Using TIMSS and PISA results to inform educational policy: a study of Russia and its neighbours

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Russia's TIMSS – PISA Puzzle

❑ TIMSS - Trends in International Mathematics and Science Study. 4th and 8th grades, 4-year cycle from 1995.

❑ PISA - Programme for International Student Assessment. 15 years old cohort, every 3 year from 2000.

❑ Russia has an international reputation of being good in mathematics, and Russian 8th graders perform quite well on the TIMSS mathematics test.

❑ However, Russian 15 year-olds do rather poorly on the PISA math test when compared to students in other countries.

Russia's TIMSS – PISA Puzzle

❑ This situation sends contradictory signals to the policy

❑ Usual explanation:

   ❑ TIMSS test is curriculum-based test. And our students perform well on repeating exactly what they learned at schools.

   ❑ While PISA introduces new-type of tasks with a lot of reading and unfamiliar context, where students need to discover math problem and then implement their math knowledge to solve it. However they never meet tasks like that in school and therefore fail.

Research goal

❑ What else can explain why Russian students do not score well on the PISA.

❑ We focus on socio-economic status differences between students taking PISA and TIMSS tests in Russia and some comparable countries.
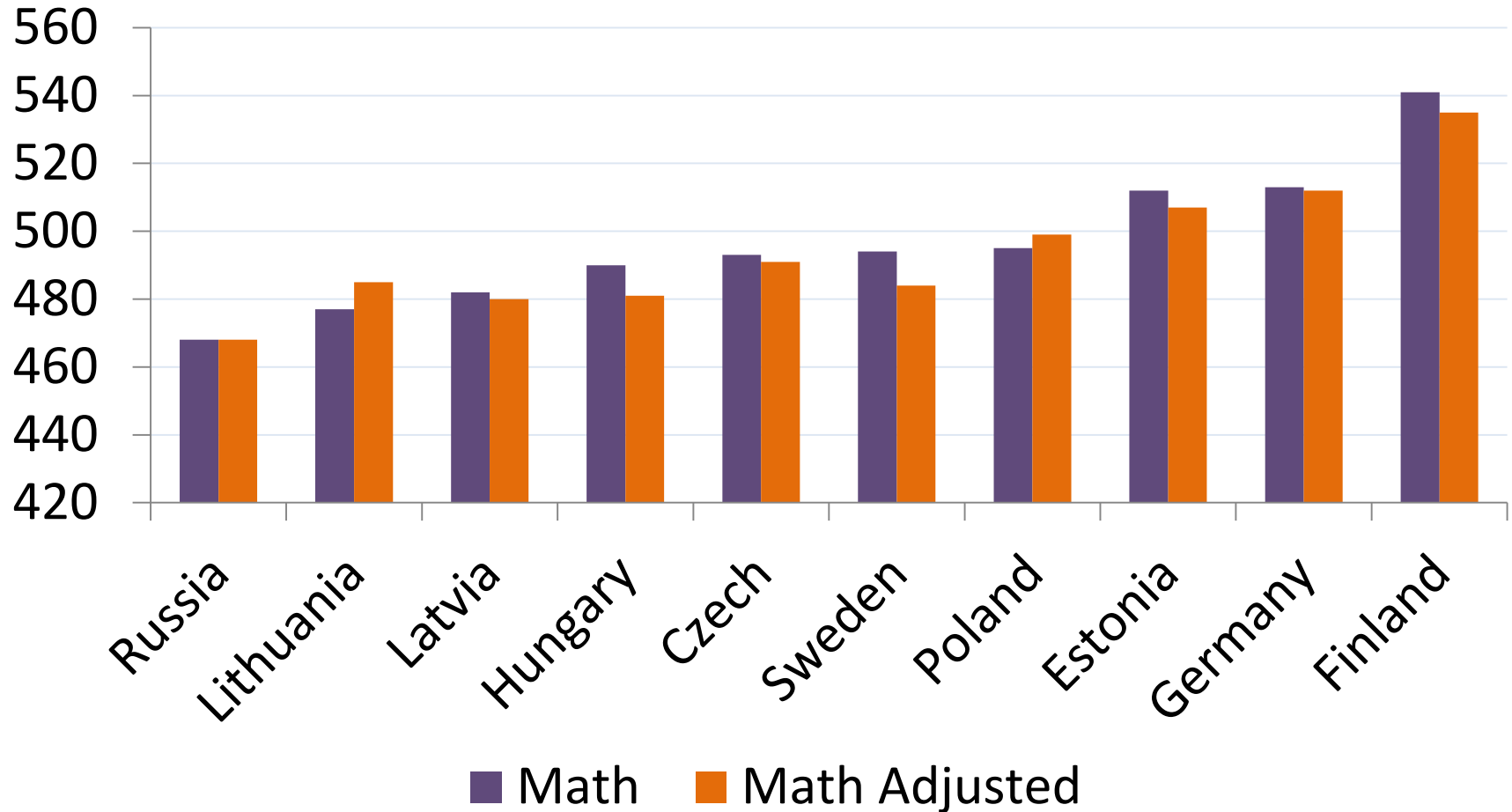
Methodology

