

How do we measure quality in higher education?

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Outline

- Why we need to consider measuring quality in higher education
- Labour market outcomes from higher education
- Measuring learning gains

The policy and regulatory
environment

Regulation of HE

- **Research Excellence Framework** (originally Research Assessment Exercise)
 - measures research quality and distributes funds accordingly
- Emphasis on *research* as key determinant of academics' careers
 - Concerns (and some evidence) that this might be at the expense of teaching
- Introduction of tuition fees increased focus on value for money and student choice
 - Students as consumers? Investors?

Regulation of HE

- Quality Assurance Agency – HE has always had quality assurance
 - Seen as not providing sufficient incentive for institutions to value teaching more highly
- ***Teaching Excellence and Student Outcomes Framework (TEF)***
- ***The Office for Students***
 - Independent regulator
 - New regulatory framework

TEF

- England wide assessment of excellence in teaching in HE
- Assesses outcomes for students in terms of graduate-level employment or further study
- Gold, Silver or Bronze awards – linked to funding
- ***Aims to guide students and encourage institutions to improve quality of teaching***

Teaching Excellence Framework

- Independent panel
- Judgement based on metrics and qualitative judgement
- Metrics
 - how many students continue their course from one year to the next
 - graduate-level employment outcomes
 - students' views from National Student Survey
- Relative judgements
 - takes account of student intake
 - takes account of subject mix
- Currently under [review](#) by Dame Shirley Pearce DBE

- What do we ideally *want* to measure?
 - Teaching quality
 - can we agree on what that looks like?
 - Impact of a degree on students' outcomes
 - which outcomes?
 - Gains in learning
 - can we develop a consistent measure across subjects and institutions?

Labour market outcomes

How might we use evidence on graduate labour market outcomes?

- **For students making HE decision about if, where and what to study**
 - Evidence of lots of variation in earnings (Britton et al., 2016)
- **To estimate the costs of HE to the taxpayer i.e. identify the subsidy**

Longitudinal Educational Outcomes database

- LEO is an exciting new dataset that **links school** (NPD), **university** (HESA) and **tax records** (HMRC)
- Population of English-educated students
- Full linked data (NPD-HESA-HMRC) for people who were 16 in 2002 onwards
 - Entire academic history, plus ethnicity & social background
 - Earnings from 2005/06-2015/16

Methodology

- Value added is estimated (separately by gender) as follows:

$$\ln(y_{it}) = \alpha + X_i' \gamma + \text{Subj}_i' \rho + \epsilon_{it} \quad (1)$$

$$\ln(y_{it}) = \alpha + X_i' \gamma + \text{Uni}_i' \beta + \epsilon_{it} \quad (2)$$

$$\ln(y_{it}) = \alpha + X_i' \gamma + (\text{Subj} * \text{Uni})_i' \beta + \epsilon_{it} \quad (3)$$

- y_{it} is real earnings - focus on outcomes at 29
- X_i a set of individual controls that include:
 - Region of school, SES, Ethnicity, School type, Prior attainment (and KS5 subject choices)
- Only include those in employment
- Condition on people **having at least 5 A*-C GCSEs**

