1 Revisiting the education classification

- Here I explore what happens when I change the grouping of the educational variable.

- "Raw" education variable has as levels:

  - 0: No qualification
  - 1: GCSE below grade C
  - 2: O levels, GCSE A-C
  - 3: A level / GCE A*
  - 4: Bachelor's+

- The two groupings I try differ in where do I put GCSE A-C.

	No qualification	GCSE below C	GCSE A-C	A levels	Bachelor's
New grouping	Low		Medium		High
Original	Low			Medium	High

1.1 Jobs at the boundary

Let $s_j(o), j \in \{H, M, L\}$ denote the share o-workers with education level j. Denote as $p_i(o)$ the i-th largest element of $\{s_H(o), s_M(o), s_L(o)\}$. A job is in the boundary iff:

$$p_1(o) - p_2(o) \leq R$$

where R is the boundary threshold.

1.2 Modifying the threshold

Figure 2 the relationship between the threshold and the number of jobs I find in the border. Figure 3 break down the border jobs according to the "boundary arm" they belong to. I chose the threshold (indicated with vertical line) so that I keep approximately the same number in the border under the different education definitions.

1.3 Education simplex graphs

Figure 4 show how the boundary looks like under the different education groupings.

1.4 Border jobs examples

Tables 4 to 3 show up 10 border job examples, separating them by border type (i.e. low-mid, low-high, mid-high, etc.). I chose the year arbitrarily. There is nothing special about 2006.

- Tables 4 to 6 show examples when I place GCSE A-C in the low-education bucket.

- Tables 2 to 3 show examples when I place GCSE A-C in the mid-education bucket. There is no table for the border Below GCSE C - Bachelor+ border because this set is empty in 2006.

2 Skills (moving to SES data)

2.1 Preliminaries

Table 1: Number of jobs in occupation panel by dataset

Number of occupations	Occupation
In LFS	233
In SES (complete sample 2001-2017)	175

2.2 Skills chosen to proxy Autor and Dorn (2013)

Index composition   **Analytical skills**:

- Importance of: dealing with people

- Importance of: teaching people (individuals or groups)

- Importance of: persuading or influencing others

- Importance of: planning the activities of others

Routine-cognitive

- Importance of: spotting problems or faults

- Importance of: basic arithmetics

- Importance of: using fractions

Routine non-cognitive

- Importance of: skill or accuracy in using hands/fingers

- Importance of: knowledge of use or operation of tools

Routineness

- How often work involves short repetitive tasks

- How much variety in job

Manual

- Physical skills.

2.3 Factor analysis results

I perform factor analysis on all the skill variables I have available in the individual level data. See this file for the complete description of the variables available.

- I extract 5 factors. Table 7 summarizes their composition and assigns a rough label to them based on the variables with largest loadings.

- Tables 10 to 14 show examples of occupations with the top values of each of the indexes obtained in the factor analysis.

- **Interpretation of the units:** the "raw" factors can have negative values. This is a problem for the skill simplex graphs. I normalize all indexes using their percentile rank within the skill index distribution.

2.4 Border jobs and skill use

Boxplot construction

1. For each education-level pair, I keep observations of individuals working on the border of the education pair, and with education levels in the pair.

2. Then in the individual level data I regress out the average skill use by occupation using the regression:

$$y_i = \delta_o + \varepsilon_i \tag{1}$$

where y_i is a placeholder for any of the skill indexes and δ_o is an occupation fixed effects.

3. I obtain the predicted residuals $\hat{\varepsilon}_i$, standardize them, and aggregate at the occupation level.

Skill simplex

References

Autor, D. H. and Dorn, D. (2013). The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market. *American Economic Review*, 103(5):1553–1597.

Autor, D. H., Levy, F., and Murnane, R. J. (2003). The Skill Content of Recent Technological Change: An Empirical Exploration. *The Quarterly Journal of Economics*, 118(4):1279–1333.

Bizopoulou, A. and Forshaw, R. J. (2019). The Task & Skill Content of Occupational Transitions over the Business Cycle : Evidence for.

Hogarth, T., Hasluck, C., Pierre, G., Vivian, D., Kellard, K., Walker, R., Ashworth, K., and Howard, M. (2001). Labour Market Trends. *Labour Market Trends*, 109(7):345–380.

Mountford, A. and Wadsworth, J. (2019). Trainspotting: "Good Jobs", Training and Skilled Immigration. Technical report.

Nickell, S. and Saleheen, J. (2017). The impact of EU and Non-EU immigration on British wages. *IZA Journal of Development and Migration*, 7(1):15.

Office for Natioal Statistics (2016). Standard occupational classification (SOC 2000) back-casting.

