

The role of intangibles in school performance: a case study for England

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- All errors and omissions remain the sole responsibility of the authors.

- This study aims to explore the role of intangibles in school performance, through a case study for schools in England
- Focus on organisational capital component of intangibles – using detailed administrative data on the school workforce – this allows us to identify staff in leadership roles
- Adopt similar approach to that used in study of hospital performance – measuring investment in organisational capital in terms of expenditure on staff generating this asset

3 strands:

- How does organisational capital vary across schools and what factors are associated with this?
- Is organisational capital related to school performance?
- Do schools make changes to their organisational capital following school inspection?
- Throughout, we consider both narrow and broad definitions of leadership to capture organisational capital

- School Workforce Census
 - Census of all publicly funded schools in England
 - Conducted annually, available since 2010
 - Contains information on occupation, pay, qualifications, absence, etc.
- National Pupil Database
 - School Census: provides information on school characteristics, such as school type, size and pupil intake
 - Key Stage 4 attainment data: provides information on attainment at age 16
- Ofsted
 - school inspection results

Analysis sample: number of secondary schools

| | 2010/11 | 2011/12 | 2012/13 |
|-------------------------|--------------|--------------|--------------|
| School Census | 3312 | 3267 | 3285 |
| School Workforce Census | 3307 (99.8%) | 3251 (99.5%) | 3265 (99.4%) |
| KS4 attainment | 3043 (91.9%) | 3028 (92.7%) | 3057 (93.1%) |

Note: Figures shown in parentheses are number of schools as % of all secondary schools in School Census

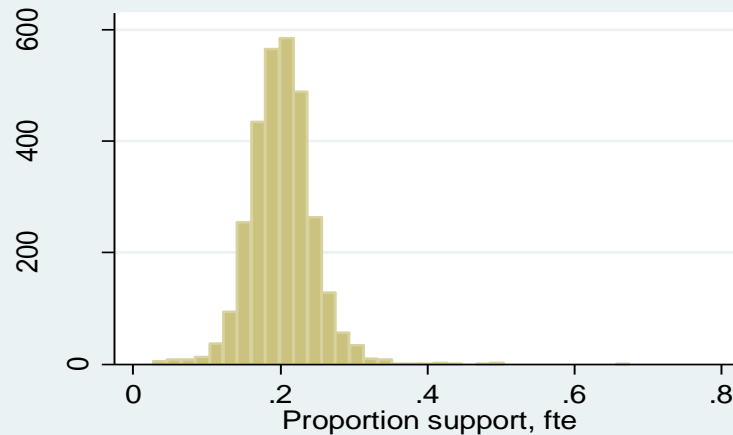
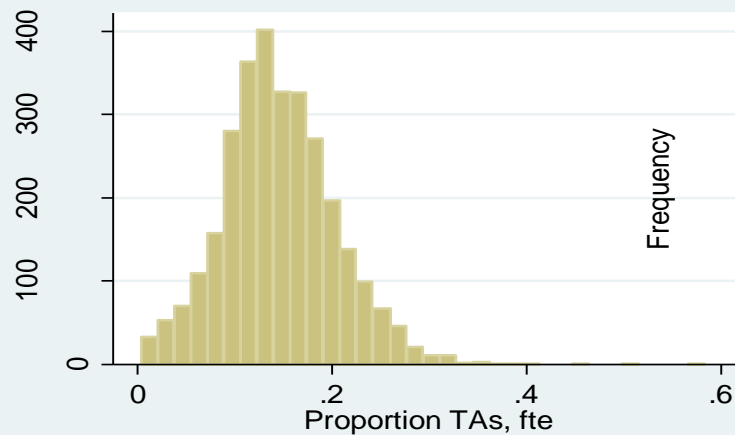
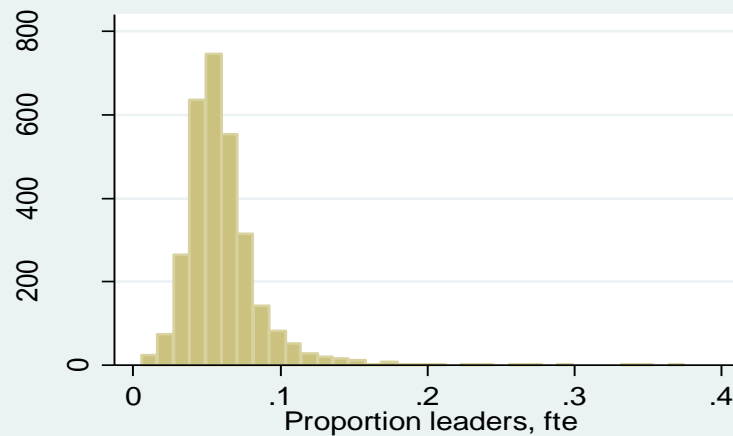
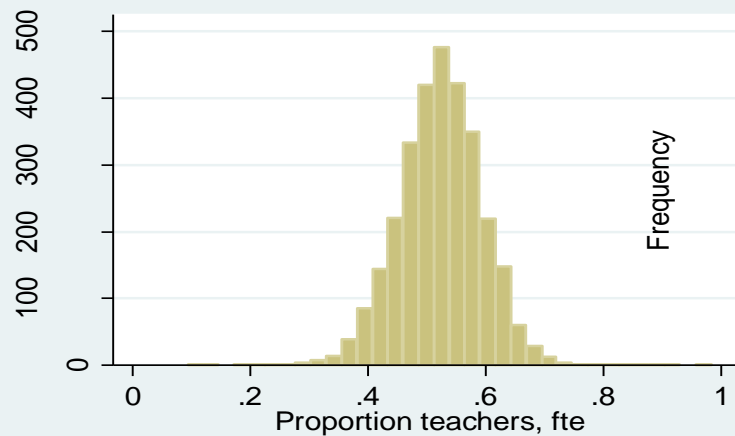
Composition of school workforce

