

The Optimal Design of a School System

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School Systems and Economic Growth

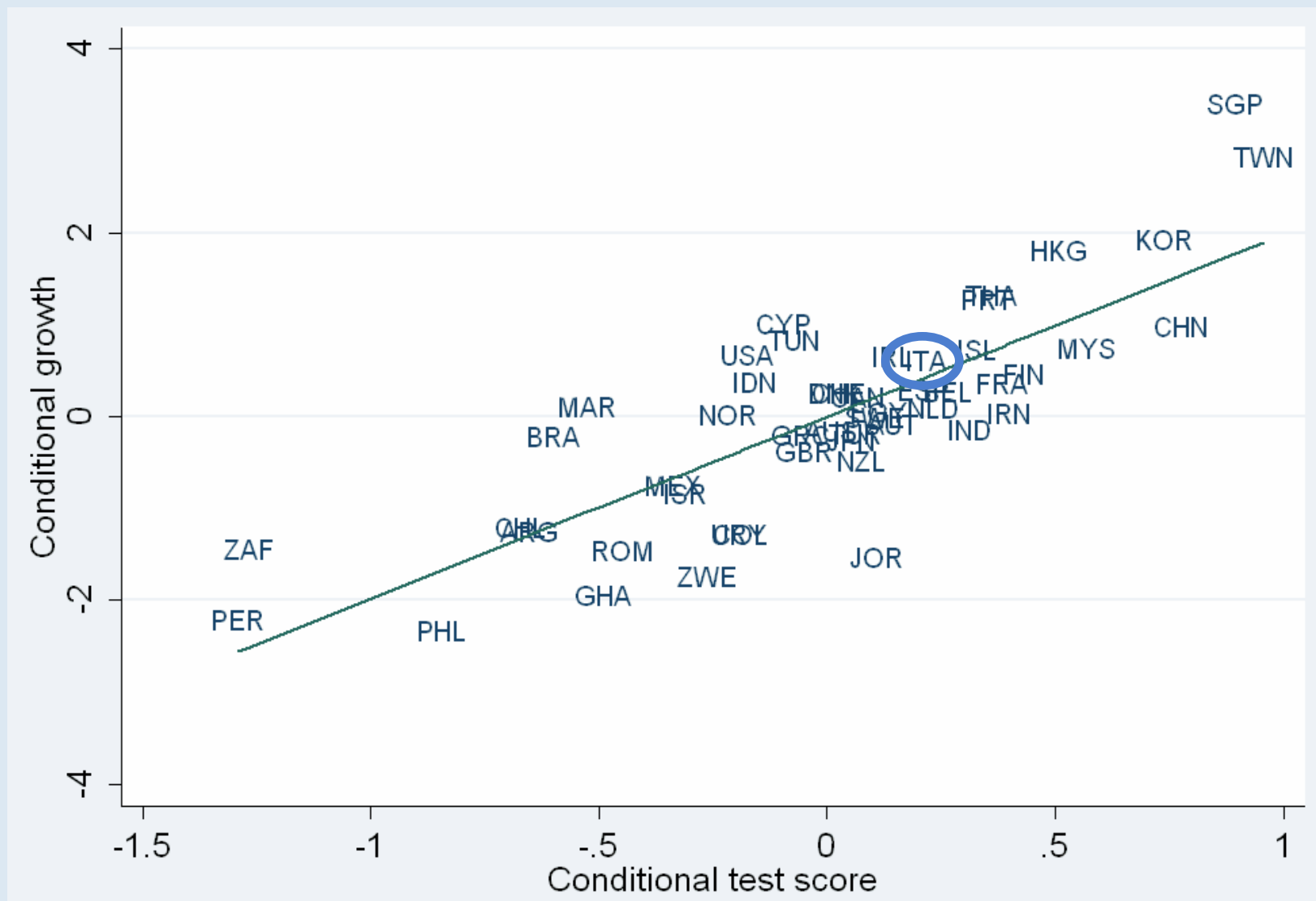
1. Motivation

- a) Educational achievement and economic **growth**
- b) The role of **spending** levels