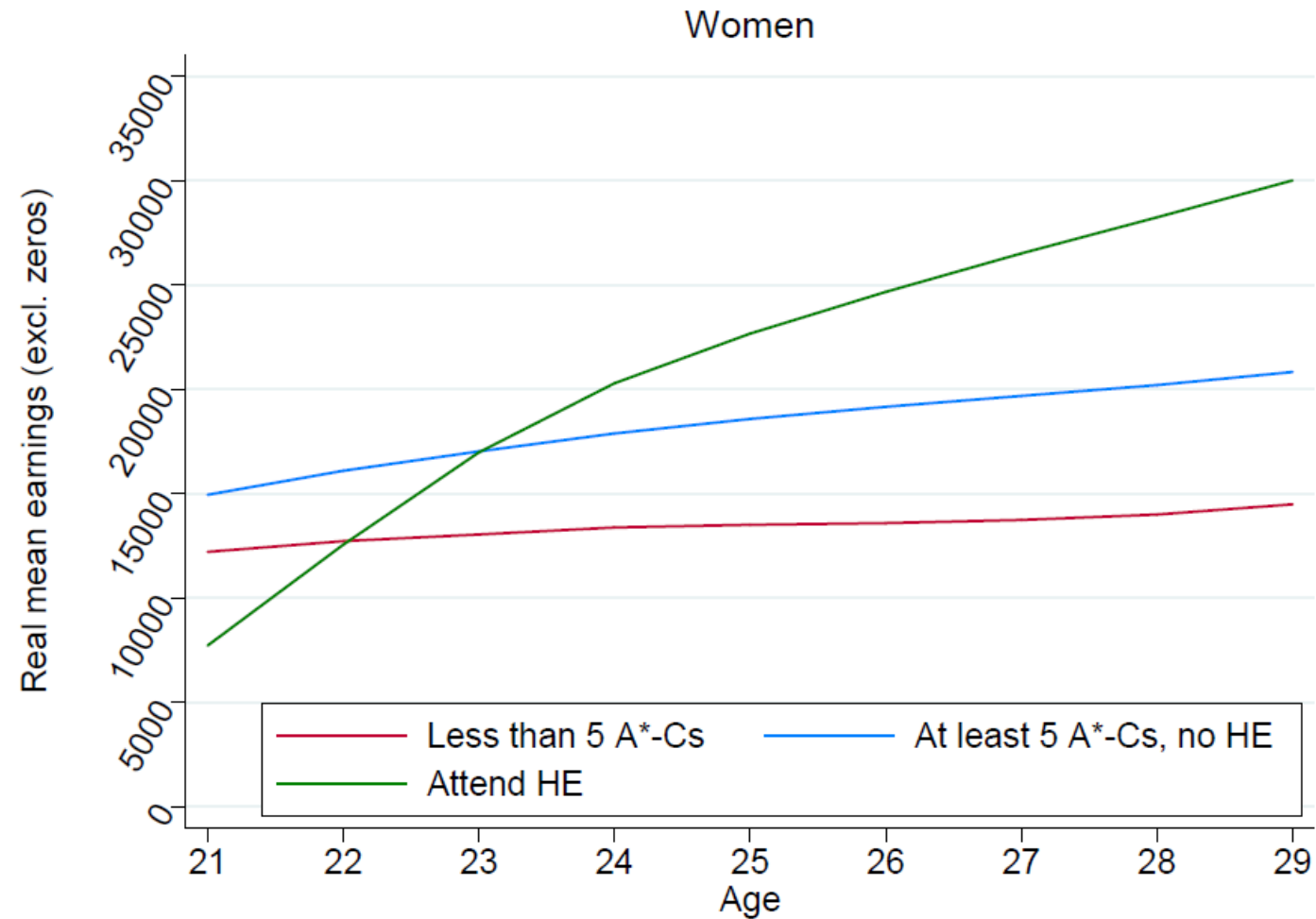
Methodology

- **Inverse probability weighted regression adjustment**
- IPWRA approach compares individuals who have similar propensities to do a given course by weighting them more heavily
 - Calculate an individual's probability of taking each course
 - Calculate the weight as the inverse of the probability of taking the course they do study
 - Run a weighted version of equation (3)
- Assumes unobservable characteristics don't affect **both** income and probability of taking course

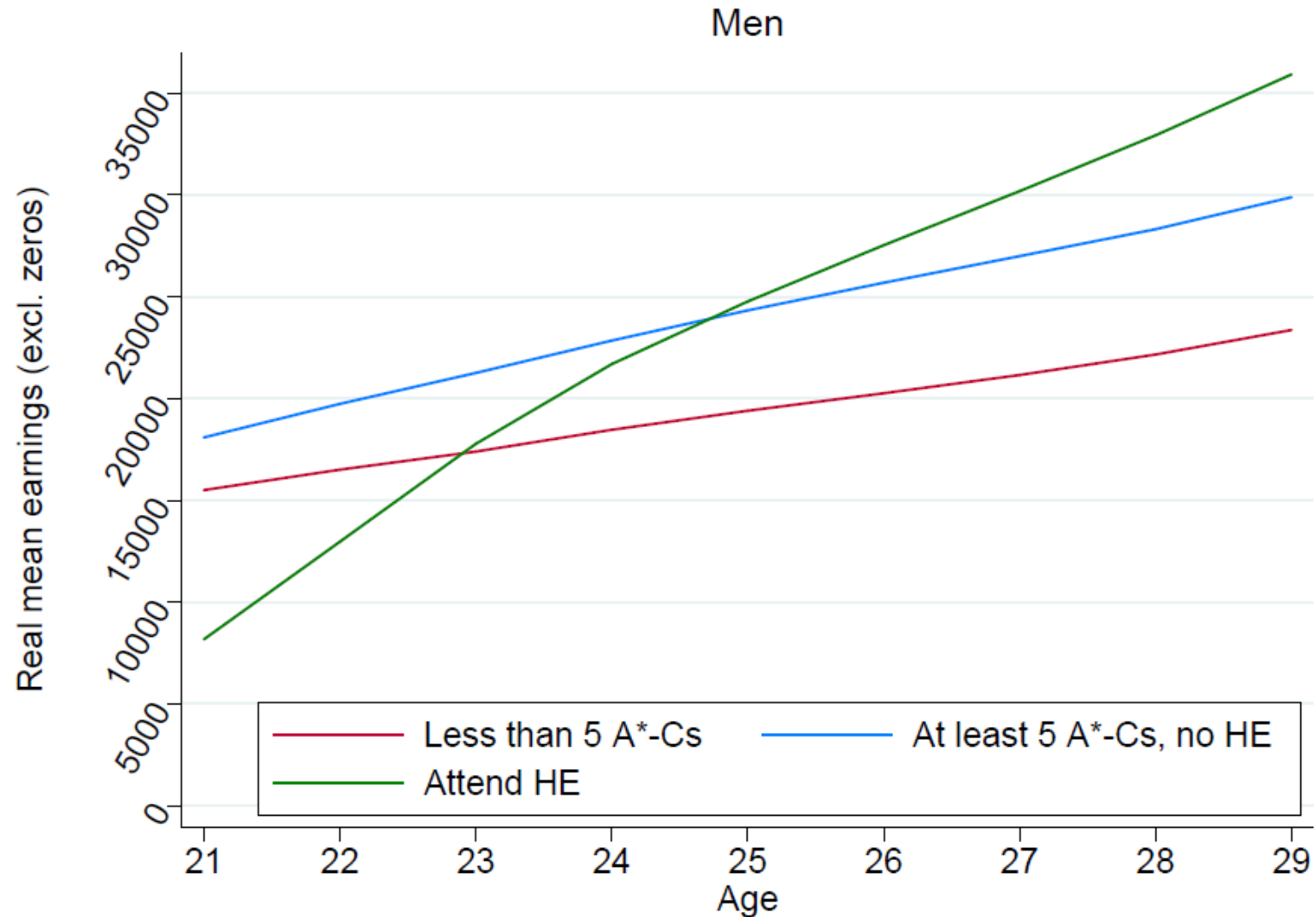
What has LEO told us?

