HKPISA

Accomplishments and Challenges

Results from HKPISA 2006

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Overview

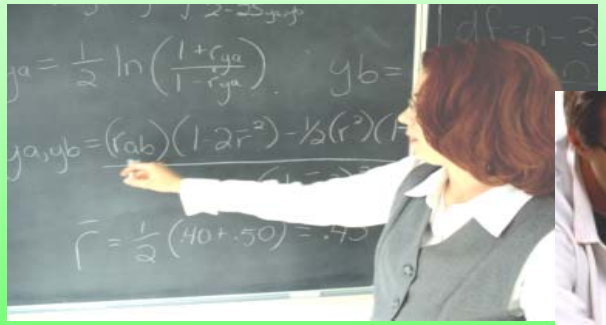
- Overall Performance
- Performance Disparity among subgroups
  - high vs low SES
  - boys vs girls
  - immigrants vs local
- Factors related to performance
- Policy concerns
- Concluding Remarks
  – accomplishments and challenges

Basic Background

- Tests competencies for real-life situations *and* not constrained by the common denominator of national curricula
- Three Domains:

Reading

Mathematics



Science

OECD/PISA Project 2006

Countries participating in the OECD PISA Project 2006:

Western Europe	Asia/Pacific Rim	Eastern Europe	Americas & others
Austria	Australia	Bulgaria	Argentina
Belgium	Hong Kong - China	Czech Republic	Brazil
Denmark	Indonesia	Croatia	Canada
Finland	Japan	Estonia	Chile
France	Korea	Greece	Colombia
Germany	Macao - China	Hungary	Israel
Iceland	New Zealand	Jordan	Mexico
Ireland	Chinese Taipei	Latvia	United States
Italy	Thailand	Lithuania	Uruguay
Luxembourg		Poland	Tunisia
Netherlands		Russian Federation	
Norway		Serbia – Montenegro	
Portugal		Slovak Republic	
Spain		Slovenia	
Sweden		Turkey	
Switzerland			
United Kingdom			

OECD/PISA 2006

Explicit Strata	Implicit Strata	Total Number of Schools	Number of Schools sampled by OECD	Number of Schools Accepted by OECD
Government	High Ability	17	6	**6**
	Medium Ability	7	2	**2**
	Low Ability	10	3	**3**
	N/A	2	0	**0**
Aided	High Ability	128	48	**46**
	Medium Ability	125	47	**46**
	Low Ability	126	37	**35**
	N/A	1	0	**0**
Independent[#]	Local (DSS*)	43	8	**7**
	International	27	5	**1**
Total		486	156	**146**

OECD/PISA 2006

Table 4.2 Distribution of Students Participating in the Main Study of HKPISA 2006

	Number of Participating Students	Proportion (%)
Graded/Form		
7/S1	107	2.3
8/S2	421	9.1
9/S3	1134	24.4
10/S4	2978	64.1
11/S5	5	0.1
Total	**4645**	**100**
Sex		
Female	2351	50.6
Male	2294	49.4
Total	**4645**	**100**

TOP Ten Countries/ Regions in PISA2006 (Figure 1)

Science			Mathematics			Reading		
Countries	*Mean*	*S.E.*	*Countries*	*Mean*	*S.E.*	*Countries*	*Mean*	*S.E.*
Finland	563	(2.0)	Chinese Taipei	549	(4.1)	Korea	556	(3.8)
Hong Kong	542	(2.5)	Finland	548	(2.3)	Finland	547	(2.1)
Canada	534	(2.0)	Hong Kong	547	(2.7)	Hong Kong	536	(2.4)
Chinese Taipei	532	(3.6)	Korea	547	(3.8)	Canada	527	(2.4)
Estonia	531	(2.5)	Netherlands	531	(2.6)	New Zealand	521	(3.0)
Japan	531	(3.4)	Switzerland	530	(3.2)	Ireland	517	(3.5)
New Zealand	530	(2.7)	Canada	527	(2.0)	Australia	513	(2.1)
Australia	527	(2.3)	Macao-China	525	(1.3)	Liechtenstein	510	(3.9)
Netherlands	525	(2.7)	Liechtenstein	525	(4.2)	Poland	508	(2.8)
Liechtenstein	522	(4.1)	Japan	523	(3.3)	Sweden	507	(3.4)
OECD average	500	(0.5)	OECD average	498	(0.5)	OECD average	492	(0.6)

Change from PISA2000+, 2003 to 2006

Table 5.2.1 Mean Scores Comparisons in Science, Mathematics and Reading from PISA2000+, 2003 to 2006

	Science		Mathematics		Reading	
Year	**Mean**	**S.E.**	**Mean**	**S.E.**	**Mean**	**S.E.**
2000+	(541)	3.0	(560)	3.3	**525**	**2.9**
2003	(539)	4.3	**550**	**4.5**	**510**	**3.7**
2006	542	2.5	**547**	**2.7**	**536****	**2.4**

** Reading Performance Improved substantially in 2006 indicate significant differences between performance in 2006 vs 2003 and 2000+

Change In Reading

Table 5.2.2 Percentile comparison of reading in 2000+, 2003 and 2006

	2000+		2003		2006		2006-2000	2006-2003
Percentile	Mean	SE	Mean	SE	Mean	SE	Difference	Difference
5th	369	8.9	355	9.8	390	6	**21**	**35**
10th	413	7.2	396	7	426	5.7	13	**30**
25th	477	3.6	461	5.2	484	3.8	7	**23**
50th	534	2.7	519	3.4	543	2.6	9	**24**
75th	584	2.8	569	2.7	594	2.4	10	**25**
90th	624	3.1	608	2.8	636	2.7	**12**	**28**
95th	646	4.1	630	3	660	2.5	**14**	**30**
Average	525	2.9	510	3.7	536	2.4	**11**	**26**

*** Difference that at statistically significant at 95 percent confidence level are indicated in bold**

Proficiency Levels in Science

Table 5.4.1 Summary Descriptions for Six Levels of Overall Scientific Literacy

Level	Scores[1]	(OECD average % of students able to perform tasks at each level or above)
6	above 707.93	1.3%
5	633.33 to 707.93	9.0%
4	558.73 to 633.33	29.3%
3	484.14 to 558.73	56.7%
2	409.54 to 484.14	80.8%
1	334.94 to 409.54	94.8%

