



PISA FOR DEVELOPMENT

Annex B

**Results of multi-level analyses of PISA 2012 mathematics
in 18 middle-income countries**

ANNEX B: RESULTS OF MULTI-LEVEL ANALYSES OF PISA 2012 MATHEMATICS IN 18 MIDDLE-INCOME COUNTRIES

ISO codes used for the 18 middle-income countries

ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
Argentina	Bulgaria	Brazil	Colombia	Costa Rica	Indonesia	Jordan	Kazakhstan	Mexico
MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
Montenegro	Malaysia	Peru	Romania	Serbia	Thailand	Tunisia	Turkey	Viet Nam

[Part 1/1]

Table B.1 Model 1: Empty model

Empty model	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
Constant	388.8*** (100.88)	439.4*** (84.26)	389.3*** (144.72)	377.0*** (112.26)	407.2*** (106.06)	375.2*** (81.98)	385.7*** (103.06)	431.5*** (126.54)	413.9*** (246.97)
Between school variance	2 597.5*** (84.60)	4 646.8*** (82.93)	2 716.6*** (76.68)	1 951.8*** (59.86)	1 983.7*** (49.59)	2 665.3*** (47.88)	2 165.0*** (43.89)	1 860.3*** (58.29)	1 938.5*** (135.29)
Within school variance	3 253.2*** (300.07)	4 160.3*** (321.05)	3 434.3*** (357.86)	3 617.7*** (266.62)	2 699.4*** (261.20)	2 456.3*** (255.97)	3 852.1*** (325.30)	3 234.5*** (301.74)	3 578.2*** (540.02)
Number of observations	5 908	5 282	19 204	9 073	4 602	5 622	7 038	5 808	33 806

Empty model	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
Constant	409.8*** (42.58)	420.5*** (107.59)	368.7*** (88.89)	444.6*** (101.92)	449.2*** (85.34)	426.5*** (104.56)	388.0*** (83.34)	448.2*** (74.14)	511.7*** (99.29)
Between school variance	2 485.2*** (26.04)	2 128.8*** (57.37)	3 243.4*** (71.55)	2 986.6*** (72.13)	3 775.7*** (64.61)	2 865.2*** (64.45)	3 017.0*** (49.51)	5 108.0*** (67.16)	3 823.6*** (66.04)
Within school variance	4 323.6*** (206.31)	4 449.3*** (259.85)	3 864.6*** (310.45)	3 588.7*** (299.45)	4 430.6*** (269.47)	3 941.1*** (303.13)	3 104.2*** (302.83)	3 172.7*** (268.99)	3 507.6*** (260.27)
Number of observations	4 744	5 197	6 035	5 074	4 684	6 606	4 407	4 848	4 959

Notes: Multilevel regression model consists of student and school levels.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295624>

[Part 1/1]

Table B.2 Model 2: Mathematics performance and gender

Individual features	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
Gender (ref. male)	-16.09*** (-6.80)	-15.19*** (-7.41)	-20.73*** (-14.23)	-25.90*** (-12.03)	-24.83*** (-14.36)	-7.028*** (-3.84)	-2.594 (-0.32)	-2.132 (-1.20)	-18.01*** (-17.92)
Constant	397.1*** (96.40)	446.7*** (81.06)	400.0*** (138.47)	390.7*** (104.57)	420.4*** (101.60)	378.6*** (79.44)	387.0*** (56.24)	432.5*** (118.52)	423.0*** (235.52)
Between school variance	2 609.1*** (84.82)	4 767.3*** (84.18)	2 752.2*** (77.60)	1 940.1*** (60.57)	1 999.1*** (50.25)	2 672.6*** (47.94)	2 195.5*** (41.19)	1 862.6*** (58.21)	1 971.6*** (136.66)
Between school variance	3 191.1*** (300.18)	4 107.3*** (318.17)	3 325.0*** (366.09)	3 461.4*** (261.88)	2 543.9*** (257.90)	2 445.0*** (257.82)	3 850.2*** (324.26)	3 233.5*** (302.01)	3 496.0*** (531.65)
Number of observations	5 908	5 282	19 204	9 073	4 602	5 622	7 038	5 803	33 806

Individual features	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
Gender (ref. male)	-12.86*** (-3.65)	3.097 (1.44)	-27.37*** (-13.54)	-14.47*** (-5.87)	-25.14*** (-9.65)	-1.407 (-0.70)	-24.17*** (-12.67)	-22.15*** (-11.20)	-25.14*** (-11.68)
Constant	416.2*** (39.69)	418.9*** (98.31)	382.7*** (85.78)	452.0*** (97.49)	461.8*** (80.14)	427.3*** (95.91)	400.9*** (82.12)	459.2*** (70.76)	525.1*** (92.75)
Between school variance	2 559.1*** (26.59)	2 120.9*** (57.40)	3 338.2*** (72.01)	3 058.3*** (73.93)	3 962.3*** (66.36)	2 876.4*** (64.41)	3 130.3*** (50.46)	5 237.0*** (67.77)	4 018.6*** (66.74)
Between school variance	4 284.5*** (193.65)	4 447.5*** (260.96)	3 702.4*** (303.36)	3 537.4*** (300.49)	4 285.9*** (269.03)	3 940.2*** (303.37)	2 955.1*** (294.25)	3 072.8*** (257.76)	3 345.9*** (257.93)
Number of observations	4 744	5 197	6 035	5 074	4 684	6 606	4 407	4 848	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295630>

[Part 1/1]

Table B.3 Model 3: Language disparities

Individual features	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
Native speaker	12.36** (2.73)	27.41*** (6.47)	16.12*** (4.14)	26.76*** (4.48)	5.606 (0.91)	-10.16*** (-4.48)	23.59*** (5.19)	1.571 (0.34)	22.64*** (7.77)
Constant	377.0*** (66.25)	415.4*** (67.56)	373.9*** (78.47)	350.9*** (50.00)	401.8*** (56.09)	379.3*** (81.84)	363.9*** (59.43)	430.0*** (79.20)	392.5*** (124.75)
Between school variance	2 565.8*** (85.06)	4 300.6*** (80.56)	2 703.8*** (76.50)	1 938.2*** (60.18)	1 981.9*** (49.54)	2 724.8*** (47.02)	2 131.8*** (43.66)	1 864.2*** (58.19)	1 872.9*** (134.88)
Within school variance	3 248.2*** (299.20)	4 120.5*** (328.19)	3 424.4*** (356.69)	3 601.1*** (263.50)	2 698.1*** (260.93)	2 438.3*** (260.58)	3 814.9*** (334.44)	3 233.7*** (302.33)	3 563.3*** (542.33)
Number of observations	5 908	5 282	19 204	9 073	4 602	5 622	7 038	5 803	33 806

Individual features	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
Native speaker	30.93** (3.12)	-3.408 (-0.89)	24.64*** (5.81)	10.23 (1.10)	4.315 (0.74)	-6.746* (-2.06)	23.48*** (3.50)	6.607 (1.42)	16.41* (2.23)
Constant	379.4*** (30.53)	422.5*** (94.45)	346.5*** (62.18)	434.6*** (44.62)	445.1*** (57.03)	430.1*** (106.76)	365.1*** (47.25)	442.1*** (59.42)	495.6*** (58.46)
Between school variance	2 463.0*** (26.01)	2 081.8*** (55.60)	3 046.2*** (68.77)	2 979.6*** (72.05)	3 771.8*** (64.62)	2 927.4*** (64.01)	3 003.3*** (49.34)	5 068.5*** (66.90)	3 797.1*** (65.73)
Within school variance	4 307.3*** (205.44)	4 450.8*** (260.24)	3 836.4*** (317.05)	3 587.2*** (299.25)	4 429.6*** (270.05)	3 932.3*** (300.48)	3 091.6*** (299.17)	3 171.5*** (269.15)	3 503.9*** (260.38)
Number of observations	4 744	5 197	6 035	5 074	4 684	6 606	4 407	4 848	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295644>

[Part 1/1]

Table B.4 Model 4: Rural-urban disparities

School location	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
Village (ref. town)	-22.09 (-1.42)	-61.23*** (-3.76)	-43.65*** (-5.55)	-32.14*** (-3.43)	-21.77** (-2.87)	-11.80 (-1.08)	-2.128 (-0.28)	-9.724 (-1.06)	-32.21*** (-7.69)
City	14.39 (1.84)	44.14*** (4.03)	27.70*** (5.13)	17.74* (2.39)	13.44 (1.04)	36.05** (3.28)	35.56*** (4.63)	15.45 (1.69)	25.36*** (7.24)
Constant	385.3*** (70.52)	425.6*** (71.90)	377.9*** (108.26)	371.1*** (60.85)	410.4*** (85.14)	371.2*** (64.05)	370.7*** (80.24)	427.7*** (55.84)	407.5*** (165.75)
Between school variance	2 490.9*** (84.36)	4 003.1*** (87.16)	2 413.7*** (77.60)	1 687.1*** (59.30)	1 857.5*** (48.68)	2 374.6*** (41.41)	1 849.4*** (46.81)	1 728.4*** (54.82)	1 570.2*** (138.88)
Within school variance	3 253.1*** (300.07)	4 160.1*** (321.15)	3 433.6*** (357.84)	3 617.4*** (266.68)	2 699.3*** (261.22)	2 456.3*** (255.97)	3 852.1*** (325.30)	3 235.4*** (301.57)	3 577.2*** (540.12)
Number of observations	5 908	5 282	19 204	9 073	4 602	5 622	7 038	5 803	33 806

