

# EARNINGS AND EMPLOYMENT EFFECTS OF WORLDSKILLS UK COMPETITION-BASED TRAINING

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# 1 Executive summary

We used government-held data on the earnings and educational outcomes of the UK population to assess the value of WorldSkills UK competition-based training. We found positive impacts on earnings and employment for competitors although there are limits on the extent to which we can attribute these to competition-based training alone. Beyond sharing a version of the final report, we recommend continuing surveys to monitor impact and socialising findings to international and Government stakeholders.

WorldSkills UK organises a national and international competitions programme in various fields such as engineering, digital, health and construction. Competitors are tested to showcase their skills in a specific field, competing with similar peers in the UK and, for those that make international competitions, from around the world. Participation in competition-based training can affect earnings and employment outcomes by improving skills and confidence of competitors as well as instilling a high-performance mindset. However, to date there has been little quantitative UK evidence on the long-term impacts of being involved in competition-based training programmes. Our research sought to fill this gap.

We estimated the impact of competition-based training on earnings and employment using a bespoke survey of WorldSkills UK competitors between 2011 and 2018 as well as data on earnings, employment and prior educational attainment of the entire England population.<sup>1</sup> For each competitor, we compared their earnings and employment outcomes with a group of peers with similar gender, ethnicity, GCSE score, highest qualification level, years since achieving highest qualification, apprenticeship status and subject of study. This allowed us to estimate the difference in outcomes between competitors and the UK average controlling for key learner characteristics.

We found that average self-reported earnings for competitors were up to 60% higher than similar subsets of the UK population, especially for the largest competitor groups: males with level 3 as their highest qualification studying either construction or engineering and manufacturing. Our results on earnings uplifts were consistent albeit significantly higher than analysis done using a less robust survey of self-reported earnings of the UK labour force.

Average differences in days worked per year were around 30% higher than similar subsets of the UK population, with the largest competitor groups working between 23% and 41% more than a similar subset of the UK population.

There are limitations to our analysis, which are based on both the data we used and the methodology that was undertaken. Regarding data, we identified potential upward bias stemming from the self-reported nature of the competitor data. Furthermore, it was not possible to exclude part-time workers from the sample of the population. Therefore, upward bias in the estimates would be likely if competitors were less likely than a similar group of the population to work part-time. Regarding the methodology, more motivated and ambitious learners might be more likely to participate in competition-based training. In that case, part of the observed earnings uplift might be explained by differences in unobservable drivers of success between competitors and the wider population.

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<sup>1</sup> While earnings and employment data is available for the whole of the UK, prior educational attainment is available only for England. Matching these two, therefore, leads to an England only dataset.

A regular competitor survey would help WorldSkills UK monitor the effectiveness of their competition-based training and help further the evidence on its impact. Developments in the ability of external researchers to link external data on competitors with Office for National Statistics (ONS) Secure Data would allow a number of limitations in this current research to be overcome.

## 2 Introduction

WorldSkills UK is a partnership between education providers, government and employers which has the overarching aim of accelerating the development of young people's skills to achieve world-class standards. WorldSkills UK supports the development of skills among young people in the UK through a range of activities.

WorldSkills UK is a key player in WorldSkills international – an organisation which brings together 85 countries to compete in biennial skills Olympics. Key activities of WorldSkills UK are running a national **skills competition** programme every year (from which the UK international skills team is selected and trained), bringing together the UK's leading employers and delivering tailored and experiential **careers events and advice** (including the largest skills and careers event in the UK), WorldSkills UK LIVE.

WorldSkills UK also invests in **research and innovation** in international skills to influence best practice in skills development through a variety of publications (e.g. blogs, reports etc.). Increasingly, it supports the **development of skills** of the further education (FE) workforce, by sharing international best practice, to deliver high quality training and assessment.

### Competition-based training

WorldSkills UK organises national and international competition-based training programmes in fields such as engineering, digital, health and construction. The national competitions programme involves UK apprentices and students competing to be crowned best in the UK at certain disciplines. Every year up to 5,000 young people register to take part and around 500 are selected to compete in the National Finals based on their performance. The international competitions programme involves the winners of the national competitions programme competing with other countries (both European and global as part of Team UK). Every two years, around 100 (of the 500 National finalists) are invited in Squad UK and from those a fraction (around 30-40) competitors are selected to represent the UK at the biennial WorldSkills and EuroSkills international skills competitions.

Through the national and international competitions programme and associated training, WorldSkills UK improves the skills and confidence of young people and stimulates a high-performance mindset. This affects not only those taking part in competitions themselves (competitors and trainers) but also their peers. Participation in one of the WorldSkills UK competitions can affect earnings and employment outcomes through two major channels: a **combination of human capital effects and signalling**.