A   Appendix
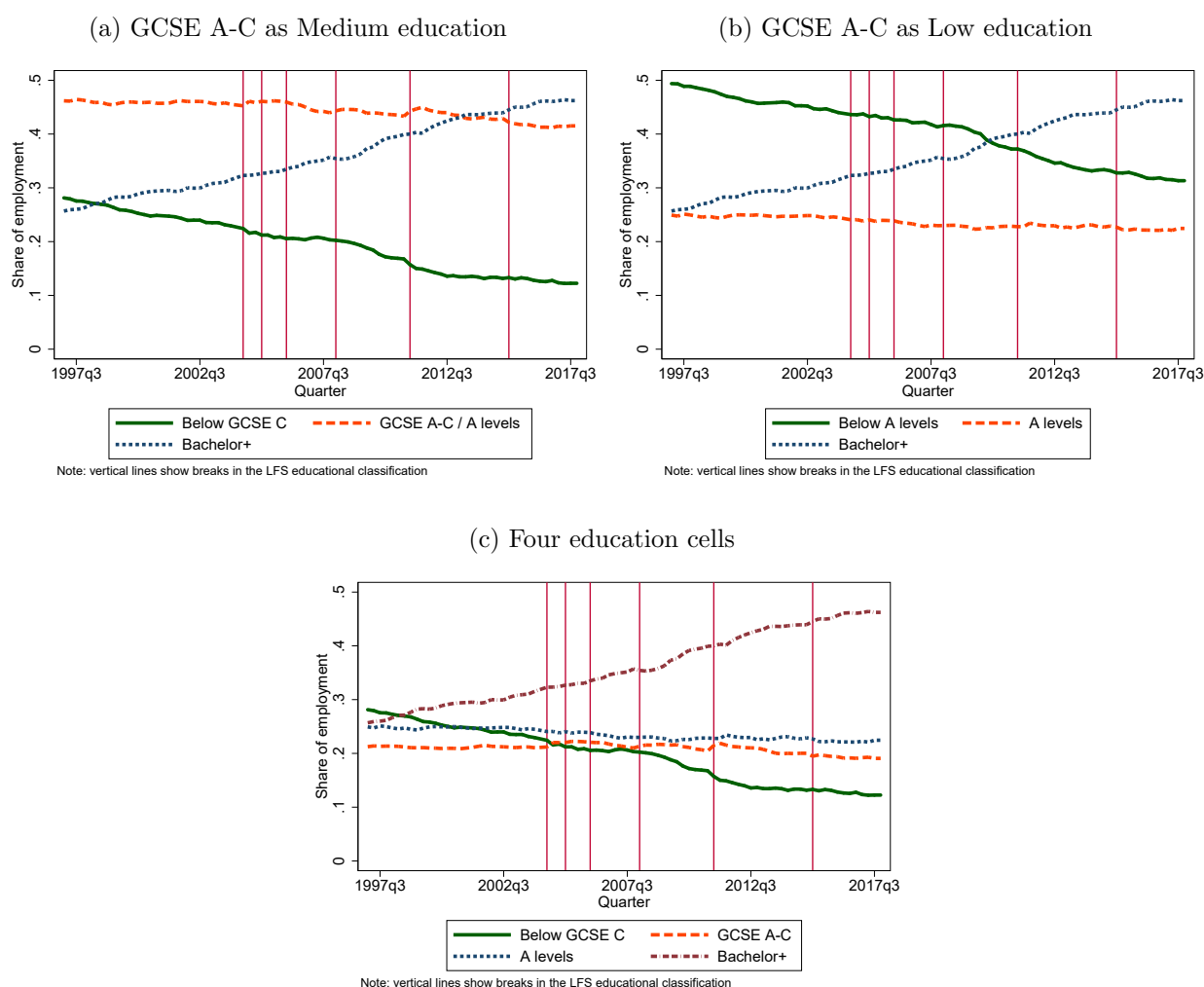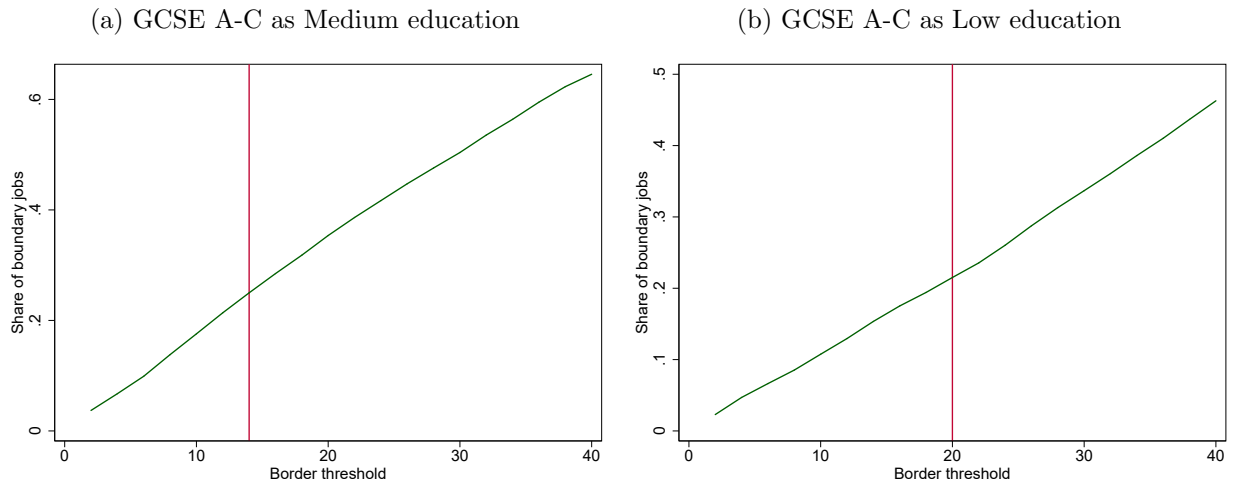
Figure 1: LFS: employment shares by educational level

(a) GCSE A-C as Medium education   (b) GCSE A-C as Low education

(c) Four education cells

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Figure 2: Share of jobs in the boundary at different border thresholds (total jobs=233)

(a) GCSE A-C as Medium education   (b) GCSE A-C as Low education

Note: the graph shows the average shares across the whole period. By year averages look very similar. The vertical line indicates the threshold I am using currently using.

Figure 3: Share of border jobs by border type
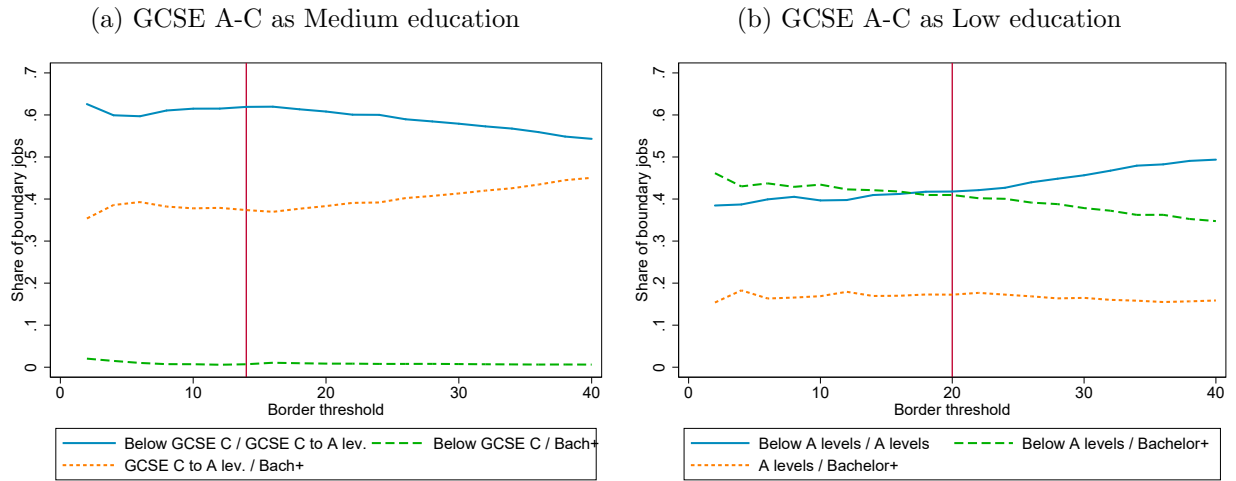
(a) GCSE A-C as Medium education   (b) GCSE A-C as Low education