2. The **governance** of the school system

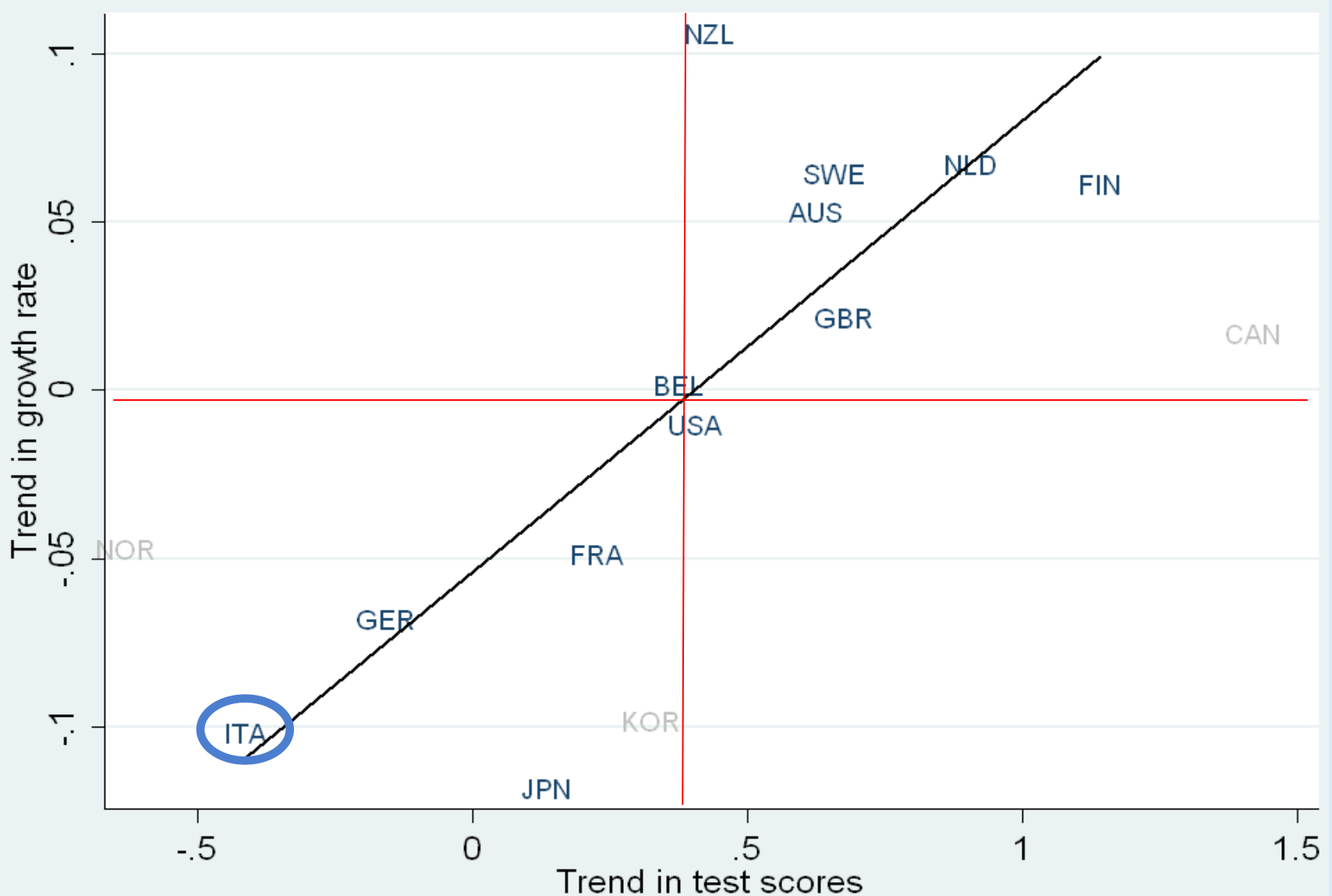
3. The **financing** of the school system

Educational Achievement and Economic Growth



Added-variable plot of regression of average annual growth rate of real GDP per capita 1960-2000 on initial level of GDP per capita, initial average years of schooling and average student achievement test scores. Source: Hanushek and Woessmann (JEL 2008).