School location	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
Village (ref. town)	m	-36.31*** (-5.50)	-45.77*** (-5.45)	-31.41** (-2.64)	-134.7*** (-10.06)	-5.717 (-0.51)	-11.76 (-0.95)	27.84 (0.87)	-25.10* (-2.46)
City	13.45 (0.52)	25.75** (2.69)	43.39*** (5.32)	27.95** (2.86)	32.43** (2.96)	33.92*** (3.65)	26.38* (1.99)	-16.21 (-1.28)	36.44* (2.49)
Constant	405.7*** (50.03)	418.5*** (93.97)	359.3*** (62.99)	437.5*** (87.68)	437.3*** (74.83)	416.4*** (96.06)	382.3*** (79.17)	456.8*** (43.72)	514.0*** (61.57)
Between school variance	2 447.3*** (29.17)	1 778.2*** (56.30)	2 185.4*** (60.56)	2 693.5*** (79.19)	3 461.2*** (62.88)	2 572.9*** (64.14)	2 877.2*** (53.02)	5 009.6*** (66.05)	3 211.9*** (63.85)
Within school variance	4 323.6*** (206.31)	4 449.3*** (259.85)	3 864.2*** (310.30)	3 588.4*** (299.41)	4 430.3*** (269.54)	3 942.0*** (303.08)	3 104.3*** (302.84)	3 172.8*** (268.97)	3 507.8*** (260.30)
Number of observations	4 744	5 197	6 035	5 074	4 684	6 606	4 407	4 848	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295650>

ANNEX B: RESULTS OF MULTI-LEVEL ANALYSES OF PISA 2012 MATHEMATICS IN 18 MIDDLE-INCOME COUNTRIES

[Part 1/1]

Table B.5 Model 5: Mathematics performance and students' origin

Individual features	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
ESCS*	12.30*** (9.03)	11.80*** (8.94)	9.267*** (6.04)	14.91*** (6.45)	13.44*** (8.31)	9.451*** (3.82)	12.21*** (7.67)	15.68*** (7.67)	6.930*** (7.92)
ESCS squared	1.643* (2.29)	-0.494 (-0.65)	0.169 (0.34)	1.349 (1.94)	1.401* (2.34)	0.757 (1.23)	0.136 (0.20)	-0.0613 (-0.04)	0.730* (2.19)
Gender (ref. male)	-15.36*** (-6.49)	-13.33*** (-6.22)	-19.73*** (-13.37)	-23.95*** (-11.06)	-23.32*** (-13.34)	-5.527** (-3.05)	0.726 (0.10)	-2.302 (-1.30)	-17.34*** (-17.50)
Native speaker	8.884 (1.76)	18.85*** (4.07)	12.48** (2.66)	28.54*** (4.33)	6.186 (0.93)	-12.83*** (-5.58)	18.15*** (4.22)	2.770 (0.60)	17.98*** (6.00)
Village (ref. town)	-15.01 (-1.08)	-39.67* (-2.55)	-37.97*** (-4.94)	-23.12** (-2.64)	-15.17* (-2.29)	-10.72 (-1.03)	1.472 (0.20)	-6.052 (-0.68)	-27.30*** (-6.47)
City	13.39 (1.92)	36.24*** (3.61)	21.38*** (4.29)	12.51 (1.89)	9.435 (0.82)	34.99** (3.29)	31.43*** (4.52)	11.72 (1.35)	20.68*** (6.18)
Constant	391.2*** (56.78)	421.8*** (59.77)	390.0*** (61.49)	372.7*** (37.90)	425.7*** (56.12)	392.7*** (63.11)	361.3*** (47.52)	431.8*** (52.32)	406.4*** (113.53)
Between school variance	1 958.5*** (76.61)	3 252.0*** (82.28)	2 040.2*** (74.66)	1 264.9*** (56.56)	1 392.2*** (45.37)	2 188.2*** (42.41)	1 498.2*** (39.85)	1 553.8*** (48.69)	1 403.7*** (133.37)
Within school variance	3 111.2*** (308.64)	3 991.8*** (324.71)	3 262.1*** (358.39)	3 358.8*** (261.62)	2 464.9*** (264.62)	2 390.7*** (258.58)	3 647.6*** (342.40)	3 129.9*** (302.80)	3 459.9*** (534.24)
% of the between school variance explained	24.60	30.02	24.90	35.19	29.82	17.90	30.80	16.48	27.59
% of the within school variance explained	4.36	4.05	5.01	7.16	8.69	2.67	5.31	3.23	3.31
Number of observations	5 819	5 183	18 951	8 997	4 571	5 606	6 908	5 797	33 598

Individual features	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
ESCS*	11.96*** (5.61)	21.16*** (9.68)	12.41*** (7.06)	19.32*** (10.49)	8.518*** (5.94)	17.21*** (8.88)	12.41*** (7.32)	3.108 (1.67)	10.22*** (4.20)
ESCS squared	-0.0722 (-0.06)	2.781** (3.27)	0.752 (1.35)	1.780* (2.23)	-0.651 (-0.53)	3.087*** (4.30)	2.369*** (4.16)	-1.246 (-1.79)	1.038 (1.47)
Gender (ref. male)	-10.75** (-2.99)	3.784 (1.80)	-26.06*** (-13.09)	-12.13*** (-5.02)	-24.09*** (-9.43)	0.0628 (0.03)	-23.61*** (-12.38)	-21.67*** (-11.30)	-23.91*** (-11.21)
Native speaker	14.91 (0.93)	-5.096 (-1.44)	24.83*** (5.99)	6.240 (0.73)	0.788 (0.13)	-11.48*** (-3.59)	10.98 (1.35)	2.672 (0.56)	14.53 (1.95)
Village (ref. town)	m	-28.00*** (-4.69)	-37.57*** (-5.17)	-24.08* (-2.03)	-128.0*** (-9.67)	-3.530 (-0.31)	-9.143 (-0.75)	30.57 (1.04)	-22.47* (-2.20)
City	11.50 (0.48)	18.56* (2.24)	33.80*** (4.69)	19.62* (2.31)	29.38** (2.75)	28.79*** (3.48)	21.98 (1.75)	-17.03 (-1.38)	29.19* (2.01)
Constant	400.6*** (25.34)	431.6*** (87.33)	365.7*** (58.93)	447.0*** (46.21)	453.1*** (49.14)	437.2*** (91.20)	393.3*** (40.10)	474.3*** (41.76)	527.0*** (44.40)
Between school variance	2 066.2*** (29.04)	1 270.0*** (49.91)	1 645.6*** (53.67)	2 076.2*** (72.62)	3 311.5*** (62.02)	2 200.3*** (58.88)	2 631.6*** (52.93)	4 738.9*** (64.54)	3 134.0*** (63.79)
Within school variance	4 188.8*** (207.01)	4 273.5*** (281.43)	3 610.0*** (307.29)	3 387.1*** (304.55)	4 250.4*** (273.40)	3 845.6*** (312.93)	2 875.2*** (287.74)	3 031.9*** (260.39)	3 308.6*** (261.28)
% of the between school variance explained	16.86	40.34	49.26	30.48	12.29	23.21	12.77	7.23	18.04
% of the within school variance explained	3.12	3.95	6.59	5.62	4.07	2.42	7.38	4.44	5.67
Number of observations	4 688	5 183	6 005	5 055	4 624	6 586	4 339	4 806	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

* ESCS refers to the PISA index of economic, social and cultural status.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295661>

[Part 1/1]

Model 6: Socio-economic background of the students and schools' socio-economic composition
Table B.6

Individual features	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
ESCS*	11.29*** (8.16)	11.51*** (8.56)	8.232*** (5.53)	13.69*** (5.79)	12.55*** (7.69)	7.659** (2.99)	10.87*** (6.57)	14.76*** (7.11)	5.873*** (6.78)
ESCS squared	1.555* (2.19)	-0.110 (-0.14)	0.0223 (0.05)	1.001 (1.47)	1.085 (1.78)	0.614 (0.96)	-0.0452 (-0.06)	-0.208 (-0.15)	0.380 (1.18)
School's mean ESCS	49.03*** (8.91)	72.91*** (13.00)	45.70*** (16.14)	35.10*** (9.86)	33.49*** (9.42)	36.97*** (6.11)	47.13*** (5.48)	45.47*** (5.68)	29.54*** (20.40)
Constant	430.0*** (114.26)	462.5*** (148.02)	455.2*** (121.68)	435.4*** (95.90)	449.9*** (101.86)	452.8*** (39.99)	411.6*** (83.27)	450.3*** (121.57)	452.2*** (239.01)
Between school variance	983.5*** (49.51)	1 294.3*** (46.92)	1 022.4*** (75.00)	762.7*** (49.98)	749.9*** (48.82)	1 785.9*** (49.29)	1 239.6*** (41.99)	1 307.8*** (37.14)	1 043.0*** (118.74)
Within school variance	3 170.5*** (308.62)	4 057.7*** (320.14)	3 366.8*** (351.56)	3 507.4*** (270.09)	2 603.1*** (268.92)	2 423.6*** (252.13)	3 666.9*** (338.58)	3 133.2*** (301.66)	3 545.4*** (542.55)
% of the between school variance explained	62.14	72.15	62.36	60.92	62.20	32.99	42.74	29.70	46.20
% of the within school variance explained	2.54	2.47	1.97	3.05	3.57	1.33	4.81	3.13	0.92
Number of observations	5 819	5 183	18 951	8 997	4 571	5 606	6 908	5 797	33 598