- Overall earnings returns are large for women, but much smaller for men
- Raw earnings differences by subject are large
 - Once we allow for background characteristics, these differences are roughly halved
- Similarly differences in earnings by university are reduced once we account for background characteristics and subject

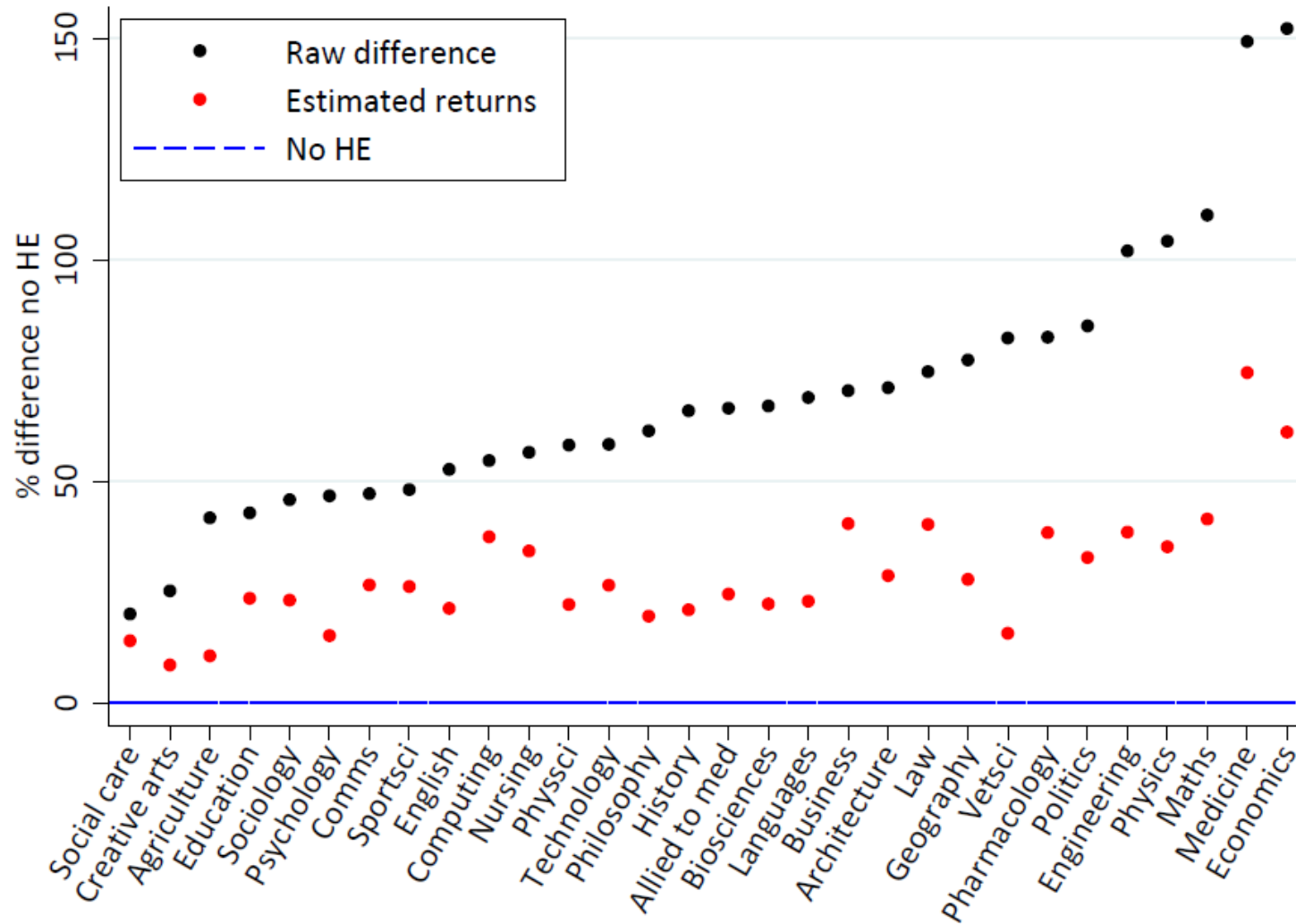