- **Human capital** is commonly defined as the relevant skills, knowledge, expertise and attributes of an individual which determine their productivity. By increasing the human capital of an individual, competition-based training can improve individual skills and expertise, which leads to positive employment outcomes and increased earnings.
- Competition-based training can also improve earnings for competitors through a **signalling effect**. Participation in a competition could signal the motivation and skills of competitors, generating positive

labour market outcomes. This effect occurs because it is costly for employers to verify the human capital and skills of an individual, meaning indicators like qualifications, work history and references are used to judge prospective candidates. Reaching a given benchmark in WorldSkills UK competitions – be it national finalists, Team UK member or medal winner – may be a signal to employers of strong human capital in a given vocational skill.

Frontier’s previous work looking at the return on investment of WorldSkills UK activities drew on the best available evidence to calculate how much value is associated with competition-based training for competitors themselves but also their trainers and peers. This showed that WorldSkills UK’s activities delivered high value for money for the taxpayer. An area of research identified as one that could benefit from further evidence was around the longer-term impacts of competition-based training on competitor outcomes such as employability and earnings. The aim of this project is to fill this evidence gap using UK administrative data, which will support WorldSkills UK’s discussions with its funders, the Department for Education (DfE).

## 3 Methodology and data

### Methodology

We studied the impact of participating in WorldSkills UK competition-based training on the long term earnings and employment outcomes of learners. The goal of our analysis was to find out if there are differences in outcomes between WorldSkills UK competitors and similar learners, controlling for unobserved factors.

WorldSkills UK collected self-reported evidence of earnings, employment, personal characteristics, and attainment history for more than 1,000 WorldSkills UK competitors and we compared that with the Longitudinal Education Outcomes (LEO) dataset which brings together education data with employment, benefits and earnings of the England population. This allowed us to compare WorldSkills UK competitors with the population of learners with similar personal characteristics and educational attainment.

Earnings and employment data excludes those which are unemployed to account for potential non-response bias in the survey regarding unemployed competitors.<sup>2</sup> Therefore, the impacts on earnings and days worked are conditional on being employed in a given year.

This methodology is not able to estimate the average difference in the earnings of competitors and non-competitors for a certain set of characteristics, nor is it able to estimate statistical significance. Rather, it compares the self-reported earnings of competitors with a subset of the England population with similar characteristics. Because LEO data is based on the whole of the England population, the results from our methodology reflect the difference in outcomes for competitors relative to the whole population, which includes those competitors.

In an ideal world, competitors’ learner IDs from the ILR (from WorldSkills UK/DfE) would be matched to the Longitudinal Education Outcomes (LEO) dataset to flag whether or not a particular learner took part in the programme. This would allow us to run econometric analysis on the resulting dataset to estimate the impact of participation in a competition on earnings and employment and its distribution. Furthermore, we would be able to quantify employment probabilities and unemployment spells for competitors and similar learners. This

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<sup>2</sup> Average earnings and employment outcomes are significantly affected by the inclusion of unemployed competitors as both their earnings amount and days employed are 0. Stripping them out from our analysis ensures any bias in the number of competitors surveyed which are unemployed doesn’t affect our estimates.

would also allow us to determine the statistical significance of such an impact, as well as confidence intervals around our estimate.

Unfortunately, at present, it is not possible to identify WorldSkills UK competitors in the LEO dataset. Linking external person level data with the LEO dataset is not currently allowed by ONS, albeit we understand this is something they are interested in allowing in future. Therefore, our methodology is the best approach given the available tools to identify the impact of WorldSkills UK competition-based training.

## Calculating earnings and employment estimates

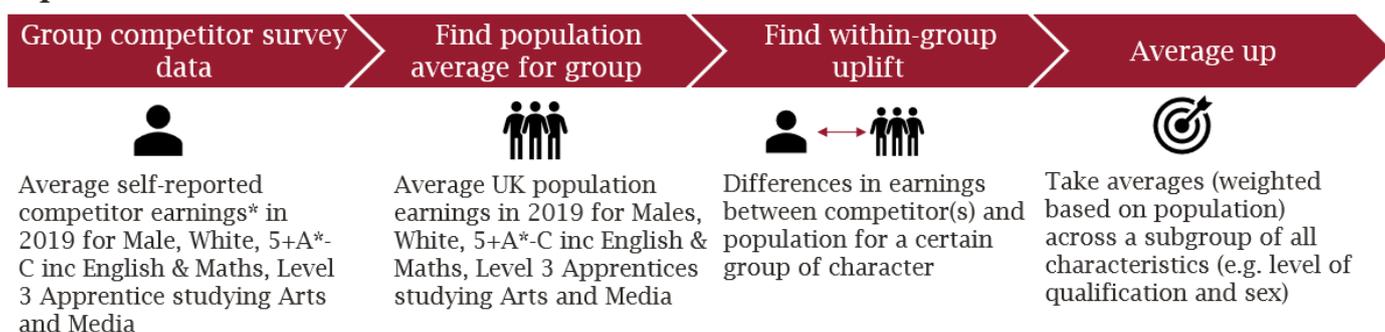
We computed overall annual earnings and annual days worked for each individual in each tax year and then estimated the mean, median and standard deviation of annual earnings and annual days worked for each combination of the following control variables:

- Gender
- Ethnicity
- GCSE score
- Highest qualification level
- Years since achieving highest qualification
- Apprenticeship status
- Subject of study.

The impact of participating in WorldSkills UK competition-based training on earnings and employment outcomes was estimated as the percentage uplift in annual earnings and annual days worked, for each combination of the characteristics that we control for. The uplift was estimated taking differences between the average self-reported annual earnings/days worked by competitors, and average population earnings/days worked from LEO data for a certain combination of characteristics (e.g. Male, White, 5+A\*-C including English & Maths, level 3 Apprentice studying Arts and Media). The overall uplift for a specific group of characteristics (e.g. all level 3 males, irrespective of other characteristics) was estimated taking averages (weighted based on population) across a subgroup of all characteristics. The uplift calculation method is illustrated in Figure 1.

**Figure 1 Uplift calculation method**

### Uplift calculation method



Source: Frontier Economics

Note: [Insert Notes]

We did not extract from LEO any statistic based on a sample size of less than 30 observations to avoid running into statistical disclosure issues. This meant that several combinations of characteristics with very few observations were not included in our analysis.<sup>3</sup>

## Cross-check methods for robustness - Analysis of LFS data

Given the methodological limitations set out above, we sought to validate our findings using another publicly-available source of earnings data for the population. We used the publicly available Labour Force Survey (LFS) dataset to cross-check our initial results from the LEO dataset on earnings uplifts, using all waves of data released from LFS since 2017.

We compared inflation adjusted average earnings of WorldSkills UK competitors and LFS respondents working full-time, 5 years after achieving highest qualification across different cuts of the data. Despite differences between the two datasets, this exercise helped to validate our findings, increasing confidence in our results.

Sample sizes in LFS are much smaller than in LEO, meaning it was not possible to control for all the educational and personal characteristics collected in the survey. Specifically, LFS data did not include GCSE attainment, which increases the change for bias when comparing the LFS data with competitor data on earnings and employment. Therefore, whilst results may be similar, differences between them may be driven by these factors.

## Data

### WorldSkills UK survey data

WorldSkills UK collected a survey of 1,128 competitors who participated in WorldSkills UK competition-based training between 2011 and 2018 on self-reported education outcomes, prior attainment, earnings and employment outcomes. For each competitor the survey includes information on:

- Year of participation in the competition
- Age
- Gender
- Ethnicity
- Region
- Employment status
- Highest qualification level
- Year highest qualification was achieved
- Industrial sector
- Subject of study
- Occupation
- Earnings between 2017 and 2021

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<sup>3</sup> Excluding these groups does not have a major impact, given the small sample sizes implies estimates may be less reliable.

- Number of months worked per year between 2017 and 2021.

We removed from our working dataset all competitors who are currently not in employment and all those who achieved their highest qualification level two or more years after participating in the WorldSkills UK competition<sup>4</sup>. This left us with 340 observations.

When conducting the analysis based on LEO data, we also filtered out all competitors who did not answer questions on earnings and months worked between 2017 and 2019 (data on 2020 and 2021 could not be matched with the LEO dataset which covers all tax years between 1998 and 2019). This gave us a final working dataset for WorldSkills UK competitors with 266 observations.<sup>5</sup>

As shown in the Table 1 below, competitors that responded to the survey tended to be predominantly males living outside of London and the South East. They tended to be aged over 25 with a level 3 qualification. The average annual earnings were approximately £29,000 with a standard deviation of around £12,500. Certain employment sectors were more popular than others, with 30 survey respondents working in construction and 19 working in manufacturing.

