# Accountability and Equity in Education: An International Perspective Based on PISA

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# Is school accountability related to equity in student achievement?

1) Findings based on PISA 2015
2) Ongoing research

# What is PISA?
## Programme for International Student Assessment

- Assessment of student proficiency in reading, mathematics and science

- Since 2000, every 3 years: 2003, 2006, 2009, 2012

PISA 2015:
- In 72 countries and economies
- Over half a million 15-year-olds took part in PISA
- Representing 28 million students



**Map of PISA countries and economies**

OECD countries

Partner countries and economies in PISA 2015

Partner countries and economies in previous cycles

# Is school accountability related to equity in student achievement?

## 1) Findings based on PISA 2015

# Equity and Accountability in PISA 2015

- *PISA 2015 Results* (Vol. I and II)

- Do education systems with higher levels of equity have more school accountability? (Country-level analysis)

- Is the relationship between socio-economic background and student achievement weaker in schools with more accountability? (Student-level analysis)

# How are equity and accountability defined and measured in PISA?

- **Equity definition**:

  Relationship between students' **socio-economic status** and **performance**
  - PISA Index of Student Economic, Social and Cultural Status (ESCS)
  - Scores in PISA assessment (science, reading, mathematics)

- **Equity measurement:** the "socio-economic gradient"
  - **Slope** of the gradient (or ESCS regression coefficient)
  - **Strength** of the gradient (or r-squared of the regression)

> There is more equity in an education system
> when PISA scores cannot be predicted solely
> on the basis of students' socio-economic statuses

# PISA 2015: Measures related to assessment, evaluation and accountability

| | External evaluation | Teacher evaluation | Internal evaluation | Formative assessment |
|---|---|---|---|---|
| **Purpose and criteria** | General assessment practice (ScQ)<br>Purpose of assessment results (ScQ) | | | |
| | Evaluation policies (ScQ) | | | Teacher's grading (TQG) |
| **Practices** | | Teacher-evaluation methods (ScQ) | | Classroom-assessment instruments (TQG/TALIS) |
| **Use and consequences** | Processes of external evaluation (ScQ)<br><br>Use of achievement data for accountability (ScQ) | | Consequences of internal evaluation (ScQ) | Feedback: student perception (StQ)<br>Adaptation of instruction (StQ) |