Mean 2017 earnings: women



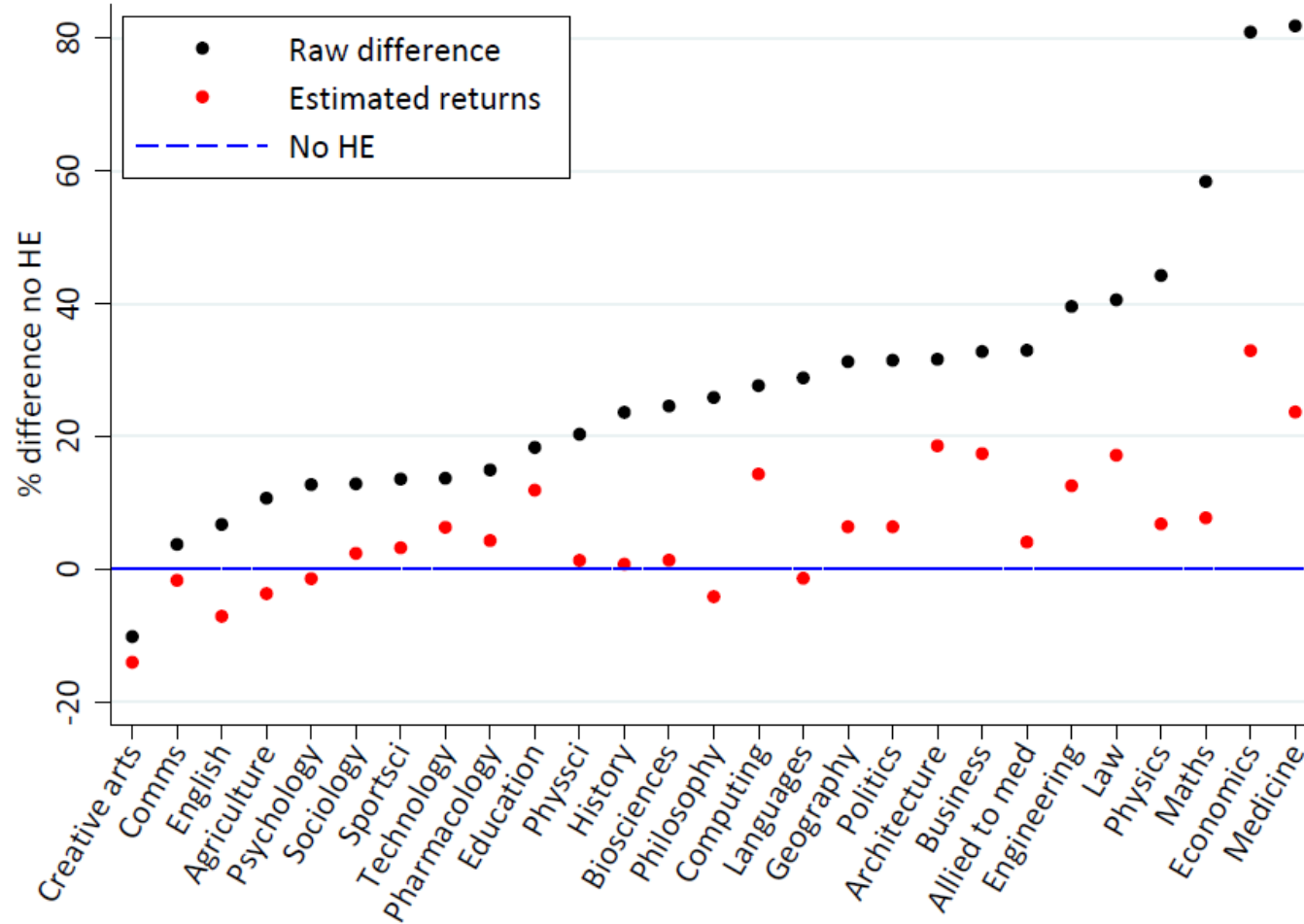
Mean 2017 earnings: men



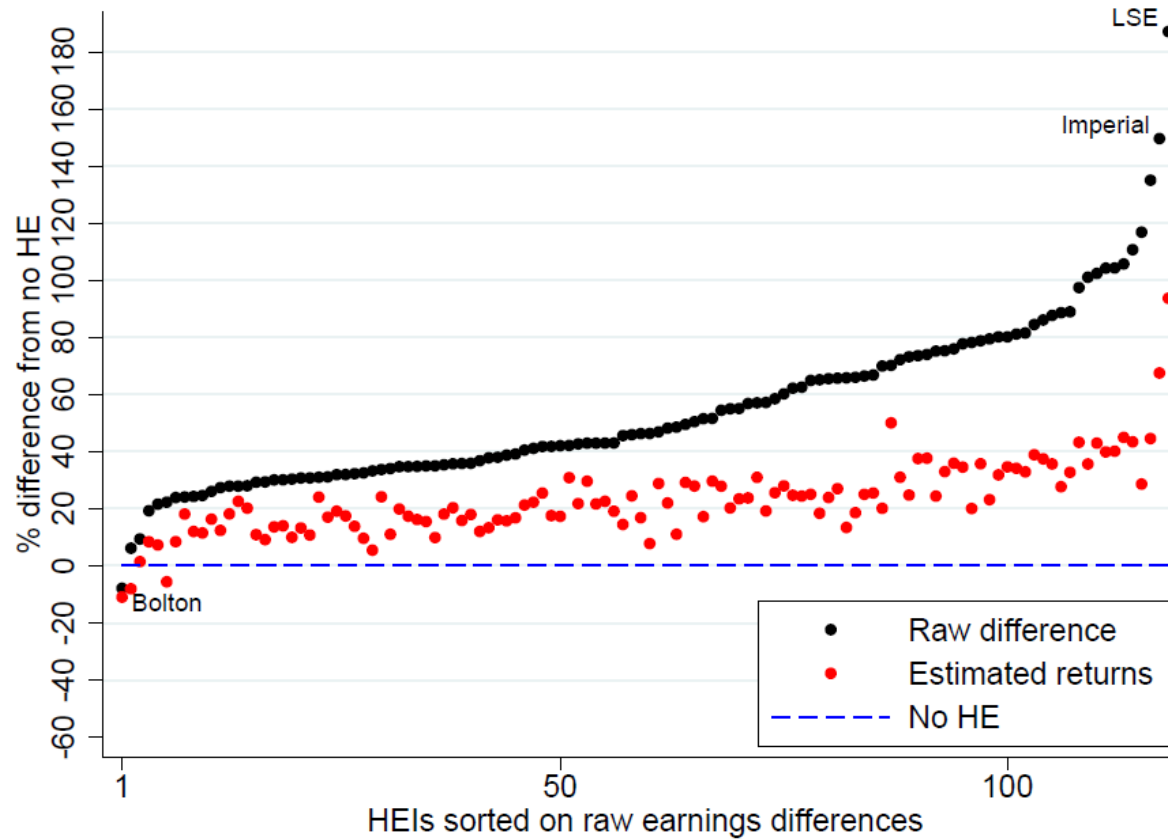
Earnings premia by subject: women



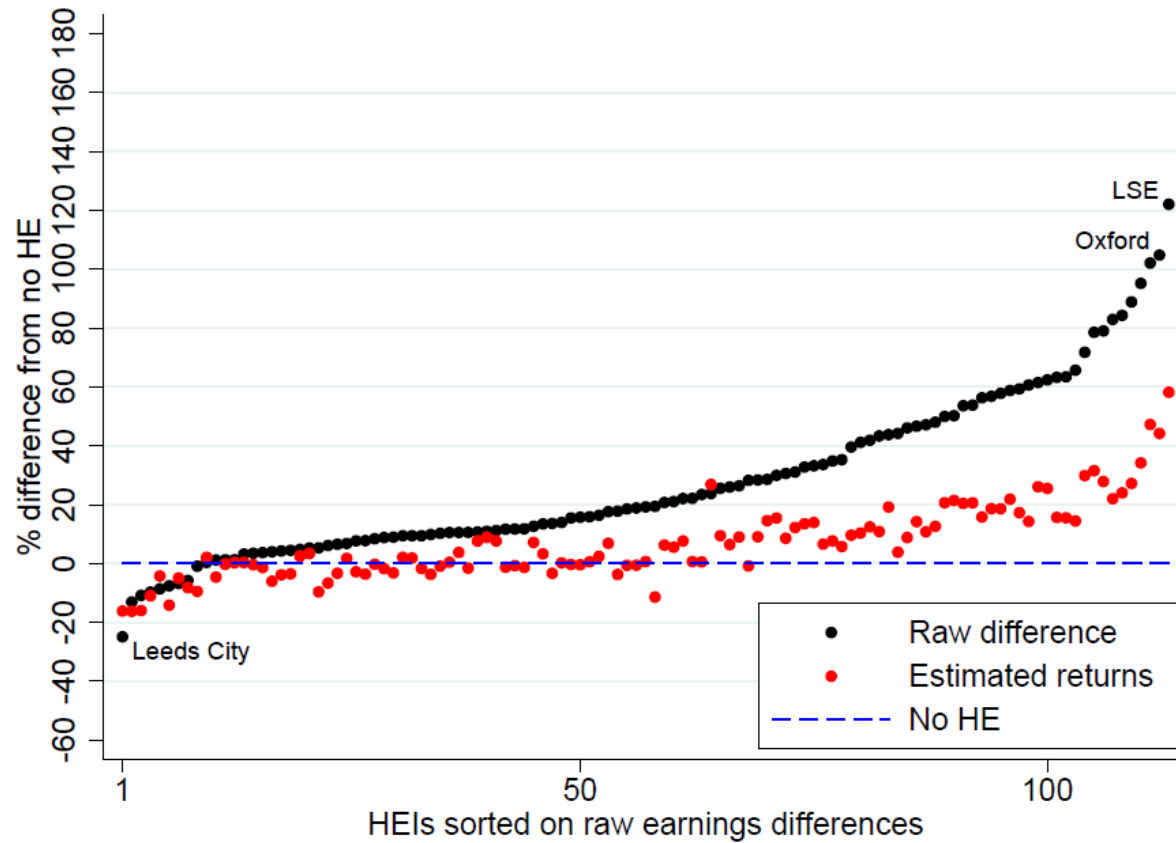
Earnings premia by subject: men



Earnings premia by institution: women



Earnings premia by institution: men



Implications for public policy

- Even if estimates are causal they cannot tell you where subsidy should go
 - Only guides on the private wage value of degrees
 - Ignoring non monetary social value
 - Ignores spillovers and regional policy
- What do earnings measure?
 - Reflect supply and demand in the labour market
 - Reflect teaching some years previously
- So can we measure learning gain directly?

