



# Analysis of factors that influence post-16 learning achievement in Wales

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## Summary

### 1. Research aims

- 1.1 The Welsh Government is in the process of developing key performance measures<sup>1</sup> for learner outcomes in further education and school sixth forms, and wants to ensure that these measures are both understandable for all audiences and accurate. These measures must be fair and reflective of different local, socioeconomic and learner characteristics, given their potential use in the creation of performance measures at the provider level. LE Wales were commissioned by the Welsh Government to provide evidence for the refinement of its achievement measures for post 16-education.
- 1.2 The main aims of this research were:
  - To identify the most relevant contextual factors influencing post-16 achievement and investigate the effect of each factor on the different achievement measures considered;
  - To construct a post-16 provider level 'demographic benchmark' – essentially an estimate of the predicted outcome of the post-16 provider given the characteristics of its learner intake. The estimation of a demographic benchmark for every post-16 provider reflects the fact that learners' characteristics vary significantly across different providers, and it would not be 'fair' to compare achievement rates for providers with a high proportion of learners with lower prior attainment or coming from more deprived backgrounds with the performance of other providers with completely different learners' characteristics. Hence, for each post-16 provider, the research developed a demographic benchmark based on its intake characteristics and reflecting the effect of these characteristics on achievement.

### 2. Data and methodology

#### Data sources

- 2.1 The research uses information on learners who were enrolled in post-16 education in 2017/18 and 2018/19 (covering general education, vocational and Welsh Baccalaureate learning programmes and courses). The data used in the analysis is based on a matched dataset linking together information from different Welsh educational collections, covering:

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<sup>1</sup> [Playlists - Consistent post -16 performance measures Hwb \(gov.wales\)](https://gov.wales/playlists-consistent-post-16-performance-measures-hwb)

- Post-16 Data Collection containing information on learner, course and school characteristics from all providers with sixth forms and middle schools with pupils in Years 12, 13 and/or 14;
- The Welsh Examinations Database (WED) containing qualification attainment data for schools;
- The Lifelong Learning Wales Record (LLWR) containing data on further education, work based learning and adult learning from further education institutions (colleges) in Wales;
- The Pupil Level Annual School Census (PLASC) containing pupil and school level data for secondary school pupils (although the analysis focused on post-16 achievement measures), PLASC data (mainly from Year 11) was a source for many of the contextual factors used in the analysis).

2.2 The resulting datasets were organised at either:

- Programme level (for general education programmes and vocational programmes), with one record per learner in each academic year looking at programme achievement (e.g. whether the learner achieved 3 A levels or equivalent at grades A\*-C), all of which were available for the academic years 2017/18 and 2018/19; or
- Course level (for individual A level courses, vocational courses and Welsh Baccalaureate) with one record per course started (e.g. A level in Biology), potentially having multiple records per learner in the same academic year. This course level information was available only for 2018/19, except for the Welsh Baccalaureate which was also available for 2017/18.

### **Achievement measures selected for analysis**

2.3 The outcome variables used in the analysis for the different datasets can be grouped into three broad categories:

- **Early dropout** (measuring the proportion of learners dropping out within the first 8 weeks of programme start – not those who dropped a single qualification such as a fourth A level);
- **Completion** (covering completion for vocational learning and completion at AS and A2 level, as well as retention from AS level to A2 levels for A levels);
- **Achievement** (for example success rates for vocational programmes and the proportion of learners achieving a specific threshold (e.g. 3 A levels at grades A\*-C) for general education programmes).

2.4 The matched educational dataset contains information on learner, provider and local area characteristics, including historical information from secondary school prior to post-16 enrolment (Year 11 and before). This linked information from secondary schools was only available for younger learners who attended secondary schools in Wales. This approach excluded around 3% of learners for general education programmes and 21% for vocational programmes from the analysis as these records lacked crucial information on the key prior attainment characteristics considered in the analysis.

