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EARNINGS AND EMPLOYMENT EFFECTS OF WORLDSKILLS UK COMPETITIONS

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EXECUTIVE SUMMARY

WorldSkills UK organises national and international competitions in various fields such as engineering, digital, health and construction. Competitors are tested to showcase their skills in a specific field, competing with peers in the UK and, for those selected to represent the UK in international competitions, from around the world. Participation in a competition 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 studied the association between participation in one of WorldSkills UK competitions and earnings and employment outcomes using a bespoke survey of WorldSkills UK competitors between 2011 and 2018 as well as data on earnings, employment and prior educational attainment from the Longitudinal Education Outcome (LEO) data set. Due to different data collection methods across the UK, our analysis focuses on only England. For each competitor, we compared their earnings and employment outcomes with a group of peers with similar characteristics in terms of 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 national average controlling for key learner characteristics. We found that:

- the earnings for competitors can be up to 60% higher than those of the general population with similar characteristics;
- differences in earnings were particularly stark for the largest competitor groups: males with level 3 qualifications in Construction or Engineering and Manufacturing;
- our results on earnings uplifts were consistent with, albeit higher than, previous analysis of a survey of self-reported earnings of the UK labour force;
- the effects on employment - average days worked per year were around 30% higher for competitors than non-competitors.

EMPOWERING YOUNG PEOPLE
Careers advice, Skills competitions, Skills champions

RAISING STANDARDS
Centre of Excellence, CPD Live, Learning Lab

CHAMPIONING FUTURE SKILLS
Insights reports, Skills Taskforce

Vision

WorldSkills UK believes in the value and prestige of technical education and its potential to empower young people and drive growth

Mission

WorldSkills UK embeds world-class standards across the UK to improve the quality of apprenticeships and technical education for the benefit of all young people and businesses

TWO TYPES OF SKILLS COMPETITIONS

NATIONAL COMPETITION

INTERNATIONAL COMPETITION

- WorldSkills UK organises a national skills competitions programme across various fields and collaborates with WorldSkills International to organise the international competition programme.
- These competitions serve as platforms for UK apprentices and students to showcase their skills and vie for the title of the best in the nation within their respective disciplines.
- The international competitions programme involves the winners of the national competitions competing with other countries (both European and global) as part of Team UK after intensive upskilling and preparation.

- The first stage of competition is a remote or online test (where applicable)
- Competitors take part in competitions at their local college, training provider centre or workplace, or take part in an online competition
- The highest scoring individuals from the Qualifiers advance to the National Finals held in autumn
- Participants in the National Finals who meet the age criteria and achieve the prescribed performance benchmark may receive an invitation to join Squad UK
- After months of intensive training, most promising candidates are selected into Team UK and participate in the international competitions

DURING THE 2021-23 CYCLE OF ACTIVITIES…

4,659 NATIONAL COMPETITORS

All those who attend national heats but either fail to qualify for national finals or qualify for national finals but do not make it into Squad UK

115 MEMBERS OF SQUAD UK

All those who make it into Squad UK and take part to the International Competitions

17 MEDAL WINNING INTERNATIONAL COMPETITORS

All those who make it into Squad UK and win a medal at the International Competitions

Individuals engaged in the skills competitions programme, whether at the national or international level, experience a direct upskilling effect

UP TO +60% IN EARNINGS FOR COMPETITORS

UP TO +30% AVERAGE DAYS WORKED PER YEAR

Differences in earnings were particularly stark for the largest competitor groups: males with level 3 qualifications in Construction or Engineering and Manufacturing. Our results on earnings uplifts were consistent with, albeit higher than, previous analysis of survey of self-reported earnings of the UK labour force.