Trends in Growth Rates vs. Trends in Test Scores

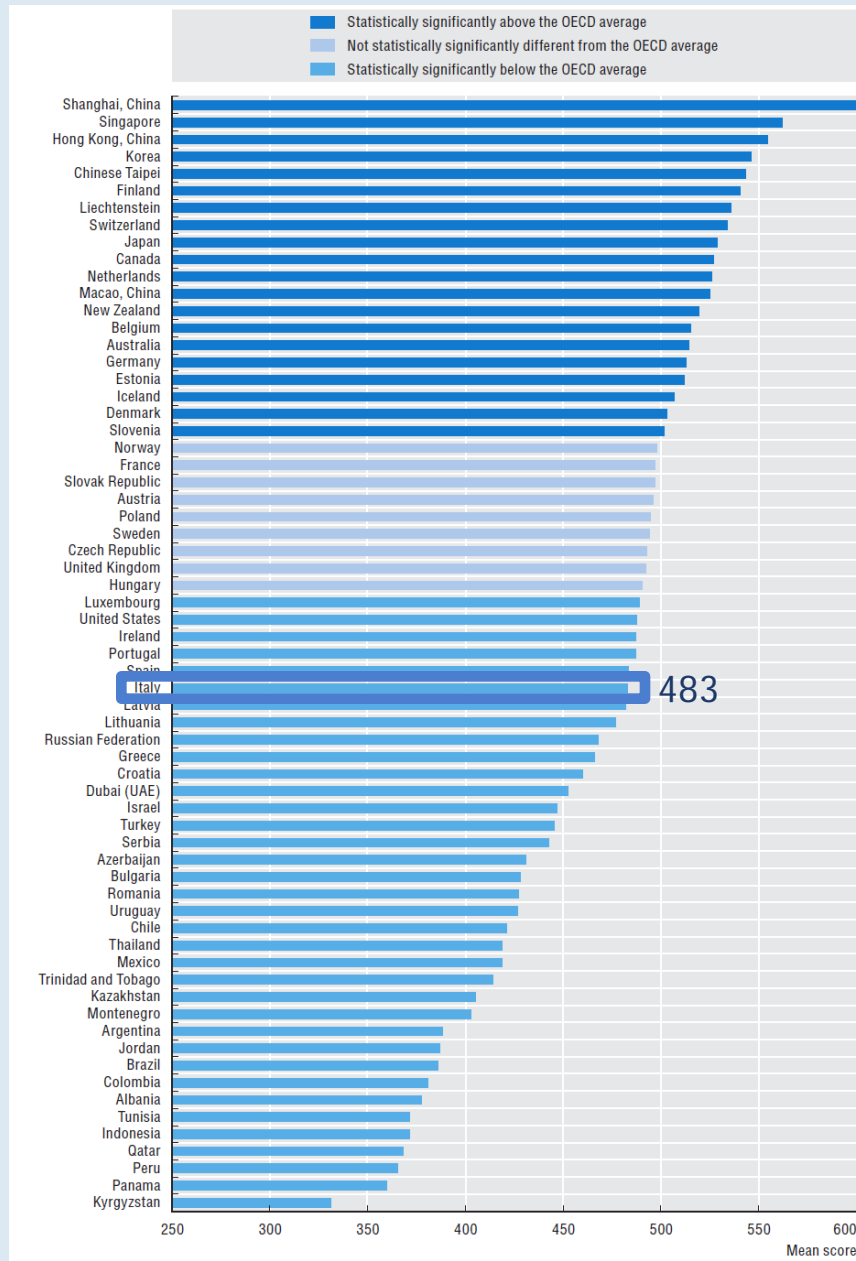


Scatter plot of trend in the growth rate of GDP per capita from 1975 to 2000 against trend in test scores.
Source: Hanushek and Woessmann (JEGro 2012).

Education and Long-run Prosperity

- Research on determinants of modern economic **growth**
 - Key: direct measures of **cognitive skills**
 - Hanushek and Woessmann (JEL 2008; EcoPol 2011; JEGro 2012)
 - Focus on educational **outcomes**, not just attainment
- Importance of education also for **historical** development
 - Catch-up in the Industrial Revolution
 - Becker and Woessmann (QJE 2009); Becker, Hornung and Woessmann (AEJ:Macro 2011)
- The **cost** of low educational achievement:
 - Use available estimates of their growth impact to simulate how future GDPs would evolve under school reforms
 - **Gains** from improving skills: present value of long-run aggregate gains

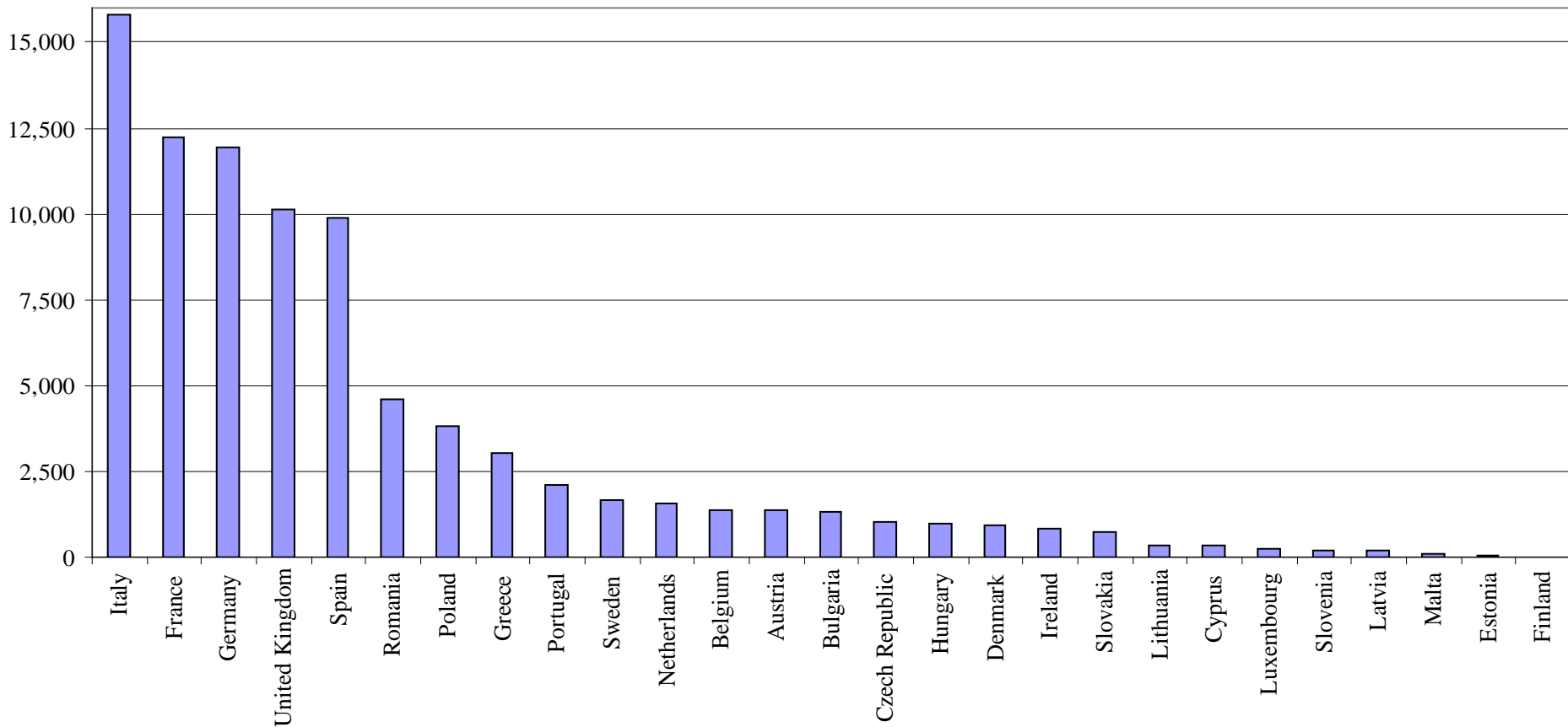
Italy's Achievement on the PISA 2009 Math Test



Source: OECD (2010).