Average earnings varied by several key characteristics, such as:

- **Gender** – Average male earnings were £29,297 while female earnings were £18,151.
- **Level of highest qualification** – Average earnings grew as the level of qualification increased (excluding level 5) with level 2 earning an average of £26,333, level 3 earning an average of £29,087, level 4 earnings an average of £31,833 and level 5 earning an average of £20,677.<sup>6</sup>

**Table 1 Gender, age, region and highest qualification split of WSUK survey respondents**

| Dimension        | Variable    | Percentage of sample |
|------------------|-------------|----------------------|
| <b>Gender</b>    | Male        | 68.4%                |
|                  | Female      | 31.6%                |
| <b>Age bands</b> | 25 or under | 28.1%                |
|                  | 26 to 30    | 40.2%                |
|                  | 31 or older | 31.6%                |
| <b>Region</b>    | London      | 6%                   |
|                  | South East  | 9.8%                 |

<sup>4</sup> Including the highest qualification level achieved is important as it controls for the effect of qualifications on earnings and employment outcomes. However, competitions may lead to competitors obtaining higher or more qualifications, making qualification level an outcome. Generally, “good controls are variables that we can think of as having been fixed at the time the regressor of interest was determined” (Angrist, Pischke, 2009). For all competitors who achieved their highest qualification level two or more years after taking part in the competition, we cannot confidently assume that their decision to attain their highest qualification level was not affected by participating in the competition. Therefore, we exclude these observations from our final working dataset.

<sup>5</sup> When conducting the cross-check analysis based on LFS data, we filtered out all part-time workers (as we focus the LFS analysis on full-time workers only) and all respondents whose earnings and months worked 5 years after achieving their highest qualification are not available. This meant observations for 134 WorldSkills UK competitors were used in the cross-check.

<sup>6</sup> Level 5 has a relatively higher share of competitors doing Arts Media and Publishing which tends to have lower pay than other industries

|                                    |                          |       |
|------------------------------------|--------------------------|-------|
|                                    | South West               | 9.8%  |
|                                    | East of England          | 4.4%  |
|                                    | East Midlands            | 6.7%  |
|                                    | West Midlands            | 8.5%  |
|                                    | Yorkshire and the Humber | 6.6%  |
|                                    | North East               | 3.1%  |
|                                    | North West               | 11.4% |
|                                    | Wales                    | 12.6% |
|                                    | Scotland                 | 12.8% |
|                                    | Northern Ireland         | 7.8%  |
| <b>Highest qualification level</b> | Level 2                  | 2.9%  |
|                                    | Level 3                  | 24.1% |
|                                    | Level 4 and above        | 29.7% |
|                                    | Did not answer           | 43.3% |

Source: Frontier Economics analysis of WorldSkills UK Competitor Survey

## Longitudinal Education Outcomes (LEO) Dataset

The LEO dataset is a de-identified, person level dataset that brings together education data with the employment and earnings data of the England population. It is the most granular dataset on labour market outcomes that exists in England, while also including information on prior attainment.

We requested access to the following data tables (or a subset of variables included in them) available within LEO:

- Key stage 4 attainment data;
- Learnings aims;
- LEO Employment Spells table (information contained within this table comes from the HMRC P45 dataset and cover tax years 1997/98 to 2018/19);
- LEO Earnings table (information contained in this table comes from the HMRC P14 dataset and cover tax years 2003/04 to 2018/19).

These resulted in the following variables being obtained:

- GCSE results. GCSE results are a strong predictor of further education destinations and earnings later in life, as shown by Belfield et. al. (2018) in a joint IFS/DfE publication using LEO data. This is important as we will use GCSE results as a proxy for "prior ability" when estimating wage and educational outcomes.
- Gender and ethnicity
- FE qualification start and end date as well as level and sector subject area

- Whether or not an apprenticeship was undertaken
- Self-employed and employment earnings
- Employment spells

The average annual earnings of the England population with comparable characteristics to competitors was approximately £20,000 with a standard deviation of around £13,000.

Average earnings for the England population with comparable characteristics to competitors varied by several key characteristics, such as:

- **Gender** – Average male earnings were £20,197 while female earnings were £12,371.
- **Level of highest qualification** – Average earnings grew as the level of qualification increased (excluding level 5) with level 2 earning an average of £16,704, level 3 earning an average of £19,905, level 4 earnings an average of £32,541 and level 5 earning an average of £22,608.<sup>7</sup>

## Labour Force Survey (LFS) data

The LFS is a study of the employment circumstances of the UK population. It is the largest household study in the UK and provides the official measures of employment and unemployment.

Our working dataset based on LFS data includes all waves of LFS data released between 2017 and 2021 and is composed of 490 observations of full-time workers with available data on earnings 5 years after achieving highest qualification and other key variables.

LFS data reflects the UK population and, thus, has a different distribution of observations. For example, LFS data has relatively more observations in London (e.g. 27% in London and the South East) compared with the competitors that responded to the survey (e.g. 16% in London and the South East). Similarly, the LFS survey tends to have relatively fewer observation in manufacturing and construction (e.g. 11%) compared to competitors which responded to the survey (e.g. around 30%).<sup>8</sup>

## 4 Results

### Results from analysis of earnings data in LEO

We found that average earnings of the WorldSkills UK competitors were around 60% higher than the UK population after controlling for gender, ethnicity, GCSE score, highest qualification level, years since achieving highest qualification, apprenticeship status and subject of study.