1 Introduction

1.1 Background

1.1.1 WorldSkills UK mission

WorldSkills UK is an independent charity and a partnership between employers, education and governments. Its overarching mission is to accelerate the development of young people's skills, with the ultimate goal of achieving world-class standards. As a prominent member of the global movement known as WorldSkills International, WorldSkills UK actively supports and empowers young individuals through competition-based training, assessment, and benchmarking. These efforts culminate in national teams competing at the biennial 'skills Olympics', where they test their abilities against international standards. The insights gained from this global network contribute to raising skill standards in the United Kingdom.

WorldSkills UK is primarily dedicated to inspiring and nurturing the skills and talents of young people, equipping them with practical competencies essential for successful careers. Its primary focus lies in technical and vocational education and training, effectively bridging the skills gap within the UK.

The activities of WorldSkills UK (2021-23) can be categorised into three main themes, as shown in Figure , with each theme contributing to its mission:

- **Empowering young people**. WorldSkills UK carries out a range of activities to inspire young people to choose high-quality apprenticeships and technical education as a prestigious career route. These activities include:
  - *Skills Competitions* – WorldSkills UK organizes national competitions encompassing a wide array of occupations and professions, offering young competitors under the age of 25 a platform to showcase their skills at a high level. Additionally, as part of the WorldSkills International network, WorldSkills UK takes part in the international WorldSkills Competitions, a biennial cycle of skills competitions where the winners of the national competitions programme compete with other countries (both European and global) as part of Team UK.
  - *Careers Advice toolkit* – This digital guide aimed at careers professional supports young individuals in enhancing employability skills and gaining career-related information, particularly within technical and apprenticeship career pathways. It provides inspiring, bite-sized content that can be flexibly used for independent online learning or incorporated into classroom and virtual career curricula.
  - *Spotlight on Careers* – This content series sheds light on current and future skills needs, aiding students in initial career planning and assisting educators in providing engaging career advice. It comprises industry overviews, insights from experts, apprentice role models' experiences, industry-related tasks, and technical pathways.

- **Raising standards**. WorldSkills UK undertakes various activities aimed at enhancing the expertise and performance of educators, by sharing international best practice, to deliver high-quality training and assessment. These activities include:
  - *Centre of Excellence* – This programme endeavours to offer its members world-class teacher training based on international insights and best practice in technical education and skills development. It fosters industry-led networks for innovation, communities of practice exploring priority skill sectors, and a global community for thought leadership, which contributes to research and shapes future policy. Supported by partners from the education and industry sectors, the Centre supported over 4,000 educators and benefitted more than 64,000 learners over the 2020-23 period. Looking ahead to the 2023-26 timeframe, the objective is to extend assistance to more than 5,000 educators and benefit the paths of 140,000 learners.
  - *CPD Live* – These live sessions cater to those involved in delivering technical and vocational education and training, as well as quality leads and pastoral staff. They demonstrate how to integrate world-class teaching practices and enhance the skills of educators, students and apprentices to align with employer demands.
  - *Learning Lab* – This resource repository contains tools and materials derived from WorldSkills UK's global insights into best practices in skills development. It aims to assist Further Education (FE) colleges and independent training providers in training more young individuals to meet world-class standards.
- **Championing future skills**. WorldSkills UK conducts research and insights activities with the aim of mainstreaming global excellence in skills. This involves sharing international best practices, exploring global trends in skills development, and benchmarking the UK's skills systems against those of other countries. These efforts ultimately contribute to the success of young people, employers, and the UK economy.

Figure 1 WorldSkills UK activities

Source: Frontier Economics and WorldSkills UK

1.1.2 Competition based training

WorldSkills UK organises a 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 around 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) of 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.
- Competitions 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.

1.2 Motivation for this study

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 Competitions 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).

1.3 Structure of this report

The report is structured as follows: Section 2 explains the methodological approach, Section 3 presents the results of the analysis, Section 4 discussed the limitations and opportunities for further research and Section 5 outlines the conclusions.