The Cost of Low Educational Achievement in the EU

Gains from bringing each nation's educational achievement to the Finnish level, billion Euro:

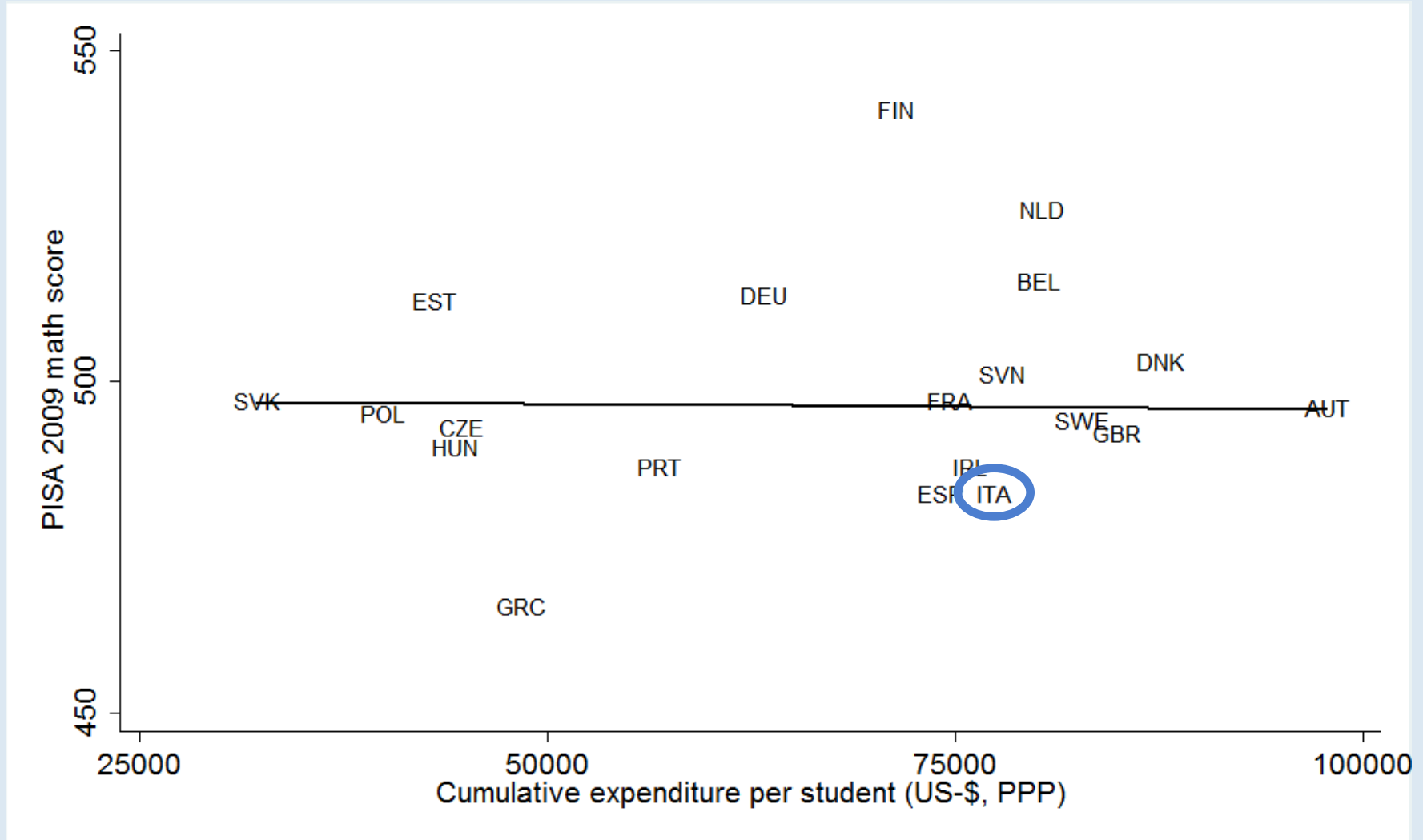


Discounted value of future increases in GDP until 2090, expressed in billion Euro (PPP).

Source: Hanushek and Woessmann (CESifoEStud 2012).

What Is the Link between Resources and Outcomes?