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<sup>7</sup> Level 5 has a relatively higher share of people doing Arts Media and Publishing which tends to have lower pay than other industries

<sup>8</sup> These figures reflect the competitors which provided information on earnings 5 years after the date of their highest qualification, in order to make them comparable with LFS analysis which looks at earnings 5 years after qualification. Results are similar for different years since highest qualification.

The largest difference in earnings between competitors and a similar peer group is observed for lower education levels. We observe a significant earnings uplift for level 2 and level 3 respondents – between 60% and 70%.

Workers are more likely to hold a level 2 or a level 3 highest qualification in employment sectors where WorldSkills UK competition-based training has a stronger association on earnings. This finding, however, could also be due to the fact that the estimated earnings uplifts for level 4 and 5 competitors were based on very small sample size of WorldSkills UK competitors (see Table 2).

**Table 2 Uplift in earnings for WorldSkills UK competitors by gender and highest qualification level**

| Level of highest qualification | Sex    | % earning uplift | WorldSkills UK sample size | LEO sample size |
|--------------------------------|--------|------------------|----------------------------|-----------------|
| Level 2                        | Male   | 68%              | 12                         | 1916            |
| Level 3                        | Female | 66%              | 13                         | 981             |
| Level 3                        | Male   | 64%              | 247                        | 34933           |
| Level 4                        | Male   | -1%              | 6                          | 302             |
| Level 5                        | Female | -8%              | 3                          | 151             |
| Level 5                        | Male   | -12%             | 9                          | 247             |

Source: Frontier Economics analysis of WorldSkills UK survey data and LEO data.

Note: Figures in red if WorldSkills UK survey sample size smaller than 10

Engineering and construction are the fields with largest samples and most robust results. A large proportion of competitors were males who had a level 3 in either engineering and manufacturing or construction as their highest qualification. This is where sample sizes are largest and results are most robust. We found that, relative to a similar peer group:

- level 3 male competitors who studied engineering and manufacturing had a 58% uplift in earnings;
- level 3 male competitors who studied construction had a 48% uplift in earnings.

For other cuts of the data we see very strong earning uplifts, but these are based on small sample sizes. Therefore, these estimates are unreliable as they may be influenced by bias and/or outlier observations. Similarly, most data cuts that show a negative uplift in earnings have very small sample sizes and correspond to higher qualification levels.

In fact, we do not observe higher uplifts for WorldSkills UK competitors when restricting the focus on individuals whose highest qualification level is 4 and above. This is due to two main factors:

- Average population earnings for level 4 qualifications were higher than for level 2 and level 3 qualifications.

- Earnings for competitors with a level 4 qualification were lower than those with a level 2 and level 3 qualification. This may be due to differences in occupation undertaken by those with level 2 and level 3, compared with those which undertake a level 4 qualification. However, we were unable to ascertain what the main driver of this differences was using the survey data.

These results suggest a strong association between participating in WorldSkills UK competition-based training and earning relatively more than a comparable peer group, specifically for the vast majority of competitors.

**Table 3 Uplift in earnings for WorldSkills UK competitors by gender, highest qualification level and subject of study**

| Level of highest qualification | Subject                                   | Sex    | Mean uplift | WorldSkills UK sample size | LEO sample size |
|--------------------------------|---|--------|-------------|----------------------------|-----------------|
| Level 3                        | Arts, media and publishing                | Male   | 135%        | 9                          | 4956            |
| Level 3                        | Arts, media and publishing                | Female | 87%         | 1                          | 40              |
| Level 3                        | Social Sciences                           | Male   | 81%         | 2                          | 79              |
| Level 3                        | Business administration and Law           | Male   | 79%         | 3                          | 1619            |
| Level 3                        | Education and training                    | Female | 78%         | 3                          | 187             |
| Level 3                        | Agriculture, horticulture and animal      | Female | 76%         | 6                          | 598             |
| Level 2                        | Construction, planning and building       | Male   | 68%         | 12                         | 1916            |
| Level 3                        | Health, public services and care          | Male   | 58%         | 3                          | 532             |
| Level 3                        | Engineering, manufacturing and technology | Male   | 57%         | 117                        | 17614           |
| Level 3                        | Science and math                          | Male   | 47%         | 3                          | 675             |
| Level 3                        | Construction, planning and building       | Male   | 46%         | 105                        | 8604            |
| Level 3                        | Health, public services and care          | Female | 9%          | 3                          | 156             |
| Level 4                        | Engineering, manufacturing and technology | Male   | -1%         | 6                          | 302             |
| Level 5                        | Arts, media and publishing                | Female | -8%         | 3                          | 151             |
| Level 5                        | Engineering, manufacturing and technology | Male   | -12%        | 9                          | 247             |
| Level 3                        | Information and communication technology  | Male   | -38%        | 5                          | 854             |