Average per cent workforce in each broad occupational group, 2012/13

| | Headcount | Full-time equivalent |
|---------------------|-----------|----------------------|
| | | |
| Leadership group | 5.2 | 6.1 |
| Classroom teachers | 47.5 | 52.4 |
| Teaching assistants | 15.6 | 14.6 |
| Support staff | 20.3 | 20.2 |
| Auxiliary staff | 12.1 | 7.3 |

Leadership group comprises headteachers, deputy and assistant heads

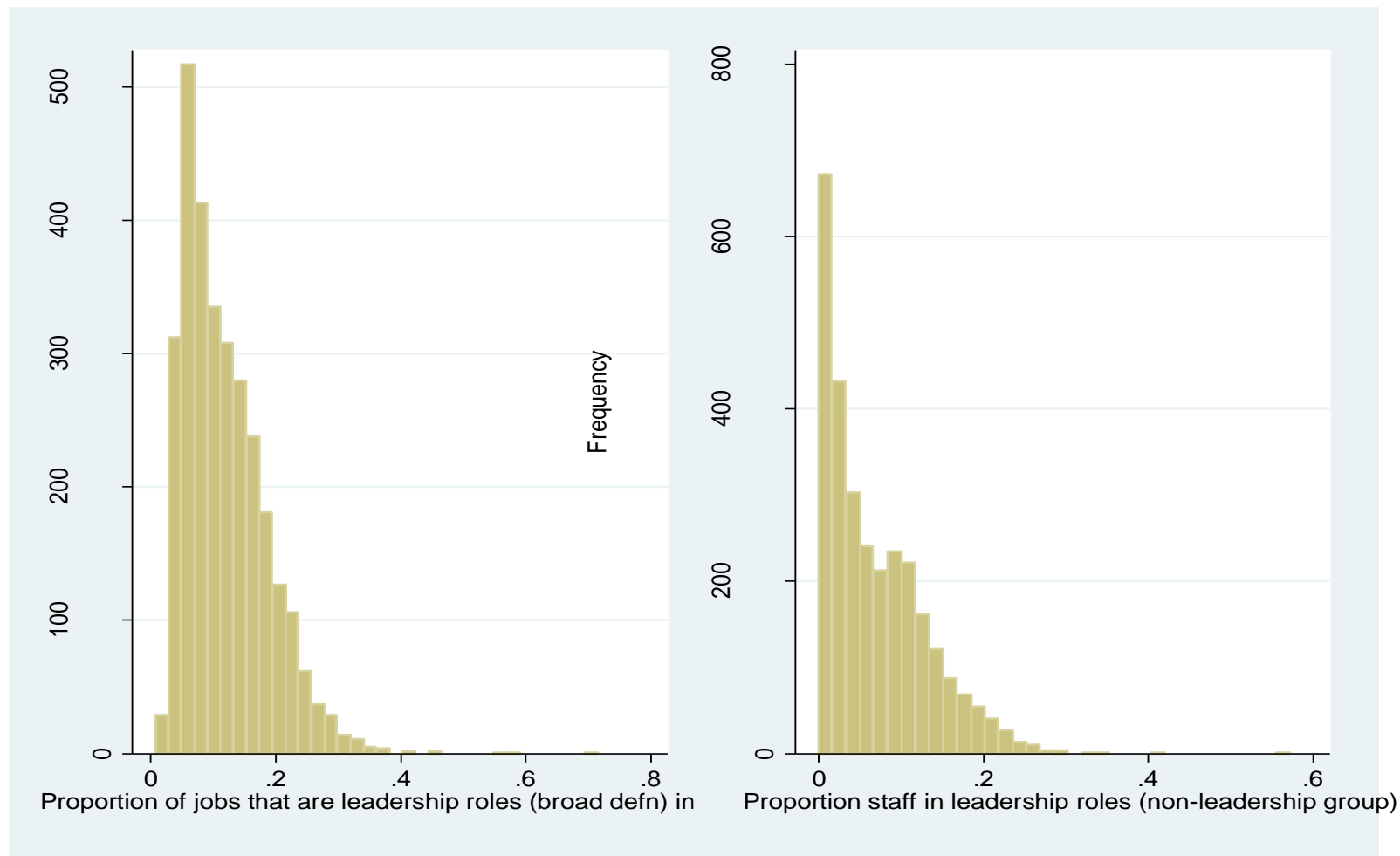
Variation in workforce composition



Identifying school leaders

- Data allows us to identify leadership group
 - Head teachers, deputies and assistants
- But we also want to identify staff outside of the leadership group who have leadership roles and thus contribute to OC
- We do this using information on roles:
 - Bursar, Business manager, Head of House, Head of Department, Head of Year, Learning manager, SEN Co-ordinator
 - We combine these categories to construct “broad leadership group”
- Broad leadership group accounts for around 12% of workforce
- Around 2/3 of staff with leadership roles were teachers, while around 1/3 were support staff
- Type of role varies by occupation:
 - Most common role among teachers was Head of Department
 - Majority of support staff with such roles were Business Managers or Bursars