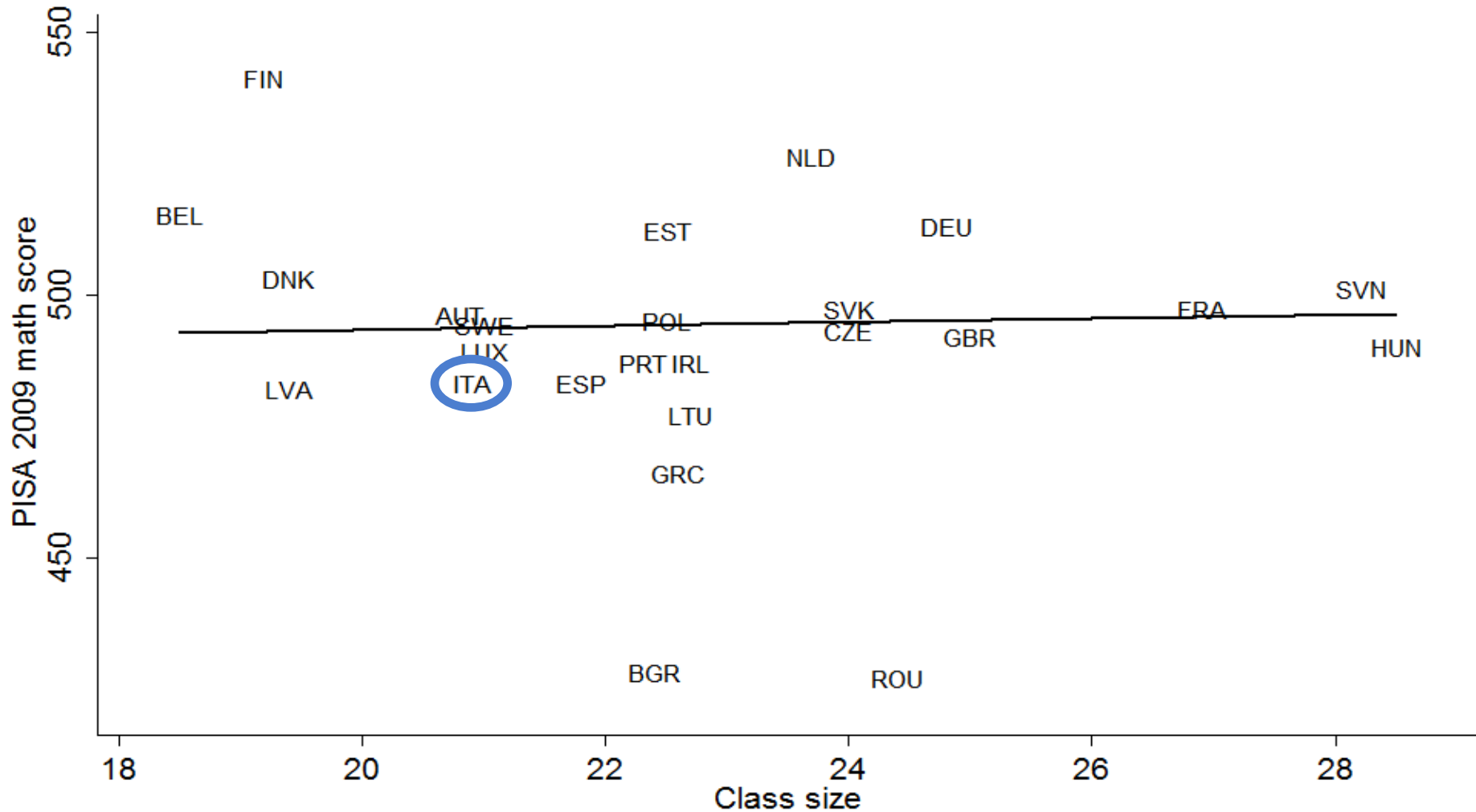
Spending and math achievement of EU countries in PISA 2009:



Own depiction based on PISA 2009 data. Regression line of best fit (without three outliers).

What Is the Link between Resources and Outcomes?

Class size and math achievement of EU countries in PISA 2009:



Own depiction based on PISA 2009 data. Regression line of best fit (without three outliers).

What Is the Link between Resources and Outcomes?

- Class size

- Hanushek and Woessmann (HbEEdu 2011); Woessmann and West (EurER 2006);
Woessmann (EcoPol 2005); Gundlach, Gmelin and Woessmann (EJ 2001)

→ Need to focus on **teacher quality**

Incentives and Institutional Reforms

- **Incentives**

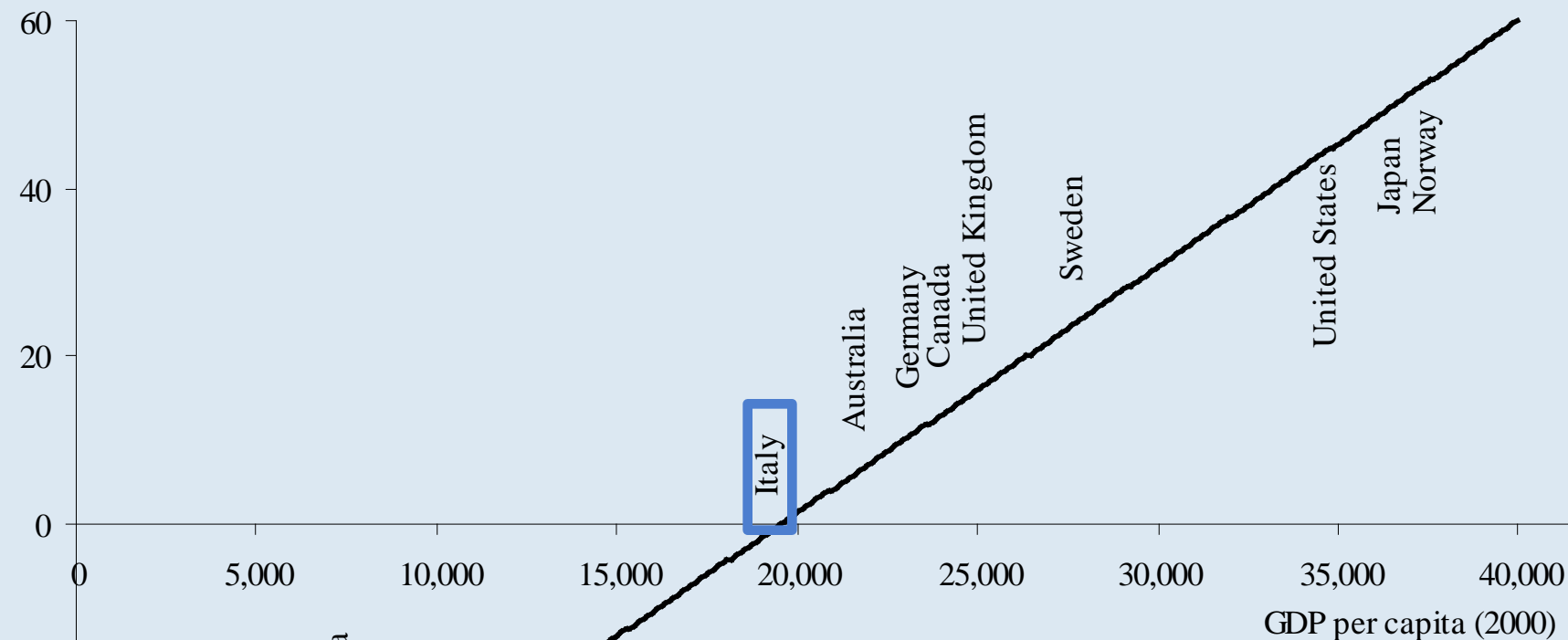
- Best way to use investments efficiently and effectively is to ensure that everyone in the system has incentives to focus on improving student outcomes