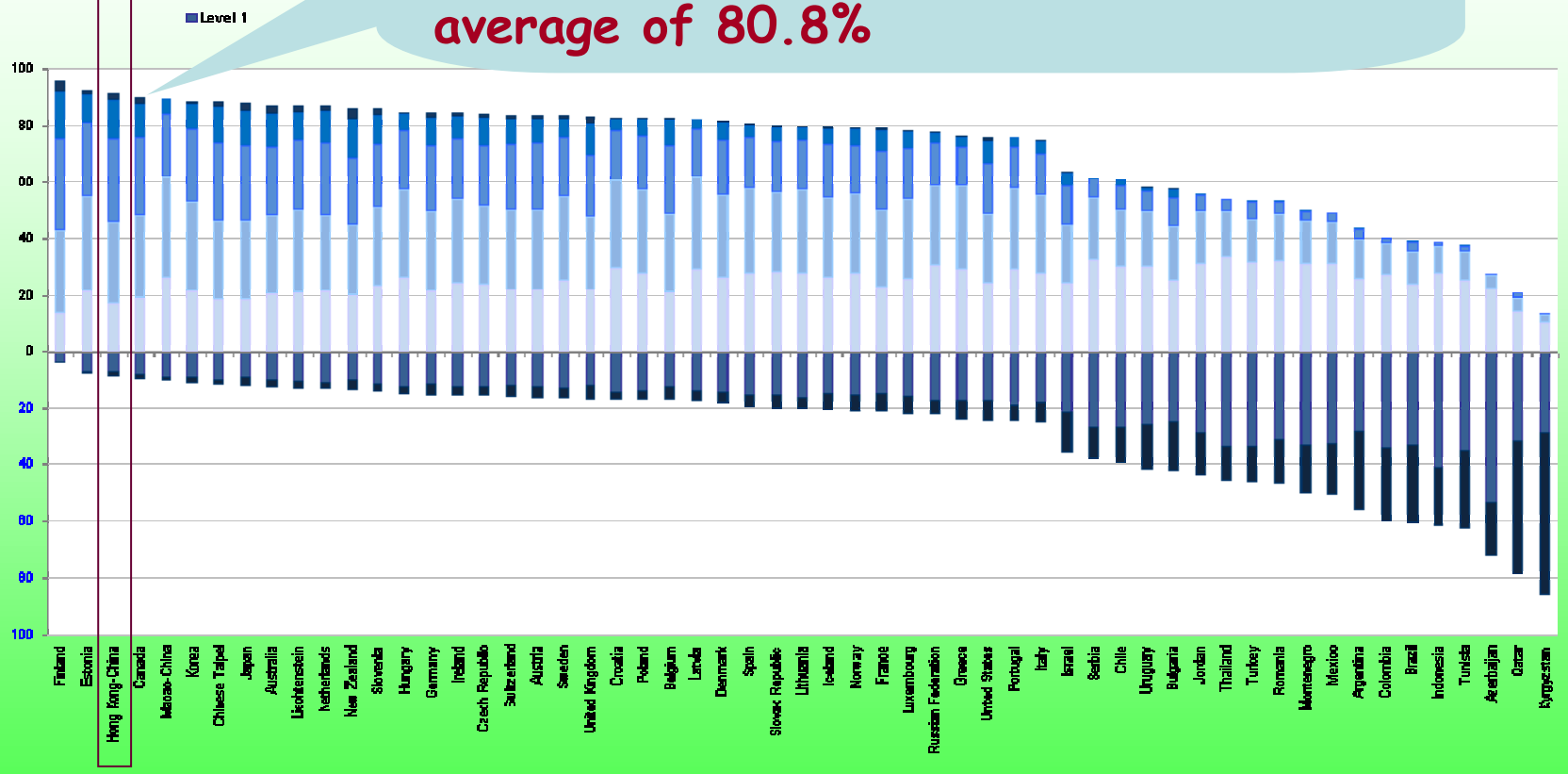
At Level 6, students can consistently identify, explain and apply scientific knowledge and knowledge about science in a variety of complex life situations.

Level 2 is the baseline level, at which students begin to demonstrate the science competencies that will enable them to participate actively in life situation related to science and technology

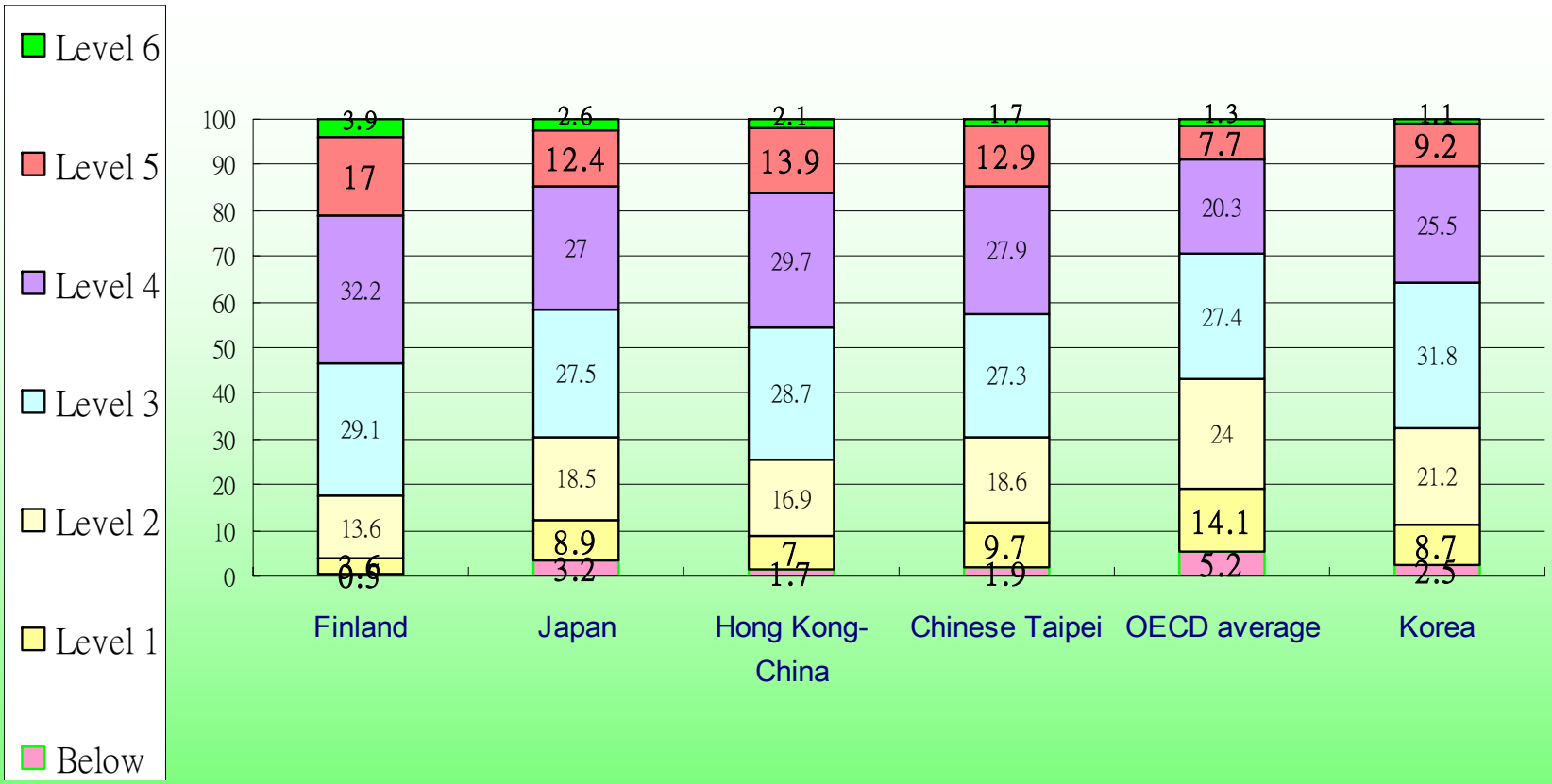
At Level 1, students have such a limited scientific knowledge that it can only be applied to a few, familiar situations. They can present scientific explanations that are obvious and follow explicitly from given evidence.