Variation in leadership group



Factors associated with variation in leadership group

| | % staff in leadership group | | | % staff in leadership roles outside leadership group | | |
|-------------------------|-----------------------------|-----------|-----------|--|-----------|-----------|
| | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 |
| Number of pupils | -0.001*** | -0.001*** | -0.001*** | -0.003*** | -0.003*** | -0.003*** |
| % male pupils | 0.005*** | 0.004** | 0.003 | 0.003 | -0.004 | -0.001 |
| % FSM pupils | 0.023*** | 0.028*** | 0.027*** | -0.027** | -0.011 | -0.019* |
| % White British pupils | -0.004*** | -0.003** | -0.006*** | -0.023*** | -0.018*** | -0.02*** |
| % SEN pupils | -0.063*** | -0.087*** | -0.1*** | -0.333*** | -0.229*** | -0.225*** |
| School type: | | | | | | |
| ...Academy | 0.144 | -0.045 | 0.071 | 1.598*** | 1.732*** | 1.359*** |
| ...Foundation | 0.08 | -0.055 | -0.099 | 1.103*** | 0.628* | 0.175 |
| ...Voluntary aided | 0.168* | 0.166 | 0.229* | 0.676** | 0.918** | 0.604 |
| ...Voluntary controlled | -0.153 | -0.09 | -0.197 | 0.739 | 1.201 | 2.074** |
| R-squared | 0.144 | 0.147 | 0.151 | 0.049 | 0.048 | 0.047 |
| N | 2884 | 2843 | 2901 | 2874 | 2786 | 2836 |