→ **Institutional framework:** provides the incentive schemes that create better student outcomes

- Autonomy
- Accountability
- Choice and competition

Effect of School Autonomy by Income Level

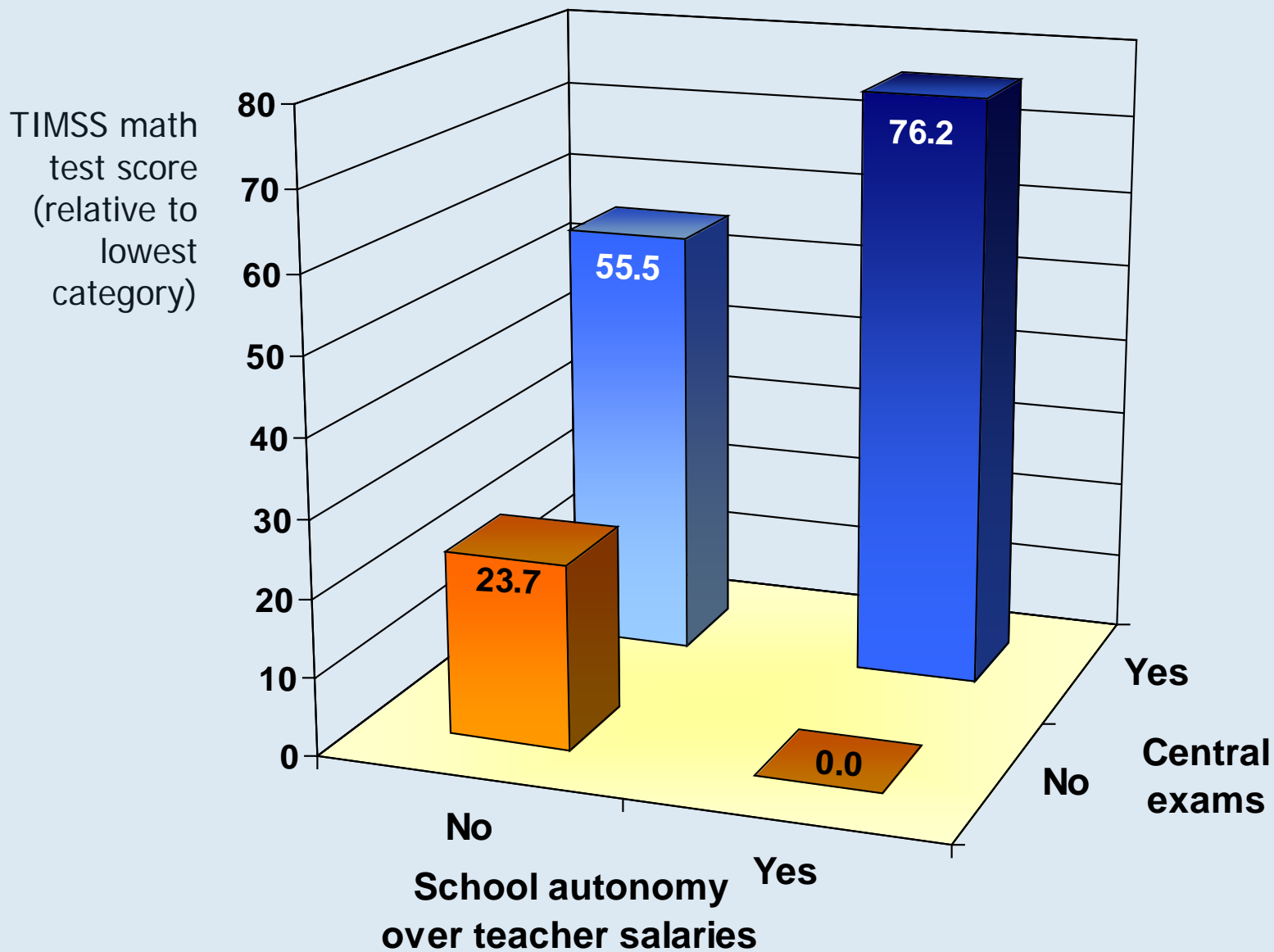
Effect of autonomy on PISA test score



Effect of academic-content autonomy (scaled 0-1) on PISA math test score (scaled with std. dev. 100) depending on initial GDP per capita (in 2000), estimated in a **panel model of PISA tests 2000-2009**.