OECD (2016), *PISA 2015 Assessment and Analytical Framework.*

# Measurement of school accountability in PISA 2015

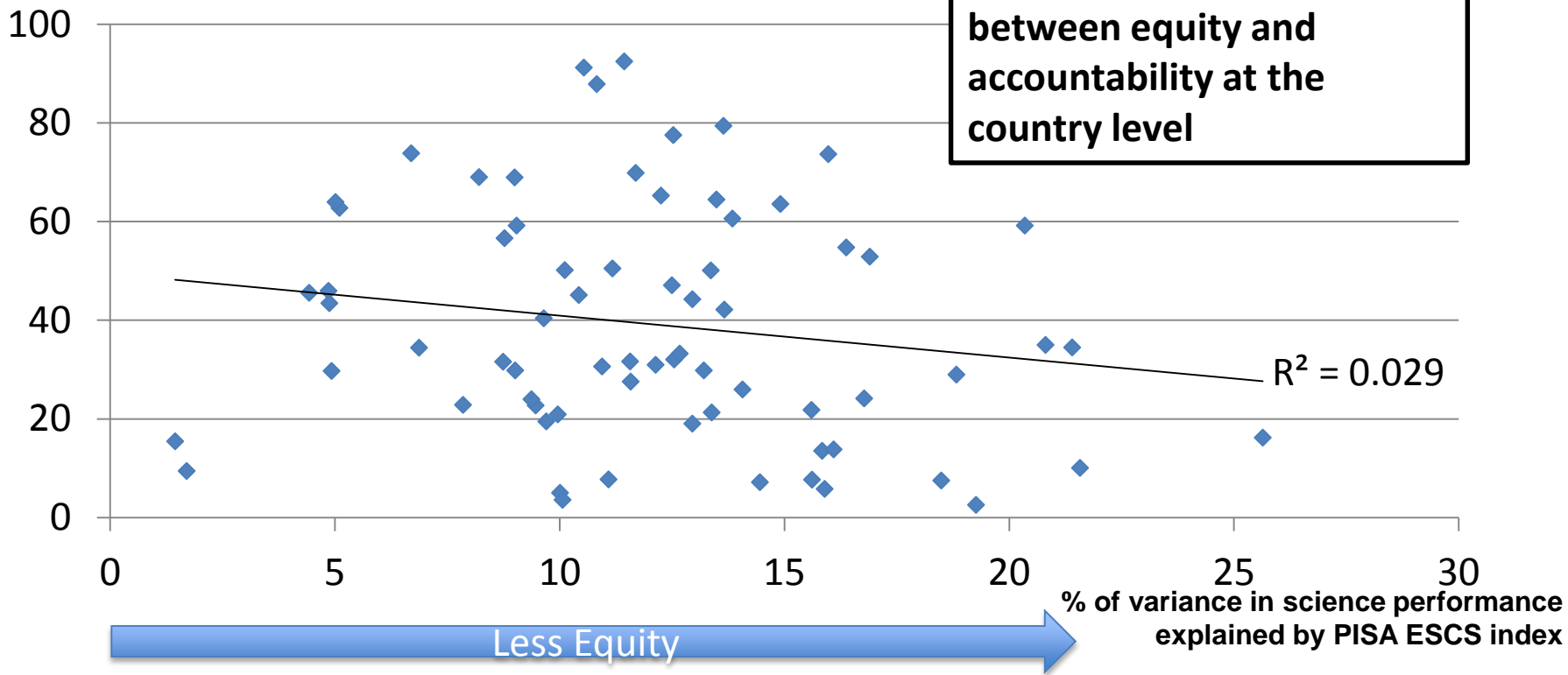| SC036 | In your school, are achievement data used in any of the following <accountability procedures>? *Achievement data include **aggregated** school or grade-level test scores or grades, or graduation rates. (Please select one response in each row.)* | | |
|---|---|---|---|
| | | **Yes** | **No** |
| SC036Q01TA | Achievement data are posted publicly (e.g. in the media) | ☐₁ | ☐₂ |
| SC036Q02TA | Achievement data are tracked over time by an administrative authority | ☐₁ | ☐₂ |
| SC036Q03NA | Achievement data are provided directly to parents | ☐₁ | ☐₂ |

**Percentage of students in schools where achievement data is:**

■ Posted publicly (e.g. media) ● Tracked over time by an administrative authority ▲ Provided directly to parents
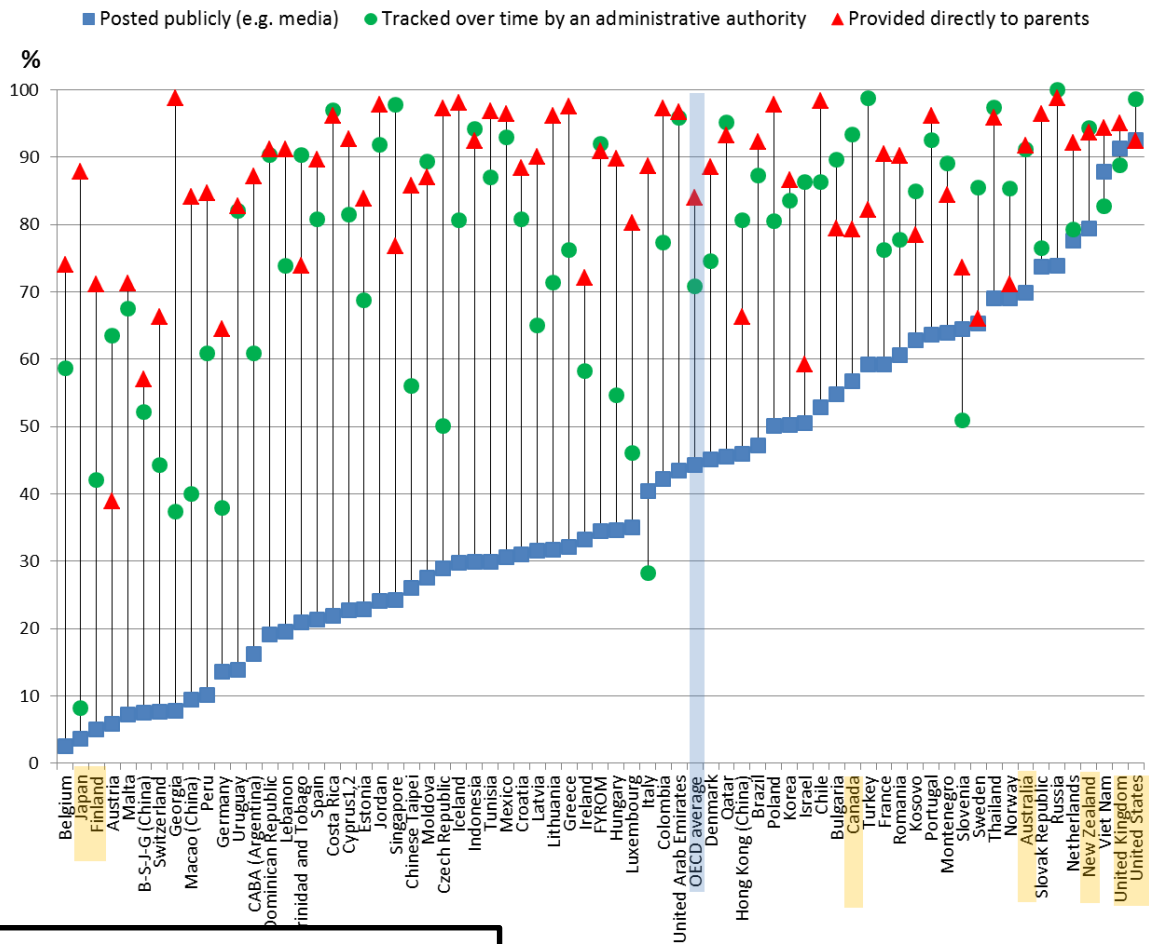
- 'Data to parents' is the most frequent form of accountability

