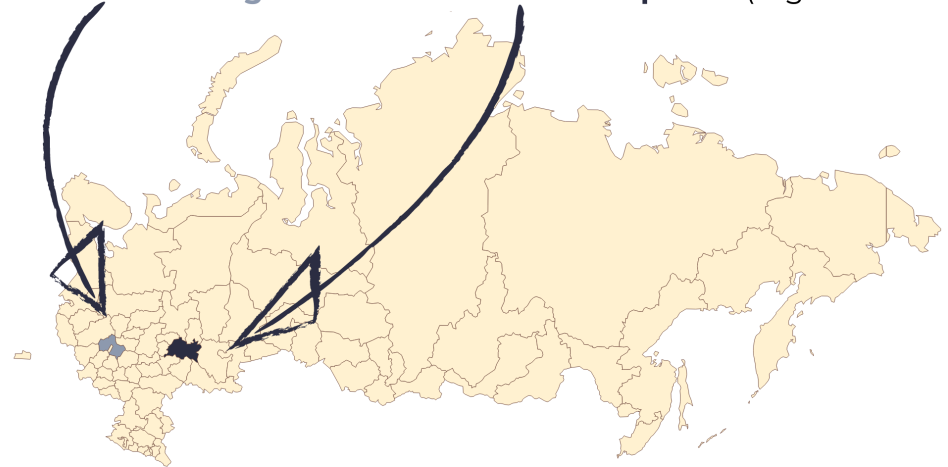


# Regional differences in students' reading, mathematics and science outcomes on PISA 2018 in Russia

Kseniia Adamovich,  
Higher School of Economics  
Moscow, the Russian Federation,  
kadamovich@hse.ru

Empirical base - 3 PISA samples:  
for the **Russian Federation** (country level),  
**Moscow region** and the **Tatarstan Republic** (regional level)

The concept of **spatial heterogeneity**:  
the strength and the direction of relationship between two phenomena may depend on their location and territorial context



## Research questions:

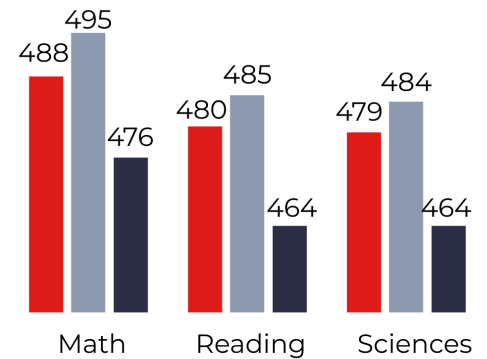
1. How the relationship of students' PISA results with their personal, family and school characteristics varies among Russian regions?
2. What are the regional differences in share of variation in PISA performance explained by personal, family and school predictors?

The size of the effects for personal characteristics is quite large. Like in other studies, boys are expected to learn better in math, and girls in reading. However, the gender gap within the regions is wider than within the country. For example, the advantage in reading for girls from the Moscow region is almost 6 scores higher than for girls from the national sample. Interestingly, for the sciences, the gender gap in regional subsamples is not significant. The language of instruction also plays an important role. Children with non-native Russian lag behind their peers by more than a year. In regional subsamples, especially in Tatarstan republic, the size of this effect is lower.

Family characteristics show greater variability. In general, the highest size of effect is for parental education. The difference in math scores between children from families with and without higher education varies from 12.48 in Tatarstan to 22.24 in the Moscow Region, in some cases, the effect of parents' education fades out. For example, the population effects on reading and science in Tatarstan are higher than the effects of family education. At the same time, the parental emotional support does not provide a significant increase in scores in the Moscow Region. The effect of educational resources at home is significant only in the Tatarstan subsample and only for mathematics and reading. The number of books at home is important through all three samples and the effects' sizes vary little.

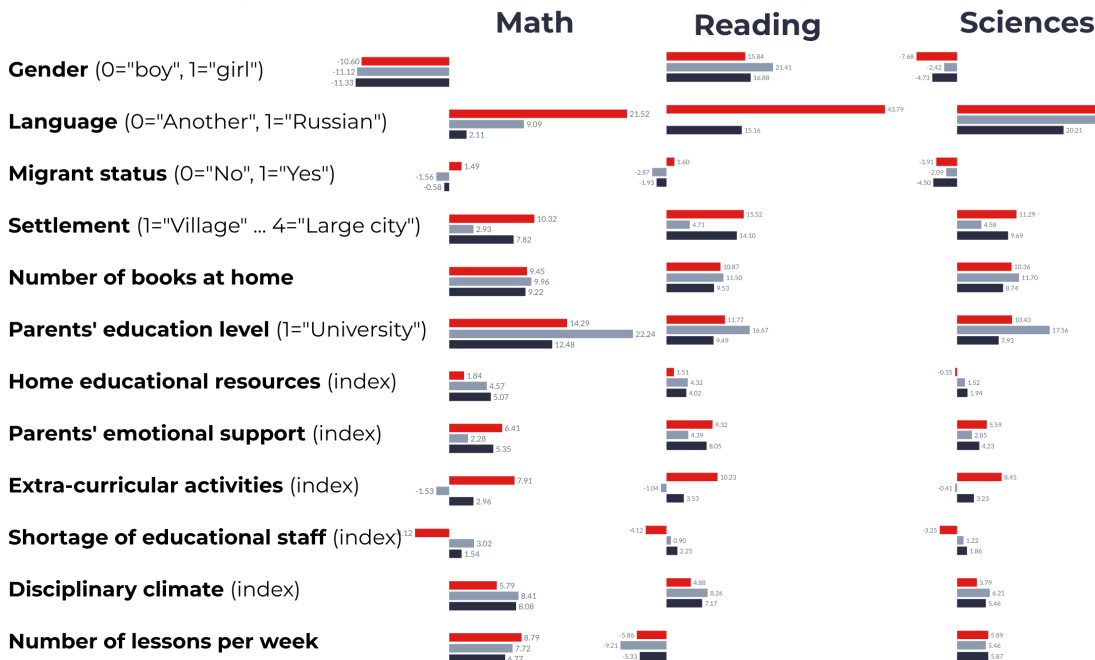
The estimates for school characteristics show that extracurricular activities and staff are not in significant deficits in regional subsamples. The biggest gap is provided by the disciplinary climate in the Moscow region subsample, especially for mathematics. An additional hour of lessons per week in Tatarstan republic gives quite a small increase, given that, in general, there are more additional lessons.

## PISA-2018 results:



**Russian Federation - 6 792 observations,**  
**Moscow region - 1 826 observations,**  
**Tatarstan Republic - 5 595 observations.**

## Relationship of Russian students' PISA results with their personal, family and school characteristics (OLS regression)



## Discussion

Our study demonstrates a special case of spatial heterogeneity in education. We elucidated the territorial differences not only in the resources availability, but also in the strength and significance of its relationship with the students' performance, and in its contribution to students' achievement.

The family contribution is higher for reading due to the cultural origins of this skill. The contribution of school is of more importance for sciences due to the specific of Russian school curriculum.

In general, the lowest effects are from those indicators whose concentration is less. Thus, the gain in scores of children in favorable contexts may be lower than that of their peers in the same conditions in another region. This is an important point for educational policy, which shows that the effectiveness of decisions can also vary depending on the territory.