Science Proficiency Level in PISA2006

Hong Kong has 91.3% student reach the basic competency level (level 2) or above which is higher than the OECD average of 80.8%



Science Proficiency Levels among Asian Societies



Hong Kong has 16% of students reach level 5 or above which is higher than other Asian Societies (Japan 15%; Chinese Taipei, 14.6%; Korea, 10.3%)

Quality and Equality of Hong Kong Secondary School System (PISA 2006)

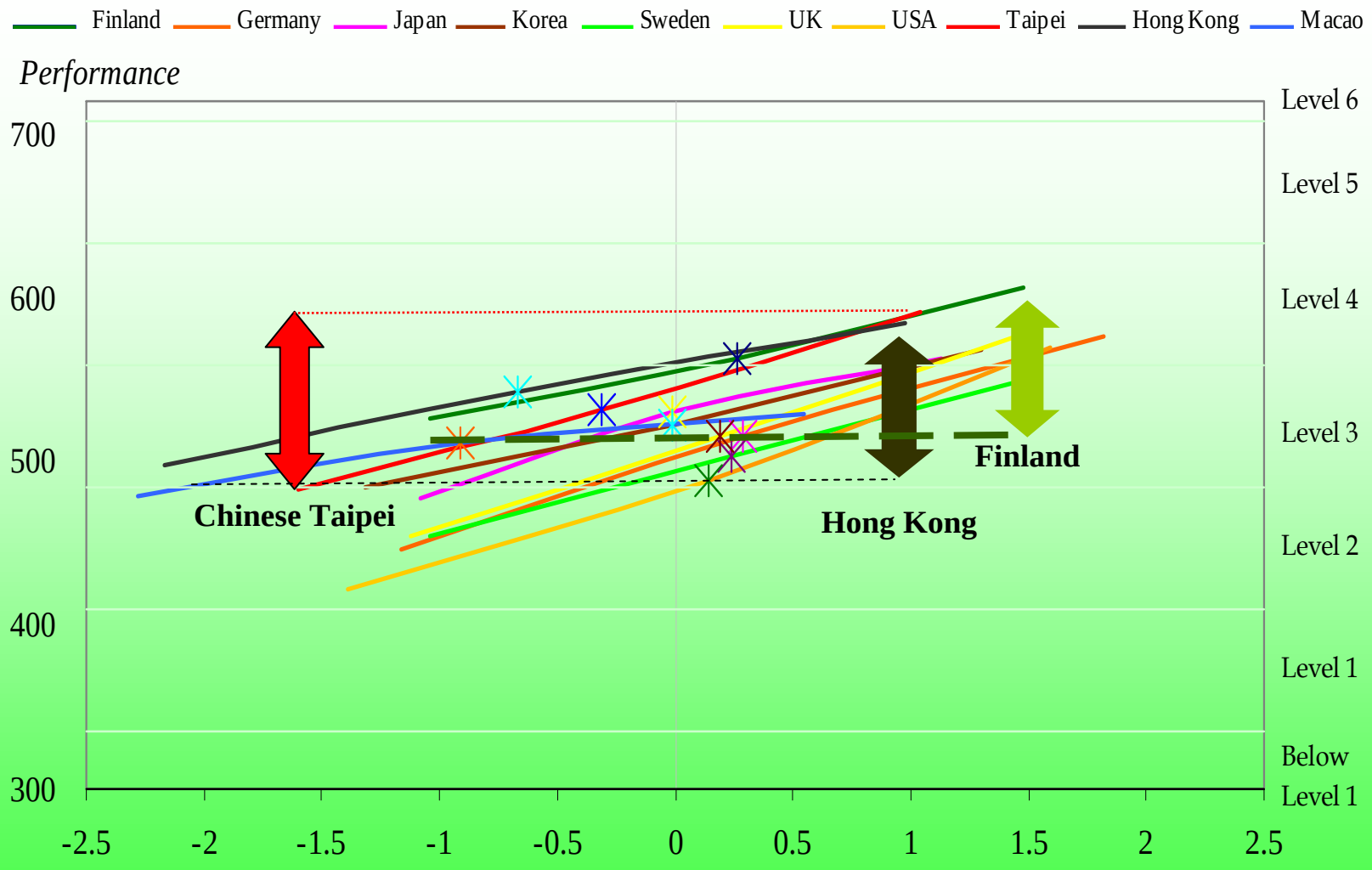


Figure 2. Quality and Equality

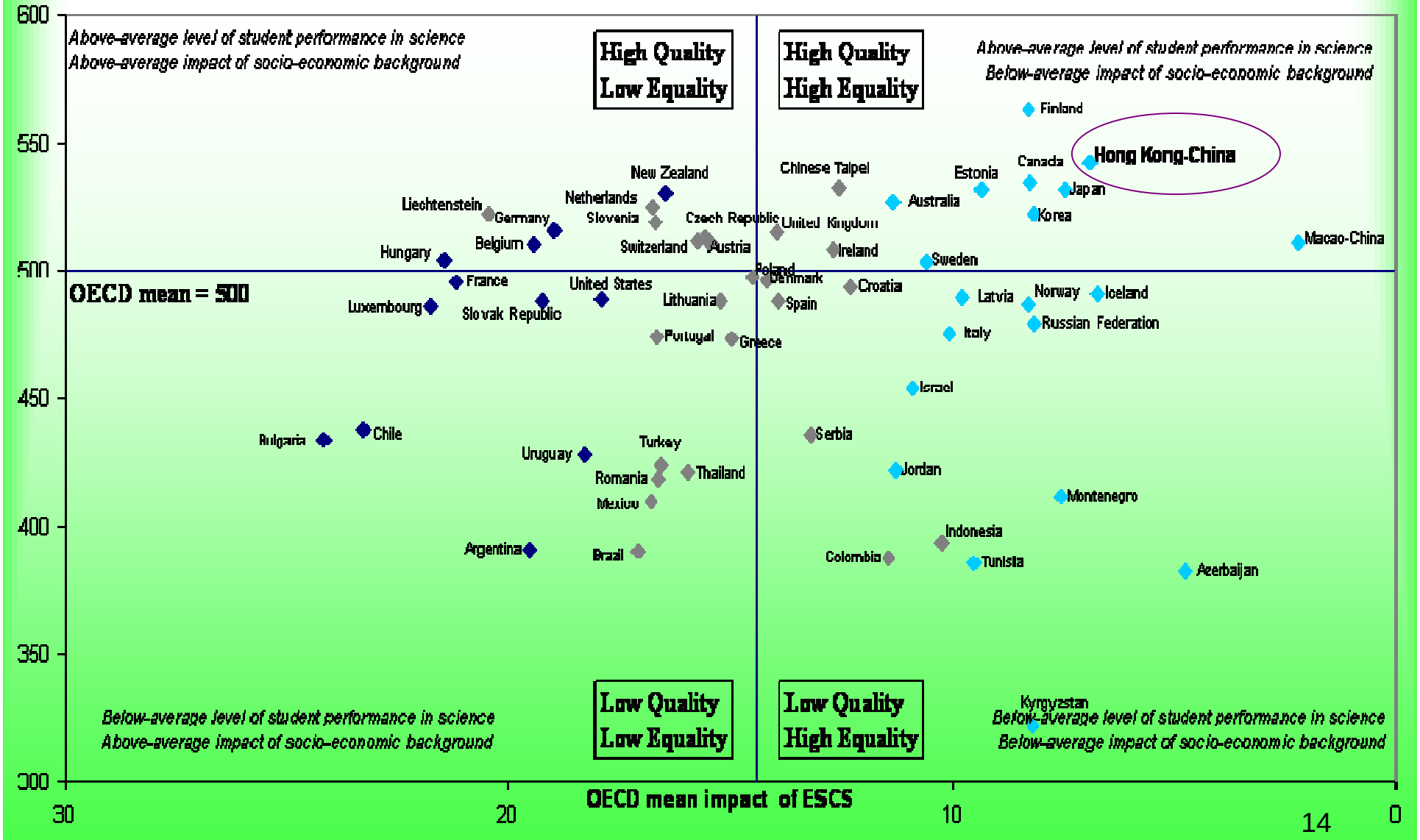
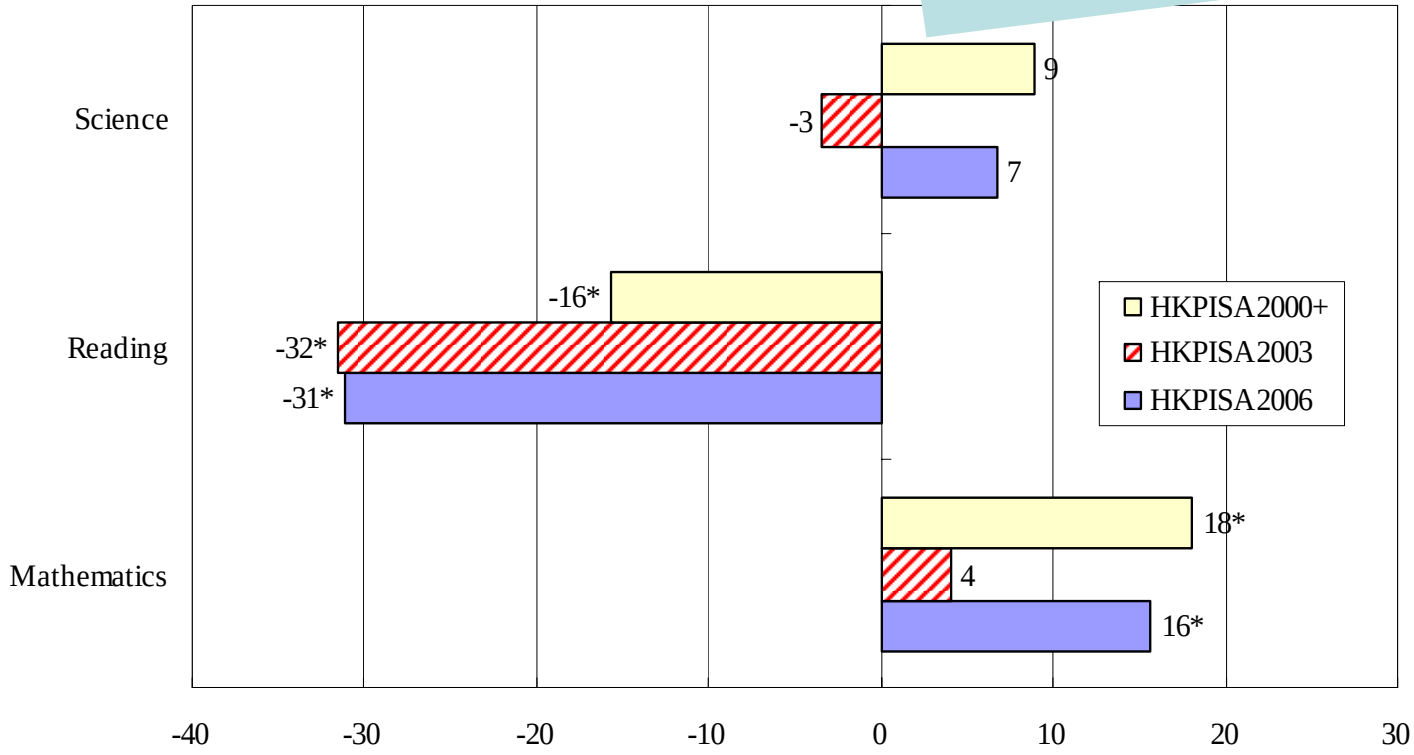