- 'Posted publicly' varies the most across countries

- All types are more frequent in English-speaking countries

- Not frequent in 2 top-performing countries with high level of equity: Japan and Finland

OECD (2016), *PISA 2015 Results Volume I*

# Do education systems with higher levels of equity have more school accountability?



**% of students in schools that post data publicly**

There is no relationship between equity and accountability at the country level

$R^2 = 0.029$

Less Equity

**% of variance in science performance explained by PISA ESCS index**

# Schools that post data publicly (e.g. media)

Positive association with science performance in 23 countries (OECD average: +11 score points)

More frequent in socio-economically advantaged schools (exceptions: in Iceland and Montenegro)

After accounting for ESCS, association still exists in 13 countries (OECD average: +4 score points)

More frequent in urban schools (exceptions: UK and Denmark)

More frequent in public schools (in 10 countries, versus 8 countries more frequent in private schools)

OECD (2016), *PISA 2015  Results Volume I*

Legend:
- Positive difference/association
- Negative difference/association
- Difference/association is not significant
- Missing values

| | School characteristics | | | Science performance | |
|---|---|---|---|---|---|
| | Advantaged – disadvantaged | Urban – rural | Private – public | Before ESCS[1] | After ESCS |
| United States | | | | | |
| United Kingdom | | | | | |
| Viet Nam | | | | | |
| New Zealand | | | | | |
| Netherlands | | | | | |
| Russia | | | | | |
| Slovak Republic | | | | | |
| Australia | | | | | |
| Norway | | | | | |
| Thailand | | | | | |
| Sweden | | | | | |
| Slovenia | | | | | |
| Montenegro | | | | | |
| Portugal | | | | | |
| Kosovo | | | | | |
| Romania | | | | | |
| France | | | | | |
| Turkey | | | | | |
| Canada | | | | | |
| Bulgaria | | | | | |
| Chile | | | | | |
| Israel | | | | | |
| Korea | | | | | |
| Poland | | | | | |
| Brazil | | | | | |
| Hong Kong (China) | | | | | |
| Qatar | | | | | |
| Denmark | | | | | |
| OECD average | 10% pts | 9 % pts | 5 % pts | 11 pts | 4 pts |
| United Arab Emirates | | | | | |
| Colombia | | | | | |
| Italy | | | | | |
| Luxembourg | | | | | |
| Hungary | | | | | |
| FYROM | | | | | |
| Ireland | | | | | |
| Greece | | | | | |
| Lithuania | | | | | |
| Latvia | | | | | |
| Croatia | | | | | |
| Mexico | | | | | |
| Tunisia | | | | | |
| Indonesia | | | | | |
| Iceland | | | | | |
| Czech Republic | | | | | |
| Moldova | | | | | |
| Chinese Taipei | | | | | |
| Singapore | | | | | |
| Jordan | | | | | |
| Estonia | | | | | |
| Costa Rica | | | | | |
| Spain | | | | | |
| Trinidad and Tobago | | | | | |
| Lebanon | | | | | |
| Dominican Republic | | | | | |
| CABA (Argentina) | | | | | |
| Algeria | | | | | |
| Uruguay | | | | | |
| Germany | | | | | |
| Peru | | | | | |
| Macao (China) | | | | | |
| Georgia | | | | | |
| Switzerland | | | | | |
| B-S-J-G (China) | | | | | |
| Malta | | | | | |
| Austria | | | | | |
| Finland | | | | | |
| Japan | | | | | |
| Belgium | | | | | |

## Is the relationship between socio-economic background and student achievement weaker in schools with more accountability?