- ❏ Descriptive cross-country and cross-waves comparison of test results for students categorised by family academic resources (FAR).
  - ❏ Comparison of PISA 2009 scores by FAR;
  - ❏ PISA 2000-2009 dynamics comparison;
  - ❏ Detailed comparison of Russian, Latvian and Estonian PISA performance.

- ❏ Qualitative part: in-depth interview with school principals, vice-principals and officials from the Ministry of Education. Estonia - seven schools in different regions; Latvia - six schools, all in Riga. Control interviews in Moscow.

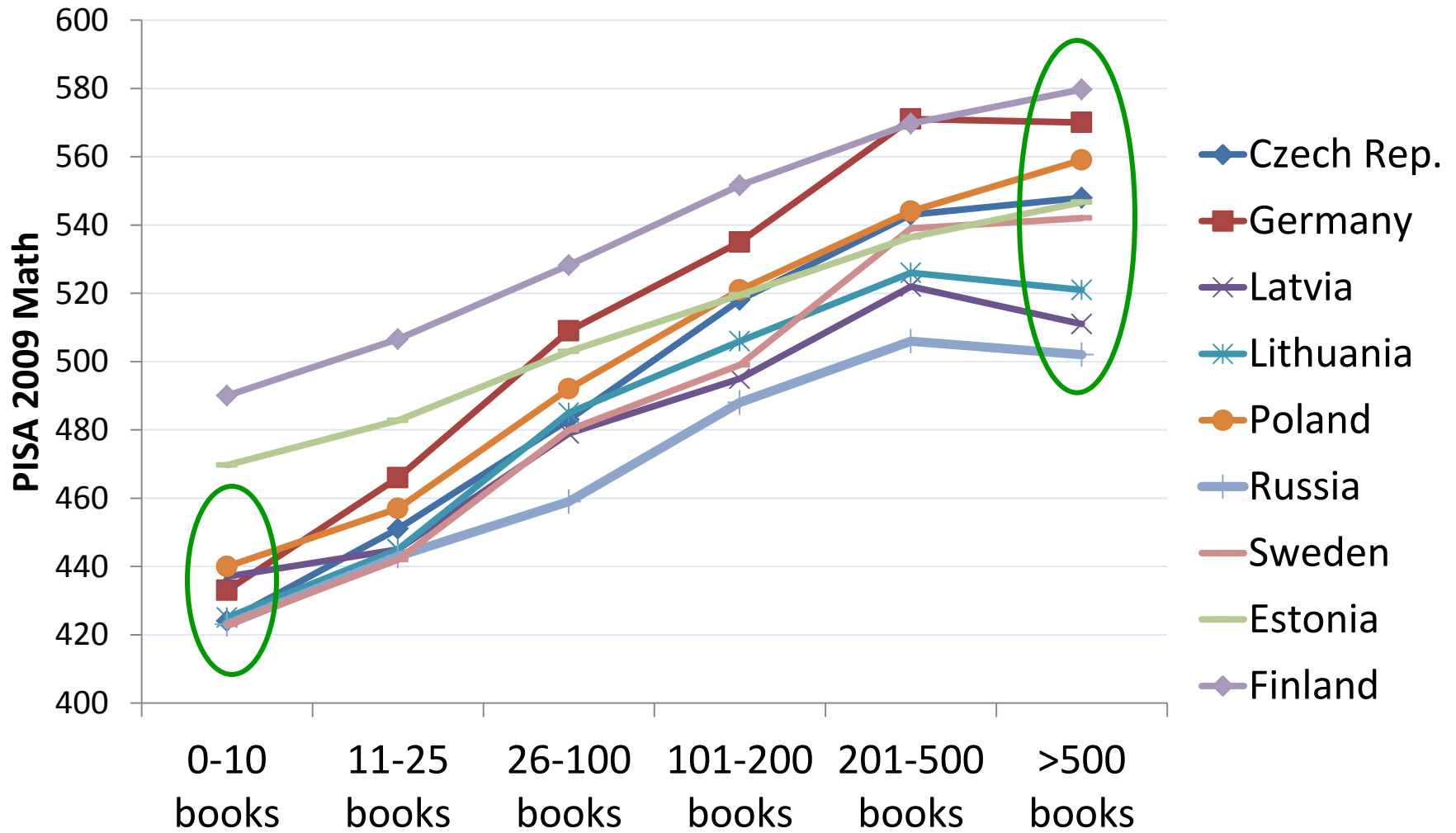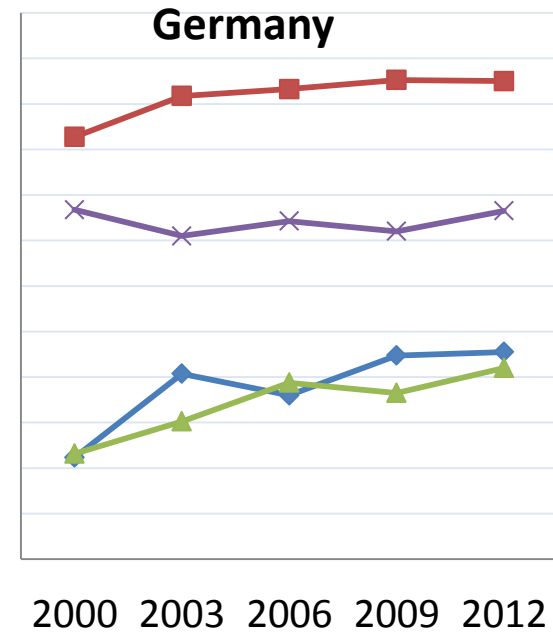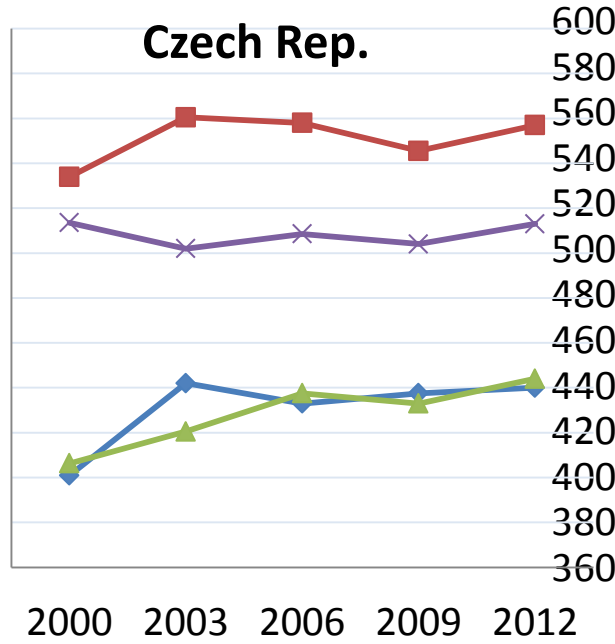- ❏ Family academic resources – number of books in home.