Note: the graph shows the average shares across the whole period. By year averages look very similar. The vertical line indicates the threshold I am using currently using.
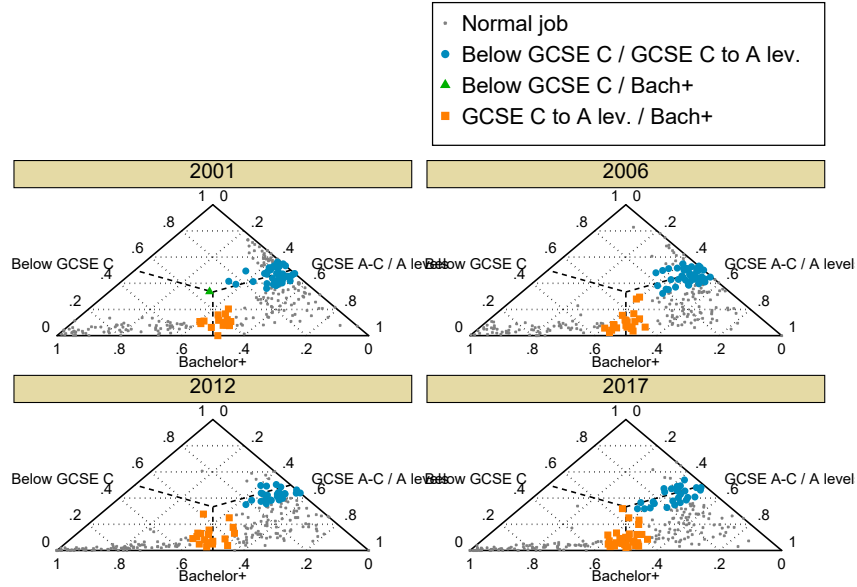
Figure 4: Border jobs under different education groupings

(a) GCSE A-C as Medium education, 14% threshold

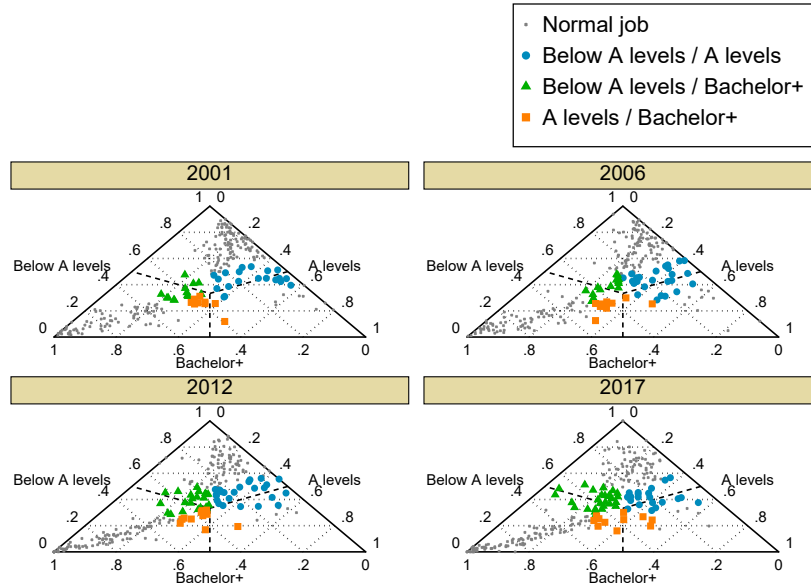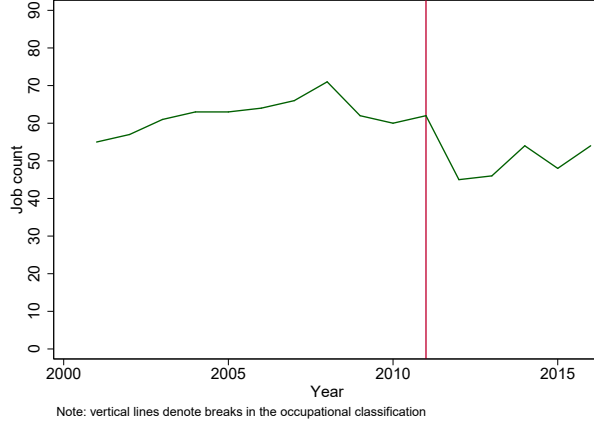## (b) GCSE A-C as Low education, 20% threshold

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Figure 5: Number of jobs in the boundary

(a) GCSE A-C as Medium education, 14% threshold   (b) GCSE A-C as Low education, 20% threshold

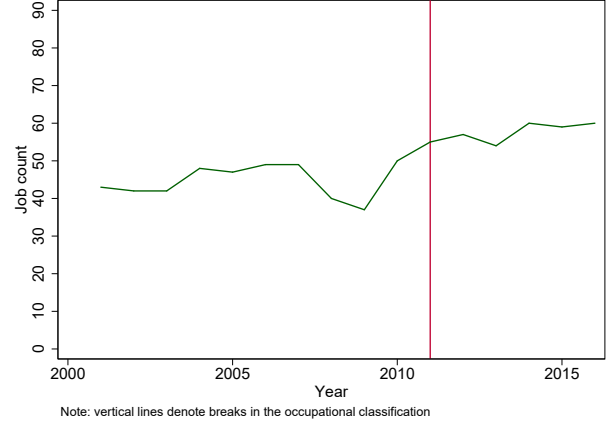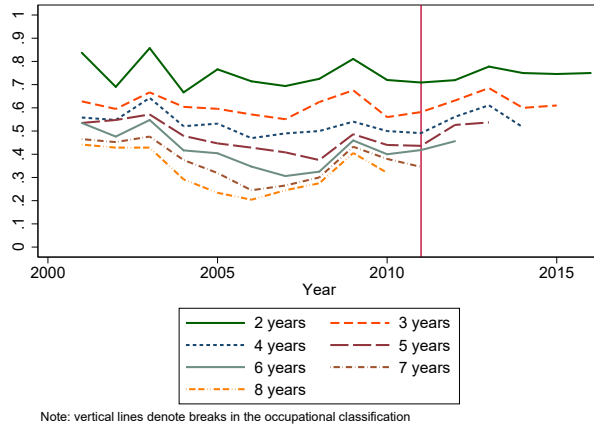Note: vertical lines denote breaks in the occupational classification

Figure 6: Share of jobs in the boundary, staying in the boundary in the next x years