- Linear regression models
- Outcome:        Students' reading scores (plausible values)
- Predictors:     Student socio-economic status (ESCS)
                  School socio-economic composition (school average ESCS)
                  Achievement data published publicly in school
                        (Yes=1, No=0)
- Hypothesis:
  - If accountability provides more opportunities for disadvantaged students, accounting for accountability will reduce the effect of socio-economic status on performance
  - If accountability does not, the effect of student socio-economic status on performance will remain the same
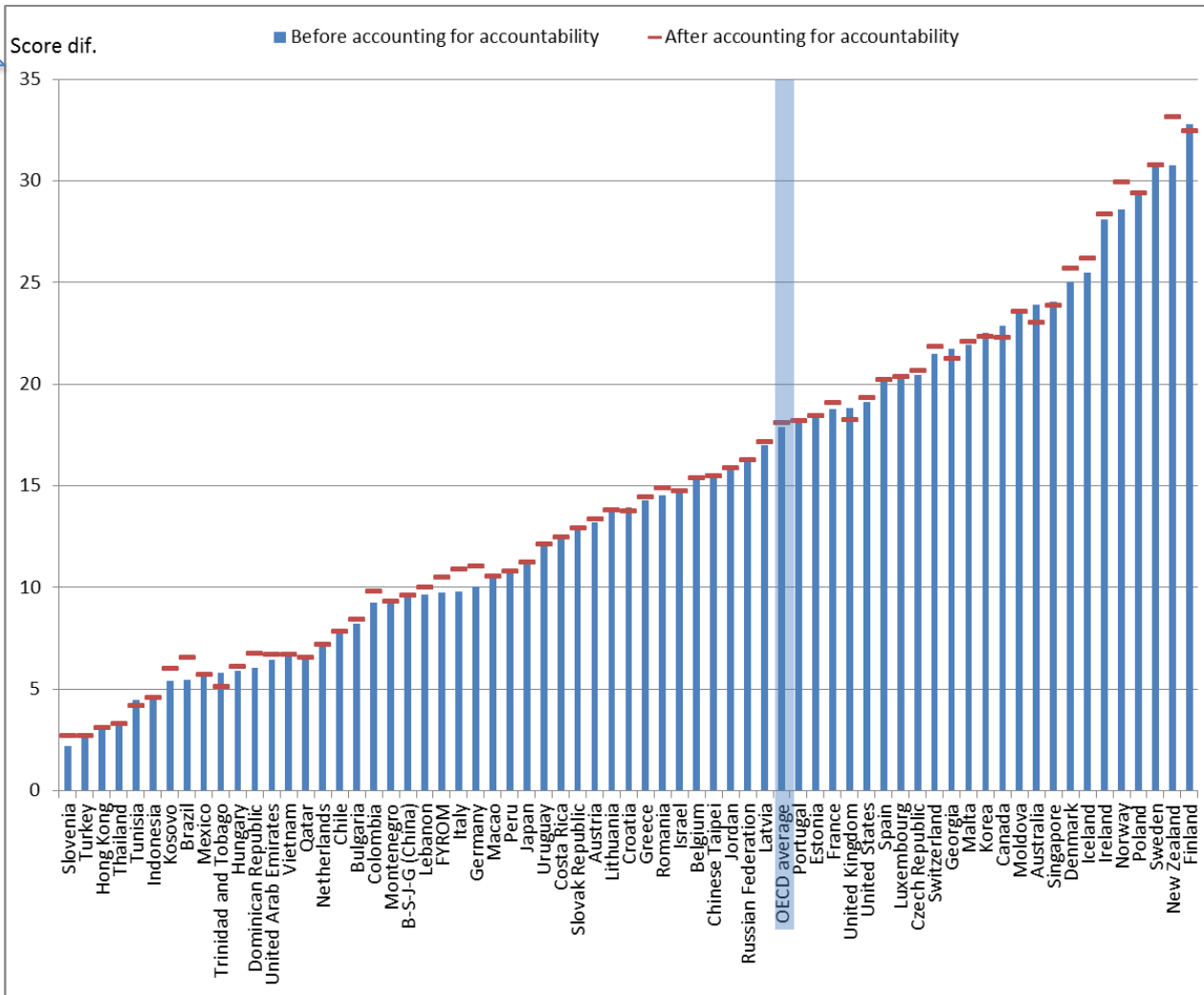
**Caution!** Possible reverse causality…