Source: Frontier Economics analysis of WorldSkills survey data and LEO data

Note: Figures in red if WorldSkills UK survey sample size smaller than 10

## Limitations

While the observed earnings difference could be driven by the competition's effect on skills, it could also be explained by three potential sources of upward bias that we were not able to control for:

- **Part-time workers** – The LEO dataset is unable to separate part-time and full-time workers, since the HMRC P45 employment dataset only contains start dates and end dates of employment spells. This may lead to bias if competitors are less likely to be part-time workers relative to learners with similar characteristics. However, the effect of this bias is unlikely to be significant as only 10% of males who are not students are working part-time.
- **Survey response bias** – The estimated uplift could be upward biased if those who answered survey questions in the WorldSkills UK survey had higher earnings than competitors who did not answer.
- **Selection on unobservable characteristics** – While the observed earnings difference could be driven by the competition's effect on skills, it could also be explained by differences in unobserved factors. For example, more motivated and ambitious learners might be more likely to participate in competition-based training. In that case, part of the observed earnings uplift might be explained by differences in unobservable drivers of success between competitors and the wider population.

## Results from analysis of employment data in LEO

Data on employment does not allow us to make conclusions on the effect of competitions on employment outcomes. The average annual days worked for WorldSkills UK competitors were around 30% higher than the England population after controlling for gender, ethnicity, GCSE score, highest qualification level, years since achieving highest qualification, apprenticeship status and subject of study.

However, we cannot robustly conclude that participation in competition-based training is strongly associated with better employment outcomes. Nearly all WorldSkills UK survey respondents stated that they worked for 12 months for each tax year from 2017 to 2021. On the other hand, a minority of learners with similar characteristics to the competitor sample were unemployed. Therefore, differences in employment between competitors and a similar peer group could be due to competitor reporting bias (unemployed ex-competitors being less likely to respond to the survey).

Even though the analysis of employment data does not allow us to make conclusions on the effect of competitions on employment outcomes, it gives us more information on what is driving the earnings uplift. The uplift in annual earnings for WorldSkills UK competitors can depend on a combination of the following two factors:

- higher hourly pay and
- more hours worked.

The analysis of earnings data from LEO does not allow us to infer which of these two factors is prevalent, since we are unable to identify part-time workers in the LEO dataset. However, LEO employment data suggest that the majority of the uplift in earnings for those employed is associated with higher hourly earnings

for those who took part competition-based training, rather than differences in employment status (full-time vs part-time).

As stated above, we are unable to separate out intrinsic motivation as a factor driving the uplifts we estimate in this research. Therefore, the uplifts should be seen as capturing both intrinsic factors as well as competition-based impacts on earnings.

## Results from analysis of LFS data

In order to control for differences between competitors and the UK population, key subsets of LFS data were compared to WorldSkills UK competitor earnings. Given the small sample of LFS data, and unlike LEO data, detailed subgroups (e.g. holding constant sex, prior attainment, subject of study, qualification level) could not be compared.