2.5 A range of contextual factors were included in the analysis to capture the effects of different characteristics. These factors cover the following areas:

- Information from the educational journey: prior attainment at Key Stage 4, absence data and any unauthorised absence in Year 11, Special Educational Needs (SEN), whether

ever eligible for Free School Meals (FSM), and local area deprivation using the Welsh Index of Multiple Deprivation (WIMD)<sup>2</sup>;

- Year 11 school characteristics (Welsh medium type and provider governance<sup>3</sup>);
- Personal characteristics (gender, ethnic background, age at start).

## Methodological approach

- 2.6 The outcome (achievement) measures considered in the analysis are binary, as they identify achievement (successful outcome) or failure (unsuccessful outcome)<sup>4</sup>. Hence, we used single level and multilevel logit models<sup>5</sup> to estimate the effect of contextual factors on post-16 achievement. The multilevel model takes into account that learners attending the same provider are likely to be more similar in terms of their characteristics, as well as in respect of other factors influencing subsequent attainment, e.g. school management. In other words, the multilevel logit accounts for the possibility that different ‘types’ of learner might ‘cluster’ in certain post-16 providers. The single level logit model does not incorporate the possibility of clustering.
- 2.7 For each of the outcome measures considered, the results of the analysis show the predicted probability of achievement for the different categories for each of the factors considered. For example, presented in Figure 1, female learners who start a two-year A level programme (and at least reach the eight week mark) have a 73% predicted probability of completing the programme, compared with 69% for males (controlling for all other factors considered).
- 2.8 The final step of the analysis focused on contextualising the results at the post-16 provider level based on the characteristics of their learners. For each provider we constructed a ‘demographic benchmark’ (based on the average predicted probability of a successful outcome for learners at that provider) and compared it with the actual (or ‘unadjusted’) outcome (the actual achievement rate observed for that provider).
- 2.9 A ‘natural’ benchmark for provider level performance is the ‘unadjusted’ national average (the average achievement rate across all Welsh post-16 providers). However, the demographic benchmark provides a fairer reflection of how we would expect providers to perform as it takes into account that the characteristics of learners vary significantly across providers.

## 3. Key findings

### The influence of contextual factors on post-16 attainment

- 3.1 The effect of contextual factors on the probability of achievement for the two-year A2 completion rate indicator is shown in Figure 1 (this is based on learners completing their A2 studies as a proportion of those reaching the 8 week point of AS studies).
- 3.2 The average completion rate for the entire group of learners considered is represented by the vertical dashed line (approximately 72%). The various factors considered in the analysis (e.g. gender) are represented on the vertical axis, while the horizontal axis reports the

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<sup>2</sup> The WIMD captures small area deprivation in Wales. For more information see [Welsh Index of Multiple Deprivation | GOV.WALES](#)