Example countries illustrate initial level of GDP per capita. Source: Hanushek, Link and Woessmann (JDevE 2013).

External Exams, Autonomy and Student Outcomes



Source: Woessmann (2005); see also Hanushek, Link and Woessmann (JDevE 2013).

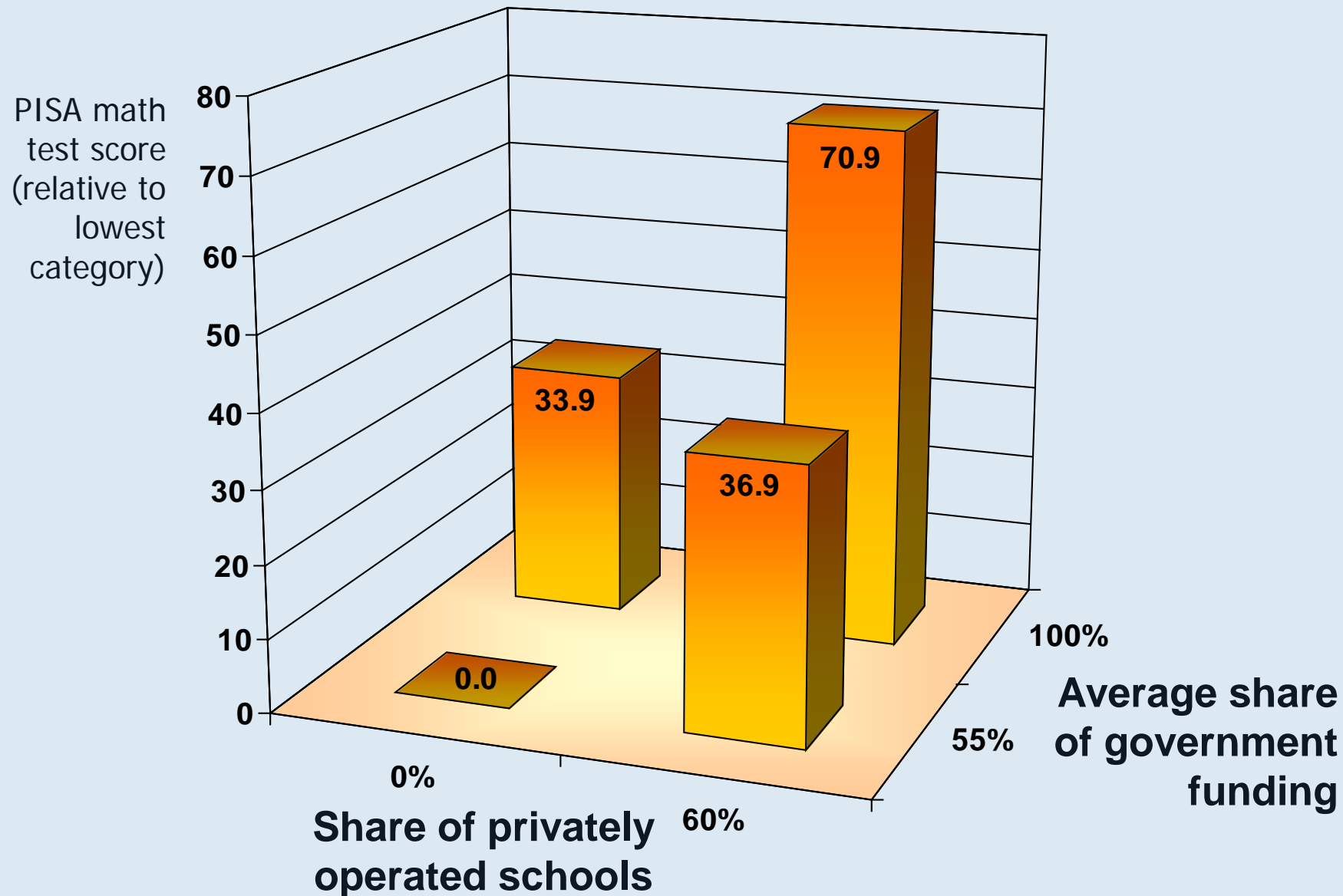
Governance of School System: Autonomy

- Autonomy effect heterogeneous by **development** level:
 - Conducive in school systems that already have surrounding conditions to ensure high performance
 - Detrimental in low-performing systems that lack basic standards
- Different **areas** of decision-making:
 - Operational decisions like **personnel** (where standardization not crucial) more appropriately made locally than decision on content **standards**
- **Countervailing effects**:
 - **Better understanding** of local decision-makers permits them to improve schools' productivity
 - ↔ **Divergent interests** and **asymmetric information**: possible to pursue goals other than achievement, conflict with maintaining common standards

