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Different systems, same inequalities? Post-compulsory education and young adults' literacy in 18 OECD countries

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Appendix

<Appendix (sub) head>**Part 1** Additional information on the first step of analysis

<i>Country</i>	<i>PIAAC</i>		<i>N</i>	<i>PISA</i>		<i>N</i>
	<i>Literacy scores</i>			<i>Reading scores</i>		
	<i>mean</i>	<i>sd</i>		<i>mean</i>	<i>sd</i>	
Austria	283.27	41.28	480	507.13	93.01	4,745
Flemish Belgium	292.86	43.51	460	532.27	96.50	3,890
Canada	286.24	47.44	2,147	534.31	94.63	29,687
Czech Republic	284.71	39.46	714	491.58	96.33	5,365
Germany	284.77	44.79	503	483.99	111.22	5,073
Denmark	283.88	51.34	460	496.87	98.07	4,235
Spain	263.57	45.04	539	492.55	84.74	6,214
Finland	307.33	44.68	491	546.47	89.42	4,864
France	280.43	47.33	593	504.74	91.75	4,673
Great Britain	278.20	52.08	845	523.41	100.34	4,120
Ireland	274.74	46.97	580	526.67	93.58	3,854
Italy	264.13	43.78	345	487.47	91.42	4,984
Japan	309.26	34.56	420	522.24	85.79	5,256
Korea	292.26	34.82	607	524.75	69.53	4,982
Norway	288.09	50.94	455	505.28	103.66	4,147
Poland	280.87	45.67	1,649	479.12	99.80	3,654
Sweden	293.10	52.60	392	516.33	92.18	4,416
USA	278.43	50.99	523	504.42	104.79	3,846

<table head – above table>**Table A1** Descriptive statistics and sample sizes of PIAAC 2011/2012 (24–29-years-old) and PISA 2000

Note: Means and standard deviations estimated with PVs and replicate weights. Sample sizes: unweighted.

<i>Country</i>	<i>coef.</i>	<i>SE</i>	<i>std.coef.</i>	<i>R²</i>
Austria	23.46	4.20	0.59	0.07
Flemish Belgium	29.42	4.54	0.72	0.11
Canada	17.90	3.79	0.39	0.04
Czech Republic	28.81	5.55	0.77	0.09
Germany	24.82	4.82	0.58	0.08
Denmark	26.51	5.44	0.53	0.07
Spain	24.77	4.79	0.56	0.05
Finland	21.33	5.53	0.49	0.05
France	27.84	3.78	0.62	0.07
Great Britain	32.94	5.47	0.68	0.10
Ireland	20.41	5.02	0.45	0.04
Italy	24.15	7.51	0.56	0.03
Japan	15.10	3.79	0.45	0.05
Korea	13.91	3.73	0.41	0.03
Norway	26.63	5.81	0.54	0.07
Poland	32.51	4.97	0.74	0.08
Sweden	16.30	6.42	0.31	0.02
USA	29.57	5.28	0.61	0.09

<table head – above table>**Table A2** Linear regression of literacy scores on parental education (HIGH-PARED)

Note: coef. = coefficients for HIGH-PARED; SE = standard errors; R² = R-squared; std. coef. = standardized coefficients for HIGH-PARED.

Source: own elaboration on PIAAC 2011/2012 (24-to29-years-old). Analyses performed with PVs and replicate weights in STATA 13 using the package 'piaactools'.

<appendix (sub) head>**Part 2** Additional information on the second step of analysis