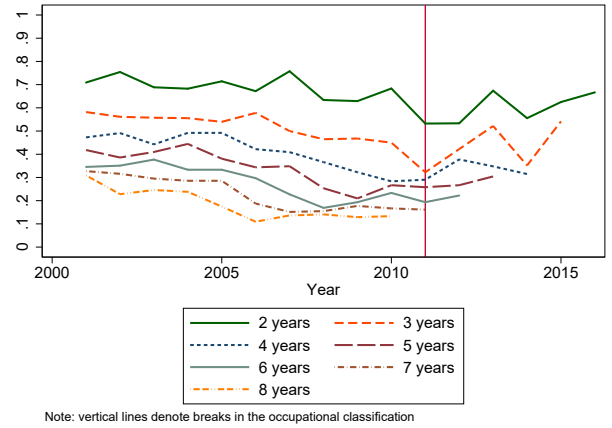(a) GCSE A-C as Low education, 20% threshold   (b) GCSE A-C as Medium education, 14% threshold

Note: vertical lines denote breaks in the occupational classification

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Table 2: Border job examples: Below GCSE C / GCSE C to A lev. border in 2006

bsoc00Agg	No.
5111 Farmers, gardeners and ground women	1.0
5119 agricult and fishing trades n.e.c.	1.0
5212 moulders, core makers, die casters	1.0
5411 weavers and knitters	1.0
5424 screen printers	1.0
5431 butchers, meat cutters	1.0
5433 fishmongers, poultry dressers	1.0
5491 glss & cermic mkr, decortr, finshr	1.0
6219 leisure & travel serv occuptns nec.	1.0
6232 caretakers	1.0
7112 retail cashiers/check-out operators	1.0
8111 food, drink & tobac process operat	1.0
8116 plastics process operatives	1.0
8121 Plant and machine operatives	1.0
8131 assemblers (electrical products)	1.0
Total	15.0

Table 3: Border job examples: GCSE C to A lev. / Bach+ border in 2006

bsoc00Agg	No.
1121 prod. works & maintenance managers	1.0
1122 managers in construction, mining and energy	1.0
1141 quality assurance and customer care managers	1.0
1172 protective service officers	1.0
1239 mngers and prop. in other srvcs nec	1.0
2129 engineering professionals n.e.c.	1.0
2441 public service administrative profs	1.0
3111 laboratory, engineering, and quality assurance tech.	1.0
3121 Draughtspersons And Building Inspectors	1.0
3131 it technitians	1.0
3232 housing and welfare officers	1.0
3442 Sports And Fitness Occupations	1.0
3520 legal associate professionals	1.0
3531 Estimators, valuers, assessors, brokers and insurance underwriters	1.0
3534 fin., invest, and taxation analysts and advisers	1.0
Total	15.0

Table 4: Border job examples: Below A levels / A levels border in 2006 (Low-Mid)

bsoc00Agg	No.
3216 dispensing opticians	1.0
3312 police, fire, and prison officers	1.0
3441 sports players	1.0
3511 Transport Associate Professionals	1.0
4142 communication operators	1.0
5211 smiths and forge workers	1.0
5311 Construction trades	1.0
5321 building trades	1.0
5413 leather and related trades	1.0
5414 tailors and dressmakers	1.0
5421 printing trades	1.0
5492 Skill trades nec	1.0
5495 goldsmth, slvrsmth, prec stone wrkr	1.0
6121 nursery nurses	1.0
6122 childminders, playgroup leaders and educational assistants	1.0
Total	15.0

Table 5: Border job examples: Below A levels / Bachelor+ border in 2006 (Low-High)

bsoc00Agg	No.
1141 quality assurance and customer care managers	1.0
1151 Financial institution and office managers	1.0
1211 farm managers	1.0
1219 mngr anml hsbndry, frst, fish nec.	1.0
1226 travel agency managers	1.0
1239 mngers and prop. in other srvcs nec	1.0
3131 it technitians	1.0
3442 Sports And Fitness Occupations	1.0
3534 fin., invest, and taxation analysts and advisers	1.0
3541 sales representatives, marketing profs, estate agents, actioneers	1.0
3565 inspects fact, utils & trading standards, statutory examiners	1.0
4111 civil service officers and assistants	1.0
4113 local gov clerical offs & assists / officers in NGOs	1.0
5494 musicl instrument makers and tuners	1.0
5496 floral arrangers, florists	1.0
Total	15.0

Table 6: Border job examples: A levels / Bachelor+ border in 2006 (Mid-High)

bsoc00Agg	No.
1121 prod. works & maintenance managers	1.0
1122 managers in construction, mining and energy	1.0
1172 protective service officers	1.0
1231 Managers And Proprietors In Other Service Industries except retail	1.0
2129 engineering professionals n.e.c.	1.0
3111 laboratory, engineering, and quality assurance tech.	1.0
3112 electrical & electronic technicians	1.0
3520 legal associate professionals	1.0
3531 Estimators, valuers, assessors, brokers and insurance underwriters	1.0
Total	9.0

Table 7: Factor analysis: variables with largest loadings per factor

Variable name	Description	Loadings
Factor 1: Verbal/analytical skills		
skverb	Literacy	0.77
skprofcom	Profesional communication skills	0.71
skplanning	Planning skills	0.68
cwritesh	importance of: writing short documents	0.64
skprobsol	Problem solving skills	0.63
cwritelg	importance of: writing long documents	0.62
Factor 2: manual / physical skills		
skphys	Physical Skills	0.88
cstrengt	importance of: physical strength	0.70
cstamina	importance of: physical stamina	0.68
chands	importance of: skill or accuracy in using hands/fingers	0.67
ctools	importance of: knowledge of use or operation of tools	0.63
Factor 3: control / discretion over job		
bme3	influence personally have on: how to do the task	0.60
bme2	influence personally have on: what tasks to do	0.57
bme4	influence personally have on: quality standards work to	0.48
bchoice	how much choice have over way in which do job	0.48
bme1	influence personally have on: how hard work	0.44
Factor 4: quantitative skills		
sknumber	Numeracy	0.52
cpercent	Importance of: using fractions	0.49
ccalca	importance of: basic arithmetics	0.43
Factor 5: Communication skills		
skclicom	Client Communication Skills	0.58
cselling	importance of: selling a product or service	0.49