Figure 3. Disparity between Boys and Girls

Significant Gender Difference in Reading and Mathematics



Females Perform Better ←→ Males Perform Better

* Note: Values that are statistically significant are indicated in **bold**

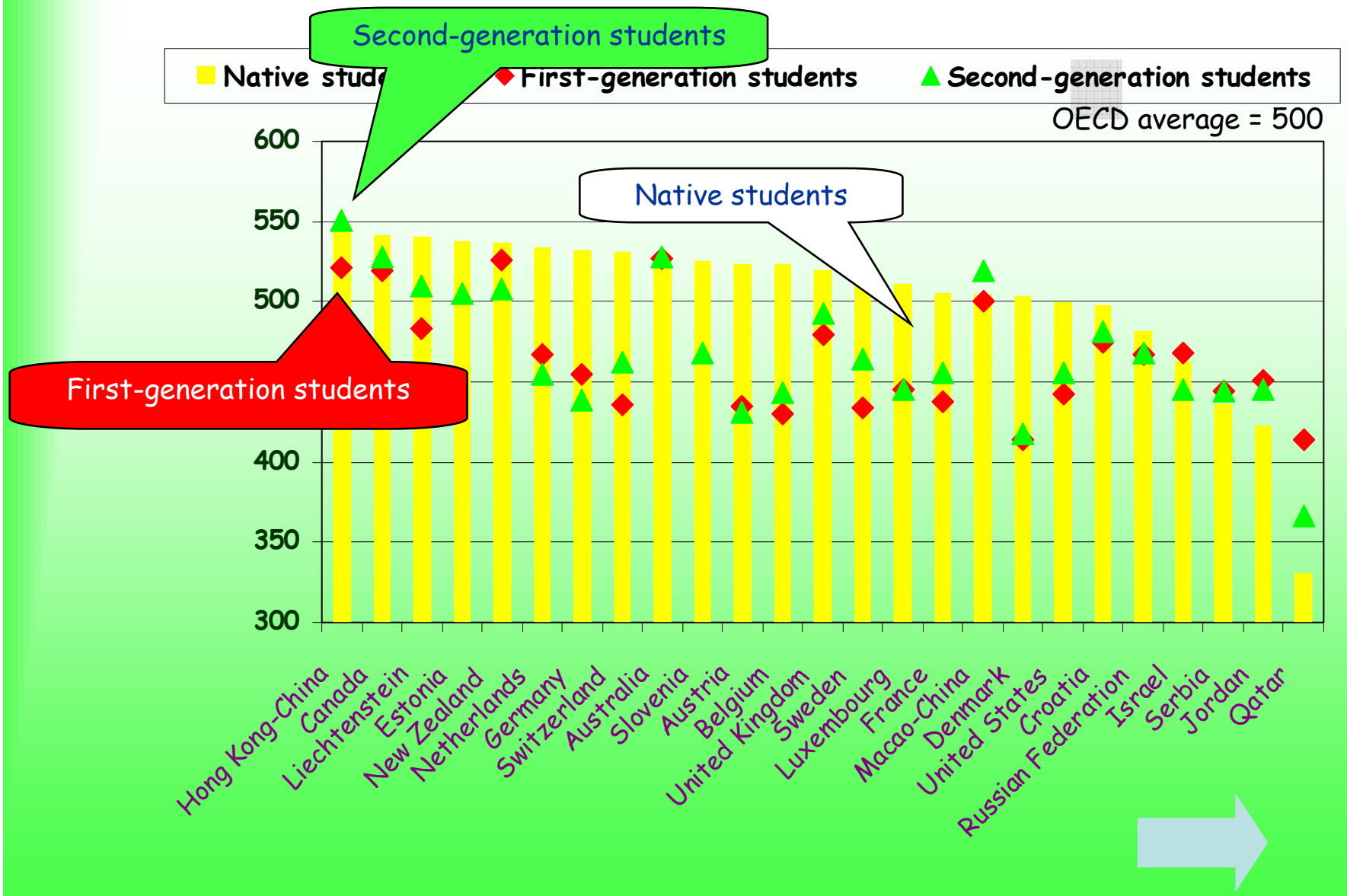
Immigrant Students in Hong Kong

- **Native Students**: Students born in the country/ with at least one parent born in the country (55%)

- **Second Generation**: Students born in the country with foreign-born parents (24.4%)

- **First Generation (foreign born)**: Students born outside of the country with foreign-born parents (18.7%)

Immigrants and Science Performance



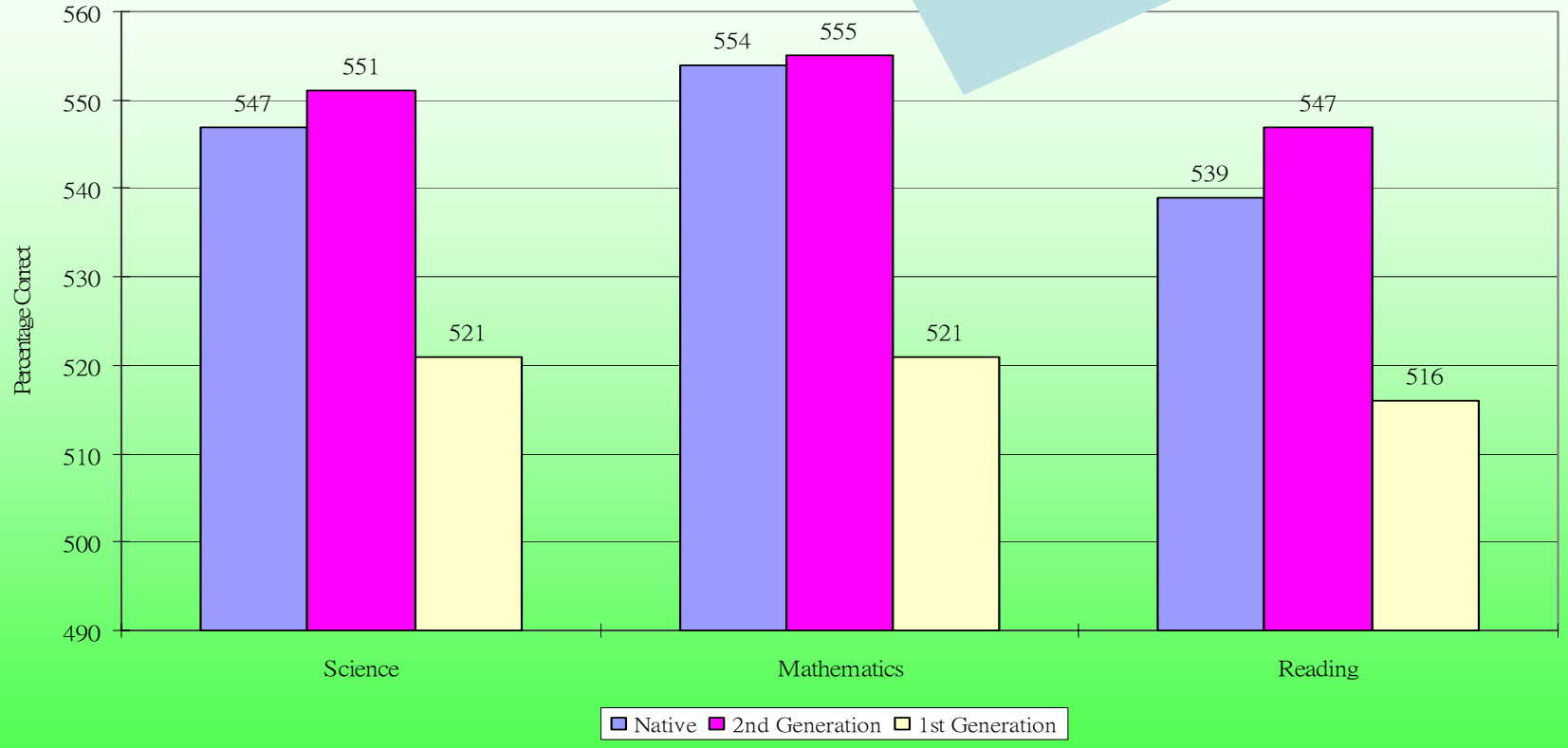
PISA 2006: Science Competencies for Tomorrow's World, Figure 4.2a.