Individual features	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
ESCS	12.27*** (6.28)	19.46*** (8.91)	10.57*** (6.27)	19.00*** (10.17)	8.751*** (5.79)	15.66*** (7.92)	12.67*** (6.97)	3.097 (1.62)	10.79*** (4.34)
ESCS squared	-0.0104 (-0.01)	2.704** (3.21)	0.297 (0.55)	2.186* (2.38)	-0.692 (-0.54)	3.102*** (4.30)	2.540*** (4.25)	-1.132 (-1.62)	0.988 (1.36)
School's mean ESCS	102.1*** (16.72)	48.40*** (8.33)	49.03*** (18.52)	56.86*** (9.74)	101.7*** (14.46)	34.64*** (7.06)	44.33*** (8.13)	83.27*** (11.22)	49.23*** (7.59)
Constant	439.1*** (126.64)	465.9*** (85.24)	441.0*** (128.85)	477.8*** (128.45)	482.9*** (117.21)	483.9*** (70.20)	449.2*** (58.95)	577.8*** (45.33)	615.8*** (49.89)
Between school variance	359.2*** (22.10)	875.0*** (53.79)	697.0*** (49.23)	1 109.0*** (46.62)	1 291.8*** (50.15)	1 651.3*** (40.81)	1 513.0*** (59.71)	2 197.4*** (61.83)	2 033.2*** (62.33)
Within school variance	4 219.8*** (218.34)	4 273.4*** (277.87)	3 792.4*** (305.58)	3 425.7*** (302.51)	4 385.5*** (273.72)	3 867.4*** (314.44)	3 021.2*** (295.73)	3 126.5*** (272.36)	3 548.8*** (264.44)
% of the between school variance explained	85.55	58.90	78.51	62.87	65.79	42.37	49.85	56.98	46.82
% of the within school variance explained	2.40	3.95	1.87	4.54	1.02	1.87	2.67	1.46	1.39
Number of observations	4 688	5 183	6 005	5 055	4 624	6 586	4 339	4 806	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

* ESCS refers to the PISA index of economic, social and cultural status.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295674>

ANNEX B: RESULTS OF MULTI-LEVEL ANALYSES OF PISA 2012 MATHEMATICS IN 18 MIDDLE-INCOME COUNTRIES

[Part 1/1]

Table B.7 Model 7: Performance differences associated with national study programme

	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
Vocational track (ref. general)	17.77 (1.84)	-38.70*** (-4.02)	-8.128 (-0.67)	45.05*** (10.11)	35.06*** (9.88)	17.08 (1.70)	m	-17.15* (-2.02)	22.22*** (7.03)
Constant	386.2*** (88.63)	455.2*** (64.10)	389.3*** (144.72)	365.5*** (101.02)	404.0*** (104.10)	371.7*** (70.82)	385.7*** (103.06)	432.7*** (120.10)	408.2*** (204.27)
Between school variance	2 596.8*** (84.32)	4 270.0*** (82.17)	2 716.5*** (76.68)	2 042.4*** (56.94)	2 025.3*** (48.18)	2 618.3*** (46.35)	2 165.0*** (43.89)	1 838.7*** (58.49)	1 847.1*** (131.40)
Within school variance	3 250.7*** (297.78)	4 160.8*** (320.99)	3 434.2*** (357.93)	3 395.0*** (273.33)	2 646.0*** (263.36)	2 456.3*** (255.97)	3 852.1*** (325.30)	3 234.8*** (301.68)	3 578.0*** (540.06)
% of the between school variance explained	0.03	8.11	0.00	-4.64	-2.10	1.76	0.00	1.16	4.71
% of the within school variance explained	0.08	-0.01	0.00	6.16	1.98	0.00	0.00	-0.01	0.01
Number of observations	5 908	5 282	19 204	9 073	4 602	5 622	7 038	5 803	33 806

	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
Vocational track (ref. general)	-68.09*** (-9.40)	-12.10* (-2.11)	m	m	-80.97*** (-9.64)	-62.82*** (-7.97)	m	-63.08*** (-6.83)	-79.54*** (-14.50)
Constant	454.9*** (47.38)	422.2*** (105.03)	368.7*** (88.89)	444.6*** (101.92)	509.8*** (63.11)	438.9*** (94.96)	388.0*** (83.34)	472.4*** (56.89)	512.2*** (99.35)
Between school variance	1 269.4*** (27.46)	2 109.1*** (57.89)	3 243.4*** (71.55)	2 986.6*** (72.13)	2 187.4*** (55.18)	2 393.2*** (59.35)	3 017.0*** (49.51)	4 152.6*** (69.31)	3 780.1*** (65.12)
Within school variance	4 158.7*** (264.49)	4 442.3*** (259.40)	3 864.6*** (310.45)	3 588.7*** (299.45)	4 395.1*** (267.18)	3 924.8*** (312.36)	3 104.2*** (302.83)	3 173.0*** (268.94)	3 507.6*** (260.27)
% of the between school variance explained	48.92	0.93	0.00	0.00	42.07	16.47	0.00	18.70	1.14
% of the within school variance explained	3.81	0.16	0.00	0.00	0.80	0.41	0.00	-0.01	0.00
Number of observations	4 744	5 197	6 035	5 074	4 684	6 606	4 407	4 848	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295684>

[Part 1/1]

Table B.8 **Model 8: Performance of private schools (government-dependent and government-independent schools combined) vs. public schools**

Type of school	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
Private (ref. public)	57.85*** (8.51)	108.2* (2.24)	80.15*** (9.39)	49.81*** (5.08)	77.99*** (7.73)	-4.472 (-0.47)	60.13*** (4.67)	2.541 (0.22)	41.68*** (7.55)
Constant	370.4*** (88.15)	438.1*** (84.82)	379.6*** (156.55)	370.2*** (118.19)	397.4*** (117.28)	377.0*** (66.73)	375.7*** (128.23)	431.4*** (123.72)	410.2*** (239.82)
Between school variance	1 862.7*** (68.07)	4 505.6*** (84.71)	2 010.3*** (69.48)	1 645.0*** (61.74)	1 293.6*** (45.78)	2 660.2*** (47.01)	1 660.4*** (51.66)	1 859.9*** (58.16)	1 798.7*** (137.75)
Within school variance	3 253.5*** (300.02)	4 160.3*** (321.05)	3 434.7*** (357.97)	3 618.7*** (266.61)	2 700.4*** (260.88)	2 456.3*** (255.97)	3 852.3*** (325.29)	3 234.8*** (301.66)	3 578.2*** (540.08)
% of the between school variance explained	32.81	2.84	41.74	31.38	35.08	10.63	26.70	0.04	9.14
% of the within school variance explained	0.03	0.50	0.84	-0.12	0.06	-0.43	-0.01	-0.01	0.02
Number of observations	5 908	5 247	19 204	9 073	4 602	5 622	7 038	5 803	33 806

Type of school	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
Private (ref. public)	-38.99*** (-3.47)	87.29*** (3.95)	65.91*** (5.54)	70.25*** (13.40)	4.990 (0.21)	-35.61*** (-3.50)	-58.27*** (-5.79)	m	-13.56 (-0.85)
Constant	409.9*** (42.46)	417.6*** (113.29)	360.2*** (91.16)	444.2*** (101.71)	449.1*** (85.05)	432.4*** (97.87)	388.3*** (83.04)	448.2*** (74.14)	512.7*** (94.12)
Between school variance	2 480.1*** (26.04)	1 880.5*** (59.56)	2 735.1*** (73.51)	2 954.3*** (70.80)	3 775.5*** (64.59)	2 691.6*** (61.65)	3 001.6*** (49.40)	5 108.0*** (67.16)	3 810.0*** (65.81)
Within school variance	4 323.6*** (206.31)	4 449.3*** (259.85)	3 865.3*** (310.42)	3 588.8*** (299.44)	4 430.6*** (269.47)	3 941.1*** (303.15)	3 104.1*** (302.85)	3 172.7*** (268.99)	3 507.6*** (260.27)
% of the between school variance explained	0.21	11.04	33.33	1.08	4.35	6.07	2.05	0.00	0.29
% of the within school variance explained	0.00	0.97	2.13	0.00	0.15	0.00	-0.07	0.75	-0.54
Number of observations	4 744	5 197	6 035	5 074	4 684	6 606	4 407	4 848	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295696>

ANNEX B: RESULTS OF MULTI-LEVEL ANALYSES OF PISA 2012 MATHEMATICS IN 18 MIDDLE-INCOME COUNTRIES

[Part 1/1]

Model 8a: Performance in private schools (government-dependent and government-independent schools combined) vs. public schools, controlled for socio-economic background