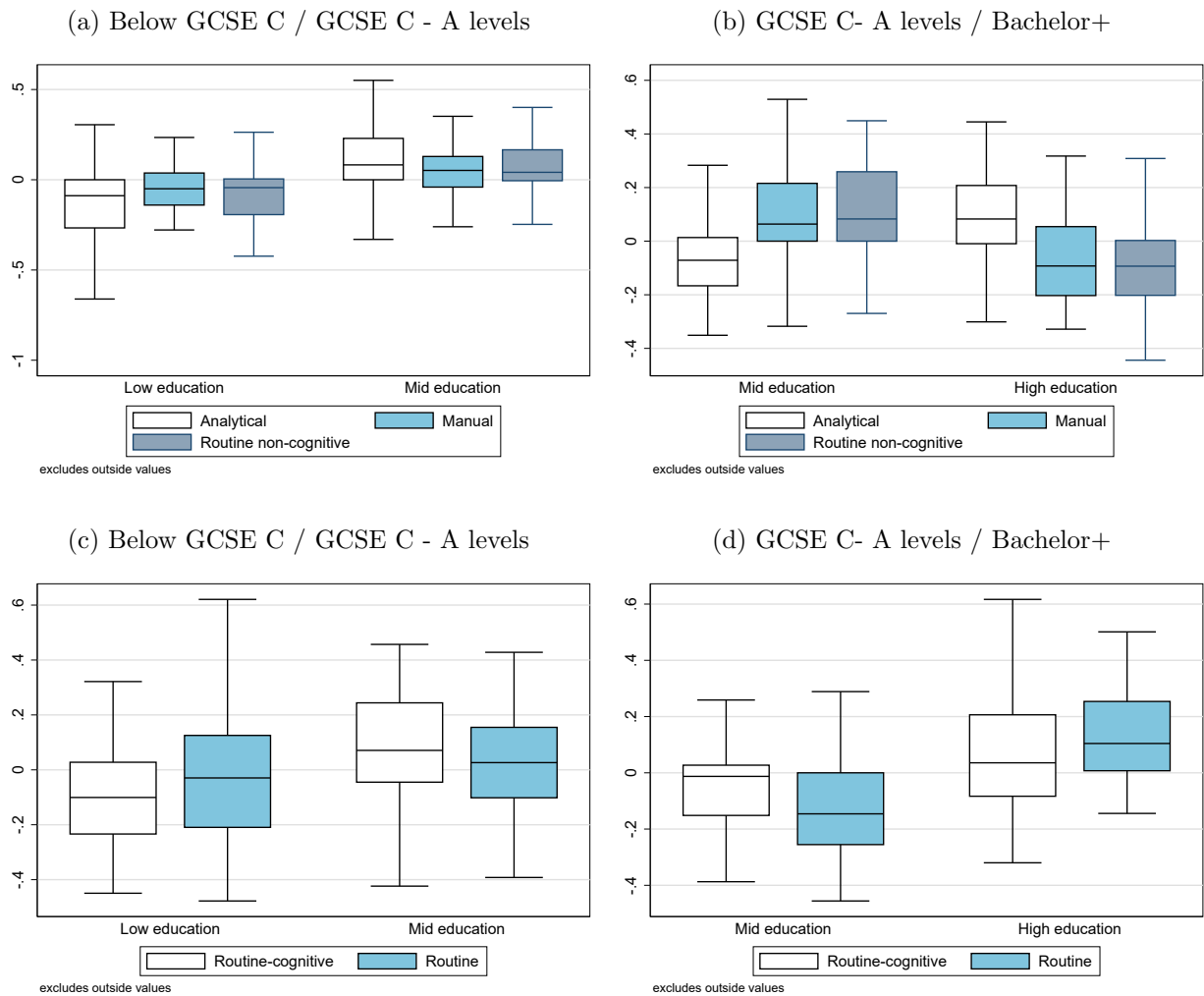Figure 7: Occupation level aggregates: skill use in border jobs (Autor and Dorn (2013) proxies)

(a) Below GCSE C / GCSE C - A levels

(b) GCSE C- A levels / Bachelor+

(c) Below GCSE C / GCSE C - A levels

(d) GCSE C- A levels / Bachelor+

Figure 8: Occupation level aggregates: skill use in border jobs (factor analysis skills)

(a) Below GCSE C / GCSE A-C

excludes outside values

(b) GCSE C- A levels / Bachelor+

excludes outside values

(c) Below GCSE C / GCSE A-C

excludes outside values

(d) GCSE C- A levels / Bachelor+

excludes outside values

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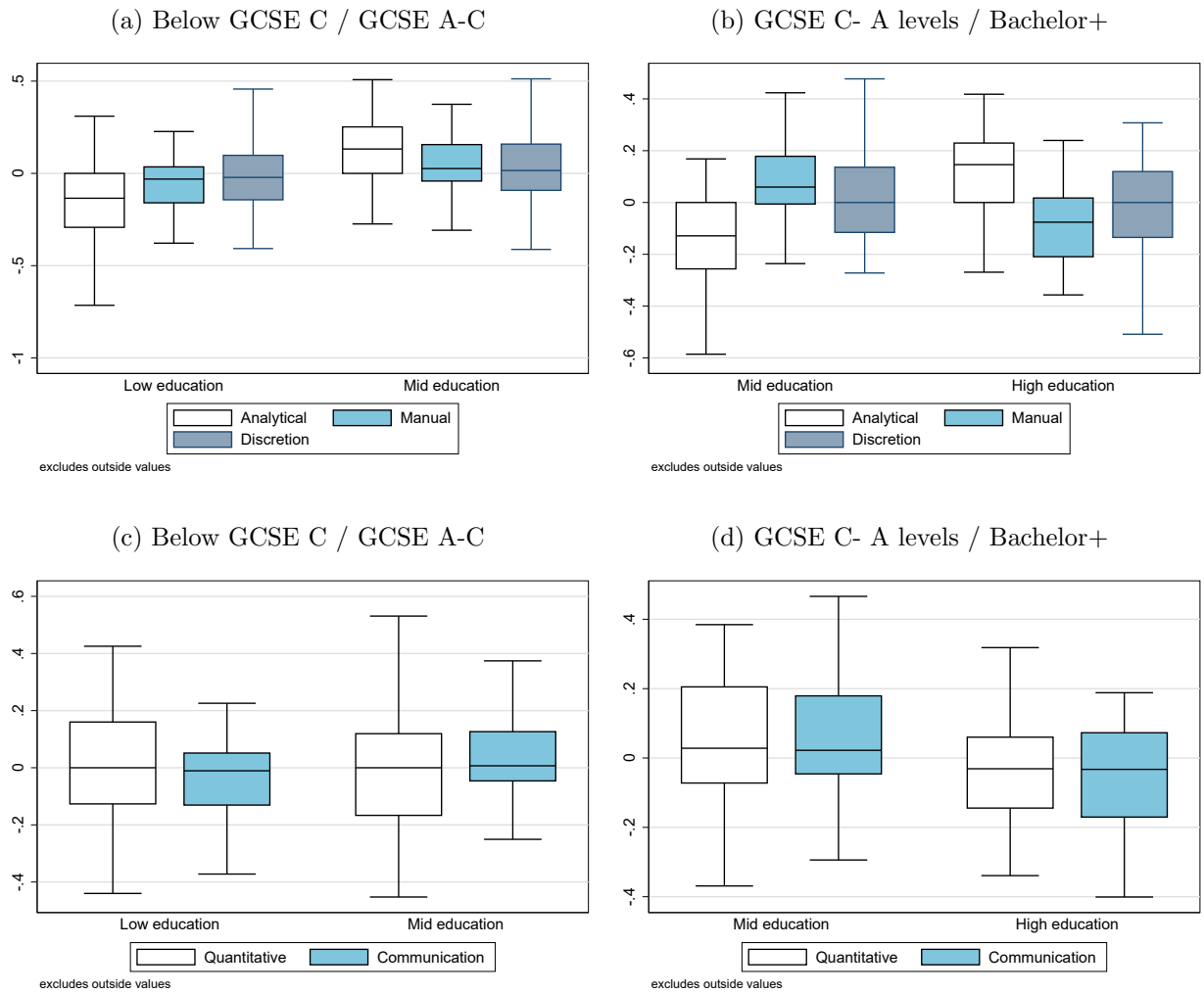
Table 8: Skill requirements in border jobs (ALM 2003 indexes)