<i>Source variable</i>	<i>Description and data source</i>	<i>Calibration thresholds</i>	<i>Fuzzy-set</i>
PIAAC variance explained by parental education	Variance in literacy skills explained by highest educational level among parents. <i>Source</i> : own elaboration on PIAAC 2011/12 (24–29-years-old).	Fully out: 0.039 Cross-over: 0.058 Fully in: 0.090	Stratified skills (<i>OUTCOME</i>)
PISA variance explained by parental education	Variance in reading skills explained by highest educational level among parents. <i>Source</i> : own elaboration on PISA 2000.	Fully out: 0.012 Crossover: 0.028 Fully in: 0.064	Previously stratified skills (<i>STRAT-PISA</i>)
Vocational orientation index	Standardized index for vocational orientation of upper-secondary education (Bol and Van De Werfhorst, 2011)	Fully out: -1.23 Cross-over: 0.15 Fully-in: 1.32	Vocational-oriented secondary education (<i>VOC-SEC</i>)
Relative enrolment between offspring of graduates/not graduates	Relative probability to enrol in tertiary education for individuals with at least one parent who completed tertiary education vs. none parent who completed it. <i>Source</i> : own elaboration on PIAAC 2011/12 (24–29-years-old).	Fully out: 1.5 Crossover: 1.75 Fully in: 2	Socially-selective higher education (<i>SE-HE</i>)
% Students in ISCED 5B	Proportion of students enrolled in ISCED 5B over those enrolled in ISCED 5A and 5B in 2004. <i>Source</i> : (OECD iLibrary, 2016)	Fully out: 10 Crossover: 20 Fully in: 30	Vocationally-oriented higher education (<i>VOC-HE</i>)

See text, section 3.5	See text, section 3.5	/	Relevant autonomy in tertiary education governance (<i>AUTON</i>)
/	/	Intersection (fuzzy-set minimum) of the sets <i>DIFF-HE</i> and <i>AUTON</i>	Differentiated tertiary (<i>DIFF-HE</i>)
Association skills/ISEI	Estimated coefficient of reading literacy skills in a linear regression predicting socio-economic status on the ISEI scale, controlling for age, gender and educational level. <i>Source</i> : own elaboration on PIAAC 2011/12.	Fully out: 0.072 Crossover: 0.077 Fully in: 0.09	Social salience of skills (<i>SKILL-SAL</i>)

<table head – above table>**Table A3** Data sources and calibration thresholds for source variables (outcome and conditions)

Note: Data on % Students in ISCED 5B for France refer to 2003, for Flemish Belgium refer to Belgium overall, and for the US come from Adams (2002, 20).

<i>Country</i>	<i>PISA variance explained by parental education</i>	<i>Vocational orientation index</i>	<i>Relative enrolment between offspring of graduates/not</i>	<i>% Students in ISCED 5B</i>	<i>Association skills/ISEI</i>
Austria	0.03	1.701	2.12	10.64	0.12
Flanders	0.00	0.945	1.80	51.82	0.08
Canada	0.04	-1.723	1.45	24.52	0.10
Czech rep.	0.07	1.744	2.33	10.36	0.09
Germany	0.06	0.887	2.04	14.98	0.10
Denmark	0.09	0.455	1.56	12.81	0.09
Spain	0.05	-0.001	1.70	13.89	0.08
Finland	0.02	0.737	1.54	0.05	0.08
France	0.02	0.393	1.77	23.85	0.08
G.Britain	0.04	0.467	1.71	22.82	0.10
Ireland	0.02	-0.354	1.67	33.56	0.06
Italy	0.02	0.948	2.33	1.10	0.05
Japan	0.00	-0.729	1.93	24.39	0.07
Korea	0.02	-0.55	1.28	39.16	0.08
Norway	0.02	0.885	1.76	2.03	0.09
Poland	0.08	0.296	1.72	1.09	0.07
Sweden	0.01	0.686	1.68	3.91	0.09
USA	0.06	-1.844	1.36	21.15	0.09

<table head – above table> **Table A4** Distribution of the source variables for the country-level explanatory conditions
Sources: see Table A3.