Results

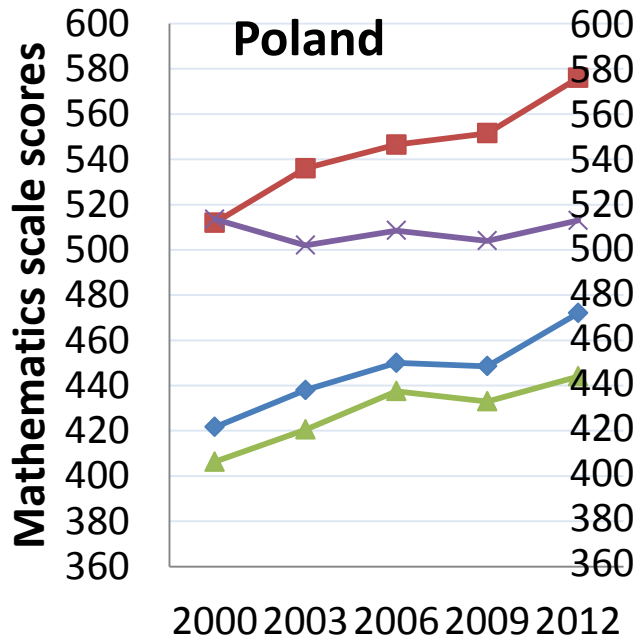# PISA 2009. Math

Trends by SES groups

Poland | Czech Rep. | Germany

Mathematics scale scores

2000 2003 2006 2009 2012

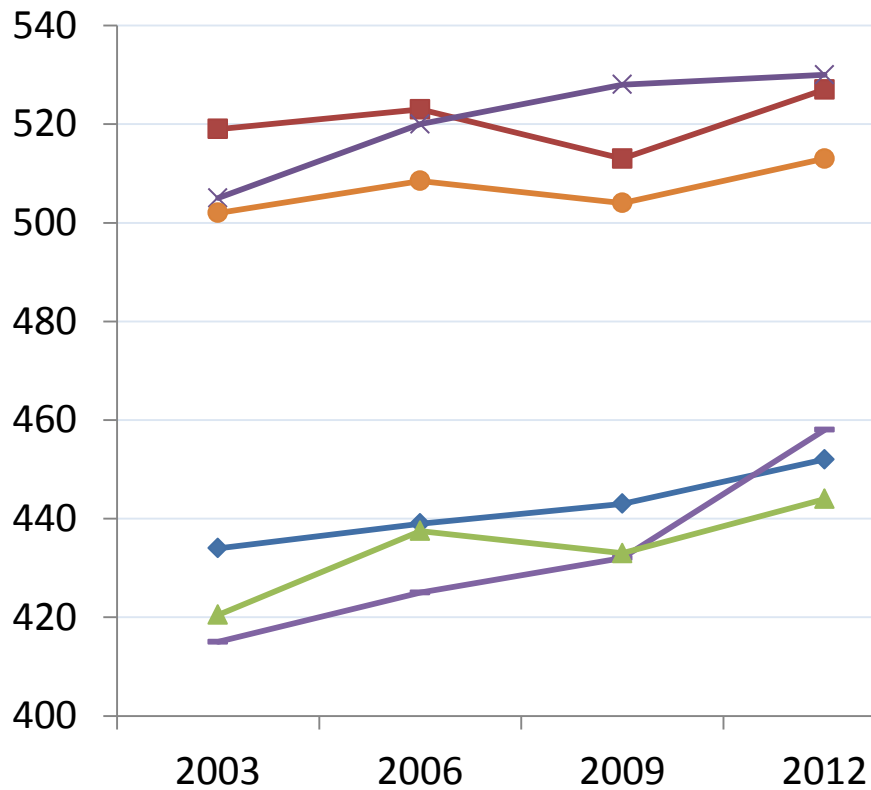- Poland disadv.
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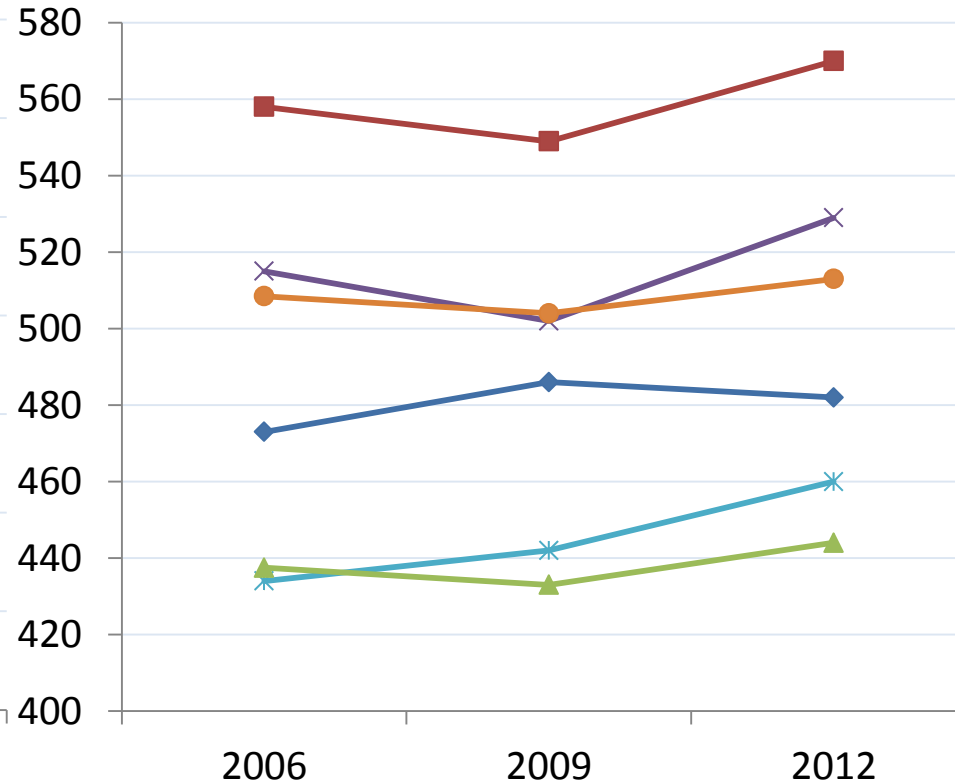
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- Germany disadv.
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Preliminary conclusions

❑ Russia perform worse in PISA than other countries even when scores are adjusted to Russian weights.