Disparity between immigrants and local students (Hong Kong vs OECD)

	Native		Second Generation		First Generation	
Hong Kong	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Science	**547**	**3.0**	**551**	**3.6**	**521**	**4.9**
Mathematics	**554**	**3.1**	**555**	**3.9**	**521**	**4.8**
Reading	**539**	**2.8**	**547**	**3.2**	**516**	**4.5**
OECD average	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Science	**506**	**0.5**	**466**	**2.2**	453	2.1
Mathematics	**503**	**0.5**	**473**	**2.1**	457	1.9
Reading	**498**	**0.6**	**457**	**3.2**	448	2.3

Figure 4. Performance of Students by Immigrant Status

First generation students perform significantly lower than the second generation and native students in all the three domains)



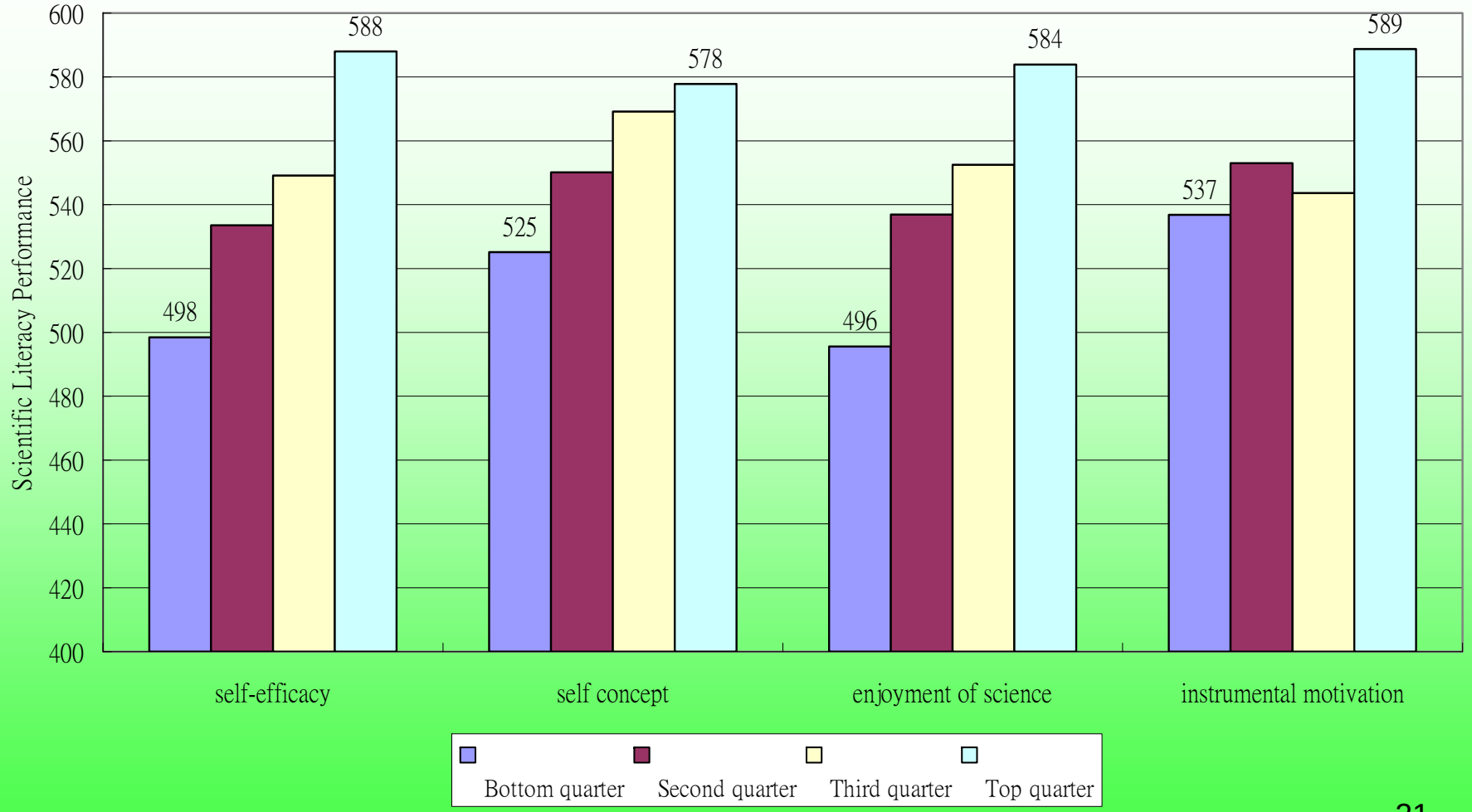
Student Attitudinal Factors I

Table 6.1 Summary Descriptions of Students' Belief and Motivation in Science

Self-belief and Motivation

Index	Description	Sample Statement
Self-Efficacy	Students' belief of their own ability to handle learning situations effectively and to overcome difficulties in science.	*"I could easily describe the role of antibiotics in the treatment of disease."*
Self-Concept	Students' belief of their scientific competence.	*"I can easily understand new ideas in science."*
Enjoyment of Science	Students' interest in science as a subject and enjoyment in learning.	*"I am happy doing science problems."*
Instrumental Motivation	Students' courage to learn science by external rewards like good job prospects.	*"I study science because I know it is useful for me."*

