

United Nations Network of Economic Statisticians

Measuring Education Productivity in the UK: Trends, Challenges and Insights

Dr Adam Clark

Senior Statistical Production Analyst

Public Service Productivity

Well-being, Innovation and Productivity Division

MESA Directorate

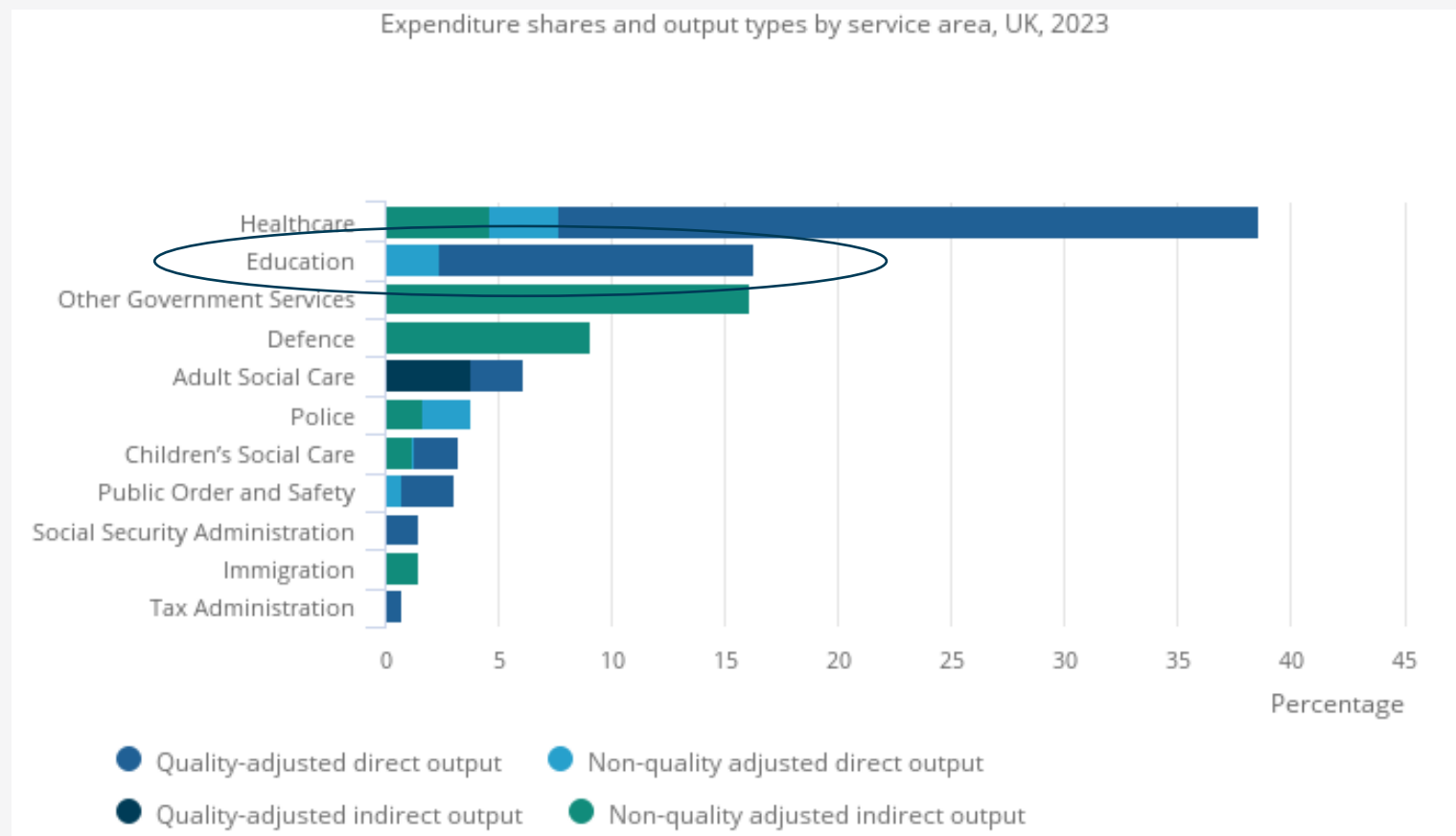
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Introduction