Table B.9

Type of school	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
Private (ref. public)	25.86*** (3.65)	-9.310 (-0.25)	12.02 (1.76)	6.303 (0.91)	15.32 (1.41)	-3.584 (-0.50)	32.75*** (3.46)	-6.127 (-0.63)	-15.38*** (-3.55)
ESCS*	11.24*** (8.19)	11.52*** (8.56)	8.142*** (5.47)	13.63*** (5.74)	12.38*** (7.61)	7.661** (3.00)	10.78*** (6.51)	14.76*** (7.11)	6.004*** (6.90)
ESCS squared	1.521* (2.16)	-0.0 982 (-0.13)	-0.0 158 (-0.03)	0.977 (1.43)	1.009 (1.65)	0.615 (0.96)	-0.116 (-0.17)	-0.208 (-0.15)	0.450 (1.39)
Mean escs of the school	41.25*** (7.30)	73.27*** (12.82)	42.67*** (12.62)	33.79*** (8.82)	29.26*** (6.31)	36.94*** (6.00)	36.68*** (4.54)	45.63*** (5.70)	32.10*** (20.11)
Constant	416.3*** (74.43)	462.7*** (147.51)	450.0*** (92.10)	432.9*** (79.39)	443.8*** (72.73)	454.2*** (40.22)	401.8*** (82.39)	450.5*** (119.63)	456.3*** (205.21)
Between school variance	858.9*** (53.60)	1 292.4*** (46.77)	1 012.9*** (73.02)	757.8*** (50.42)	732.6*** (45.82)	1 782.5*** (49.49)	1 115.8*** (44.85)	1 307.1*** (37.19)	1 027.7*** (116.58)
Within school variance	3 171.1*** (308.52)	4 057.8*** (320.14)	3 366.7*** (351.67)	3 507.5*** (270.09)	2 603.4*** (268.78)	2 423.6*** (252.14)	3 667.1*** (338.60)	3 133.2*** (301.66)	3 545.5*** (542.50)
% of the between school variance explained	66.96	72.19	62.74	61.20	63.09	33.13	48.50	29.73	47.01
% of the within school variance explained	2.52	2.48	1.98	3.04	3.56	1.34	4.80	3.12	0.92
Number of observations	5 819	5 183	18 951	8 997	4 571	5 606	6 908	5 797	33 598

Type of school	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
Private (ref. public)	-85.24*** (-12.23)	38.20** (2.72)	4.601 (0.68)	-39.39*** (-4.41)	-81.34*** (-7.75)	-40.24*** (-6.01)	-94.78** (-2.65)	0 c	-58.05*** (-3.52)
ESCS	12.27*** (6.28)	19.42*** (8.87)	10.55*** (6.27)	19.03*** (10.17)	8.760*** (5.79)	15.72*** (7.98)	12.69*** (6.98)	3.097 (1.62)	10.75*** (4.31)
ESCS squared	-0.00779 (-0.01)	2.682** (3.18)	0.287 (0.54)	2.212* (2.39)	-0.671 (-0.53)	3.131*** (4.37)	2.548*** (4.26)	-1.132 (-1.62)	0.972 (1.33)
Mean escs of the school	102.7*** (17.18)	45.12*** (7.93)	48.25*** (18.12)	57.96*** (9.72)	102.7*** (14.63)	36.04*** (7.65)	44.86*** (8.34)	83.27*** (11.22)	54.42*** (10.60)
Constant	439.5*** (128.48)	462.2*** (84.90)	439.5*** (126.16)	478.6*** (127.32)	483.5*** (117.41)	492.4*** (75.29)	450.3*** (59.99)	577.8*** (45.33)	629.5*** (69.17)
Between school variance	344.7*** (21.78)	830.3*** (52.81)	694.7*** (49.71)	1 097.9*** (45.61)	1 273.5*** (49.70)	1 416.9*** (37.36)	1 481.0*** (60.18)	2 197.4*** (61.83)	1 808.1*** (54.31)
Within school variance	4 219.4*** (218.35)	4 273.4*** (277.86)	3 792.4*** (305.60)	3 425.9*** (302.49)	4 385.2*** (273.78)	3 868.2*** (314.58)	3 020.5*** (295.81)	3 126.5*** (272.36)	3 459.2*** (264.49)
% of the between school variance explained	86.16	61.00	78.60	63.26	66.28	50.58	50.91	56.99	52.71
% of the within school variance explained	2.41	3.96	1.86	4.54	1.02	1.85	2.71	1.45	1.37
Number of observations	4 688	5 183	6 005	5 055	4 624	6 586	4 339	4 806	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

c: There are too few observations or no observation to provide reliable estimates (i.e. there are fewer than 30 students or fewer than 5 schools with valid data).

* ESCS refers to the PISA index of economic, social and cultural status.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295703>

[Part 1/1]

Model 9: Relation between individual features, type of school, national study programme and performance

Table B.10

	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
ESCS*	10.88*** (8.05)	10.57*** (7.95)	7.449*** (5.13)	12.35*** (5.19)	11.48*** (7.45)	8.527*** (3.31)	11.23*** (6.74)	14.88*** (7.12)	5.842*** (6.66)
ESCS squared	1.626* (2.33)	0.0873 (0.12)	-0.0231 (-0.05)	1.380* (2.03)	1.260* (2.17)	0.656 (1.03)	-0.00191 (-0.00)	-0.129 (-0.09)	0.763* (2.29)
Gender (ref. male)	-15.32*** (-6.45)	-13.72*** (-6.34)	-19.70*** (-13.32)	-25.98*** (-13.12)	-23.83*** (-13.61)	-5.604** (-3.10)	8.101 (1.22)	-2.376 (-1.35)	-17.43*** (-17.61)
Native speaker	8.845 (1.76)	15.76*** (3.40)	12.31** (2.60)	24.60*** (3.53)	5.913 (0.89)	-13.20*** (-5.74)	18.68*** (4.36)	2.838 (0.62)	17.14*** (5.76)
Village (ref. town)	7.797 (1.15)	-13.91 (-1.75)	5.190 (1.01)	11.23 (1.45)	0.946 (0.19)	15.83 (1.56)	9.875 (1.31)	17.04* (1.97)	2.956 (0.74)
City	7.418 (1.57)	-3.987 (-0.59)	-11.92** (-3.12)	-2.877 (-0.43)	-7.096 (-0.74)	16.81 (1.47)	17.32** (2.62)	13.41 (1.55)	-3.185 (-0.93)
Vocational track (ref. general)	20.87** (3.11)	-0.852 (-0.13)	-10.70 (-0.82)	42.60*** (10.75)	35.49*** (10.94)	26.44* (2.39)	m	-13.45 (-1.76)	19.86*** (7.72)
School type: private (ref. public)	29.01*** (1.57)	-4.366 (-0.59)	9.475 (-3.12)	11.53 (-0.43)	16.30 (-0.74)	-5.722 (1.47)	28.94*** (2.62)	7.550 (1.55)	-10.78* (-0.93)
Constant	407.5*** (51.39)	458.9*** (67.13)	460.1*** (56.92)	413.1*** (35.36)	449.2*** (48.29)	453.8*** (36.33)	370.4*** (39.49)	436.5*** (47.18)	444.1*** (93.54)
Between school variance	789.5*** (53.38)	1 314.5*** (47.64)	1 003.6*** (72.82)	800.8*** (50.43)	727.6*** (42.08)	1 598.0*** (54.35)	958.7*** (37.34)	1 278.3*** (37.32)	960.2*** (116.01)
Within school variance	3 108.7*** (305.89)	3 997.1*** (322.54)	3 263.0*** (359.34)	3 143.7*** (261.33)	2 410.7*** (264.73)	2 390.5*** (258.80)	3 654.6*** (343.38)	3 130.1*** (302.51)	3 460.3*** (533.06)
% of the between school variance explained	69.62	71.72	63.07	59.00	63.34	40.04	55.75	31.29	50.46
% of the within school variance explained	4.46	3.92	4.98	13.10	10.71	2.69	5.14	3.22	3.30
Number of observations	5 819	5 183	18 951	8 997	4 571	5 606	6 908	5 797	33 598

	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
ESCS	9.362*** (5.27)	19.47*** (8.91)	10.83*** (6.45)	18.22*** (9.73)	6.676*** (4.75)	16.32*** (8.30)	11.61*** (6.70)	2.331 (1.25)	9.730*** (3.97)
ESCS squared	-0.640 (-0.54)	2.679** (3.18)	0.844 (1.58)	2.122* (2.32)	-0.957 (-0.78)	3.113*** (4.34)	2.362*** (4.15)	-1.268 (-1.82)	1.117 (1.57)
Gender (ref. male)	-12.47*** (-3.78)	3.600 (1.72)	-25.98*** (-13.08)	-12.43*** (-5.15)	-24.16*** (-9.52)	-0.729 (-0.36)	-23.65*** (-12.38)	-21.70*** (-11.33)	-24.01*** (-11.26)
Native speaker	15.74 (0.95)	-4.009 (-1.14)	24.25*** (6.02)	7.168 (0.84)	-0.143 (-0.02)	-12.11*** (-3.83)	11.07 (1.36)	1.686 (0.35)	12.82 (1.71)
Village (ref. town)	-14.95 (-1.85)	-7.437 (-1.26)	0.940 (0.14)	8.957 (1.21)	-11.97 (-1.33)	9.022 (1.34)	3.380 (0.40)	33.41* (2.30)	11.39 (1.20)
City	11.12 (1.23)	-3.116 (-0.44)	-1.979 (-0.33)	-2.269 (-0.36)	1.325 (0.19)	8.797 (1.39)	-5.158 (-0.60)	-15.64* (-2.00)	-17.51 (-1.41)
Vocational track (ref. general)	-57.36*** (-7.14)	-9.312 (-1.79)	m	m	-47.14*** (-5.26)	-38.79*** (-4.40)	m	-27.72*** (-4.23)	-65.59*** (-12.69)
School type: private (ref. public)	-90.26*** (1.23)	35.99* (-0.44)	1.645 (-0.33)	-42.29*** (-0.36)	-95.59*** (0.19)	-24.21*** (1.39)	-101.3** (-0.60)	m	-57.51** (-1.41)
Constant	456.9*** (31.66)	465.9*** (70.88)	432.2*** (55.77)	478.1*** (49.54)	523.6*** (53.19)	497.6*** (56.01)	455.1*** (39.89)	600.1*** (44.63)	648.6*** (40.27)
Between school variance	353.5*** (16.03)	790.4*** (53.25)	683.7*** (50.81)	1 094.0*** (47.10)	1 274.2*** (50.00)	1 238.4*** (34.09)	1 549.4*** (59.62)	1 771.2*** (59.19)	1 835.5*** (50.03)
Within school variance	4 045.4*** (252.23)	4 266.7*** (278.52)	3 612.5*** (306.55)	3 388.0*** (303.27)	4 218.3*** (273.06)	3 837.8*** (319.77)	2 874.7*** (287.83)	3 031.6*** (260.29)	3 309.0*** (260.78)
% of the between school variance explained	85.79	62.88	78.94	63.36	66.25	56.79	48.66	65.33	52.00
% of the within school variance explained	6.43	4.11	6.52	5.57	4.79	2.64	7.41	4.45	5.65
Number of observations	4 688	5 183	6 005	5 055	4 624	6 586	4 339	4 806	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