# Is the relationship between socio-economic background and student achievement weaker in schools with more accountability?

| | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. |
| Student ESCS index | 37.4 | (0.4) | 17.9 | (0.3) | | | 37.1 | (0.4) | 18.1 | (0.3) |
| School average ESCS | | | 70.8 | (1.1) | | | | | 70.1 | (1.2) |
| School posts data publicly | | | | | 11.8 | (1.8) | 8.9 | (1.5) | 4.8 | (1.4) |

## On average, among OECD countries:

- Accountability does not moderate the effect of socio-economic background on student achievement

- Accountability is a significant predictor of science performance even after accounting for student and school ESCS

**Score dif.**

Legend: ■ Before accounting for accountability — After accounting for accountability

Vertical axis (left): 0, 5, 10, 15, 20, 25, 30, 35

Upward arrow labeled: Less Equity

Countries (left to right): Slovenia, Turkey, Hong Kong, Thailand, Tunisia, Indonesia, Kosovo, Brazil, Mexico, Trinidad and Tobago, Hungary, Dominican Republic, United Arab Emirates, Vietnam, Qatar, Netherlands, Chile, Bulgaria, Colombia, Montenegro, B-S-J-G (China), Lebanon, FYROM, Italy, Germany, Macao, Peru, Japan, Uruguay, Costa Rica, Slovak Republic, Austria, Lithuania, Croatia, Greece, Romania, Israel, Belgium, Chinese Taipei, Jordan, Russian Federation, Latvia, OECD average, Portugal, Estonia, France, United Kingdom, United States, Spain, Luxembourg, Czech Republic, Switzerland, Georgia, Malta, Korea, Canada, Moldova, Australia, Singapore, Denmark, Iceland, Ireland, Norway, Poland, Sweden, New Zealand, Finland

The effect of socio-economic status on reading performance does not change after accounting for differences in school accountability in any country or economy participating in PISA 2015

## Other factors and policies that have a stronger association with higher levels of equity in student performance in PISA

- Equalizing **resource allocation** between schools
- Expanding **access to pre-primary education** for disadvantaged students
- Reducing shares of **grade repetition**
- Delaying age of **selection into different academic tracks**

# Ongoing research:
# Panel estimates using PISA

## Ongoing exploratory research: Motivation

-School accountability is increasingly prevalent around the world. It is one of the most important reforms taking place in education systems (Benavot and Tanner, 2007; Figlio and Loeb, 2011)

-Evidence on the effect of school accountability on equity and overall achievement is mixed.

-Accountability proves to be a controversial topic (Impact in school communities? Incentives? All types of accountability desirable?)

-Up to now very few cross-national studies studying school accountability. Most of them of cross sectional nature.

## Ongoing exploratory research: Motivation

-Not much literature on the relationship between school accountability, school autonomy and equity in education.

-Most evidence from particular programs within and across states in the US (Hanushek & Raymond, 2005; Carnoy & Loeb, 2003; Dee & Jacob, 2009) and some evidence from Europe (Braga Checchi and Meschi, 2013), Burgess et al., 2005)

-Many studies show improved average achievement. Some others show higher inequity at the same time.

-Urgent to establish what works and what doesn't work to improve equity in education.

-What can we say about school accountability and equity when looking at PISA?

# Ongoing exploratory research: Why Panel Estimates?

- Some evidence so far coming from PISA based reports and academic articles (autonomy and accountability would work together, accountability positively affecting average results, no impact on equity)

- Limitations:

  -Evidence mostly studying associations between accountability policies/practices and equity in education.

  -Some important school/country characteristics also affecting equity are not fully observed (e.g. teaching quality, school leadership, spending per student, etc.).

- Studies with a longitudinal component could contribute to better understand the direct effect of accountability on educational outcomes.

# Ongoing exploratory research: The Design

- In this exploratory research we will produce panel estimates for the effect of accountability on equity in education.