An attempt to measure learning gain

A comprehensive conceptual framework and measurement instrument

Our project

- Develop and test an instrument to measure learning gain ***across subjects***: reliability, validity and at-scale usability
- Test a longitudinal model of learning gain in relation to student background characteristics and contextual factors

What does the literature say about learning in HE?

- Literature on learning in higher education focuses on a vast range of different skills, abilities, competencies and attributes
 - Barrie, 2006, 2007; Bennett, Dunne & Carré, 1999
- Major challenges in trying to measure learning gain in a consistent way across such a wide range of outcomes

Learning gain: key aspects in the wider literature

- Critical thinking
 - Important outcome in the mission statement of many universities
 - Shown to be correlated to attainment in university exams, graduation likelihood
- Engagement and satisfaction
 - Both used as measures of the overall academic experience in higher education
 - Correlation to standardised measures of content knowledge less strong than critical thinking and other cognitive measures
- General content knowledge/competencies
 - Lend themselves more readily to measurement
- Discipline-specific content knowledge/competencies
 - The focus of course assessments, including exams

What did we do?

- Developed a measurement instrument based on 12 existing and new questionnaire scales
- Scales were compiled into an online survey, distributed on three occasions to a large population of students in 11 universities
- Undergraduate and postgraduate students
- Four target subjects
 - Business, Chemistry, English, and Medicine

Literature and evidence review

Theoretical framework development

Qualitative
Component

Interviews: 33 students in 3 universities: 4 subjects
undergraduate and postgraduate levels

Measurement instrument development and testing

Quantitative
Component:
Survey

Round 1



6,275

Oct
2016

Round 2



3,189

June
2017

Round 3



2,553

April
2018

Admin data



HESA
matching

Conceptual framework

Cognitive component

Critical thinking
Analytical thinking
Cognitive abilities
Synthesising
Analysing
Evaluating
Problem solving

Meta-cognitive component

Self-regulation
Life-long learning attitude and motivation
Learning to learn
Need for cognition (information)

Affective component

Attitudes towards own discipline and learning
Motivation
Engagement
Professional and academic interest

Socio-communicative component

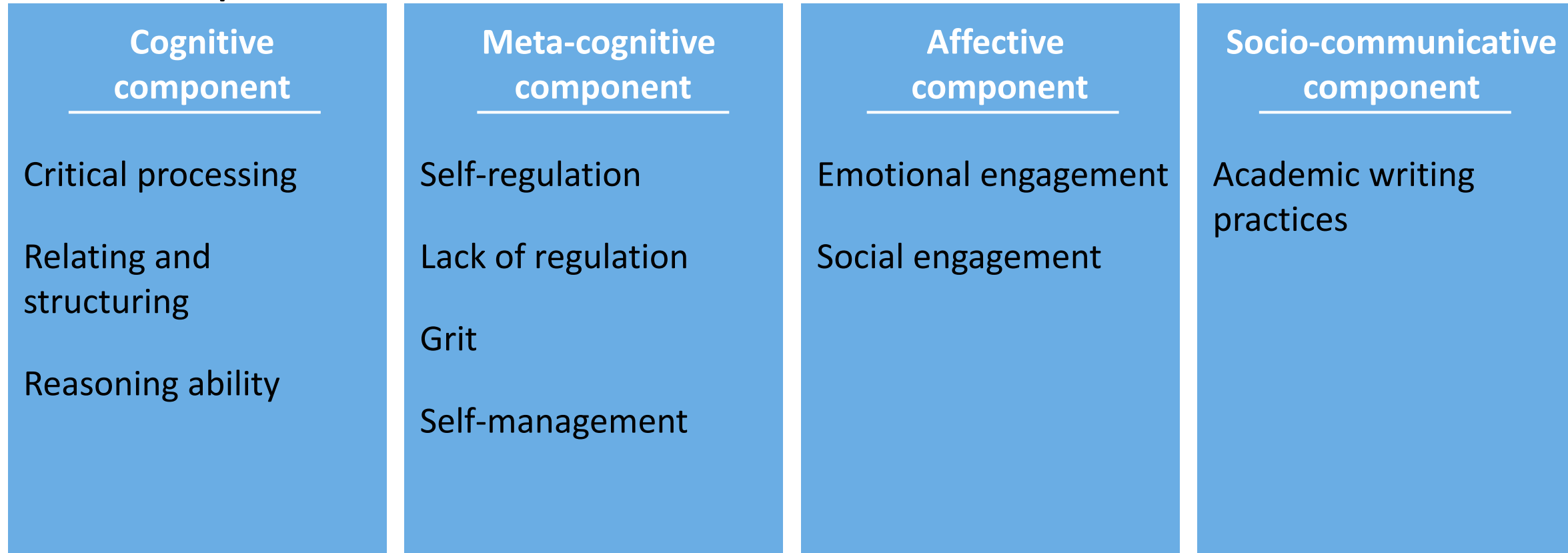
Levels of belonging in social learning networks
Social embeddedness
Communication skills