* ESCS refers to the *PISA index of economic, social and cultural status*.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295715>

ANNEX B: RESULTS OF MULTI-LEVEL ANALYSES OF PISA 2012 MATHEMATICS IN 18 MIDDLE-INCOME COUNTRIES

[Part 1/2]

Table B.11 Model 10: Grade repetition, preschool attendance and mathematics performance

	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
ESCS*	9.812*** (7.74)	11.08*** (8.52)	7.467*** (5.02)	9.968*** (4.48)	10.62*** (7.24)	8.805*** (3.45)	10.14*** (6.95)	14.44*** (7.14)	6.795*** (7.96)
ESCS squared	1.507* (2.23)	-0.0704 (-0.10)	0.443 (0.92)	1.088 (1.75)	1.271* (2.33)	0.767 (1.22)	0.450 (0.69)	0.120 (0.09)	0.898** (2.79)
Gender (ref. male)	-20.61*** (-9.41)	-15.48*** (-7.46)	-26.53*** (-18.39)	-30.38*** (-16.89)	-28.03*** (-16.63)	-7.391*** (-4.17)	-2.529 (-0.33)	-3.707* (-2.08)	-19.25*** (-20.44)
Native speaker	4.348 (1.01)	17.65*** (4.17)	8.551* (2.09)	18.94** (2.78)	4.566 (0.76)	-12.19*** (-5.24)	16.39*** (4.20)	2.632 (0.57)	17.17*** (5.90)
Grade 7	-83.51*** (-10.50)	m	-74.89*** (-20.82)	-69.16*** (-14.91)	m	-57.39*** (-4.64)	-53.22 (-1.32)	m	-67.50*** (-10.60)
Grade 8	-58.14*** (-14.28)	-69.24*** (-3.87)	-56.22*** (-16.39)	-46.91*** (-13.46)	-45.03*** (-13.15)	-50.73*** (-4.52)	-23.44 (-1.70)	-20.99 (-0.93)	-47.54*** (-10.79)
Grade 9	-30.04*** (-8.40)	-45.01*** (-5.69)	-29.19*** (-15.66)	-30.08*** (-9.38)	-21.45*** (-7.27)	-32.93*** (-3.29)	-25.17*** (-4.19)	-18.53*** (-4.04)	-25.54*** (-7.31)
Grade 11	9.941 (1.51)	20.04*** (3.51)	26.69*** (7.97)	29.26*** (11.20)	19.18*** (8.37)	9.203* (2.09)	m	18.21*** (7.23)	24.34*** (4.87)
Grade 12	18.06 (1.33)	-3.250 (-0.08)	m	m	63.48*** (3.65)	43.47* (1.97)	m	38.42 (1.85)	25.95 (0.85)
Repeated a grade	-12.26*** (-3.64)	-33.63*** (-4.66)	-13.99*** (-7.84)	-3.267 (-1.52)	-13.02*** (-5.45)	-17.48*** (-6.89)	-35.91*** (-7.27)	-15.40* (-2.00)	-32.43*** (-15.04)
Vocational track (ref. general)	13.87 (1.71)	-39.81*** (-4.76)	-28.89* (-2.13)	1.115 (0.28)	1.951 (0.48)	-7.635 (-0.63)	m	-31.78*** (-4.11)	1.140 (0.37)
Attended preschool	28.00*** (7.63)	12.32** (3.19)	9.199*** (6.25)	4.091 (1.41)	8.431** (3.12)	3.455 (1.39)	18.27*** (7.26)	0.972 (0.41)	15.56*** (8.60)
Constant	391.6*** (64.70)	443.2*** (51.94)	423.8*** (77.04)	391.1*** (51.43)	420.8*** (67.58)	415.6*** (44.26)	368.2*** (46.34)	433.6*** (78.75)	413.5*** (109.10)
Between school variance	1 339.2*** (64.68)	2 974.5*** (76.99)	1 502.4*** (61.42)	1 194.4*** (53.45)	1 050.4*** (38.95)	1 977.1*** (50.95)	1 625.7*** (37.09)	1 676.9*** (52.92)	1 084.0*** (107.21)
Within school variance	2 662.7*** (267.22)	3 871.3*** (326.59)	2 715.4*** (381.65)	2 654.7*** (259.99)	2 073.9*** (262.06)	2 322.2*** (243.21)	3 399.4*** (364.57)	3 050.4*** (304.57)	3 310.2*** (583.88)
% of the between school variance explained	48.44	35.99	44.70	38.81	47.05	25.82	24.91	9.86	44.08
% of the within school variance explained	18.15	6.95	20.93	26.62	23.17	5.46	11.75	5.69	7.49
Number of observations	5 819	5 183	18 951	8 997	4 571	5 606	6 908	5 797	33 598

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

* ESCS refers to the PISA index of economic, social and cultural status.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295721>

[Part 2/2]

Table B.11 Model 10: Grade repetition, preschool attendance and mathematics performance

	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
ESCS*	9.252*** (5.42)	19.40*** (9.14)	10.08*** (5.78)	19.21*** (10.52)	7.114*** (5.18)	16.31*** (8.57)	10.84*** (6.38)	1.741 (0.94)	10.81*** (4.49)
ESCS squared	-0.568 (-0.48)	2.697** (3.20)	1.088* (2.06)	1.806* (2.29)	-1.055 (-0.86)	2.862*** (4.04)	2.207*** (3.98)	-1.353* (-1.99)	1.222 (1.72)
Gender (ref. male)	-13.34*** (-4.02)	0.925 (0.44)	-29.39*** (-15.26)	-12.29*** (-5.12)	-24.42*** (-9.62)	-1.744 (-0.87)	-26.45*** (-15.06)	-27.12*** (-15.27)	-24.69*** (-11.99)
Native speaker	11.04 (0.69)	-11.39*** (-3.37)	20.03*** (5.68)	5.248 (0.61)	0.152 (0.02)	-9.928** (-3.14)	11.62 (1.46)	1.744 (0.40)	14.27* (2.05)
Grade 7	m	m	-69.02*** (-9.66)	m	m	-0.0588 (-0.00)	-106.5*** (-15.65)	-103.9*** (-5.14)	-151.9*** (-9.99)
Grade 8	m	-154.1*** (-3.58)	-46.90*** (-12.09)	-0.765 (-0.03)	-163.8*** (-3.74)	-22.92 (-1.59)	-70.21*** (-11.12)	-105.2*** (-7.15)	-107.5*** (-8.60)
Grade 9	-6.112 (-0.17)	-88.04*** (-13.39)	-24.74*** (-8.77)	-1.577 (-0.10)	-154.5*** (-8.58)	-22.39*** (-6.86)	-37.21*** (-6.00)	-34.29*** (-11.12)	-83.26*** (-7.50)
Grade 11	11.82** (3.22)	16.88 (1.09)	22.04*** (10.78)	10.03* (2.25)	33.52*** (3.81)	20.51** (2.85)	24.16*** (5.27)	20.50*** (3.40)	m
Grade 12	m	m	m	m	m	m	m	27.38 (1.83)	m
Repeated a grade	-33.74*** (-3.92)	m	-12.05*** (-5.02)	-17.92** (-3.01)	-40.50*** (-3.33)	-20.93*** (-3.57)	-22.70*** (-5.05)	-23.52*** (-7.00)	-13.60 (-1.85)
Vocational track (ref. general)	-64.54*** (-8.61)	-14.72** (-2.73)	m	m	-82.98*** (-9.31)	-63.09*** (-8.60)	m	-65.78*** (-7.66)	10.83 (0.88)
Attended preschool	0.260 (0.12)	11.29*** (4.82)	7.797** (2.96)	14.76** (3.20)	-1.479 (-0.53)	30.44*** (3.74)	1.703 (0.79)	-0.00499 (-0.00)	7.860* (2.35)
Constant	449.5*** (28.96)	433.8*** (93.36)	376.2*** (69.35)	439.2*** (45.24)	529.8*** (50.47)	432.8*** (45.08)	425.0*** (47.09)	506.9*** (55.37)	532.7*** (61.05)
Between school variance	1 109.2*** (27.58)	1 378.9*** (49.59)	1 843.9*** (51.59)	2 157.8*** (67.72)	1 837.9*** (59.03)	1 923.1*** (53.35)	1 037.7*** (24.24)	3 213.0*** (63.21)	1 915.4*** (50.36)
Within school variance	4 009.4*** (244.57)	3 974.8*** (297.24)	3 093.9*** (291.45)	3 368.6*** (296.79)	4 184.5*** (276.59)	3 734.2*** (330.75)	2 563.6*** (250.59)	2 616.7*** (275.95)	3 260.9*** (261.63)
% of the between school variance explained	55.37	35.23	43.15	27.75	51.32	32.88	65.60	37.10	49.91
% of the within school variance explained	7.27	10.66	19.94	6.13	5.55	5.25	17.42	17.52	7.03
Number of observations	4 688	5 183	6 005	5 055	4 624	6 586	4 339	4 806	4 959

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

* ESCS refers to the PISA index of economic, social and cultural status.