*statistically significant at 10 per cent level, **statistically significant at 5 per cent level,

***statistically significant at 1 per cent level

OC and school performance: model specification

We estimate separate cross-sectional models for each year of our analysis period:

$$Y_i = \alpha + \sum \beta_j \ln L_{jj} + \sum \gamma_k \ln K_{ki} + \pi \ln INT_i + \sum \delta_n Z_{ni} + e_{it}$$

where

Y = measure of school performance

L= labour input

K = other inputs

INT = intangibles

Z = control variables

Depending on performance measure used, some specifications control for prior attainment at end primary school

Measuring intangible investments

- Measured in terms of payments to managers (leaders)
- Analysis looks at total investment in organisational capital:
leadership group + those outside leadership group in
leadership roles
- As well as considering these two components separately
- Requires a number of assumptions:
 - Time spent on management
 - 100% for those in the leadership group
 - 100% for bursars and business managers
 - 10% for teachers with leadership responsibilities (NUT, 2005; TNS BMRB, 2014)
 - Assume 20% of management time relates to organisational capital (in line with existing studies)
 - Use same average wage across all schools (in line with approach for hospital analysis for England)

Measures of school performance

- Percent of pupils achieving 5 or more GCSEs (or equivalents) at grade A*-C including English and Mathematics
 - headline measure of pupil attainment
 - often used in school league tables
 - forms part of government's "floor standards" (threshold of 40% in 2013)
- Best 8 value added
 - measure of pupil progress from end KS2 to end KS4 (from approximately age 11 to 16)
 - points awarded for each achieved GCSE grade; the "best 8" are summed



Results: 5 GCSEs grades A*-C, no controls

| | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Investment in OC (total) | 1.424*** (3.30) | 3.663*** (7.50) | 4.436*** (9.80) | | | |
| Investment in OC: leadership group | | | | 1.158*** (3.03) | 2.648*** (6.08) | 3.831*** (9.28) |
| Investment in OC: outside leadership group | | | | 0.066 (0.31) | 0.851*** (3.48) | 0.46* (1.94) |
| Prior attainment | 8.392*** (87.81) | 7.774*** (71.19) | 8.184*** (73.24) | 8.388*** (87.77) | 7.751*** (70.95) | 8.174*** (73.09) |
| R-squared | 0.736 | 0.649 | 0.657 | 0.735 | 0.649 | 0.656 |
| N | 2792 | 2744 | 2811 | 2792 | 2744 | 2811 |

Notes: t-statistics in parentheses, *statistically significant at 10 per cent level,
 statistically significant at 5 per cent level, *statistically significant at 1 per cent level