Figure 5. Self-belief and Motivation & Science Performance

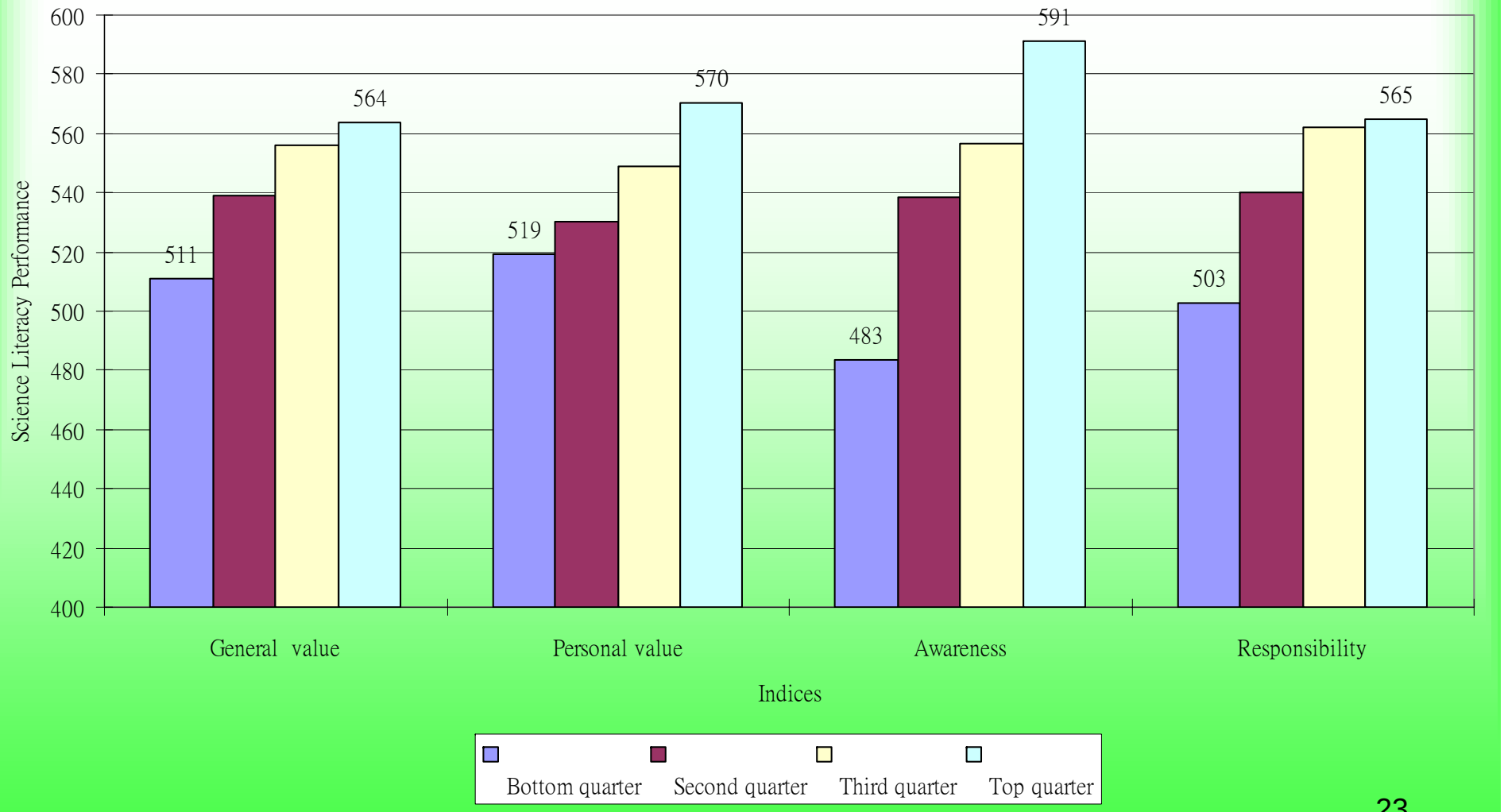


Student Attitudinal Factors II

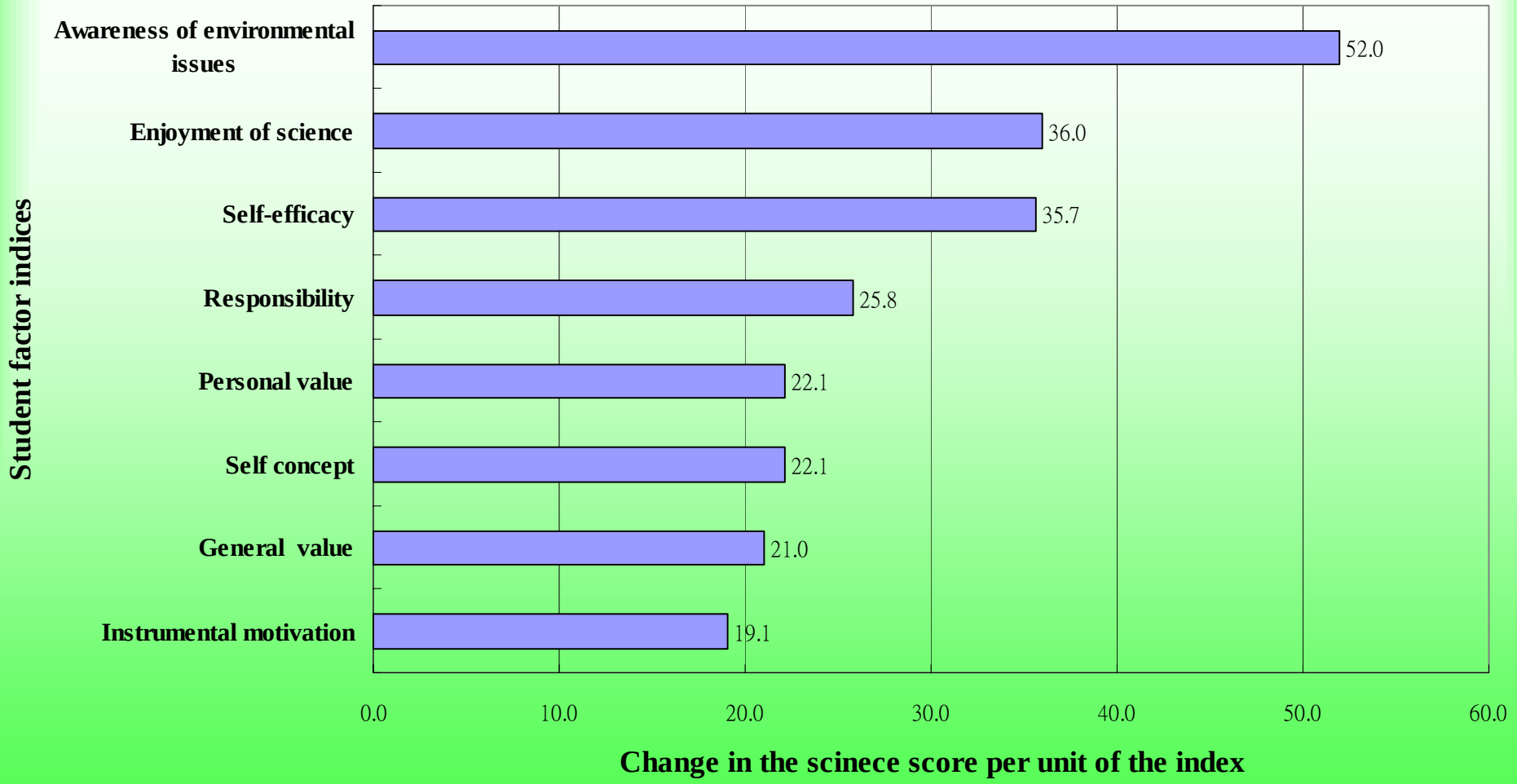
Table 6.2 Descriptions of Students' ***Value of Science and Engagement in Environmental Issues***

Index	Description	Sample Statement
General Value	Students' general views on various issues relating to science.	*"I agree that advances in science and technology usually improve people's living conditions".*
Personal Value	Students' personal views on various issues relating to science.	*"I will use science in many ways when I am an adult."*
Environmental Awareness	Students' awareness of environmental issues.	*"I know something about nuclear waste and could explain the general issue."*
Responsibility for sustainable development	Students' responsibility for sustainable development.	*"I agree that it is important to carry out regular checks on the emissions from cars as a condition of their use.*