Source: OECD, PISA 2012 Database.

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ANNEX B: RESULTS OF MULTI-LEVEL ANALYSES OF PISA 2012 MATHEMATICS IN 18 MIDDLE-INCOME COUNTRIES

[Part 1/2]

Table B.12 Model 11: OTL and mathematics performance

	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
ESCS*	9.356*** (6.59)	8.616*** (5.35)	6.429*** (3.61)	8.467** (2.94)	10.61*** (5.27)	8.778** (2.68)	10.83*** (6.20)	11.58*** (3.86)	6.407*** (6.14)
ESCS squared	1.711* (2.45)	0.447 (0.46)	0.468 (0.80)	1.169 (1.38)	1.332* (2.03)	1.178 (1.34)	1.435* (1.98)	0.487 (0.23)	0.927* (2.32)
Gender (ref. male)	-18.70*** (-7.02)	-19.19*** (-7.31)	-27.45*** (-16.87)	-33.83*** (-14.72)	-28.08*** (-12.01)	-8.333*** (-3.67)	-6.525 (-0.92)	-6.627** (-3.07)	-20.24*** (-16.77)
Native speaker	4.449 (0.72)	11.10* (2.24)	10.87* (2.34)	22.39** (3.08)	8.865 (1.27)	-13.61*** (-4.09)	17.47*** (3.91)	6.190 (1.06)	17.77*** (6.14)
Grade 7	-76.65*** (-7.80)	m	-70.25*** (-14.32)	-50.11*** (-7.25)	m	-52.84*** (-4.28)	-77.45* (-2.21)	m	-50.36*** (-5.33)
Grade 8	-53.12*** (-9.79)	-42.05* (-2.42)	-51.64*** (-11.15)	-35.38*** (-7.27)	-43.98*** (-7.49)	-48.83*** (-4.49)	-4.793 (-0.32)	-29.29 (-1.23)	-36.83*** (-7.40)
Grade 9	-27.27*** (-6.34)	-34.51*** (-3.37)	-26.03*** (-9.37)	-21.38*** (-4.55)	-23.38*** (-6.72)	-32.99*** (-3.42)	-17.60** (-2.85)	-9.724 (-1.79)	-23.05*** (-6.51)
Grade 11	5.509 (0.75)	9.775 (1.49)	25.74*** (6.64)	26.35*** (8.00)	11.96** (2.62)	15.38* (2.50)	m	12.64*** (4.06)	21.29*** (3.77)
Grade 12	20.99 (1.43)	m	m	m	52.29*** (3.52)	43.26 (1.74)	m	46.88* (2.34)	9.266 (0.27)
Grade repetition	-9.931* (-2.08)	-34.25*** (-3.67)	-11.74*** (-4.91)	-2.285 (-0.76)	-12.43*** (-3.45)	-16.12*** (-4.97)	-30.85*** (-5.43)	-7.284 (-0.74)	-27.12*** (-11.65)
Vocational track (ref. general)	6.010 (0.81)	-38.32*** (-4.86)	-32.50 (-1.95)	4.489 (1.02)	6.284 (1.38)	-4.913 (-0.42)	m	-28.11*** (-3.97)	2.878 (1.00)
Attended preschool	30.00*** (5.71)	11.74** (2.62)	8.458*** (4.59)	5.467 (1.53)	7.786** (2.63)	4.176 (1.58)	15.07*** (5.14)	1.417 (0.50)	16.30*** (6.95)
Index of OTL: Formal mathematics	14.29*** (7.91)	27.90*** (13.18)	17.38*** (10.95)	19.30*** (8.28)	14.09*** (6.34)	10.43*** (4.63)	22.93*** (12.80)	18.74*** (7.99)	27.89*** (24.33)
Constant	361.3*** (5.76)	316.6*** (4.94)	557.7*** (11.37)	534.3*** (8.40)	538.4*** (6.06)	533.5*** (8.29)	61.72 (0.94)	346.0*** (4.95)	501.5*** (10.14)
Between school variance	1 159.1*** (60.85)	2 570.3*** (68.09)	1 227.5*** (54.61)	1 048.5*** (48.08)	910.9*** (35.20)	1 830.0*** (47.40)	1 403.5*** (36.68)	1 496.0*** (46.73)	864.0*** (93.29)
Within school variance	2 576.8*** (228.11)	3 635.5*** (227.75)	2 671.0*** (301.14)	2 614.0*** (215.87)	2 076.8*** (194.63)	2 309.8*** (219.57)	3 138.8*** (269.38)	2 951.9*** (270.62)	3 095.4*** (485.07)
% of the between school variance explained	55.38	44.69	54.81	46.28	54.08	31.34	35.17	19.58	55.43
% of the within school variance explained	20.79	12.61	22.23	27.74	23.06	5.96	18.52	8.74	13.49
Number of observations	3 779	3 360	12 217	5 663	2 886	3 692	4 540	3 844	22 209

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

* ESCS refers to the PISA index of economic, social and cultural status.

Source: OECD, PISA 2012 Database.

StatLink  <http://dx.doi.org/10.1787/888933295733>

[Part 2/2]

Table B.12 Model 11: OTL and mathematics performance

	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
ESCS*	6.862*** (3.68)	16.68*** (6.49)	11.30*** (5.79)	16.49*** (7.28)	5.507*** (3.42)	14.98*** (7.12)	10.92*** (5.18)	0.879 (0.32)	10.18** (3.18)
ESCS squared	-0.737 (-0.55)	3.063** (3.01)	1.488* (2.24)	1.168 (1.29)	-1.881 (-1.44)	3.383*** (4.30)	1.960** (2.85)	-1.337 (-1.38)	1.098 (1.18)
Gender (ref. male)	-18.12*** (-5.55)	-2.373 (-0.99)	-31.42*** (-13.18)	-11.32*** (-4.16)	-28.05*** (-8.80)	-3.235 (-1.42)	-26.41*** (-10.89)	-29.64*** (-12.61)	-23.32*** (-9.43)
Native speaker	7.093 (0.46)	-10.93** (-2.98)	17.88*** (4.46)	4.537 (0.48)	1.303 (0.17)	-8.248* (-2.27)	14.19 (1.53)	5.998 (0.99)	10.74 (1.59)
Grade 7	m	m	-54.68*** (-6.49)	m	m	19.51 (0.50)	-112.7*** (-14.51)	-89.73*** (-3.57)	-131.4*** (-6.79)
Grade 8	m	-192.7*** (-5.68)	-36.49*** (-7.14)	-0.488 (-0.01)	-150.5** (-2.81)	-10.24 (-0.61)	-71.00*** (-8.75)	-85.02*** (-5.97)	-82.48*** (-5.40)
Grade 9	-11.11 (-0.25)	-69.26*** (-9.75)	-16.01*** (-4.71)	1.315 (0.10)	-150.4*** (-8.27)	-17.78*** (-4.22)	-38.89*** (-5.13)	-32.35*** (-9.11)	-76.20*** (-6.22)
Grade 11	5.627 (1.31)	-9.150 (-0.62)	15.34*** (4.83)	5.678 (1.07)	21.54* (2.26)	9.177 (1.19)	25.39*** (3.94)	20.26** (3.04)	m
Grade 12	m	m	m	m	m	m	m	31.20 (1.54)	m
Grade repetition	-13.50 (-0.95)	m	-12.60*** (-3.76)	-17.29* (-2.39)	-35.43* (-2.27)	-20.05** (-2.87)	-24.43*** (-3.95)	-25.00*** (-5.53)	-10.72 (-1.26)
Vocational track (ref. general)	-56.43*** (-8.35)	-9.668 (-1.78)	m	m	-78.76*** (-8.99)	-55.62*** (-7.67)	m	-62.64*** (-7.46)	5.045 (0.49)
Attended preschool	2.028 (0.73)	6.402* (2.20)	7.171* (2.16)	17.10** (2.83)	0.621 (0.18)	23.58** (2.61)	0.627 (0.27)	0.427 (0.17)	7.402 (1.66)
Index of OTL: Formal mathematics	27.60*** (9.81)	42.53*** (18.95)	21.94*** (11.04)	23.16*** (10.67)	33.28*** (9.62)	33.76*** (11.39)	3.486 (1.69)	20.68*** (9.51)	34.31*** (10.43)
Constant	483.0*** (6.56)	372.2*** (6.00)	431.9*** (5.51)	500.5*** (7.25)	468.0*** (6.28)	280.4*** (3.61)	512.6*** (7.76)	542.8*** (8.25)	496.5*** (7.28)
Between school variance	978.3*** (24.19)	1 071.6*** (45.54)	1 417.1*** (41.60)	1 774.9*** (60.45)	1 594.1*** (57.85)	1 686.6*** (48.39)	999.8*** (24.02)	2 983.6*** (60.98)	1 593.0*** (47.73)
Within school variance	3 672.4*** (218.58)	3 595.5*** (242.73)	2 958.6*** (252.30)	3 264.6*** (236.25)	3 913.4*** (216.48)	3 566.2*** (248.62)	2 546.2*** (189.23)	2 574.3*** (215.98)	3 099.2*** (218.45)
% of the between school variance explained	60.63	49.66	56.31	40.57	57.78	41.13	66.86	41.59	58.34
% of the within school variance explained	15.06	19.19	23.44	9.03	11.67	9.51	17.98	18.86	11.64
Number of observations	3 073	3 415	3 777	3 337	3 062	4 374	2 804	3 198	3 285

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

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Source: OECD, PISA 2012 Database.