Results: 5 GCSEs grades A*-C, including controls

| | 2011 | 2012 | 2013 |
|---|---------------|-----------------|-----------------|
| Investment in OC: leadership group | 0.546 | 1.759*** | 2.833*** |
| Investment in OC: outside leadership group | -0.111 | 0.587** | 0.334 |
| Total staff | -0.594 | -0.454 | -0.574 |
| % male pupils | -0.03*** | -0.047*** | -0.045*** |
| % FSM pupils | -0.124*** | -0.07*** | -0.148*** |
| % White British pupils | -0.135*** | -0.113*** | -0.122*** |
| % SEN pupils | 0.139 | 0.073 | 0.095 |
| School type (ref: community school) | | | |
| ...Academy | 2.089*** | 2.973*** | 2.652*** |
| ...Foundation | -0.023 | -0.212 | -0.583 |
| ...Voluntary aided | 1.254*** | 1.279** | 1.724*** |
| ...Voluntary controlled | 0.443 | 0.558 | 1.239 |
| Prior attainment | 8.199*** | 7.561*** | 7.569*** |
| R-squared | 0.776 | 0.691 | 0.702 |
| N | 2792 | 2744 | 2811 |

Results: Best 8 value added, no controls

| | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Investment in OC (total) | 5.978*** (5.78) | 7.455*** (6.97) | 8.503*** (8.34) | | | |
| Investment in OC: leadership group | | | | 4.459*** (4.86) | 5.122*** (5.37) | 6.712*** (7.22) |
| Investment in OC: outside leadership group | | | | 1.625*** (3.16) | 2.127*** (3.95) | 1.897*** (3.54) |
| R-squared | 0.012 | 0.017 | 0.024 | 0.013 | 0.017 | 0.024 |
| N | 2792 | 2744 | 2811 | 2792 | 2744 | 2811 |

Notes: t-statistics in parentheses, *statistically significant at 10 per cent level,
 statistically significant at 5 per cent level, *statistically significant at 1 per cent level

Results: Best 8 value added, including controls

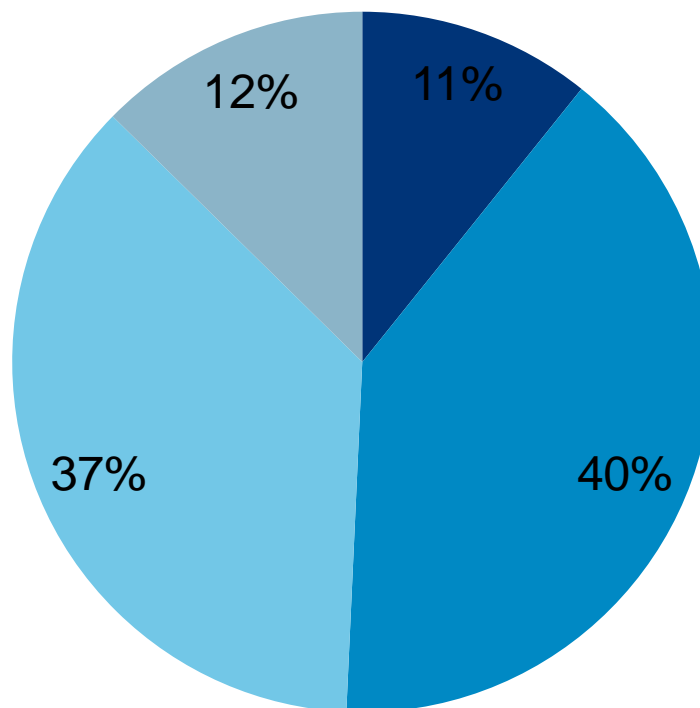
| | 2011 | 2012 | 2013 |
|---|-----------------|-----------------|-----------------|
| Investment in OC: leadership group | 4.639*** | 4.709*** | 5.766*** |
| Investment in OC: outside leadership group | 1.245** | 1.642*** | 1.497*** |
| Total staff | -4.5*** | -4.119*** | -3.416*** |
| % male pupils | -0.105*** | -0.127*** | -0.136*** |
| % FSM pupils | -0.349*** | -0.214*** | -0.305*** |
| % White British pupils | -0.264*** | -0.227*** | -0.241*** |
| % SEN pupils | -1.039*** | -0.914*** | -0.628** |
| School type (ref: community school) | | | |
| ...Academy | 8.931*** | 8.157*** | 7.435*** |
| ...Foundation | 0.988 | -2.015* | -1.976 |
| ...Voluntary aided | 3.355*** | 2.045* | 2.081 |
| ...Voluntary controlled | 0.52 | -2.104 | 0.719 |
| R-squared | 0.152 | 0.158 | 0.168 |
| N | 2792 | 2744 | 2811 |