	(1) Analytical	(2) Manual	(3) R.N.C	(4) R.C.	(5) Routineness
Mid-High jobs					
High education	0.26***	-0.23***	-0.82***	0.31**	0.62***
	(0.04)	(0.04)	(0.16)	(0.11)	(0.10)
Observations	1,550	1,550	1,550	1,550	1,550
Low-Mid jobs					
Mid education	0.32***	0.09*	0.29*	0.63***	0.07
	(0.05)	(0.04)	(0.14)	(0.12)	(0.12)
Observations	1,509	1,509	1,509	1,509	1,509

Table 9: Skill requirements in border jobs

	(1) Analytical	(2) Manual	(3) Discretion	(4) Quant.	(5) Comm.
Mid-High jobs					
High education	9.22***	-6.96***	-0.50	-0.57	-2.66*
	(1.22)	(1.24)	(1.29)	(1.24)	(1.34)
Observations	1,550	1,550	1,550	1,550	1,550
Low-Mid jobs					
Mid education	6.43***	2.31	0.90	1.67	2.54
	(1.22)	(1.20)	(1.50)	(1.35)	(1.37)
Observations	1,509	1,509	1,509	1,509	1,509

Figure 9: Skill simplex: Autor and Dorn (2013) proxies

(a) Below GCSE C / GCSE A-C - A-levels
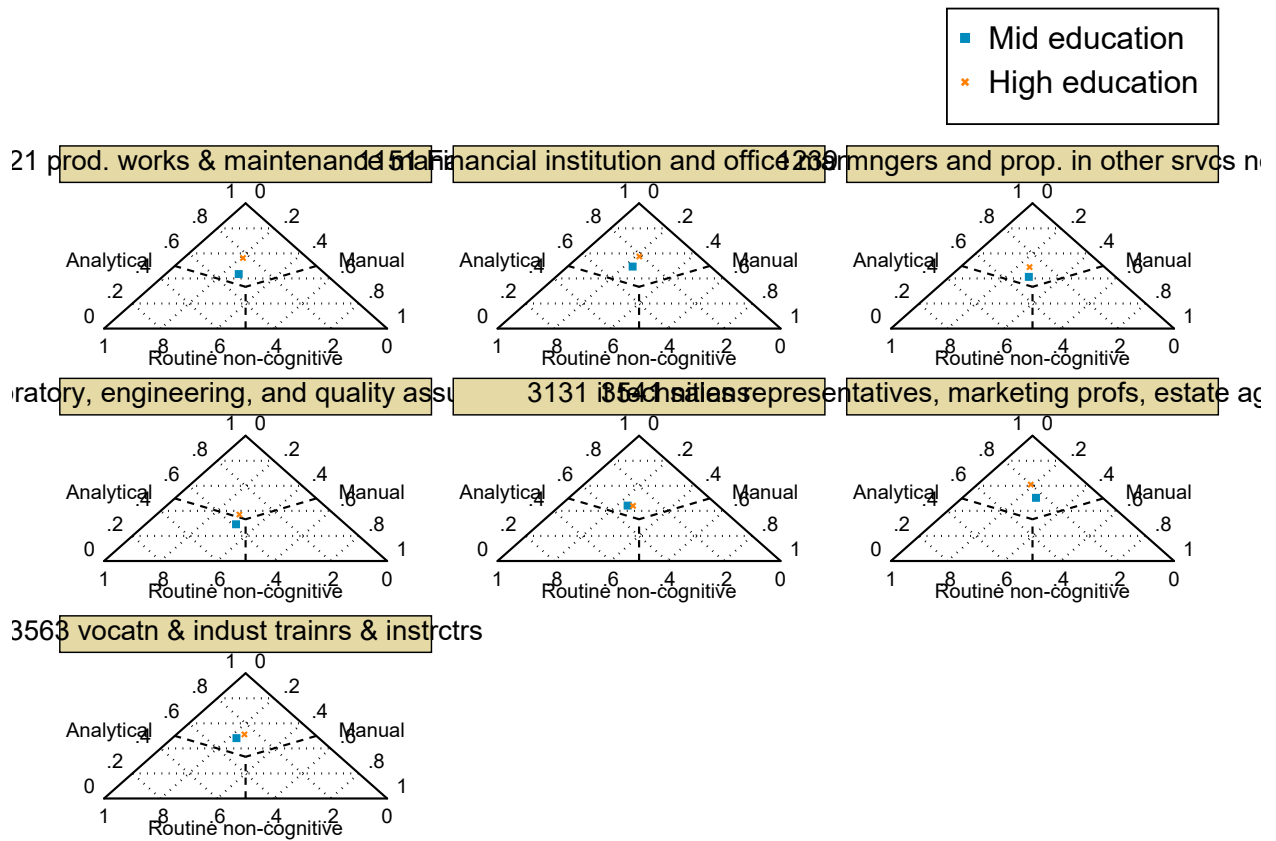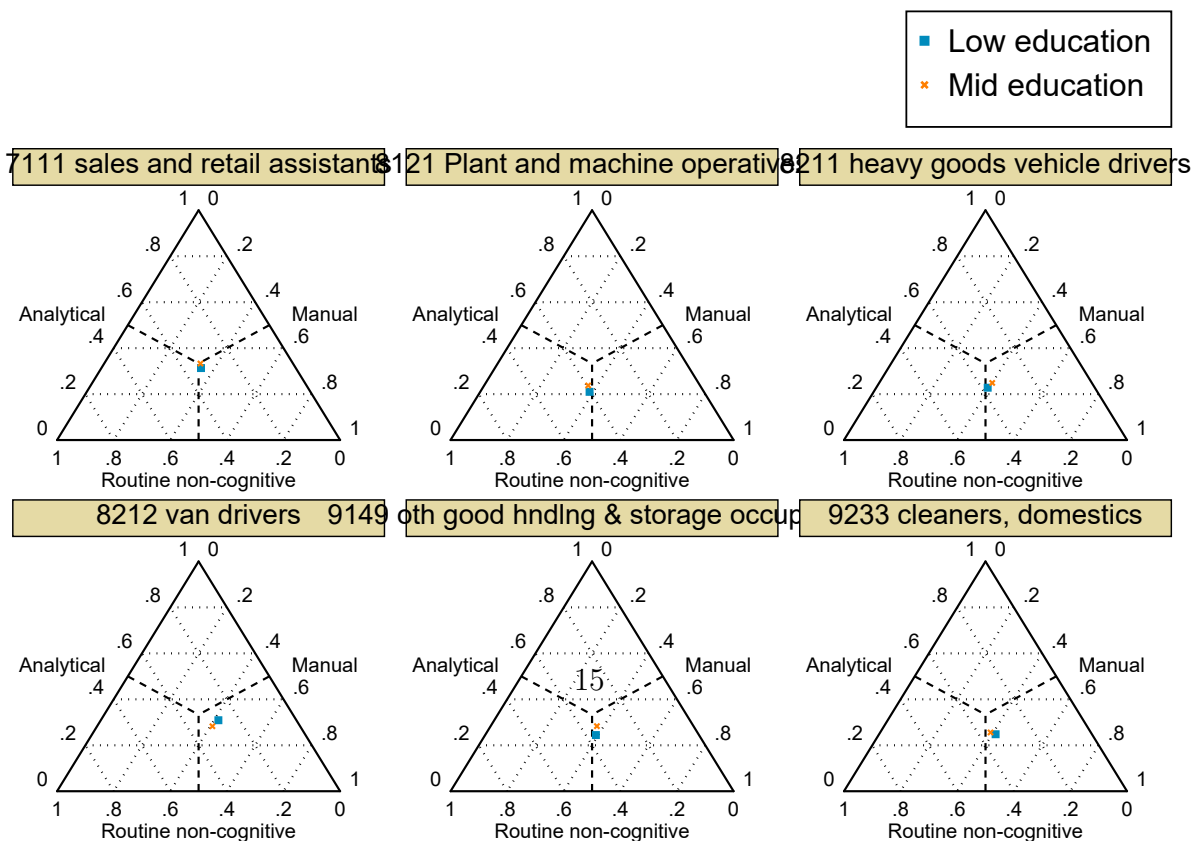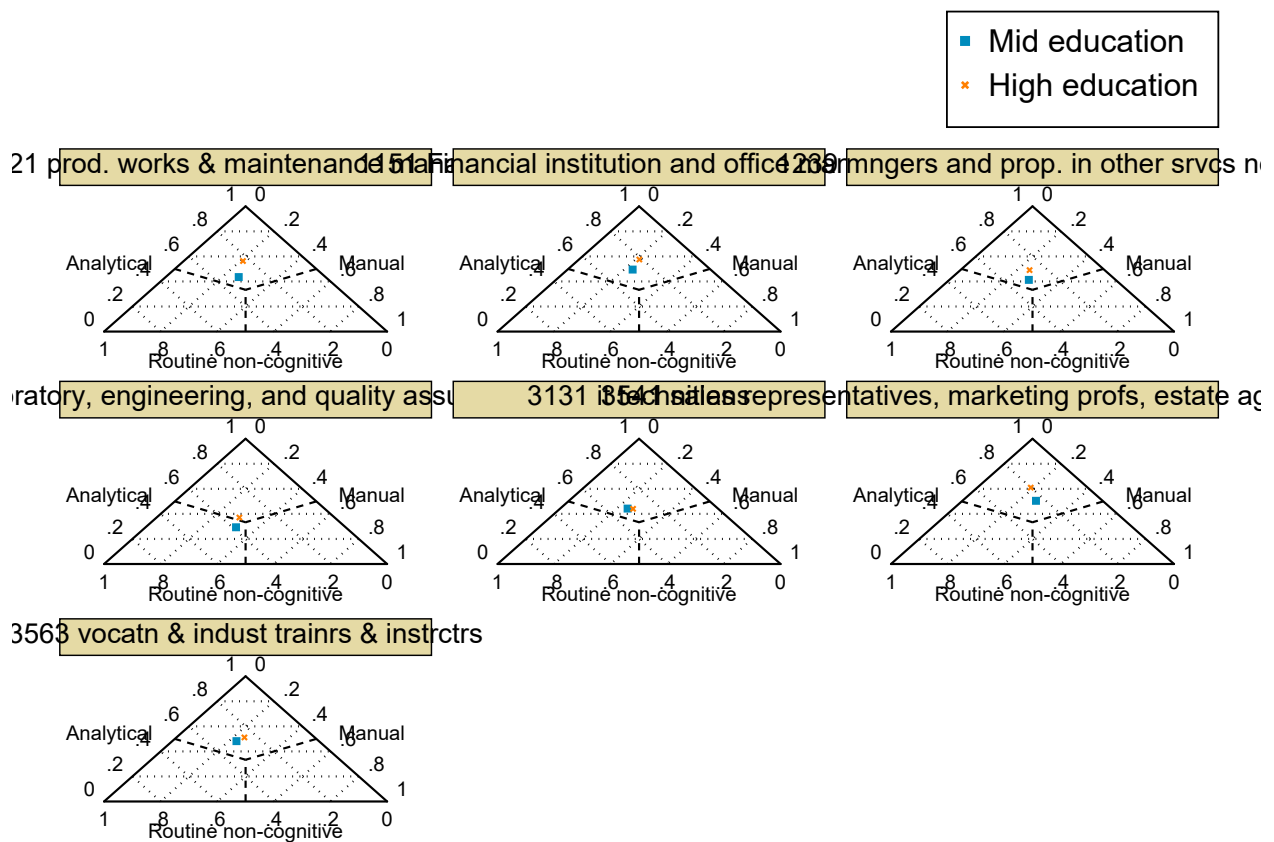