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ANNEX B: RESULTS OF MULTI-LEVEL ANALYSES OF PISA 2012 MATHEMATICS IN 18 MIDDLE-INCOME COUNTRIES

[Part 1/2]

Table B.13 Model 12: Individual and school level features

Individual features	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
ESCS*	7.906*** (6.29)	9.880*** (7.35)	5.484*** (3.78)	8.352*** (3.43)	9.126*** (6.00)	7.441** (2.87)	8.629*** (5.60)	13.18*** (6.41)	5.373*** (6.30)
ESCS squared	1.128 (1.67)	0.686 (0.96)	0.321 (0.67)	1.031 (1.48)	1.169* (2.05)	0.725 (1.07)	0.00748 (0.01)	-0.0139 (-0.01)	1.017** (3.09)
Gender (ref. male)	-21.00*** (-9.17)	-15.95*** (-7.40)	-26.50*** (-17.66)	-30.93*** (-15.94)	-28.98*** (-15.97)	-7.189*** (-3.62)	-29.82** (-3.05)	-3.727* (-2.09)	-19.72*** (-20.24)
Native speaker	3.215 (0.69)	15.46*** (3.59)	7.929 (1.90)	17.78* (2.30)	5.222 (0.79)	-12.16*** (-5.65)	16.14*** (3.96)	2.691 (0.58)	15.21*** (5.23)
Grade 7	-77.25*** (-9.93)	-62.10** (-2.85)	-71.60*** (-18.94)	-68.60*** (-13.54)	m	-40.48*** (-3.68)	-83.80* (-2.38)	-21.48 (-0.95)	-47.92*** (-7.14)
Grade 8	-54.62*** (-12.69)	-34.41*** (-4.03)	-55.42*** (-14.79)	-46.85*** (-12.68)	-45.05*** (-12.95)	-35.22*** (-4.09)	-28.06 (-1.76)	-18.51*** (-3.93)	-30.21*** (-7.29)
Grade 9	-27.34*** (-7.34)	ref.	-30.14*** (-15.53)	-31.01*** (-9.16)	-21.46*** (-6.92)	-13.58 (-1.92)	-27.38*** (-4.19)	ref.	-7.996* (-2.38)
Grade 10	ref.	19.32*** (3.35)	ref.	ref.	ref.	ref.	ref.	18.37*** (6.90)	ref.
Grade 11	7.328 (1.01)	-2.819 (-0.07)	29.14*** (8.36)	31.02*** (11.53)	21.36*** (6.76)	13.17** (2.69)	m	37.85 (1.86)	14.64** (2.79)
Grade 12	-5.889 (-0.47)	m	m	m	63.42*** (3.80)	59.56*** (3.51)	m	m	7.058 (0.27)
Repeated a grade	-13.35*** (-3.59)	-30.71*** (-3.94)	-13.25*** (-6.93)	-1.402 (-0.62)	-10.71*** (-3.70)	-18.90*** (-7.54)	-35.46*** (-6.42)	-14.14 (-1.81)	-29.95*** (-13.28)
Vocational track (ref. general)	22.51** (2.85)	16.79* (2.45)	-28.17* (-2.14)	3.747 (0.88)	2.472 (0.59)	1.349 (0.10)	m	-15.70 (-1.74)	2.835 (1.12)
Attended preschool	27.10*** (7.51)	10.89** (2.68)	9.462*** (6.06)	2.673 (0.84)	6.931* (2.56)	2.788 (0.97)	16.84*** (5.93)	0.399 (0.16)	15.02*** (8.01)
School features	ARG	BGR	BRA	COL	CRI	IDN	JOR	KAZ	MEX
School's mean ESCS	27.82*** (6.66)	46.74*** (6.20)	39.72*** (12.70)	34.58*** (8.09)	24.58*** (5.15)	20.63** (2.82)	35.59*** (4.65)	28.67** (2.90)	23.08*** (10.96)
Average absenteeism teachers	-2.675 (-0.72)	11.52 (1.82)	-5.261 (-1.81)	6.210 (1.17)	-3.268 (-0.70)	-0.771 (-0.05)	-3.423 (-0.75)	-3.648 (-0.60)	-5.123 (-1.71)
Teacher shortage	-0.509 (-0.26)	4.640 (0.85)	-0.505 (-0.33)	-0.461 (-0.22)	-0.179 (-0.08)	-5.387 (-1.24)	-0.606 (-0.29)	3.018 (1.04)	0.773 (0.65)
% of teachers with professional development	-0.0157 (-0.29)	0.203* (2.49)	0.0286 (0.84)	-0.00231 (-0.03)	0.0635 (1.24)	0.0468 (0.50)	0.0147 (0.27)	-0.106 (-1.57)	0.00250 (0.09)
Learning time in minutes	0.117*** (4.07)	0.187* (2.47)	-0.0119 (-0.34)	0.0387 (1.07)	-0.106 (-1.24)	0.196*** (3.37)	-0.0228 (-0.28)	0.163*** (3.54)	0.0503* (2.52)
Infrastructure	0.195 (0.10)	-0.639 (-0.22)	-1.639 (-1.03)	2.216 (0.75)	0.704 (0.27)	-0.764 (-0.17)	-2.139 (-0.90)	0.203 (0.06)	1.268 (0.93)
Educational resources	-1.861 (-0.99)	2.563 (0.68)	4.684** (2.91)	0.906 (0.32)	4.450* (2.07)	4.078 (1.10)	-0.136 (-0.04)	2.341 (0.65)	1.233 (0.88)
Disciplinary climate	12.15* (2.22)	21.72** (2.71)	16.83*** (4.45)	15.79* (2.08)	20.79** (3.07)	17.05 (1.64)	33.47*** (4.73)	17.68* (2.12)	13.93*** (5.13)
Absentism pupils	-45.49** (-3.20)	-77.35*** (-4.16)	-15.25 (-1.50)	-16.49 (-0.47)	-4.145 (-0.20)	-43.03 (-1.39)	-52.80** (-2.95)	-4.415 (-0.20)	-65.42*** (-7.55)
% of girls at school	50.94* (2.29)	12.55 (0.80)	-12.45 (-0.58)	17.15 (1.15)	59.57 (1.71)	-42.86* (-2.04)	44.03*** (3.93)	10.50 (0.46)	9.009 (0.82)
Private school (ref. public)	9.165 (1.74)	2.480 (0.11)	-2.440 (-0.38)	-2.556 (-0.39)	3.568 (0.29)	-0.181 (-0.02)	21.85*** (3.34)	-9.658 (-0.72)	-8.044* (-2.02)
School size	-0.00605 (-0.94)	0.0287** (3.01)	0.00575* (2.18)	-0.000564 (-0.34)	0.00459 (1.02)	0.0181 (1.63)	-0.00594 (-0.62)	-0.0196*** (-4.40)	0.00410** (3.03)
Location of school: village (ref. town)	-3.591 (-0.37)	31.13 (1.66)	21.05*** (3.44)	14.10 (1.56)	3.642 (0.62)	5.400 (0.69)	15.32* (2.14)	-6.695 (-0.68)	1.447 (0.37)
Location of school: city	4.964 (1.26)	2.037 (0.31)	-10.42** (-3.06)	-2.389 (-0.43)	-3.826 (-0.56)	-0.293 (-0.03)	10.62* (2.30)	5.785 (0.75)	0.697 (0.25)
Constant	379.3*** (6.25)	294.7*** (5.27)	595.4*** (15.35)	568.1*** (11.33)	552.8*** (7.53)	541.5*** (8.46)	206.8*** (3.48)	397.8*** (6.82)	531.9*** (14.29)
Between school variance	443.3*** (41.57)	788.3*** (38.55)	597.3*** (66.87)	602.9*** (43.31)	496.0*** (43.72)	1 142.7*** (53.36)	582.9*** (36.01)	1 036.9*** (35.32)	573.0*** (87.43)
Within school variance	2 651.2*** (251.02)	3 865.9*** (325.96)	2 713.8*** (354.33)	2 667.7*** (245.68)	2 082.0*** (247.29)	2 313.6*** (259.04)	3 415.8*** (317.72)	3 043.7*** (303.00)	3 298.6*** (563.88)
% of the between school variance explained	82.93	83.04	78.01	69.11	75.00	57.13	73.08	44.26	70.44
% of the within school variance explained	18.50	7.08	20.98	26.26	22.87	5.81	11.33	5.90	7.81
Number of observations	5 240	4 916	17 622	7 717	4 192	4 990	5 858	5 751	31 630

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

c: There are too few observations or no observation to provide reliable estimates (i.e. there are fewer than 30 students or fewer than 5 schools with valid data).

m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

ref.: reference category.