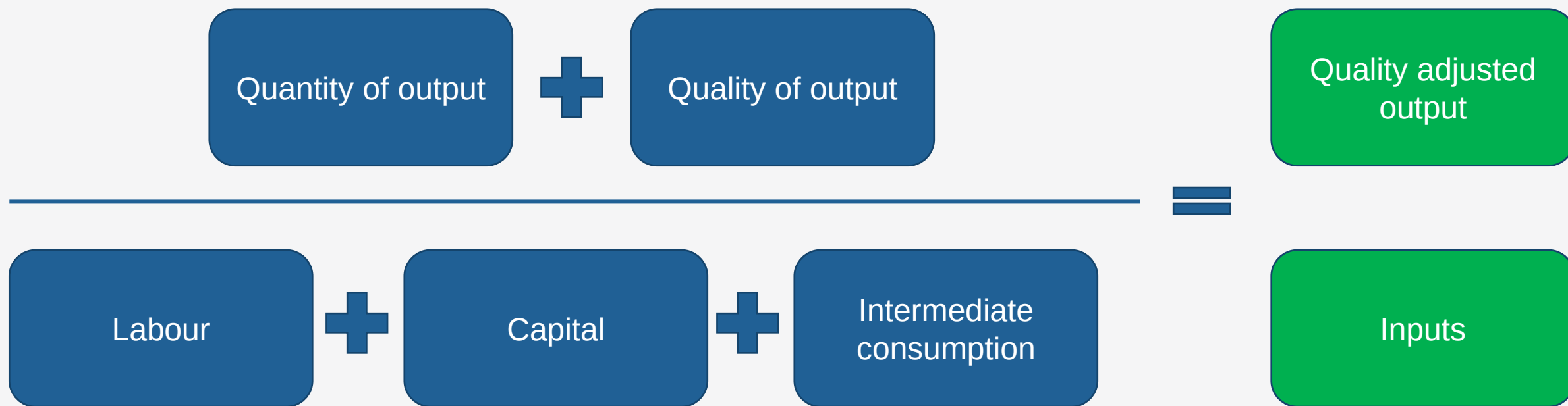
- In the UK, education is the second largest public service area with direct measurements according to expenditure shares (16.3% in 2023)
- Due to its relative weight, education typically has significant bearing on aggregated total UK public service productivity (next to healthcare)
- The Office for National Statistics' (ONS) productivity model for Education is comprehensive and was further refined following the public service productivity review to expand coverage of and improve outcome measures

Introduction



Source: Public service productivity: total, UK, 2023, ONS

Estimation of Productivity



Main concepts

Main Concepts - Inputs

Labour

- Directly measured labour composed of FTE teachers (adjusted by volume of overtime) aggregated by their salary shares
- Indirectly measured labour obtained from National Accounts - COFOG 9
- Direct and indirect indices weighted by Local gov and Central gov shares
- Indirect labour deflated by Average labour costs per hour (ALCH)

Intermediate Consumption (IC)

- Figures are obtained from National Accounts (COFOG 9) and we obtain these for provision (schools) and administration (gov depts)
- Provision prices are deflated by a constructed deflator, composed of relevant CPI/SPPI/PPI weighted by expenditure as declared in the Department for Education's annual reports and accounts
- Administration prices deflated by GDP-implied deflator
- Provision and Administration aggregated based on expenditure shares

Consumption of fixed Capital (CFC)

- Figures are obtained from National Accounts (COFOG 9)
- Prices are deflated by capital stocks deflator industry P (Education)

Components are weighted and aggregated based on expenditure shares

Weights in 2023

Labour = 65.2%

IC = 26.2%

CFC = 8.5%

Main Concepts – Non-quality-adjusted output

Non-quality-adjusted output is informed by the volume of activities performed by a service area, which are weighted by expenditure to form a cost-weighted activity index (CWAi)

For Education, the activity is **FTE enrolment figures adjusted by absence rate*** for:

Pre-School – Students in Local authority (LA) maintained pre-primary and the private, voluntary and independent (PVI) sector

Primary – LA-maintained schools, and academies in England

Secondary - LA-maintained schools, and academies in England

Special - LA-maintained schools, and academies in England

Alternative Provision - LA-maintained schools, and academies in England

Healthcare Training – Training of healthcare professionals from 1997 to 2011

Further Education (FE) – Adult learners aged 16 to 19

Activity is captured for the above school phases across England and the devolved nations

Main Concepts – Quality-adjusted Output

Quality adjustment is a statistical estimate of the change in the quality of a public service. This provides a more accurate picture of the link between output and outcomes