<i>Country</i>	<i>STR AT- PISA</i>	<i>VOC- SEC</i>	<i>SE- HE</i>	<i>VOC- HE</i>	<i>AUTON</i>	<i>DIFF- HE</i>	<i>SKILL- SAL</i>	<i>OUTCOM E</i>
Austria	0.62	1.00	1.00	0.01	0.20	0.01	1.00	0.73
Flanders	0.00	0.96	0.70	1.00	0.20	0.20	0.85	1.00
Canada	0.71	0.00	0.00	0.93	0.40	0.40	1.00	0.01
Czech rep.	1.00	1.00	1.00	0.01	0.80	0.01	0.94	0.98
Germany	0.97	0.95	1.00	0.18	0.20	0.18	1.00	0.95
Denmark	1.00	0.77	0.03	0.05	0.01	0.01	0.94	0.76
Spain	0.94	0.38	0.30	0.10	0.40	0.10	0.29	0.16
Finland	0.24	0.91	0.02	0.00	0.40	0.00	0.92	0.13
France	0.15	0.72	0.59	0.91	0.60	0.60	0.59	0.88
G.Britain	0.78	0.78	0.33	0.88	0.99	0.88	1.00	1.00
Ireland	0.07	0.16	0.18	1.00	0.60	0.60	0.00	0.02
Italy	0.15	0.96	1.00	0.00	0.20	0.00	0.00	0.00
Japan	0.00	0.05	0.96	0.93	0.80	0.80	0.00	0.11
Korea	0.19	0.09	0.00	1.00	0.99	0.99	0.14	0.00
Norway	0.02	0.95	0.54	0.00	0.01	0.00	1.00	0.83
Poland	1.00	0.64	0.35	0.00	0.20	0.00	0.06	0.97
Sweden	0.00	0.89	0.22	0.00	0.01	0.00	0.96	0.00
USA	0.98	0.00	0.00	0.79	0.99	0.79	0.96	0.98

<table head – above table>**Table A5** Distribution of the fuzzy sets for the country-level explanatory conditions and the outcome

Note: Sources and calibration thresholds: see Table A3.

<i>STRAT- PISA</i>	<i>VOC- SEC</i>	<i>SE- HE</i>	<i>DIFF- HE</i>	<i>SKILL- SAL</i>	<i>OUTCOME</i>	<i>Cons.</i>	<i>Cases</i>
0	1	1	1	1	1	1.000	FRA
1	1	1	0	1	1	0.959	AUT,CZE,DEU
1	1	0	1	1	1	0.916	GBR
0	1	1	0	1	1	0.91	BELF,NOR
1	1	0	0	1	1	0.849	DNK
1	1	0	0	0	1	0.799	POL
1	0	0	1	1	1	0.709	USA
1	0	0	0	0	0	0.624	ESP
1	0	0	0	1	0	0.593	CAN
0	1	0	0	1	0	0.512	FIN,SWE
0	1	1	0	0	0	0.408	ITA
0	0	1	1	0	0	0.372	JPN
0	0	0	1	0	0	0.248	IRL,KOR

<table head – above table>**Table A6** Truth table

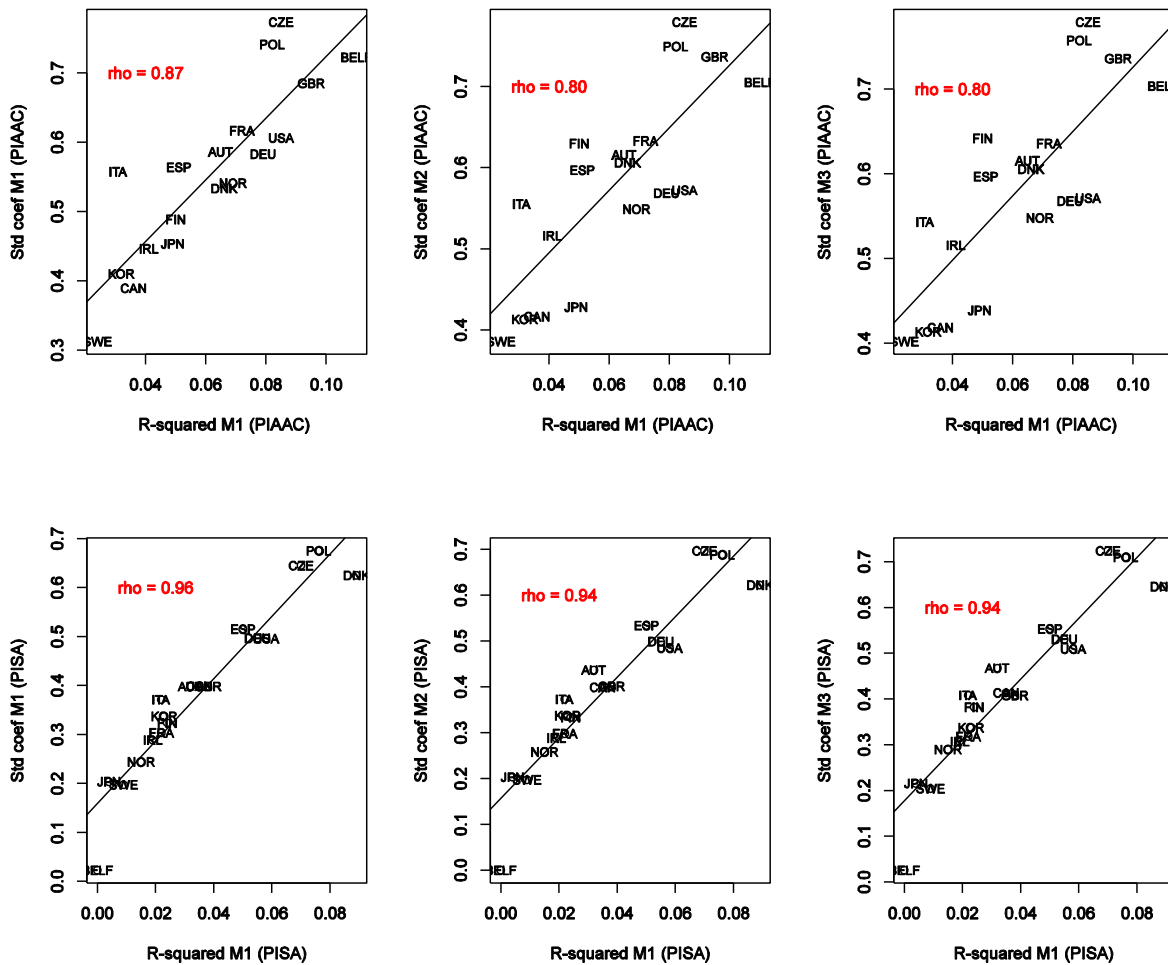
Note: Frequency threshold: 1. Consistency threshold: 0.7.