View of knowledge dimension | Epistemological beliefs; View of intelligence; Open-mindedness

Research dimension | Curiosity; Interest in research; Interest in knowledge; Attitude to sharing ideas

Moral dimension | Moral reasoning

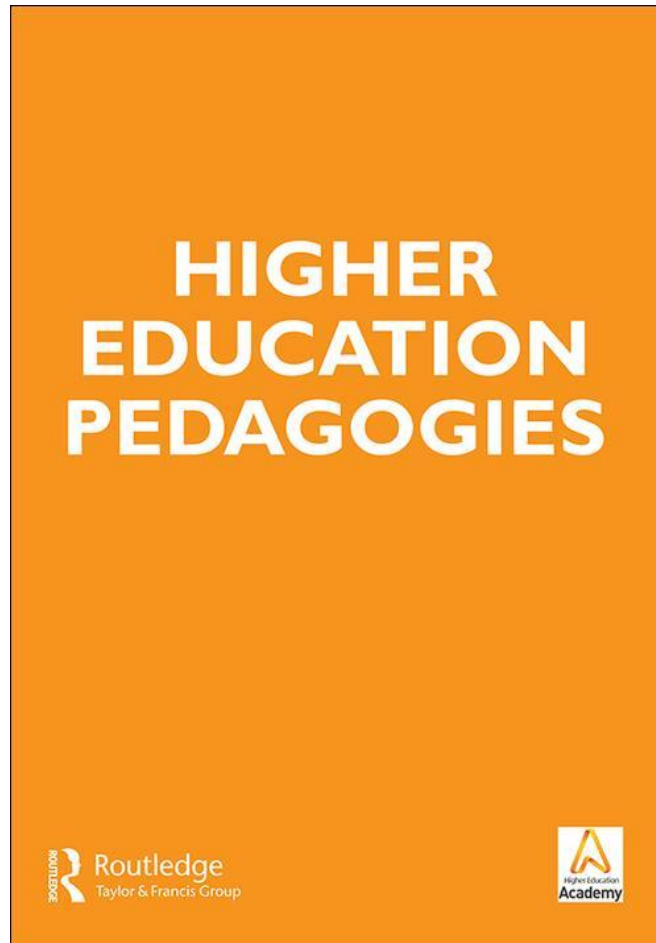
Conceptual framework to measurement



View of knowledge and learning dimension | Epistemological beliefs

Research dimension | Attitude to research

For full information about the framework:






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Building the foundations for measuring learning gain in higher education: a conceptual framework and measurement instrument

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ABSTRACT
In this paper, we set out the first step towards the measurement of learning gain in higher education by putting forward a conceptual framework for understanding learning gain that is relevant across disciplines. We then introduce the operationalisation of this conceptual framework into a new set of measurement tools. With the use of data from a large-scale survey of 11 English universities and over 4,500 students, we test the reliability and validity of the measurement instrument empirically. We find support in the data for the reliability of most of the measurement scales we put forward, as well as for the validity of the conceptual framework. Based on these results, we reflect on the conceptual framework and associated measurement tools in the context of at-scale deployment and the potential implications for policy and practice in higher education.



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Learning gain; conceptual framework; measurement instruments

Introduction

Globally, higher education participation has steadily increased over the past two decades; in the US, over 52% of young people attend some form of college (OECD, 2017); in England, the context for our research, around 69% of young people participate in some form of tertiary education (OECD, 2017), and around 30% of all 18-year-olds in the system are enrolled in a higher education institution (Department for Education, 2017b). As has been documented elsewhere, university attendance results in myriad benefits for individuals, including increased employability (Knight & Yorke, 2003), employment (Blundell, Dearden, Goodman, & Reed, 2000) and earning gains (Britton, Dearden, Shephard, & Vignoles, 2016). There is recognition, however, that these economic benefits do not encompass the totality of learning in universities, and that in particular they do not necessarily capture *learning* gain.

The broader methodologically focused project from which this paper draws aims to understand the extent to which new, and existing measurement instruments, both self-report and test-like, may be used to capture non-subject specific learning gain in English universities. As the first step in that process, the present paper first reviews existing evidence on definitions, conceptualisations, and measurement of learning gain.