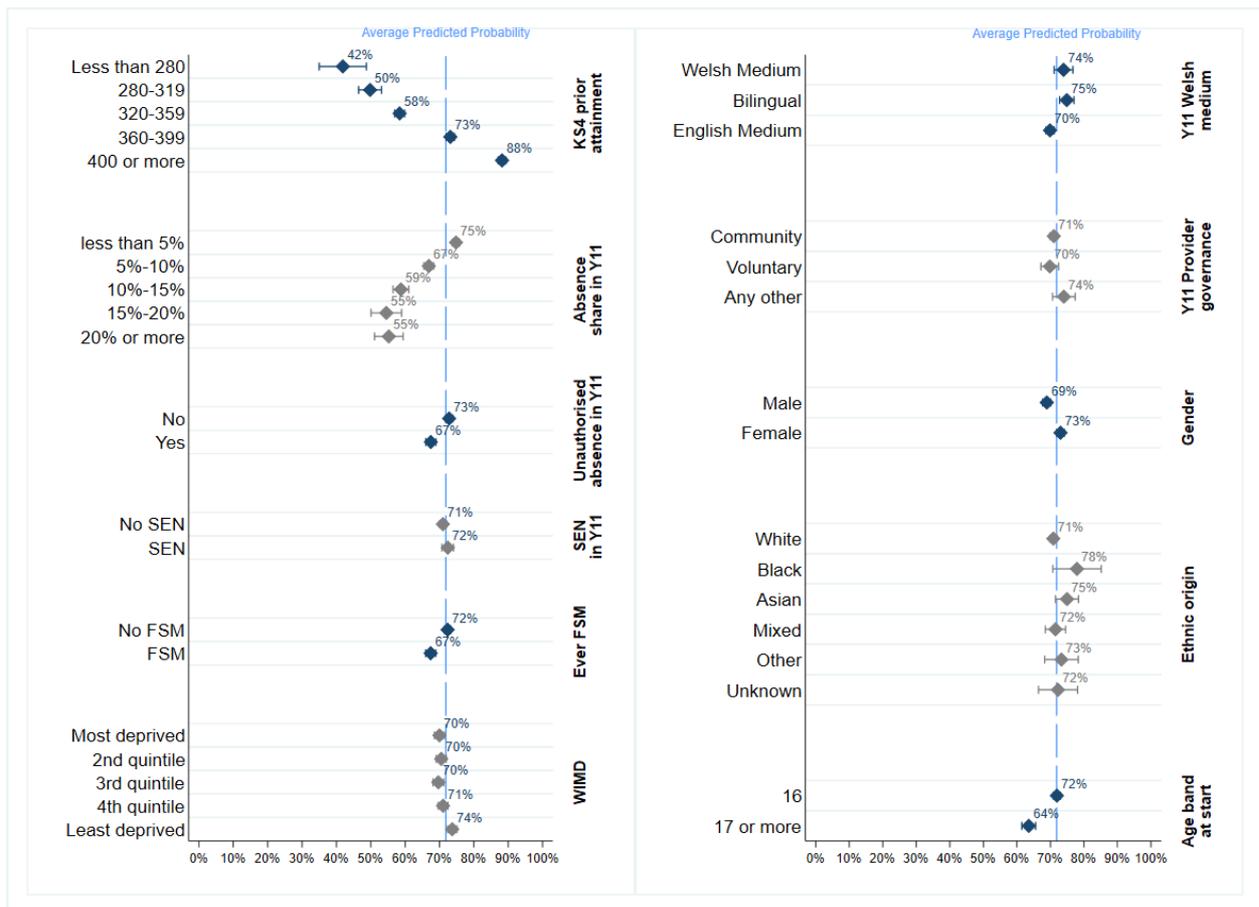
<sup>3</sup> The governance structure of schools in Wales include Community (Local Authority maintained schools not influenced by business or religious groups that follow the national curriculum) and Voluntary schools (whilst not established by the Local Authority, they are funded mainly or entirely by it with a foundation or trust having some formal influence in the running of the school).

<sup>4</sup> With the exception of the variable identifying success for vocational programmes, as that has three possible outcomes: ‘No success’, ‘Partial success’ and ‘Full success’.

<sup>5</sup> The logit model is used in economic models with a binary response variable (identifying a positive or negative outcome) and models the probability of a positive outcome given a set of control variables.

predicted probability of achievement for learners with different characteristics (e.g. female learners versus male learners), controlling for all other factors.

**Figure 1 Overall completion rate for learners who started a two-year A level programme and were still in learning after the first eight weeks**



Note: SEN: Special Educational Needs; FSM: Free School Meals; WIMD: Welsh Index of Multiple Deprivation