For Education, quality adjustment is informed by **attainment** and **students' well-being**

(a) Attainment:

- Exam performance and achieved grades contribute to the future careers of young people and composition of the UK labour workforce
- Primary and Secondary schools across the UK are quality adjusted for attainment
- Further education in England is quality adjusted for attainment
- The Key Stage 2 disadvantaged gap index (DAG) informs Primary Schools

(b) Students' well-being:

- The government's [plan for change](#) aims to break down barriers for opportunity, and a key aspect of this is the promotion of well-being in schools.
- Good mental health and well-being in schools is linked to attendance, attainment, and engagement
- Assigned a lower weight than attainment (~10%), reflecting its role as a precursor rather than a final outcome

Main Concepts – Attainment

Nation	School Phase	Attainment Source
England	Primary	% of pupils reaching expected standard in reading, writing and maths
	Secondary	Average Attainment 8 score
	Further Education	% of pupils achieving minimum requirements for L2 and L3 qualifications by age 19
Scotland	Primary	% of pupils achieving the curriculum for excellence level in reading, writing and numeracy
	Secondary	% of pupils achieving 5+ awards at SCQF level 5
Wales	Primary	% of pupils achieving the expected level in English, welsh and maths
	Secondary	Average Capped 9 score
Northern Ireland	Primary	% of pupils achieving level 4 or above in communication, maths, and ICT
	Secondary	% of pupils achieving 5+ GCSEs (A*-C) including English and maths

Main Concepts – Attainment

Primary Schools		Secondary Schools		Further Education	
Year Group	% weight	Year Group	% weight	Age Group	% weight
Reception	14.29%	Year 7	20%	16	25%
Year 1	14.29%	Year 8	20%	17	25%
Year 2	14.29%	Year 9	20%	18	25%
Year 3	14.29%	Year 10	20%	19	25%
Year 4	14.29%	Year 11	20%		
Year 5	14.29%				
Year 6	14.29%				

- ❑ Each year of Education builds towards the final exam outcome per school phase
- ❑ The ‘cohort-split’ model retrospectively apportions exam outcomes to year groups within cohorts according to the declared weights (revised following the PSPR)
- ❑ An attainment index is generated by taking year group contributions from across different cohorts per academic year, allowing the model to account for the cumulative nature of education
- ❑ The output back-series are updated as new cohorts feed into the model

Main concepts - Students' Well-being

- Primary and Secondary schools are quality adjusted according to student well-being
- Data obtained from the **Understanding societies** harmonised UK household longitudinal survey (UKHLS)
- Survey covers responses from youths aged 10-15 years from across the UK

How do you feel about your school?

How do you feel about your schoolwork?

1 (Completely Happy) – 7 (Completely unhappy)



Crosstabulation applied to determine total positive responses (1-3) to both questions



Growth in positive responses informs well-being index (re-based to 2003)



National Funding Formula % allocation to pupil deprivation used to weight well-being – Residual weight applied to attainment

Main Concepts – Key stage 2 disadvantaged gap index

(b) KS2 disadvantaged gap index:

- Disadvantaged pupils are defined as those who attend primary school and have been eligible for free school meals at any point in the last six years, children looked after by a local authority and children who left local authority care in England and Wales.
- The disadvantaged attainment gap index is derived by taking the inverse of the growth rate, where a fall in the index (closer to 0) reflects an improvement in quality (reduction in the attainment gap).
- We take the proportion of total school funding assigned to the pupil premium (which is funding specifically targeted at supporting disadvantaged pupils) to inform the weighting choice.
- This quality adjustment is based on data for England, as no equivalent measures are available covering other parts of the UK.



Weightings in 2023

	Primary Schools	Secondary Schools	FE England
Attainment	84.6%	90.4%	100.0%
Well-being	9.6%	9.6%	-
KS2 DAG	5.7%	-	-