2 Methodology and data

2.1 Methodology

We studied the impact of participating in a WorldSkills UK competition on 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 who are unemployed to account for potential non-response bias in the survey regarding unemployed competitors.[1] Therefore, the impacts on earnings and days worked are conditional on being employed in a given year.

This methodology 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 reflect the difference in outcomes for competitors relative to the whole population, which includes those competitors.

2.2 Data

2.2.1 WorldSkills UK survey data

WorldSkills UK collected a survey of 1,128 competitors who participated in a WorldSkills UK competition 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;

[1] 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.

- Employment status;
- Highest qualification level;
- Year highest qualification was achieved;
- Industrial sector;
- Subject of study;
- Occupation;
- Earnings between 2017 and 2021;
- 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[2]. 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.[3]

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

[2] 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.

[3] 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.

an average of £29,087, level 4 earnings an average of £31,833 and level 5 earning an average of £20,677.[4]

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

Dimension	Variable	Percentage of sample
Gender	Male	68.4%
	Female	31.6%
Age bands	25 or under	28.1%
	26 to 30	40.2%
	31 or older	31.6%
Region	London	6%
	South East	9.8%
	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%
Highest qualification level	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

[4] Level 5 has a relatively higher share of competitors doing Arts Media and Publishing which tends to have lower pay than other industries

2.2.2 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.[5]

2.2.3 Labour Force Survey (LFS)

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%).[6]

[5] Level 5 has a relatively higher share of people doing Arts Media and Publishing which tends to have lower pay than other industries

[6] 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.

3 Results

3.1 Results from analysis of LEO data

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.

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 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	-	6	302
Level 5	Female	-	3	151
Level 5	Male	-	9	247

Source: Frontier Economics analysis of WorldSkills UK survey data and LEO data.
Note: The table does not show statistics for cuts of data for which 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 – a group that generally includes a significant proportion of university graduates. 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 a WorldSkills UK competition 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	-	9	4956
Level 3	Arts, media and publishing	Female	-	1	40
Level 3	Social Sciences	Male	-	2	79
Level 3	Business administration and Law	Male	-	3	1619
Level 3	Education and training	Female	-	3	187
Level 3	Agriculture, horticulture and animal	Female	-	6	598

Level 2	Construction, planning and building	Male	68%	12	1916
Level 3	Health, public services and care	Male	-	3	532
Level 3	Engineering, manufacturing and technology	Male	57%	117	17614
Level 3	Science and math	Male	-	3	675
Level 3	Construction, planning and building	Male	46%	105	8604
Level 3	Health, public services and care	Female	-	3	156
Level 4	Engineering, manufacturing and technology	Male	-	6	302
Level 5	Arts, media and publishing	Female	-	3	151
Level 5	Engineering, manufacturing and technology	Male	-	9	247
Level 3	Information and communication technology	Male	-	5	854

Source: Frontier Economics analysis of WorldSkills survey data and LEO data
Note: The table does not show statistics for cuts of data for which WorldSkills UK survey sample size smaller than 10

Furthermore, we found that 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.

3.2 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:

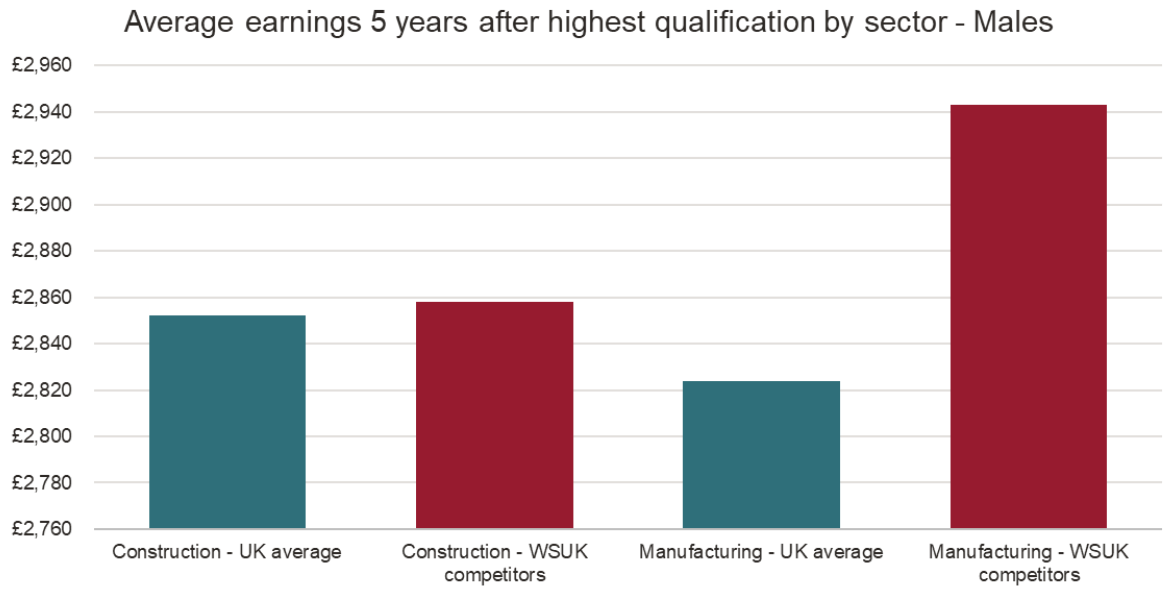
- **Lower competitor earnings for level 4 males relative to level 3:** The average earnings for male competitors is lower for level 4 than level 3. This may be due to the mix of their occupations and sectors they work in.
- **Higher population earnings for level 4 and above due to mix effects:** There 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 1 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 to be driven in some part by the mix of sectors that competitors work in compared to the UK population, where high paying jobs in sectors such as 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

4 Limitations and opportunities for further research

4.1 Limitations in the methodology

Our methodology is not able to estimate the average difference in the earnings of competitors and non-competitors for a certain set of characteristics, nor 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 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 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.

4.2 Caveats around results from LEO analysis

4.2.1 Caveats around analysis of LEO earnings data

In our analysis of earnings data in LEO, 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 competitions. 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.

4.2.2 Caveats around analysis of LEO employment data

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 the competition 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: (i) higher hourly pay and; (ii) 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 in competitions, 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.

4.3 Caveats around results from LFS analysis

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 in section 4.3 do not necessarily reflect an uplift in earnings determined by the participation into the WorldSkills UK competition 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.

4.4 Opportunities for further research

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 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.

5 Conclusion

We used government-held data on the earnings and educational outcomes of the UK population, in combination with a bespoke survey of WorldSkills UK competitions alumni, to assess the value of WorldSkills UK competitions.

We compared the outcomes of competitors with a suitable group of similar learners not participating in competitions.

We found a strong positive association between participation in WorldSkills UK competitions and improved earnings and employment outcomes. The data we collected suggests that earnings for competitors can be as much as 60% higher than those of non-competitors.

The research also found that days worked for WorldSkills UK competitors were around 30% higher than the average annual days worked of non-competitors with similar characteristics.

We found some variation by gender, level and subject of study. For example:

- Level 3 male competitors who studied engineering and manufacturing had a 58% uplift in earnings and a 23% uplift in days worked relative to the UK population with similar characteristics.
- Level 3 male competitors who studied construction had a 46% uplift in earnings and a 41% uplift in days worked relative to the UK population with similar characteristics.

To the best of our knowledge, this is the first time that a study of this nature has been conducted, drawing on both the LEO data set and a survey of WorldSkills UK competitors. Repeated future surveys of competitors would add value by expanding the sample and allowing for effects to be studied over time. Although not currently possible, matching WorldSkills UK competitors in administrative data sources (such as the LEO data set) would allow for more detailed statistical modelling further enhancing the methodological validity of the study.