A \ B	OUTCOME	STRAT-PISA	VOC-SEC	SE-HE	DIFF-HE	SKILL-SAL
OUTCOME		0.74	0.69	0.67	0.52	0.69
STRAT-PISA	0.69		0.52	0.49	0.49	0.59
VOC-SEC	0.81	0.66		0.88	0.39	0.78
SE-HE	0.58	0.46	0.64		0.43	0.49
DIFF-HE	0.31	0.31	0.20	0.29		0.28
SKILL-SAL	0.84	0.77	0.81	0.70	0.59	

<table head – above table>**Table A7** Results from analysis of necessity and sufficiency.

Note: Consistency values for A as superset of B.

<appendix (sub) head>**Part 3** Robustness checks



<Figure head – below figure>**Figure A1** Correlation plots of chosen vs. alternative measures for social stratification of literacy in PIAAC (above) and PISA (below). Note: Std. coef. = standardized coefficients for HIGH-PARED. M1 = Model with no controls; M2 = Model controlling for migratory status; M3 = Model controlling for migratory status and gender. rho = Pearson’s correlation coefficient. Source: own elaboration on PIAAC 2011/2012 (24–29-years-old) and PISA 2000. Analyses performed with PVs and replicate weights in STATA 13 using the packages ‘piaactools’ and ‘pisatools’.

<i>Solution components</i>	<i>con</i>	<i>cov</i>	<i>un. cov.</i>	<i>Cases</i>
	<i>s.</i>	.		
SKILL-SAL * SE-HE	0.89	0.5	0.19	BELF, NOR; FRA; AUT, CZE, DEU
STRAT-PISA * DIFF-HE	0.76	0.2	0.08	FRA; GBR; USA

STRAT-PISA * VOC-SEC	0.5	0.15	DNK; AUT, CZE, DEU; GBR; POL
	0.89	5	
<i>Whole solution</i>	0.8		
	0.82	2	

<table head – above table>**Table A8** Minimized configurations sufficient for the outcome (first alternative solution)

Note: Frequency threshold: 1. Consistency threshold: 0.7. Outcome and conditions defined as in the original formulation. Parsimonious solution resulting from model ambiguities.