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Measurement quality

- Response rates a substantial challenge across the pilot projects, good here
- Most, but not all, scales reliable

Scale reliabilities

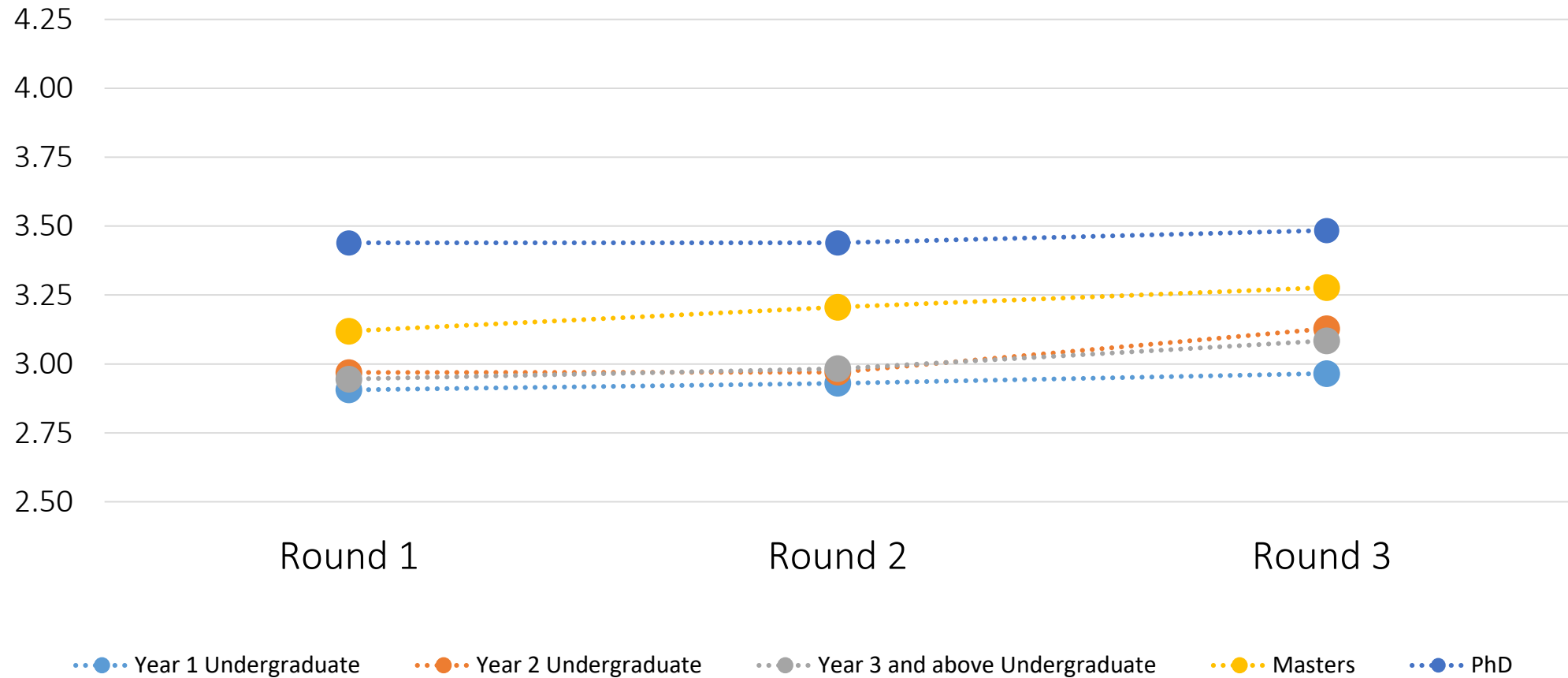
Scale	Reliability coefficient (α)
Relating and Structuring	0.815
Critical Processing	0.765
Self-Regulation of Learning	0.733
Lack of Regulation	0.769
Grit	0.735
Emotional Engagement with Learning	0.867
Social Engagement with Learning	0.665
Academic writing (difficulties)	0.667
Self-Management	0.741
Attitude to Research	0.916
Reasoning Ability	0.769
Epistemological beliefs	0.479

Example: Critical processing of information

Critical processing (from ILS, Vermunt & Vermetten, 2004)

Item	M(SD)	Factor loading
1 I draw my own conclusions on the basis of data	3.18(1.07)	0.65
2 I try to be critical of the interpretations of experts	3.14(1.20)	0.79
3 I check whether the conclusions drawn by the authors of a publication follow logically from the facts on which they are based	2.95(1.19)	0.56
4 I compare my view of a topic with the views of established authors on that topic	2.89(1.21)	0.62

Critical processing of information



Can we capture learning gain?

- Yes, across disciplines, we observe *change* in the skills, abilities, and competencies included in our measurement instrument.
- This change takes different trajectories for different:
 - Skills, abilities, and competencies
 - Academic disciplines
- Years of study and stages (undergraduate/postgraduate)

Conclusions

- Securing student engagement is not trivial, but is achievable, through explicit aims, considered timings, and good survey design
- The measures are on the whole robust, but some aspects continue to remain elusive to measurement (i.e. epistemic beliefs)
- The measures are user-friendly, with short survey times, even when including the test element

Conclusions

- Starting levels of skills differ more within each group than between groups
- The patterns of learning gains are similar across different student groupings
- There is more variation between subjects, and stages of studies, than between student background characteristics, both in starting levels, and change rates

Conclusions

- The instrument is *not* suitable for cross-institutional comparisons
 - (too much variation obscured in the aggregate)
- So is not an external accountability tool at the institution level

- But could be used effectively:
 - In collaboration with course/module designers,
 - To test local course/programme/module changes
 - To evidencing the change (improvement?) resulting from this
 - To provide a common framework for within-institution comparisons

Final thoughts

- What do we want our universities to be doing?
 - Improving student outcomes
 - Improving student learning
- How important is comparability across institutions?

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