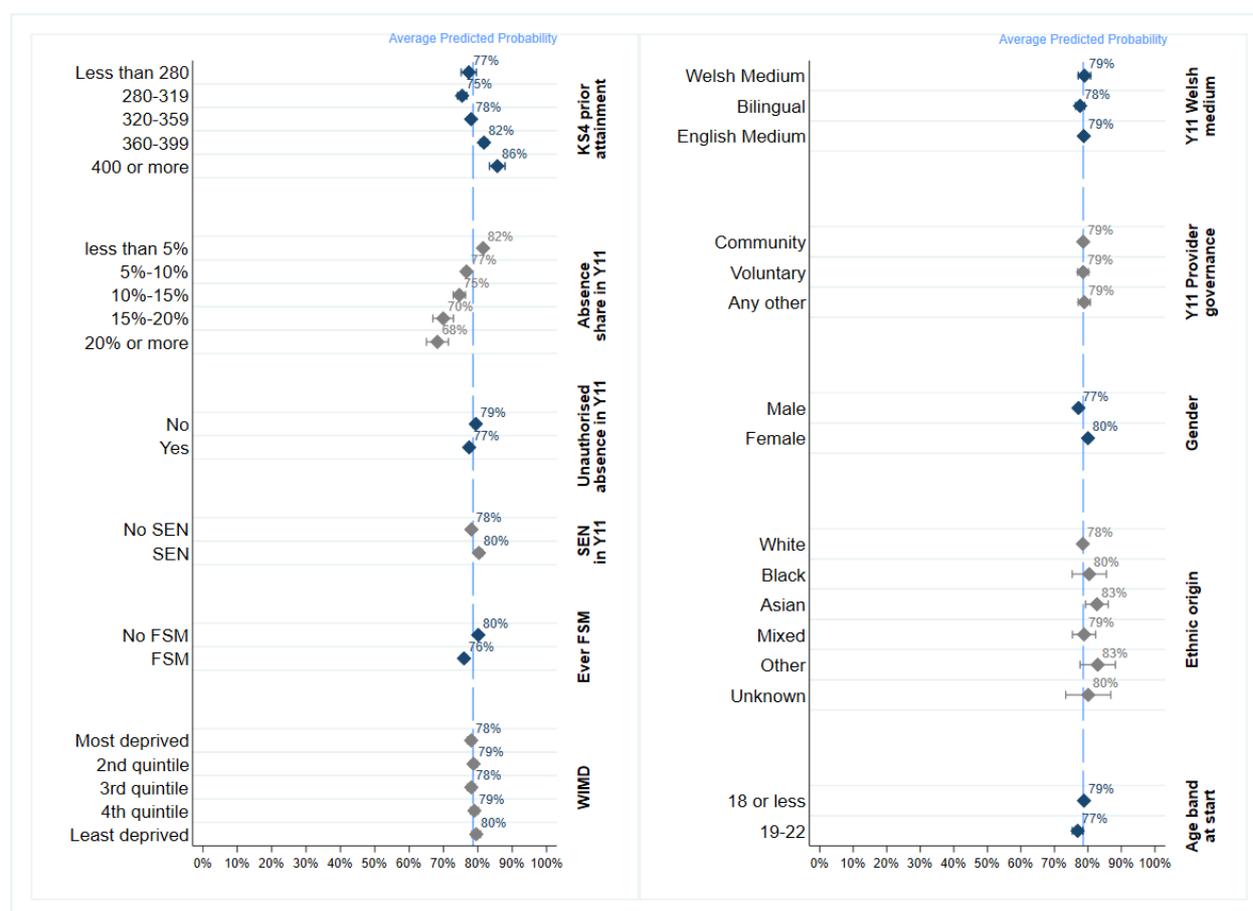
3.3 While the average completion rate across all learners is around 72% (as indicated by the vertical dashed line), there is a significant variation in the likelihood of achievement across the different characteristics, with higher values indicating a higher probability of achievement.

3.4 In particular, prior attainment at Key Stage 4 and absence data (both share of absences and whether the learner had any unauthorised absence in Year 11) were identified to have a very strong effect on A2 completion:

- Learners with very high point scores at Key Stage 4 attainment were more than twice as likely (88% vs. 42%, as shown in the top part of the left panel of Figure 1) to complete the A2 programme compared with learners with very low Key Stage 4 prior attainment scores;
- Learners who missed fewer than 5% of sessions in Year 11 were 20 percentage points more likely to complete at A2 (75% vs. 55%) compared with those who missed at least 15% of the sessions (second set of characteristics shown in the left panel of Figure 1). Moreover, unauthorised absence had a strong effect on the likelihood of completion (a 6-percentage point gap in favour of those with no unauthorised absence) even after controlling for absence rate.
- Some other factors also have a significant effect on the likelihood of A2 completion. These include socio-economic characteristics (with a negative effect associated with being eligible for Free School Meals and living in the most deprived areas of Wales), gender (with females being more likely to complete compared to males), and age of start (with older learners considerably less likely to complete than younger learners).