- For the case of PISA a longitudinal setting will follow countries over time (for years 2006 to 2015).

- We will also study whether the effect of accountability pratices is moderated by the presence of school autonomy.

- By including country fixed effects we expect to account in our models for those unoberved fixed country level characteristics related both to accountability and educational outcomes.

# Ongoing exploratory research: The Design

- To measure school accountability we will use head teacher school questionnaire items present in several PISA waves.

    – School achievement information tracked or posted publicly (2 items)

- To measure school autonomy we will make use of some of the measures used by Hanushek, Link and Woessmann (2013) also present in previous PISA reports.

    *(e.g. deciding which courses are offered; determining course content; choosing which textbooks are used; selecting teachers for hire; establishing teachers' starting salaries; deciding on budget allocations within the school).*

# Ongoing exploratory research: Trends over time
Example: Pctg. of Students in Schools where Achievement Data are Posted Publicly
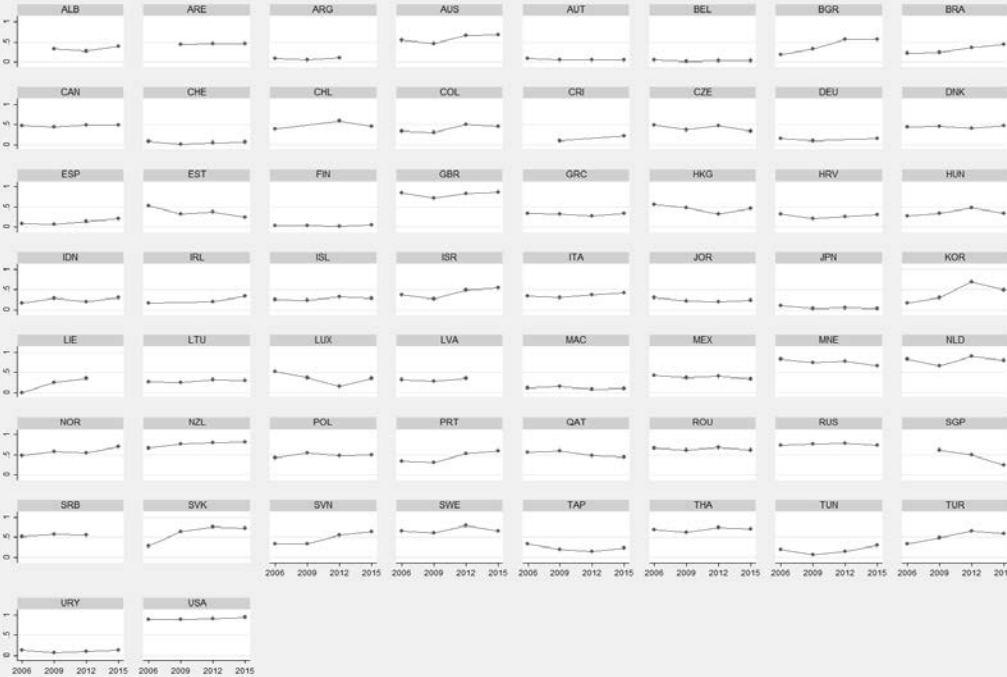


Graphs by Country code 3-character

High and stable:
USA, UK, New Zealand

Low and stable:
Argentina, Uruguay, Spain, Germany, Austria, Switzerland, Belgium, Finland, Japan, Macau (China)

Important Variations:

Increase: Australia, Brazil, Bulgaria, Israel, Turkey, Korea, Slovakia, Slovenia, Norway, Portugal.

Decrease: Singapore, Estonia

Unclear pattern: Netherlands, Sweden, Luxemburg, Chile, Colombia.

## Ongoing exploratory research: The Model

Outcome:
-PISA plausible values for individual "i" in country "c" in school "s" in time "t"  for reading and math.

Measures of Interest:
-School accountability and school autonomy in country c in time t
(effect of accountability on average achievement)
-Interaction term between school accountability and/or school autonomy and student SES
(effect of accountability/autonomy on equity in achievement)

Other Controls:
- Other Institutional characteristics in time t (school funding, competition, property, etc.)
- Student and School Socioeconomic Status (ESCS, school ESCS) in time t
- Other observed school, individual and household characteristics in time t
- Country fixed effects, absorbing all institutional characteristics fixed in time
- Time fixed effects to account for cohort effects across PISA waves

**Thank you…**

- For more information:

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