<i>Solution components</i>	<i>cons.</i>	<i>cov.</i>	<i>un. cov.</i>	<i>Cases</i>
SKILL-SAL * SE-HE	0.89	0.53	0.20	BELF, NOR; FRA; AUT, CZE, DEU
SKILL-SAL * DIFF-HE* STRAT-PISA	0.79	0.22	0.13	GBR; USA
STRAT-PISA * VOC-SEC * diff-he	0.89	0.47	0.16	DNK; AUT, CZE, DEU; POL
<i>Whole solution</i>	0.84	0.83		

<table head – above table>**Table A9** Minimized configurations sufficient for the outcome (second alternative solution)

Note: Frequency threshold: 1. Consistency threshold: 0.7. Outcome and conditions defined as in the original formulation. Intermediate solution with positive directional expectations for STRAT-PISA, and SE-HE, SKILL-SAL.

<i>Country</i>	<i>Source variables</i>		<i>Fuzzy sets</i>	
	<i>Std.coef M3 PISA</i>	<i>Std.coef. M3 PIAAC</i>	<i>STRAT-PISA</i>	<i>OUTCOME</i>
Austria	0.47	0.62	0.87	0.73
Flanders	0.03	0.70	0.00	1.00
Canada	0.41	0.42	0.64	0.00
Czech rep.	0.72	0.78	1.00	1.00
Germany	0.53	0.57	0.97	0.23
Denmark	0.65	0.61	1.00	0.59
Spain	0.55	0.60	0.98	0.47
Finland	0.38	0.64	0.47	0.94
France	0.32	0.64	0.24	0.91
G.Britain	0.41	0.74	0.61	1.00
Ireland	0.31	0.52	0.21	0.04
Italy	0.41	0.54	0.61	0.10
Japan	0.22	0.44	0.06	0.00
Korea	0.34	0.41	0.30	0.00
Norway	0.29	0.55	0.17	0.12
Poland	0.71	0.76	1.00	1.00
Sweden	0.20	0.40	0.05	0.00
USA	0.51	0.57	0.95	0.25

Table A10 Distribution of alternative source variables and fuzzy sets for the outcome and the condition 'STRAT-PISA'

Note: Std.coef. = standardized coefficient for HIGH-PARED. M3 = Model controlling for migratory status and gender.

<i>STRAT- PISA</i>	<i>VOC- SEC</i>	<i>SE- HE</i>	<i>DIFF- HE</i>	<i>SKILL- SAL</i>	<i>OUTCOME</i>	<i>Cons.</i>	<i>Cases</i>
0	1	1	1	1	1	0.999	FRA
1	1	0	1	1	1	0.916	GBR
1	1	0	0	0	1	0.876	POL
1	1	0	0	1	1	0.868	DNK
1	1	1	0	1	1	0.77	AUT,CZE,DEU
1	0	0	0	0	0	0.758	ESP
0	1	1	0	1	0	0.706	BELF,NOR
1	0	0	0	1	0	0.665	CAN
1	1	1	0	0	0	0.617	ITA
0	1	0	0	1	0	0.573	FIN,SWE
1	0	0	1	1	0	0.436	USA
0	0	1	1	0	0	0.29	JPN
0	0	0	1	0	0	0.246	IRL,KOR

<table head – above table>**Table A11** Truth table with alternative calibration for the outcome and the condition ‘STRAT-PISA’

Note: Frequency threshold: 1. Consistency threshold: 0.76. Outcome and condition ‘STRAT-PISA’

based on standardized coefficients from model 3 (see Table A10); other conditions defined as in the original formulation.

<i>Solution components</i>	<i>cons.</i>	<i>cov.</i>	<i>un. cov.</i>	<i>Cases</i>
SKILL-SAL * SE-HE * STRAT-PISA	0.75	0.36	0.22	AUT, CZE, DEU
SKILL-SAL * DIFF-HE* strat-pisa	0.72	0.16	0.07	FRA
STRAT-PISA * VOC-SEC * sel-he	0.86	0.37	0.23	DNK; POL ; GBR
<i>Whole solution</i>	0.76	0.67		

<table head – above table>**Table A12** Minimized configurations sufficient for the outcome (third alternative solution)

Note: Frequency threshold: 1. Consistency threshold: 0.76. Outcome and condition 'STRAT-PISA'

based on standardized coefficients from model 3 (see Table A10); other conditions defined as in the original formulation. Parsimonious solution.