(b) GCSE C- A levels / Bachelor+

Figure 10: Skill simplex: factor analysis

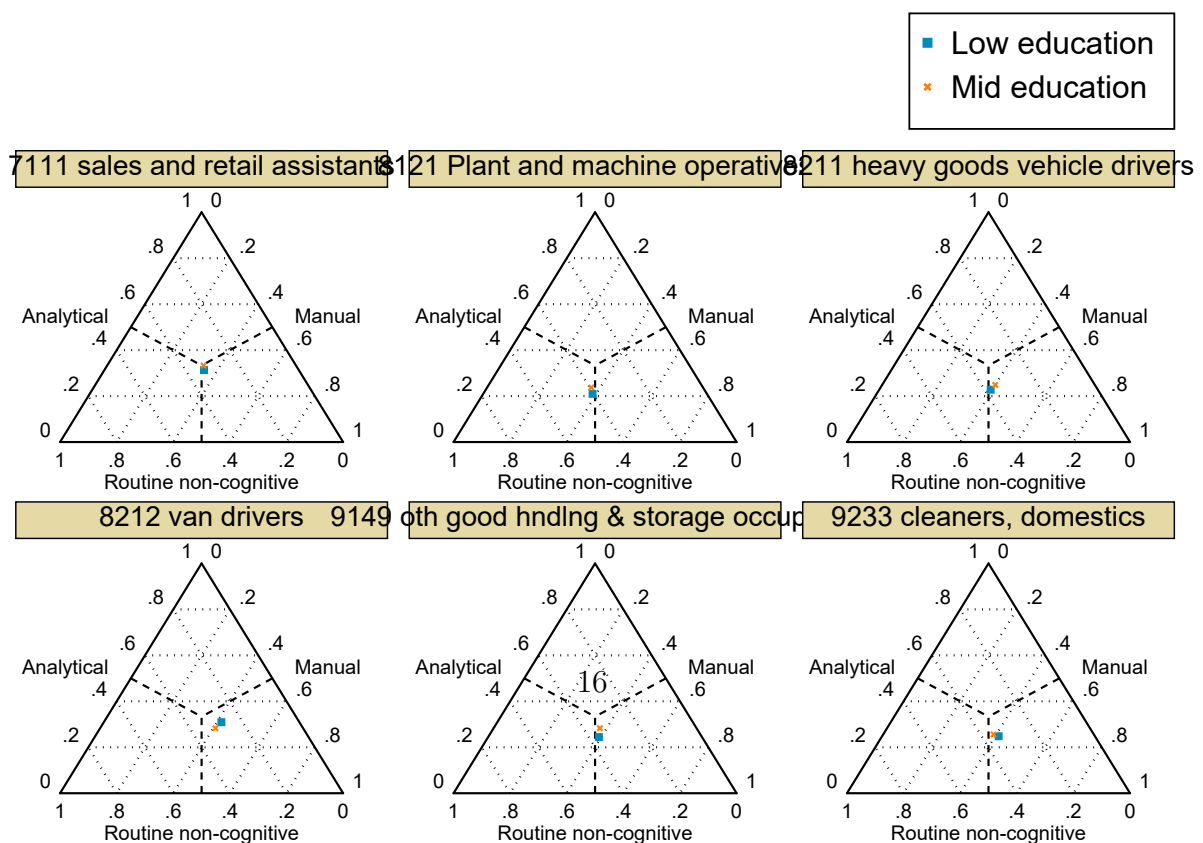## (a) Below GCSE C / GCSE A-C - A levels

(b) GCSE C- A levels / Bachelor+

Table 10: Top occupations: Analytical

bsoc00Agg	No.
1112 directors & chief execs of maj orgs	1.0
1114 sen. officials spec interest orgs	1.0
2212 psychologists	1.0
2311 higher educ teaching prfsnals	1.0
2313 educ officers,school inspectrs	1.0
2314 secondary eductn teaching prfsnals	1.0
2317 registrs & sen admins ed establish	1.0
2321 scientific researchers	1.0
2411 solic & lawyers, judges & coroners	1.0
2443 probation officers	1.0
Total	10.0

Table 11: Top occupations: Manual

bsoc00Agg	No.
5119 agricult and fishing trades n.e.c.	1.0
5312 bricklayers, masons, roofers	1.0
5321 building trades	1.0
5431 butchers, meat cutters	1.0
5433 fishmongers, poultry dressers	1.0
5492 Skill trades nec	1.0
8119 process operatives n.e.c.	1.0
8135 tyre, exhaust and windscrn fitters	1.0
8141 scaffolders, stagers, riggers	1.0
9129 lab oth const trades n.e.c.	1.0
Total	10.0

Table 12: Top occupations: Discretion

bsoc00Agg	No.
1163 retail and wholesale managers	1.0
1234 shopkprs, wholesale & retail dealrs	1.0
2444 clergy	1.0
3229 therapists n.e.c.	1.0
3442 Sports And Fitness Occupations	1.0
5119 agricult and fishing trades n.e.c.	1.0
5321 building trades	1.0
6221 Hairdressers And Related Occupations	1.0
8215 Transport operatives nec	1.0
9231 window cleaners	1.0
Total	10.0

Table 13: Top occupations: Quant

bsoc00Agg	No.
2111 chemists	1.0
2126 design, development, production and process engineers	1.0
2132 software professionals	1.0
2321 scientific researchers	1.0
2422 management accountants	1.0
2434 chartrd surveyors (not qntity surv)	1.0
3422 product, clothing & related dsgners	1.0
4121 Credit controllers, accnts wages cleark, bookkeeper	1.0
5412 upholsterers	1.0
8134 weighers, graders, sorters	1.0
Total	10.0

Table 14: Top occupations: Communication

bsoc00Agg	No.
1163 retail and wholesale managers	1.0
2213 pharmacists & pharmacologists	1.0
4123 counter clerks	1.0
7111 sales and retail assistants	1.0
7112 retail cashiers/check-out operators	1.0
7113 telephone salespersons	1.0
7211 Customer sevice occupations	1.0
224 waiters, waitresses	1.0
9225 bar staff	1.0
9226 leisure and theme park attendants	1.0
Total	10.0