❑ The results differ in different SES breakdowns. Russian low SES groups perform at the same level as students at least in half of our countries of comparison.

❑ Achievement gap is more than one standard deviation in all countries except Russia, Latvia, Estonia and Finland.

❑ Smaller achievement gaps in Estonia and Finland are mainly the result of high scores of students in the most disadvantaged groups. In Russia small gap is mainly the result of relatively low scores for advantaged students.

❑ Russian low FAR group made substantial gains from 2000 till 2012. Russian higher FAR group did not.

□ In 2012 both Baltic countries' Russian-medium groups outperformed students in Russia. Why?

□ Bilingual education

□ Textbooks

□ Professional development courses

□ The PISA factor

□ Implementation

Conclusions and discussion

❑ Russia's average scores on PISA and TIMSS mask real trends in results.

❑ In both tests different FAR groups have their own tendency from 1999/2000 till 2011/2012 and comparing to other countries' same FAR groups.

❑ Interviews showed that in Baltic countries teachers are aimed to fit every student, in Russia we still have "one-size-fits-all" style. With the intention to help low achievers in case of problems.

❑ Improving high FAR students performance will affect both tests results, but especially PISA.

Thank you!

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BH distribution

Number of Books in the Home	Russia	Latvia	Lithuania	Poland	Czech	Hungary	Sweden	Germany	Finland
0-10 books	8.3	8.0	14.9	10.0	8.6	8.9	7.5	12.2	5.8
11-25 books	17.6	14.3	20.5	20.0	14.7	12.9	9.7	13.4	10.8
26-100 books	34.7	36.5	33.3	34.2	35.4	27.2	29.9	29.1	33.5
101-200 books	17.9	19.9	15.7	17.6	19.4	18.7	19.7	19.0	23.3
201-500 books	13.5	13.3	9.8	11.5	14.8	17.7	20.6	16.2	20.2
> 500 books	7.9	8.0	5.8	6.5	7.0	14.7	12.6	10.1	6.4

PISA 2009, Mathematics

FAR Group	Russia	Latvia	Lithuania	Estonia	Poland	Czech Rep.	Hungary	Sweden	Germany	Finland
Group 1 (lowest)	423	437	425	470	440	424	370	423	433	490
	(5.6)	(6.8)	(5.0)	(7.1)	(4.2)	(5.0)	(7.5)	(6.0)	(5.2)	(6.0)
Group 2	443	445	445	483	457	451	439	442	466	507
	(3.4)	(4.4)	(3.5)	(4.3)	(3.6)	(3.9)	(4.2)	(5.4)	(4.6)	(4.3)
Group 3	459	479	485	503	492	483	478	480	509	528
	(3.6)	(3.2)	(3.4)	(2.9)	(2.8)	(3.0)	(3.4)	(2.6)	(3.5)	(2.7)
Group 4	488	495	506	520	521	518	508	499	535	552
	(4.8)	(4.4)	(3.9)	(3.1)	(3.5)	(3.6)	(3.3)	(3.8)	(3.8)	(2.6)
Group 5	506	522	526	536	544	543	533	539	571	570
	(4.7)	(4.3)	(5.0)	(3.8)	(5.5)	(3.9)	(4.0)	(3.6)	(3.7)	(3.0)
Group 6 (highest)	502	511	521	549	559	548	557	542	570	580
	(8.5)	(7.3)	(6.3)	((6.1)	(5.8)	(6.7)	(6.6)	(5.9)	(6.5)	(5.9)
Gap (Group 6 – Group 1)	79	74	96	79	120	123	188	119	137	90
Gap (Group 5 – Group 2)	63	77	81	53	87	92	94	97	105	63
National Average Math score	468	482	477	512	495	493	490	494	513	541
	(5.1)	(5.1)	(4.5)	(4.6)	(4.2)	(4.3)	(4.8)	(4.6)	(4.6)	(4.1)
Average Math Score, Adjusted for Russian weights	468	480	485	507	499	491	481	484	512	535