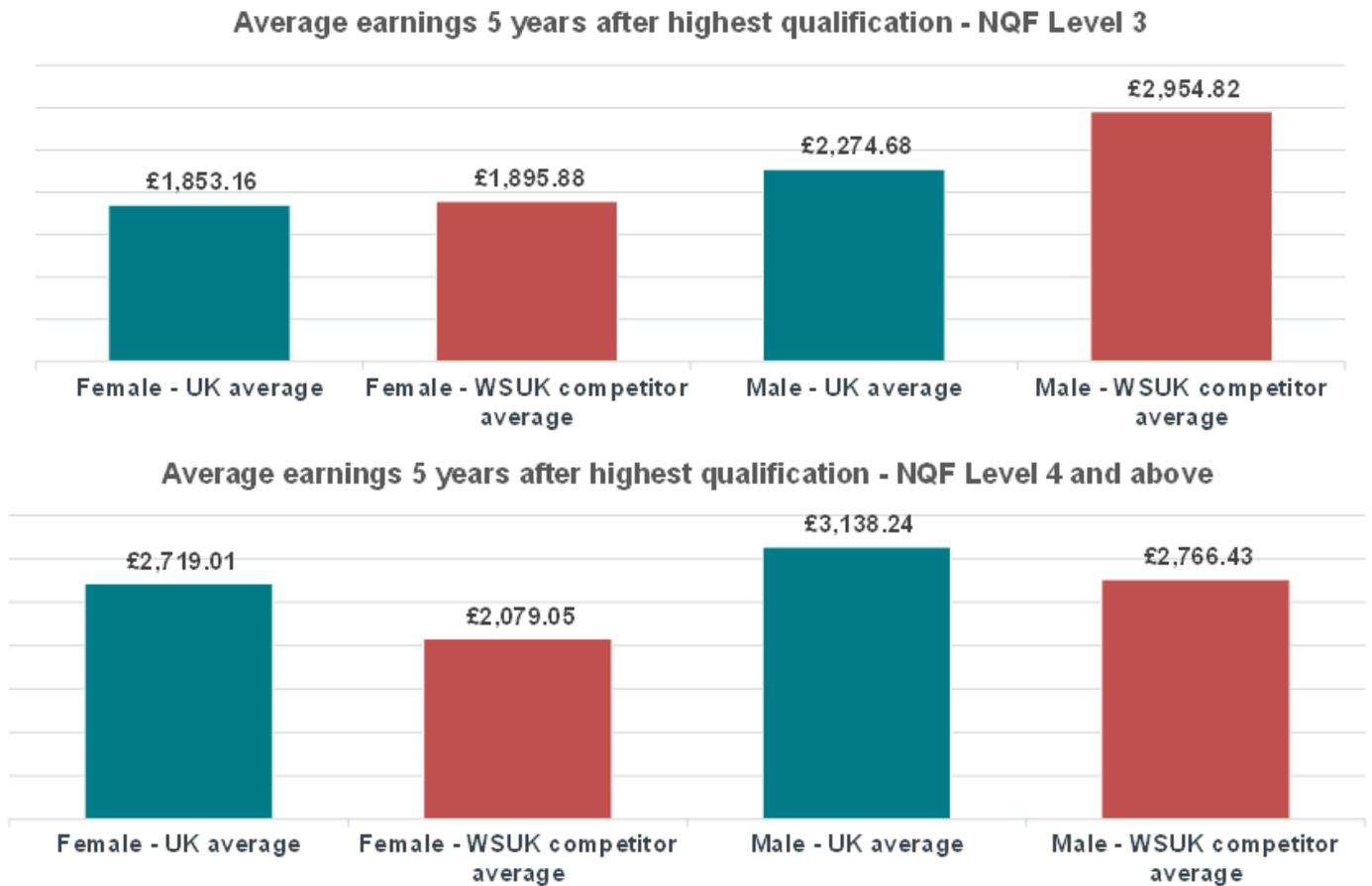
Although less robust, the analysis of LFS data is in line with the results emerging from the analysis of LEO data. LFS analysis confirms that the majority of WorldSkills UK competitors earn on average more than a similar subgroup of the UK population, and that the earning uplift is stronger for individuals holding lower qualification levels and working in specific fields, particularly for Level 3 males working in engineering, construction and manufacturing.

Holding constant highest qualification, average competitor earnings are higher than a comparable subgroup of the UK population with a level 3 qualification but not for females and for level 4 qualifications and above. Average earnings of level 3 male WorldSkills UK competitors five years after highest qualification are around 30% higher than the UK average. However, average earnings of level 3 female competitors five years after highest qualification are roughly in line with the national average. Average earnings for competitors with a level 4 qualification and above are approximately 12% lower for males and 24% lower for females.

This is explained by two main effects:

- **Lower competitor earnings for level 4 males relative to level 3:** The average earnings for male competitors are lower for level 4 than level 3. This may be due to the mix of their occupations and sectors they work in.
- **Higher population earnings for level 4 and above due to mix effects:** There is a different distribution of level 4 respondents in LFS and the WorldSkills UK sample. It is likely that there are more university graduates in the LFS subsample, which is pushing the average UK earnings up.