Outstanding challenges

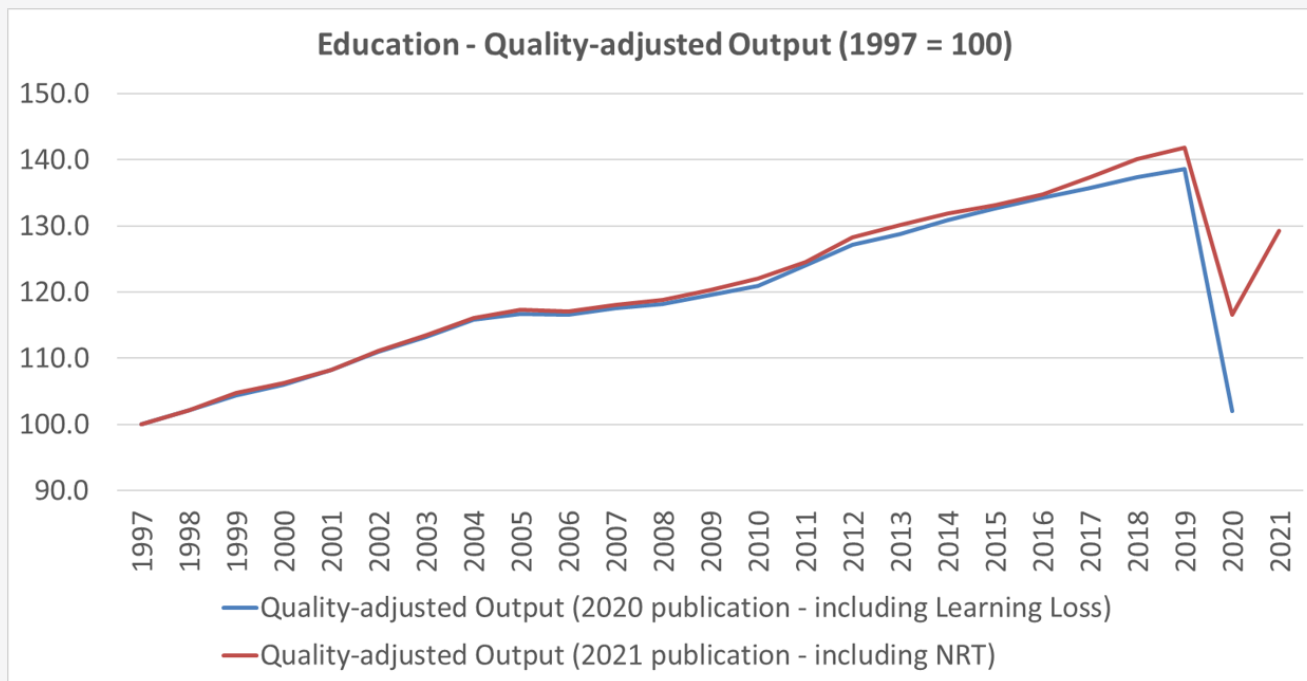
Treatment of attainment during COVID-19

- Typical attainment data were not available during the pandemic due to cancellation of exams and teacher-assessed grades inflating exam outcomes
- In response, the ONS has used the England National Reference Test (NRT) to fill in attainment data gaps
- The ONS also adjusted the ‘cohort-split’ model to confine COVID-19 effects to the pandemic period
- Despite these changes, there remains an element of uncertainty in the estimates during the pandemic

Alignment of well-being sources to government priorities

- The current well-being measure (Understanding Society) has been questioned for its alignment with policy objectives related to belonging and thriving in school.
- The source was selected due to its long, consistent time series on pupil well-being.
- Alternative data sources and measures remain under investigation.

Treatment of attainment during COVID-19

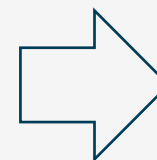


Source: [Public service productivity: total, UK, 2021](#).

- The NRT is a short English and maths test at GCSE-level – it is meant to track attainment standards over time
- The NRT was not subject to teacher-assessed grading or cancelled, making it an attractive source
- Initial testing demonstrated that, compared to when learning loss measures were applied, QA output was estimated to have fallen less significantly
- The ONS and our stakeholders agree that the NRT provides the most informed narrative during the pandemic

HOWEVER:

- The NRT represents England only
- Only performance in English and maths is assessed
- The NRT is not a formally recognised GCSE



