time; we computed the ratio. OECD Education at a Glance (2021).

Working time: Self-reported working hours. TALIS (2018). The indicator represents the weighted average of self-reported working hours of full-time, part-time and other teachers.

Teaching time: Self-reported teaching hours. TALIS (2018). The indicator represents the weighted average of self-reported teaching hours of full-time, part-time and other teachers.

Teaching over working time: Researchers' calculations. TALIS (2018).

Teachers' salaries: Annual average salaries (including bonuses and allowances) in public institutions, in equivalent US Dollars converted using Purchasing Power Parity for private consumption. OECD Education at a Glance.

School heads' actual salaries: Annual average salaries (including bonuses and allowances) in public institutions, in equivalent US Dollars converted using Purchasing Power Parity for private consumption. OECD Education at a Glance.

Teachers' statutory salaries at the start of their career: Annual statutory salaries in comparable US dollars using purchasing power parity for private consumption. OECD Education at a Glance.

Qualification requirements to enter the teaching profession: Eurydice Report: Teaching Careers in Europe: Access, Progression, and Support Report.

Recruitment methods: Eurydice Report: Teaching Careers in Europe: Access, Progression, and Support Report.

Status of Continuing Professional Development (1): Eurydice Report: Teaching Careers in Europe: Access, Progression, and Support Report.

Status of Continuing Professional Development (2): Eurydice Report: Teaching Careers in Europe: Access, Progression, and Support Report.

8. Annex 2

Variables	Score	Student truancy	Leavers without qual.	Indefinite contract	Student-teacher ratio	Staff shortage	Small settings	Prof. development	Attrition	Intention to leave	Teaching over working time	Expenditure /GDP	Teachers' salaries	Heads' salaries
Score	1.00													
Student truancy	**-0.43**	1.00												
Leavers without qual.	-0.02	0.04	1.00											
Indefinite contracts	**0.33**	-0.05	-0.12	1.00										
Student-teacher ratio	**-0.51**	0.13	0.13	-0.24	1.00									
Staff shortage	-0.21	-0.03	0.12	**-0.52**	-0.01	1.00								
Small settings	0.05	0.06	-0.20	0.06	-0.04	-0.15	1.00							
Prof. development	0.21	-0.03	**0.33**	-0.09	0.16	-0.10	0.06	1.00						
Attrition	0.29	**-0.68**	0.15	0.34	-0.27	**-0.62**	**-0.53**	-0.18	1.00					
Intention to leave	0.15	0.05	0.08	**0.47**	-0.14	**-0.64**	0.29	**0.43**	0.25	1.00				
Teaching-working time	-0.34	0.32	**0.41**	-0.36	-0.04	0.29	-0.02	**0.50**	-0.53	-0.08	1.00			
Expenditure/GDP	0.12	-0.11	0.19	-0.01	0.02	-0.21	0.07	**0.26**	0.30	0.14	0.28	1.00		
Teachers' salaries	**0.46**	-0.26	0.06	-0.04	**0.33**	-0.01	0.03	0.22	0.06	**-0.39**	-0.05	0.22	1.00	
Heads' salaries	0.23	0.02	0.06	-0.14	**0.39**	-0.30	-0.06	**0.46**	-0.12	-0.25	-0.24	0.29	**0.83**	1.00

highlighted shows significance at p<.1

9. Annex 3

Model 1

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Salaries	0.08	0.05	1.71	0.14	-0.03	0.20
Student-teacher ratio	-0.13	0.05	-2.47	0.04	-0.25	-0.01
Teaching/Working	-0.22	0.12	-1.81	0.12	-0.51	0.08
Expenditure	-0.07	0.10	-0.72	0.50	-0.30	0.17
Indef. contracts	0.25	0.14	1.71	0.14	-0.11	0.60
Student truancy	-0.01	0.02	-0.44	0.67	-0.07	0.05
Prof. development	0.08	0.05	1.78	0.13	-0.03	0.19
Villages	0.02	0.02	0.70	0.51	-0.04	0.07
Staff short.	0.03	0.03	0.92	0.39	-0.05	0.11
Unqualified	0.01	0.03	0.37	0.73	-0.05	0.07
constant	4.18	0.73	5.75	0.00	2.40	5.96