- 3.5 Similar conclusions can be drawn when looking at achievement for vocational programmes or other achievement measures for general education programmes, although the magnitude of the effects vary to some extent. Figure 2 presents the results for (full) success for vocational programmes at Level 3.
- 3.6 Prior attainment at Key Stage 4 is still a significant driver of vocational achievement, but to a smaller extent compared with general education achievement: learners in the top band for prior attainment have an 86% probability of success, compared with 75%-77% for those in the bottom two categories.
- 3.7 Absence share continues to play a significant role in explaining post-16 vocational achievement, with learners who missed fewer than 5% of sessions in Year 11 being 14 percentage points more likely to succeed compared with those who missed 20% or more (82% vs. 68%).

**Figure 2 Success rate for vocational programmes at Level 3 (based on learners successfully passing all qualifications in their programme)**



Note: SEN: Special Educational Needs; FSM: Free School Meals; WIMD: Welsh Index of Multiple Deprivation

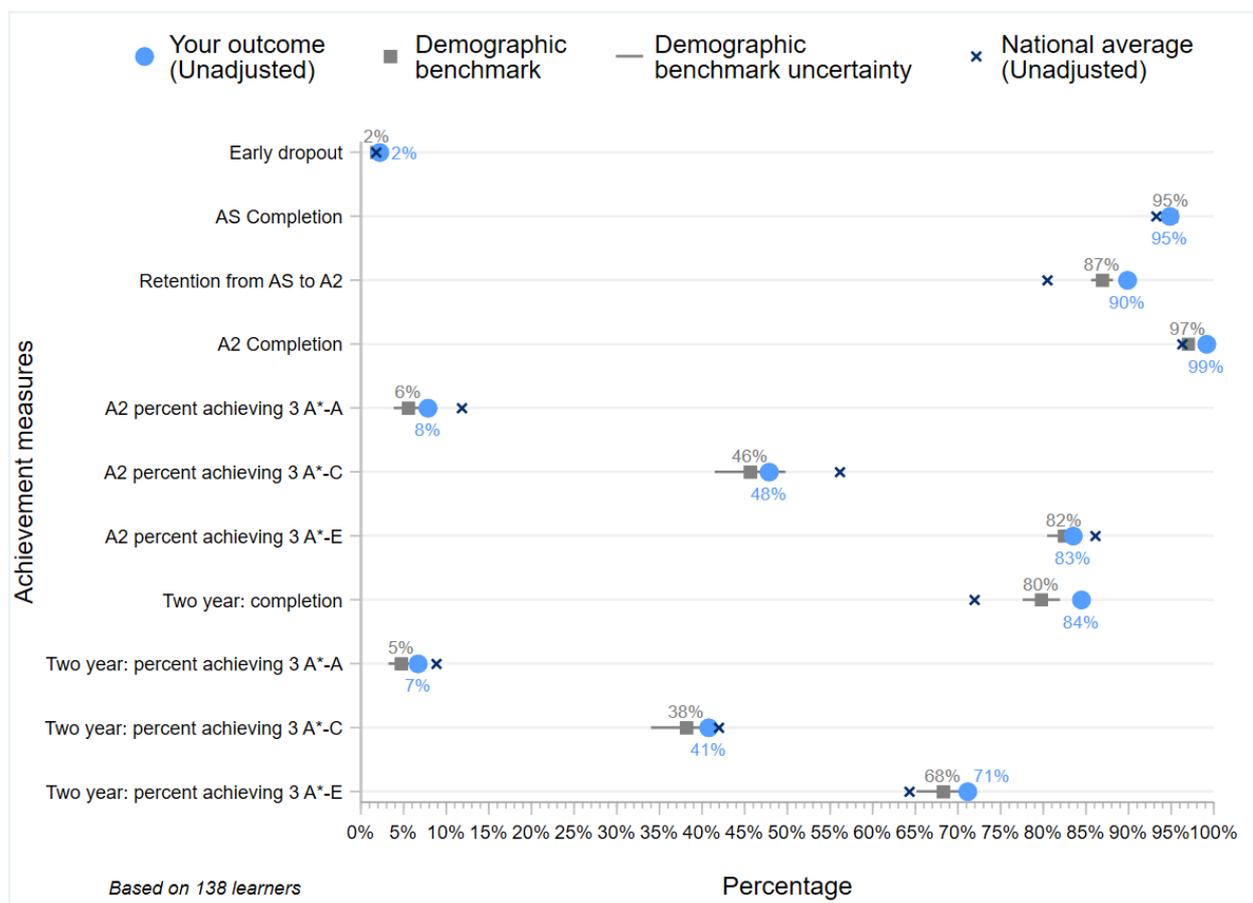
### Provider level template for demographic benchmark