Governance of School System: Accountability

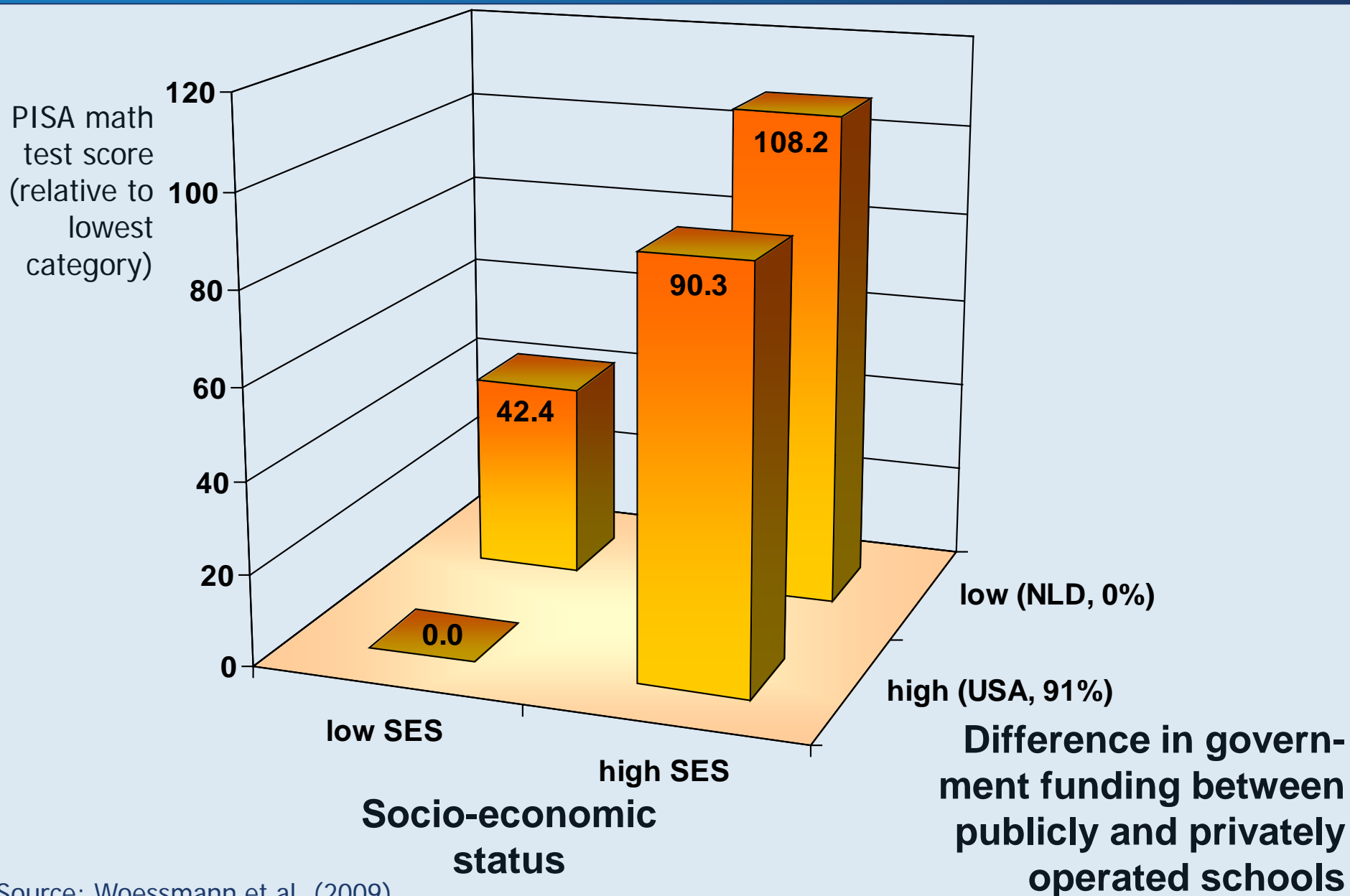
- **Central exams** provide information:
 - Ease monitoring problems inherent in education systems
 - Align local incentives with goals of system
- Other **accountability** measures:
 - Aimed primarily at students: use of assessments for decisions on student promotion and retention
 - Aimed at teachers: internal and external monitoring of teacher lessons by principals and inspectors
 - Aimed at schools: assessments used to compare schools to district or national performance
- **School management** and parental **choice**:
 - Public vs. non-public management (\neq autonomy)
 - Parental choice can create competition, hold accountable

Funding, Operation and Student Outcomes



Source: Woessmann et al. (2009); see also West and Woessmann (EJ 2010).

Funding and Equity of Student Outcomes



Financing of School System

- **Financing ≠ operation:**
 - **Public** funding crucial for quality and equity
 - Does not imply public operation
- **Voucher-type financing:**
 - Funding follows students
 - Creates choice, in particular for poor families
 - Funding can differ by student characteristics
- **Admission mechanisms:**
 - Avoid cream skimming: lotteries when oversubscription
- **Experiences from around the world:**
 - The Netherlands
 - Colombia, Chile, Sweden; India (see Bettinger, HbEEdu 2011)
 - U.S. states: Milwaukee, Cleveland, Washington DC; charters

The Optimal Design of a School System

1. Improved educational achievement crucial for **growth**
2. Higher **spending** alone does not ensure better outcomes
 - Need to focus on teacher quality
3. The **governance** of the school system
 - **Accountability** for outcomes crucial in **autonomous** system
 - Output-oriented reforms: State ensures accountability and funding for inclusive education and uses **choice** and **competition** among autonomous schools to deliver best results
4. The **financing** of the school system
 - **Public** funding crucial for equity (and quality)
 - Does not mean public operation
 - Voucher-type financing (funding follows students) enables **choice** for all families
 - Avoid cream skimming in admissions