Results need to be interpreted with caution

Updating the ‘cohort-split’ model

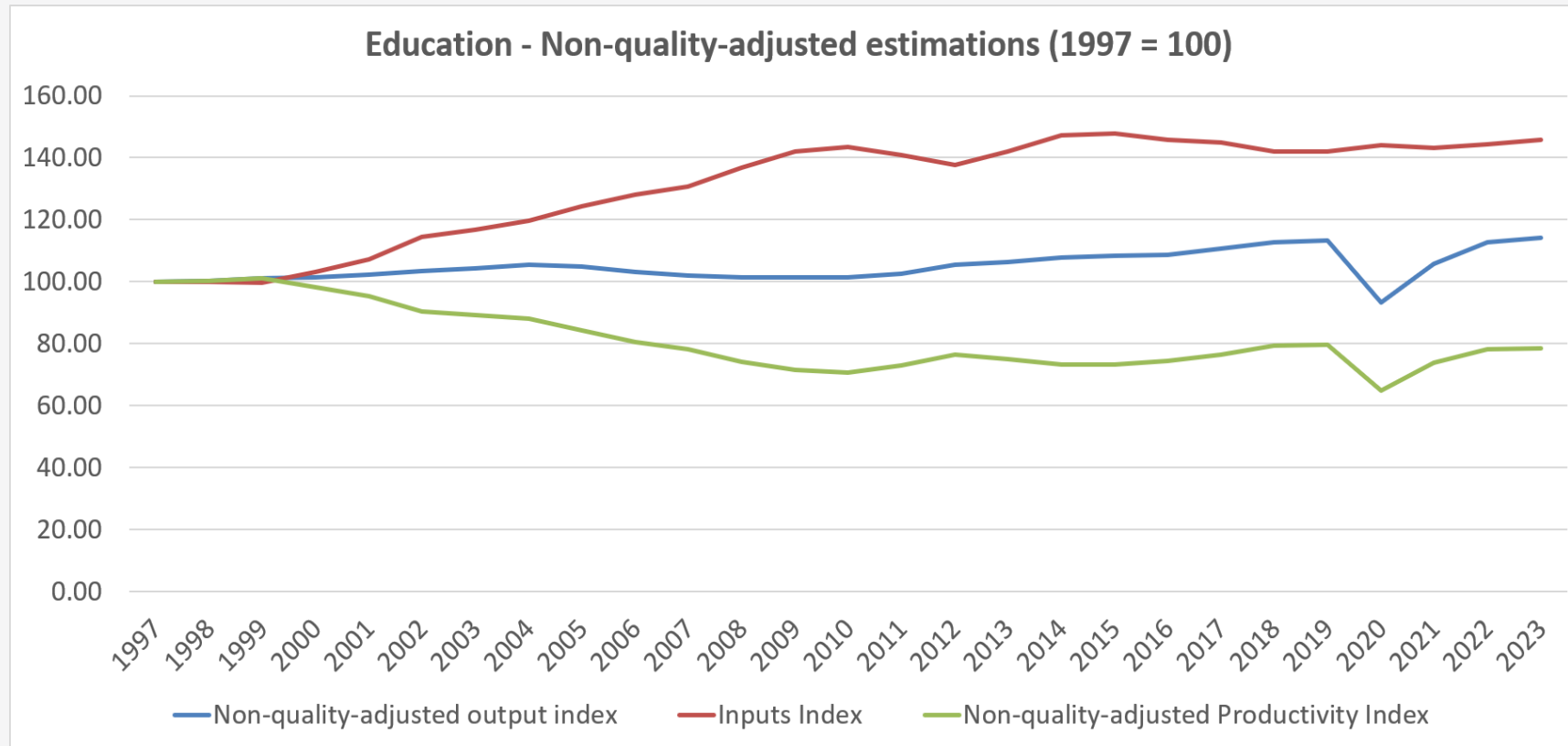
- The ‘cohort-split’ model was recently updated to confine COVID-19 effects to the pandemic period, and to account for the Scotland education system
- Yet two key issues persist in the model:-
 - Weights: Year groups bear similar weight in the absence of compelling evidence to assign differential weights
 - Following Scotland updates, there is a requirement to ensure the model is reflecting systems in the other nations

Human capital measure

- Attainment is the key quality component in the ONS’s model, but a human capital measure (e.g. earnings following school) would provide a more meaningful indication of value
- This would allow the productivity model to better capture the broader economic and social returns of education
- The ONS is exploring the Longitudinal Education Outcomes (LEO) dataset to construct human capital measures and thus prepare a more robust model of quality adjustment