Organisational capital and school inspection

- Do schools respond to inspections in terms of changes in organisational capital?
- Ofsted are responsible for inspecting all maintained schools and academies in England
- Schools rated on a four point scale:
 - Outstanding, good, satisfactory, inadequate
- Consider change in % workforce in leadership roles between November 2011 and November 2012
 - 2501 schools report on leadership in both 2011 and 2012
 - 438 of these schools inspected between December 2011 and July 2012



Distribution of inspection results



■ Outstanding ■ Good ■ Satisfactory ■ Inadequate

Based on 438 schools inspected December 2011-July 2012

% workforce in leadership group (narrow)

| | November 2011 | November 2012 | Change |
|---|---------------|---------------|--------|
| All Schools (N=2,501) | 5.1 | 5.0 | 0.0 |
| School inspected between December 2011 and July 2012? | | | |
| No (N=2,018) | 5.1 | 5.0 | 0.0 |
| Yes (N=483) | 5.0 | 5.0 | 0.0 |
| If inspected, Rating: | | | |
| Outstanding (N=52) | 5.0 | 4.8 | -0.2 |
| Good (N=193) | 4.8 | 4.9 | 0.0 |
| Satisfactory (N=177) | 5.2 | 5.3 | 0.1 |
| Inadequate (N=61) | 5.2 | 5.2 | -0.1 |

% workforce in broad leadership group

| | November 2011 | November 2012 | Change |
|---|---------------|---------------|--------|
| All Schools (N=2,501) | 12.0 | 11.8 | -0.2 |
| School inspected between December 2011 and July 2012? | | | |
| No (N=2,018) | 12.1 | 11.9 | -0.2 |
| Yes (N=483) | 11.5 | 11.4 | -0.0 |
| If inspected, Rating: | | | |
| Outstanding (N=52) | 12.9 | 12.9 | -0.1 |
| Good (N=193) | 11.4 | 11.0 | -0.4 |
| Satisfactory (N=177) | 11.3 | 11.6 | 0.3 |
| Inadequate (N=61) | 11.1 | 11.1 | 0.0 |

Results: Change in % leaders

| | Change in % workforce in narrow leadership group | | Change in % workforce in broad leadership group | |
|---------------------------|--|--------------------|---|--------------------|
| | Raw | Including controls | Raw | Including controls |
| Ofsted Inspection rating: | | | | |
| Outstanding | -0.141 (0.66) | -0.124 (0.57) | 0.160 (0.38) | 0.205 (0.48) |
| Good | 0.047 (0.41) | 0.029 (0.25) | -0.138 (0.60) | -0.157 (0.69) |
| Satisfactory | 0.121 (1.01) | 0.126 (1.04) | 0.562** (2.37) | 0.536** (2.24) |
| Inadequate | -0.048 (0.24) | -0.052 (0.26) | 0.229 (0.58) | 0.217 (0.54) |

Notes: t-statistics in parentheses, *statistically significant at 10 per cent level,
 statistically significant at 5 per cent level, *statistically significant at 1 per cent level

- On average, the leadership group accounts for around 5% of the school workforce
- Outside of the main leadership group, many other staff in schools also have leadership responsibilities
- This varies considerably across schools – partly explained by school characteristics, but sizeable amount of variation unexplained
- Limitations:
 - measurement of organisational capital
 - time period

Summary

- Our measures of OC are positively associated with school performance
- Results provide further support for importance of considering contributions to OC outside of the main leadership group
- Schools judged outstanding at inspection appear to have a higher % staff engaged in broader leadership roles
- Some evidence to suggest schools rated satisfactory go on to expand the size of their broad leadership group – this did not apply for schools rated good/outstanding (perhaps see no need for change) or schools rated inadequate (may face other constraints)