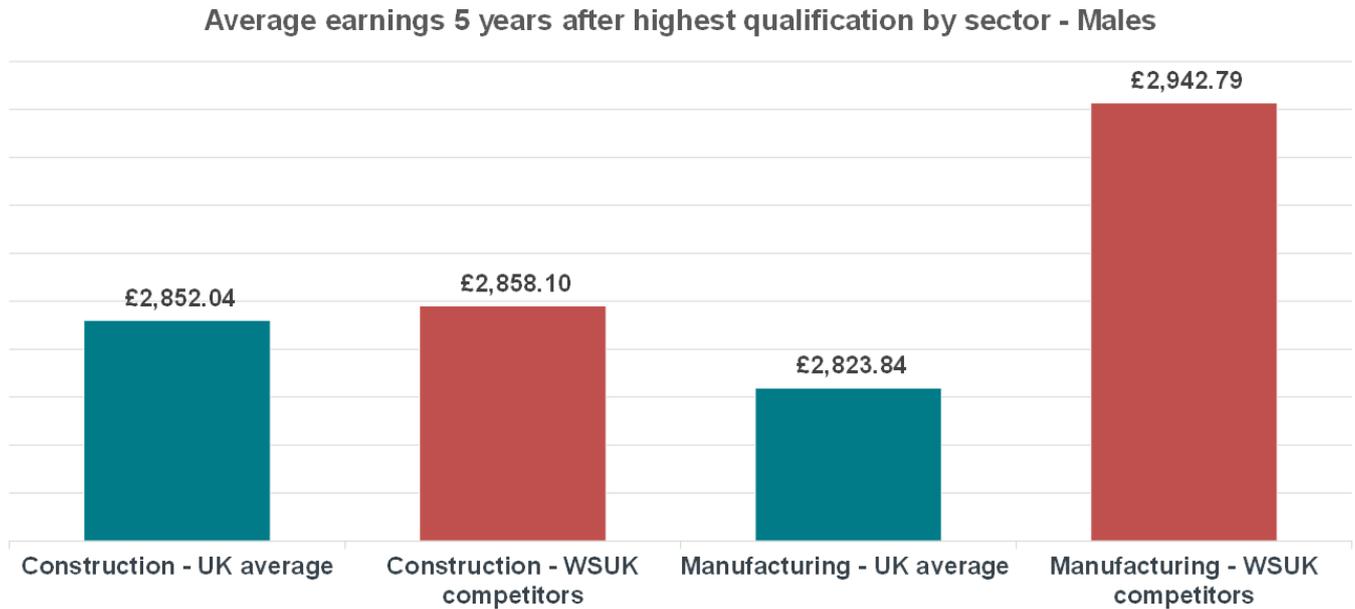
**Figure 4** Inflation adjusted average earnings 5 years after highest qualification by qualification level and gender



Source: Frontier Economics analysis of WorldSkills UK and LFS data

Holding constant the industrial sector, male competitors working in construction and manufacturing earn more than the average UK population employed in those sectors five years after highest qualification. This is particularly evident in manufacturing where average competitor earnings are around 5% higher than the average. Unfortunately, small sample sizes do not allow us to compare female competitors in a specific sector with the UK average using LFS.

**Figure 2** Inflation adjusted average earnings 5 years after highest qualification by sector for males



Source: Frontier Economics analysis of WorldSkills UK and LFS data

The LFS results are most similar to the LEO results when comparing occupations between the competitor sample and the UK population. This is likely to be the most robust comparison, as occupational mix is a possibility in driving observed differences across region and sector. In fact, male competitors working in Skilled Trade Occupations earn ~ 25% more than the UK population working in a skilled trade five years after highest qualification. Conversely, competitors in professional occupations earn ~ 11% less than the UK population in professional occupations. However, this is likely driven in some part by the mix of sectors that competitors work in compared to the UK population, where high paying jobs in finance and law push up the professional occupation average.

**Figure 6** Inflation adjusted average earnings 5 years after highest qualification by sector and qualification group for males



Source: Frontier economics analysis of WorldSkills and LFS data

The limited sample size of LFS data does not allow us to control for more than one variable at a time. Therefore, the comparisons of averages shown above do not necessarily reflect an uplift in earnings determined by the participation in WorldSkills UK competition-based training but can reflect substantial heterogeneity in the two samples compared.

Another limitation of LFS is that estimates of gross earnings have been derived by taking gross pay for the last pay period and interpolating it to a yearly figure (e.g. taking gross pay for the last month and multiplying it by 12 to estimate yearly pay). LEO data is more accurate at capturing total gross pay within a financial year, as it accounts for job transitions and changes to pay within a given year.

## 5 Next steps

We would recommend WorldSkills UK continue surveying competitors on a regular basis to continue monitoring earnings and employment outcomes, helping it maximise the effectiveness of its competition-based training programmes. Continuous monitoring of outcomes would help WorldSkills UK increase the robustness of the findings regarding the positive value that competitions have by repeating this exercise over several years. This would also help track and monitor the impact that changes to the delivery of its competition-based training programmes have on key outcomes.

Similarly, WorldSkills UK could survey competitors from other devolved administrations in the UK to broaden out the geographical scope of this research. However, one key limitation of this is the fact that attainment data used in LEO only covers England. Therefore, LFS data would need to be used instead.

We would also recommend close collaboration with the ONS and the respective data owners of LEO, including the Department for Education, in case linking competitor data with LEO were to become permitted. This would allow more robust econometric research on the impact of competitions, reducing some data and methodology limitations we identified above. Furthermore, this would also improve the methods and data used to evaluate policies and programmes aimed at vocational education in the UK.