Current Findings

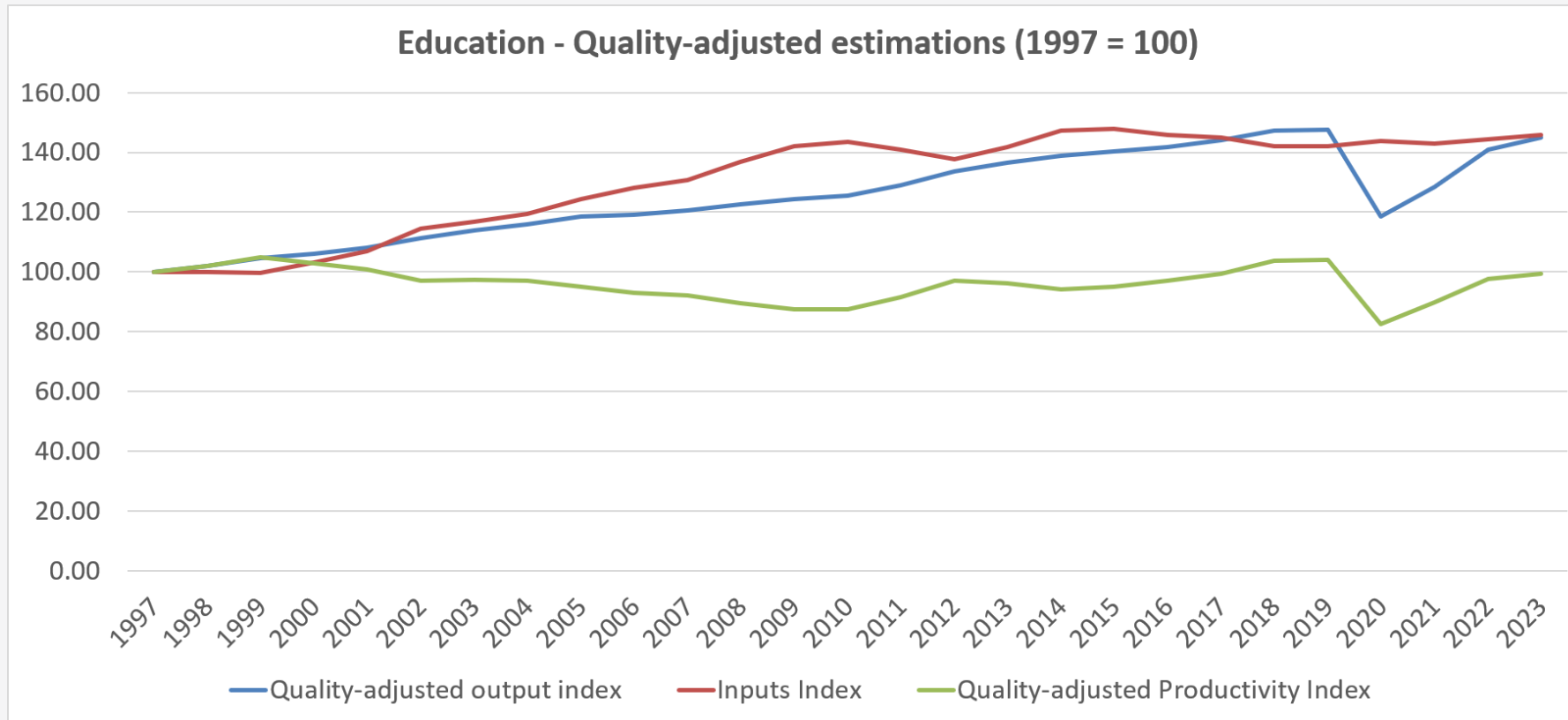
Non-quality-adjusted estimations in 2023



- **NQA productivity grew by 0.5% in 2023**, and is 1.6% below pre-COVID 2019 levels
- **NQA output grew by 1.4% in 2023**, predominantly driven by rising enrolment in England secondary schools
- **Inputs grew by 0.9% in 2023**, driven primarily by increased volume of goods and services consumed

Source: Public service productivity: total, UK, 2023

Quality-adjusted estimations in 2023



- QA productivity grew by **1.9% in 2023**, and is 4.4% below pre-COVID 2019 levels
- QA output grew by **2.9% in 2023**, predominantly driven by rising attainment outcomes in England primary schools

Source: Public service productivity: total, UK, 2023

Summary

- Education represents a significant component of UK public service expenditure, and ONS applies a comprehensive methodology to measure productivity in this sector.
- Methodological challenges remain, particularly in interpreting the COVID-19 period. ONS continues to refine the approach, including exploring the feasibility of incorporating broader human capital measures.
- The latest annual estimates indicate that education productivity was recovering by 2023; however, as outcomes had not yet fully returned to pre-pandemic levels, overall productivity remained below its pre-COVID-19 position.

Thank You

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