- 3.8 The estimation results were used to construct a demographic benchmark, which accounts for the characteristics of the intake of each provider. This was used to compare actual outcomes with the outcomes that would be ‘expected’ considering the characteristics of learners. The resulting metrics are shown graphically in Figure 3 for general education programmes. The ‘template’ in Figure 3 is provided as an example for one provider but may be replicated for each institution providing post-16 education.
- 3.9 The chart shows the actual (unadjusted) outcome (i.e. the average actual performance of learners at that provider), the demographic benchmark (i.e. what we would expect the provider to achieve based on the characteristics of its intake based on the model estimates

for all learners and providers), a range of plausible values for the demographic benchmark (labelled as 'uncertainty', which shows whether the actual outcome lies inside or outside this range) <sup>6</sup> and the national average computed across all learners and providers.

- 3.10 In particular, the specific post-16 provider shown in Figure 3 is identified to be always 'outperforming' the predictions of the model, as the actual values (light blue circle) are always placed to the right of (or overlapping with) the demographic benchmark (grey square). This suggests that the results of the provider are strong considering the characteristics of its intake, despite the fact that for some measures the actual outcome is below the national average.
- 3.11 For example, 48% of learners at this provider achieved 3 A\*-C is in comparison with a national average of 56% (indicating a negative performance at first glance). However, the demographic benchmark for this specific provider is 46%, potentially reflecting an intake with relatively low prior attainment, high absence rates in Year 11, and/or learners coming from a more deprived background (on average). This suggests that the provider has actually performed better than expectations based on the characteristics of its intake.

**Figure 3 General Education 'template' (programme level)**



## 4. Conclusions

- 4.1 This study investigated the role of contextual factors in explaining subsequent achievement at the post-16 level in Wales. This was achieved using matched data from various Welsh

<sup>6</sup> The 'uncertainty' in the estimates is reflected in the 95% confidence intervals around the demographic benchmark. The primary factor influencing the size of the confidence intervals is the number of learners studying at that provider and included in the calculation of the benchmark.

educational data collections and linking information on general education, vocational learning and Welsh Baccalaureate study with information from Year 11 secondary school data.

- 4.2 The results indicate that absence in Year 11 (both share of absences and unauthorised absence) and prior attainment at Key Stage 4 are very strong drivers of subsequent achievement at post-16 level. This was observed across a variety of achievement measures considered for both general education and vocational programmes (for different vocational programme levels).
- 4.3 Other characteristics such as eligibility for Free School Meals, local area deprivation, gender, and age at start also seem to play a role in explaining post-16 achievement.

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Full Research Report: < Patrignani, P.; Behrens, S.; Conlon, G. (2022). *Analysis of factors that influence post-16 learning achievement in Wales*. Cardiff: Welsh Government, GSR report number 19/2022.

Available at: <https://gov.wales/analysis-factors-influence-post-16-learning-achievement-wales-summary>

Views expressed in this report are those of the researchers and not necessarily those of the Welsh Government

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Mae'r ddogfen yma hefyd ar gael yn Gymraeg.

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