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Salaries	0.08	0.04	2.21	0.06	0.00	0.17
Student-teacher ratio	-0.13	0.04	-3.01	0.02	-0.24	-0.03
Teaching/Working	-0.22	0.09	-2.51	0.04	-0.43	-0.02
Expenditure	-0.04	0.07	-0.62	0.55	-0.20	0.12
Indef. contracts	0.21	0.11	1.91	0.09	-0.04	0.47
Student truancy	-0.01	0.02	-0.40	0.70	-0.05	0.04
Prof. development	0.08	0.03	2.34	0.05	0.00	0.16
Villages	0.02	0.02	1.02	0.34	-0.02	0.06
Staff short.	0.03	0.03	1.08	0.31	-0.03	0.09
constant	4.29	0.60	7.11	0.00	2.90	5.68

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Salaries	0.09	0.04	2.42	0.04	0.01	0.17
Student-teacher ratio	-0.14	0.04	-3.29	0.01	-0.23	-0.04
Teaching/Working	-0.24	0.07	-3.50	0.01	-0.40	-0.09
Expenditure	-0.05	0.06	-0.75	0.48	-0.19	0.10
Indef. contracts	0.21	0.11	1.97	0.08	-0.03	0.44
Prof. development	0.08	0.03	2.79	0.02	0.02	0.15
Villages	0.02	0.02	0.99	0.35	-0.02	0.05
Staff short.	0.03	0.03	1.16	0.28	-0.03	0.09
constant	4.28	0.57	7.46	0.00	2.98	5.57

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Salaries	0.08	0.03	2.53	0.03	0.01	0.14
Student-teacher ratio	-0.15	0.04	-4.26	0.00	-0.23	-0.07
Teaching/Working	-0.24	0.06	-4.09	0.00	-0.37	-0.11
Indef. contracts	0.20	0.10	2.07	0.06	-0.01	0.42
Prof. development	0.08	0.03	2.92	0.01	0.02	0.13
Villages	0.01	0.01	0.81	0.43	-0.02	0.04
Staff short.	0.02	0.02	1.08	0.31	-0.02	0.07
constant	4.41	0.51	8.68	0.00	3.29	5.53

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Salaries	0.07	0.03	2.60	0.02	0.01	0.12
Student-teacher ratio	-0.14	0.03	-4.56	0.00	-0.21	-0.08
Teaching/Working	-0.22	0.05	-4.30	0.00	-0.33	-0.11
Indef. contracts	0.21	0.09	2.35	0.04	0.02	0.40
Prof. development	0.08	0.02	3.56	0.00	0.03	0.13
Staff short.	0.02	0.02	1.22	0.24	-0.02	0.06
constant	4.43	0.48	9.30	0.00	3.40	5.46

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Salaries	0.06	0.03	2.48	0.03	0.01	0.12
Student-teacher ratio	-0.14	0.03	-4.52	0.00	-0.21	-0.08
Teaching/Working	-0.23	0.05	-4.38	0.00	-0.34	-0.12
Indef. contracts	0.15	0.07	1.97	0.07	-0.01	0.31
Prof. development	0.08	0.02	3.54	0.00	0.03	0.13
constant	4.71	0.43	10.96	0.00	3.78	5.63

Model 2

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Student-teacher ratio	-0.10	0.03	-3.49	0.00	-0.15	-0.04
Expenditure	0.02	0.04	0.41	0.68	-0.06	0.09
Student truancy	-0.04	0.01	-2.86	0.01	-0.07	-0.01
Prof. development	0.05	0.02	2.52	0.02	0.01	0.09
Staff shortage	-0.02	0.01	-1.36	0.18	-0.05	0.01
constant	6.13	0.10	61.37	0.00	5.93	6.34

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Student-teacher ratio	-0.09	0.03	-3.55	0.00	-0.14	-0.04
Student truancy	-0.04	0.01	-3.02	0.00	-0.06	-0.01
Prof. development	0.05	0.02	2.64	0.01	0.01	0.09
Staff shortage	-0.02	0.01	-1.72	0.09	-0.05	0.00
constant	6.14	0.09	68.68	0.00	5.96	6.32

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Student-teacher ratio	-0.09	0.03	-3.60	0.00	-0.15	-0.04
Student truancy	-0.04	0.01	-2.74	0.01	-0.06	-0.01
Prof. development	0.05	0.02	2.73	0.01	0.01	0.09
constant	6.17	0.09	68.65	0.00	5.99	6.35

Score	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Student-teacher ratio	-0.10	0.03	-3.75	0.00	-0.16	-0.05
Student truancy	-0.03	0.01	-2.33	0.03	-0.06	0.00
Prof. development	0.03	0.02	1.56	0.13	-0.01	0.08
Salaries	0.06	0.03	1.95	0.06	0.00	0.12
Indefinite contracts	0.21	0.08	2.79	0.01	0.06	0.37
constant	4.67	0.47	9.99	0.00	3.71	5.64

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