* ESCS refers to the PISA index of economic, social and cultural status.

Source: OECD, PISA 2012 Database.

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[Part 2/2]

Table B.13 Model 12: Individual and school level features

Individual features	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
ESCS*	8.936*** (5.10)	17.76*** (8.35)	9.030*** (5.23)	17.86*** (9.64)	6.310*** (4.22)	15.63*** (7.95)	10.16*** (5.48)	1.211 (0.66)	10.27*** (3.97)
ESCS squared	-0.649 (-0.55)	2.684** (3.24)	1.341* (2.44)	2.060* (2.42)	-1.586 (-1.13)	3.005*** (4.12)	2.291*** (3.70)	-1.438* (-2.19)	1.404 (1.87)
Gender (ref. male)	-13.55*** (-4.09)	1.229 (0.58)	-30.65*** (-15.54)	-13.06*** (-5.38)	-25.95*** (-9.91)	-2.220 (-1.08)	-26.44*** (-13.17)	-27.01*** (-14.89)	-24.81*** (-12.22)
Native speaker	11.65 (0.74)	-9.802** (-2.92)	19.33*** (5.45)	6.113 (0.72)	3.248 (0.54)	-11.36*** (-3.53)	10.11 (1.24)	-0.217 (-0.05)	9.576 (1.30)
Grade 7	m	m	-68.27*** (-8.69)	30.84 (1.29)	m	4.117 (0.15)	-90.21*** (-12.37)	-14.44 (-0.62)	-132.1*** (-8.59)
Grade 8	28.15 (0.89)	-157.9*** (-3.50)	-46.41*** (-12.01)	11.60 (0.99)	-60.46* (-2.10)	-18.13 (-1.12)	-51.13*** (-7.57)	-15.34 (-0.88)	-79.17*** (-6.84)
Grade 9	ref.	-87.71*** (-12.93)	-23.97*** (-8.35)	ref.	ref.	-17.26*** (-4.55)	-18.67** (-2.62)	-34.62*** (-11.41)	-55.04*** (-5.16)
Grade 10	12.94*** (3.39)	ref.	ref.	10.78* (2.38)	33.05*** (3.32)	ref.	ref.	ref.	ref.
Grade 11	m	11.80 (0.74)	23.29*** (9.12)	m	m	17.75* (2.38)	26.81*** (5.13)	20.99** (3.18)	0 c
Grade 12	m	m	m	m	m	m	m	29.13 (1.95)	0 c
Repeated a grade	-32.69*** (-3.82)	m	-11.03*** (-4.03)	-15.72** (-2.62)	-39.28** (-3.23)	-22.00*** (-3.62)	-21.32*** (-4.31)	-23.20*** (-6.61)	-9.499 (-1.24)
Vocational track (ref. general)	-58.63*** (-6.99)	-13.63** (-2.65)	m	m	-44.43*** (-5.90)	-29.73 (-1.60)	m	4.378 (0.57)	9.521 (0.45)
Attended preschool	-0.173 (-0.08)	10.23*** (4.31)	7.205* (2.55)	12.87** (2.73)	-1.604 (-0.53)	31.77*** (3.87)	0.508 (0.21)	-0.455 (-0.21)	9.188** (2.59)
School features	MNE	MYS	PER	ROU	SRB	THA	TUN	TUR	VNM
School's mean ESCS	66.54*** (5.62)	29.90*** (5.58)	33.84*** (8.16)	38.34*** (6.06)	46.55*** (4.15)	19.16** (3.02)	30.33*** (5.43)	47.44*** (5.50)	34.06*** (5.03)
Average absenteeism teachers	12.38 (1.51)	-1.761 (-0.30)	-2.056 (-0.44)	-5.132 (-0.59)	19.05* (2.03)	-8.347 (-1.27)	1.128 (0.25)	5.213 (0.59)	14.36 (1.01)
Teacher shortage	1.551 (0.24)	3.260 (1.00)	0.870 (0.35)	-5.823 (-1.76)	-3.147 (-0.77)	6.259 (1.90)	-5.783* (-2.12)	0.373 (0.12)	-0.0551 (-0.02)
% of teachers with professional development	0.127 (1.61)	0.112 (1.86)	0.0608 (1.05)	-0.0522 (-0.94)	-0.0283 (-0.45)	0.0339 (0.55)	-0.00720 (-0.11)	0.0477 (0.51)	0.0296 (0.53)
Learning time in minutes	-0.126 (-0.70)	0.116* (2.35)	-0.00468 (-0.15)	0.255** (2.93)	0.0930 (0.39)	0.130 (1.51)	-0.0510 (-0.95)	0.531*** (4.97)	-0.0929 (-1.67)
Infrastructure	9.543* (2.38)	0.854 (0.32)	-1.207 (-0.52)	-8.035* (-2.07)	-1.144 (-0.35)	5.649* (1.97)	-4.478 (-1.55)	-4.310 (-1.05)	-0.968 (-0.27)
Educational resources	-7.286 (-1.39)	3.183 (1.09)	2.472 (1.15)	11.03** (3.03)	4.121 (1.09)	2.358 (0.67)	-3.073 (-1.05)	5.113 (1.23)	-2.532 (-0.71)
Disciplinary climate	-10.70 (-0.87)	35.59*** (3.91)	13.12 (1.72)	22.18*** (3.37)	15.80 (1.72)	17.56 (1.21)	37.09*** (3.31)	58.47*** (6.24)	41.71*** (3.73)
Absentism pupils	9.218 (0.23)	-28.59 (-1.57)	-79.22*** (-3.43)	-45.05** (-3.01)	-178.0*** (-5.13)	-41.94 (-1.39)	-42.46* (-2.28)	17.18 (0.72)	-49.41 (-1.42)
% of girls at school	5.642 (0.25)	8.264 (0.35)	10.81 (1.12)	61.29** (3.04)	20.34 (1.15)	6.366 (0.36)	71.29 (1.47)	9.007 (0.83)	183.0*** (4.17)
Private school (ref. public)	-93.51*** (-4.76)	21.37 (1.88)	3.150 (0.42)	5.716 (0.40)	-92.06*** (-5.93)	-24.29*** (-3.70)	13.84 (0.62)	0 c	-30.82* (-2.37)
School size	-0.00243 (-0.17)	0.00558 (1.19)	-0.00343 (-0.74)	0.0192*** (3.79)	0.0247** (3.03)	0.00797* (2.55)	0.00347 (0.51)	-0.00518 (-0.90)	0.00454 (0.87)
Location of school: village (ref. town)	0 c	-5.273 (-0.91)	-10.97 (-1.72)	8.819 (0.77)	0 c	7.469 (0.73)	-27.24 (-1.72)	11.22 (0.80)	-2.475 (-0.39)
Location of school: city	15.05 (1.36)	0.411 (0.07)	-0.527 (-0.09)	-0.363 (-0.07)	5.082 (0.77)	3.190 (0.53)	3.177 (0.48)	-7.806 (-1.08)	10.17 (1.01)
Constant	511.6*** (8.22)	431.5*** (8.01)	548.7*** (8.53)	419.4*** (7.12)	552.8*** (7.13)	267.8*** (4.00)	516.4*** (7.71)	571.6*** (8.55)	477.6*** (7.13)
Between school variance	296.5*** (17.95)	499.9*** (41.01)	577.9*** (45.96)	698.1*** (45.83)	594.5*** (31.61)	1 062.0*** (28.54)	559.1*** (32.89)	1 051.3*** (44.32)	693.8*** (38.98)
Within school variance	4 009.9*** (242.89)	3 972.5*** (298.01)	3 089.3*** (288.47)	3 368.3*** (295.20)	4 174.9*** (257.82)	3 751.4*** (313.41)	2 574.8*** (226.77)	2 609.1*** (269.62)	3 264.9*** (255.28)
% of the between school variance explained	88.07	76.52	82.18	76.63	84.25	62.93	81.47	79.42	81.85
% of the within school variance explained	7.26	10.72	20.06	6.14	5.77	4.81	17.05	17.76	6.92
Number of observations	4 688	5 119	5 603	5 055	3 832	6 351	3 750	4 577	4 811

Notes: Multilevel regression model consists of student and school levels.

Multilevel models are able to analyse data in nested structure (student within school). For this estimation we use random slope model at the school level.

t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

c: There are too few observations or no observation to provide reliable estimates (i.e. there are fewer than 30 students or fewer than 5 schools with valid data).

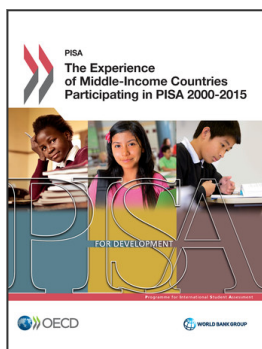
m: Data are not available. These data were not submitted by the country or were collected but subsequently removed from the publication for technical reasons.

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