Figure 6. Value of Science and Concern on Environmental Issues



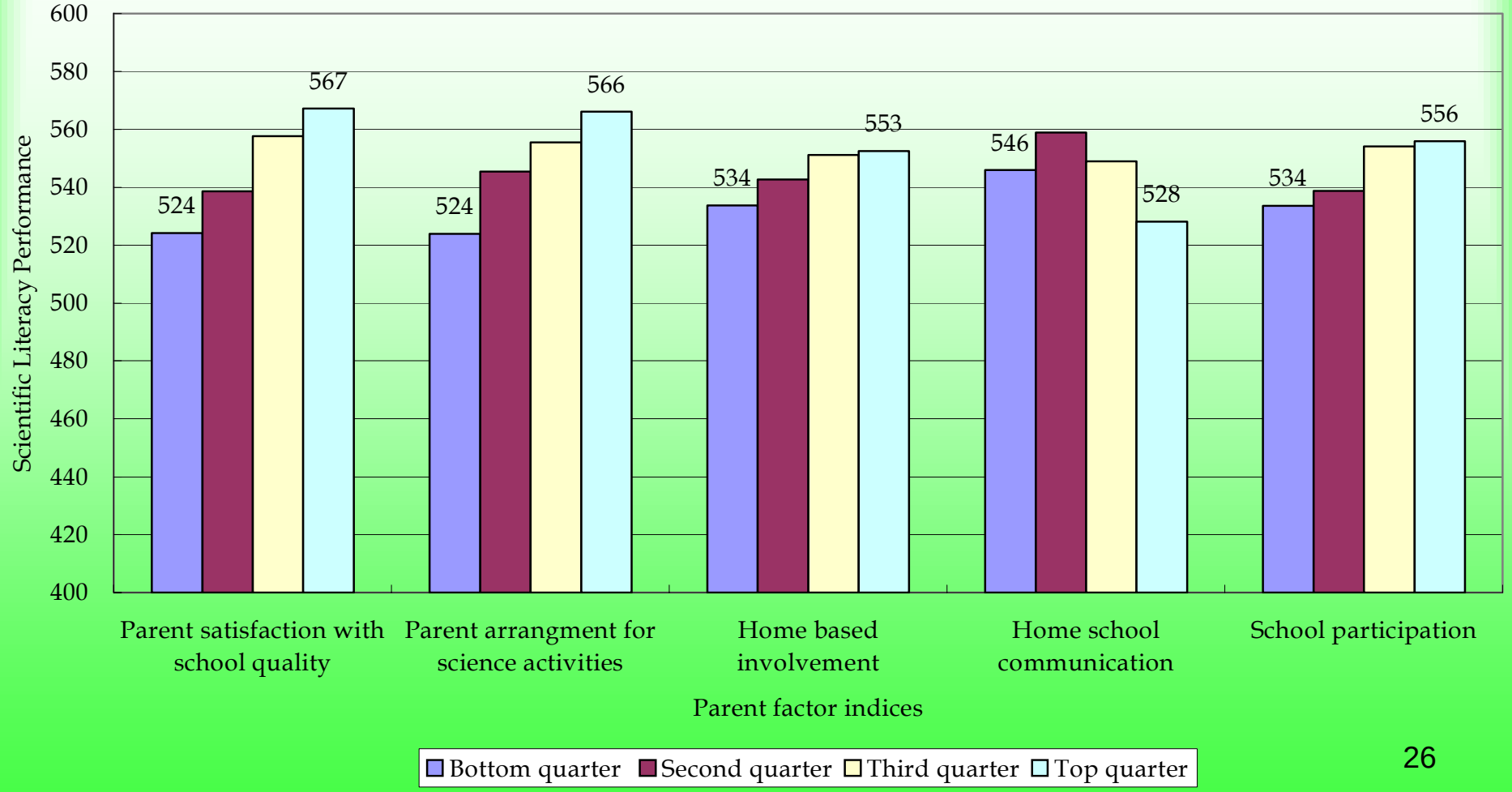
Relative Effect of Student Factors



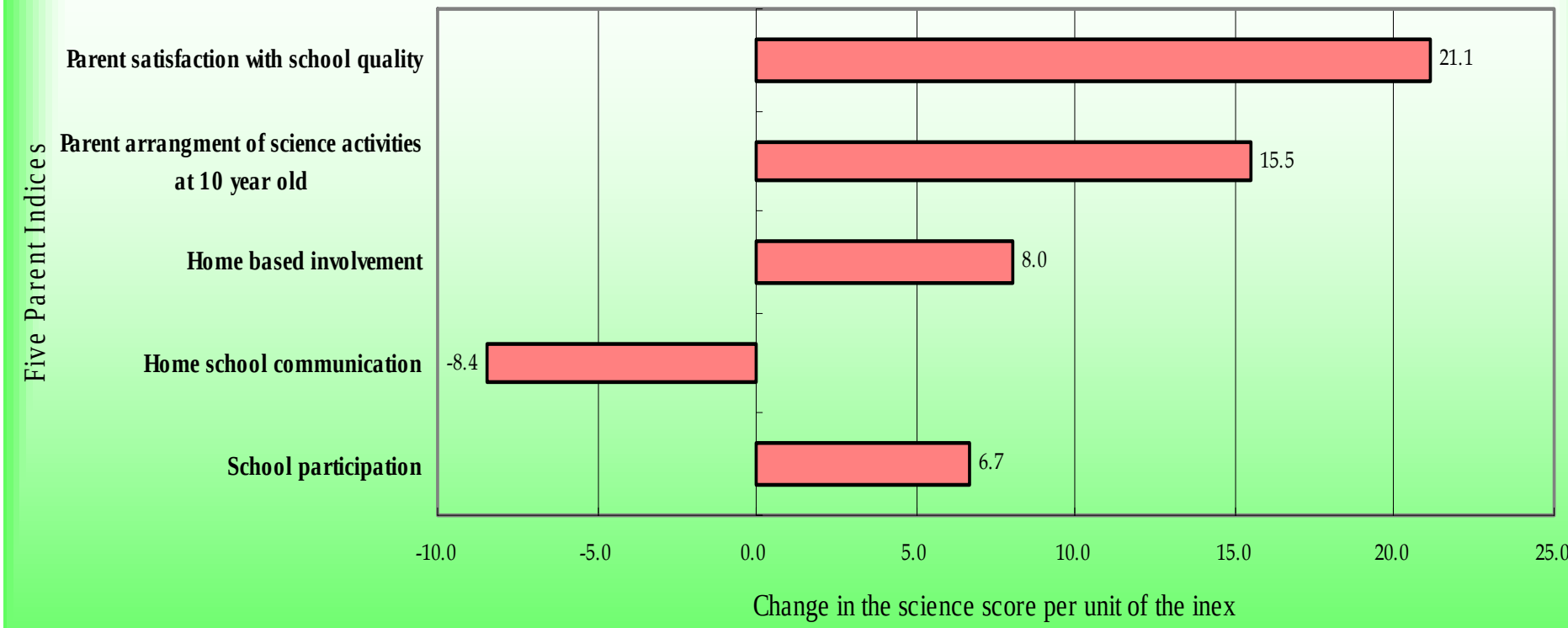
Parent Factors

Indices	Description	Sample Statement
Parent satisfaction	Parents' perceptions of the quality of school learning	*"I am satisfied with the disciplinary in my child's school."*
Parent arrangement of science activities	Students' activities related to science at age 10	*"Thinking back to when your child was about 10 years old, how often would your child have done these things? Watched TV programmes about science"*
Home-based involvement	Six items measuring parent participation in discussing school life with their children and supporting their school work at home.	*"I discuss current affairs with your child."*
Home-school communication	Three items measuring parent keeping contact with school teachers on a regular base.	*"I keep contact with school and teachers."*
School Participation	Four items measuring parent participation in school activities or volunteering	*"I participate in volunteering work (such as tutoring in homework supervision) in school"*

Figure 7. Parent Factors and Science Performance



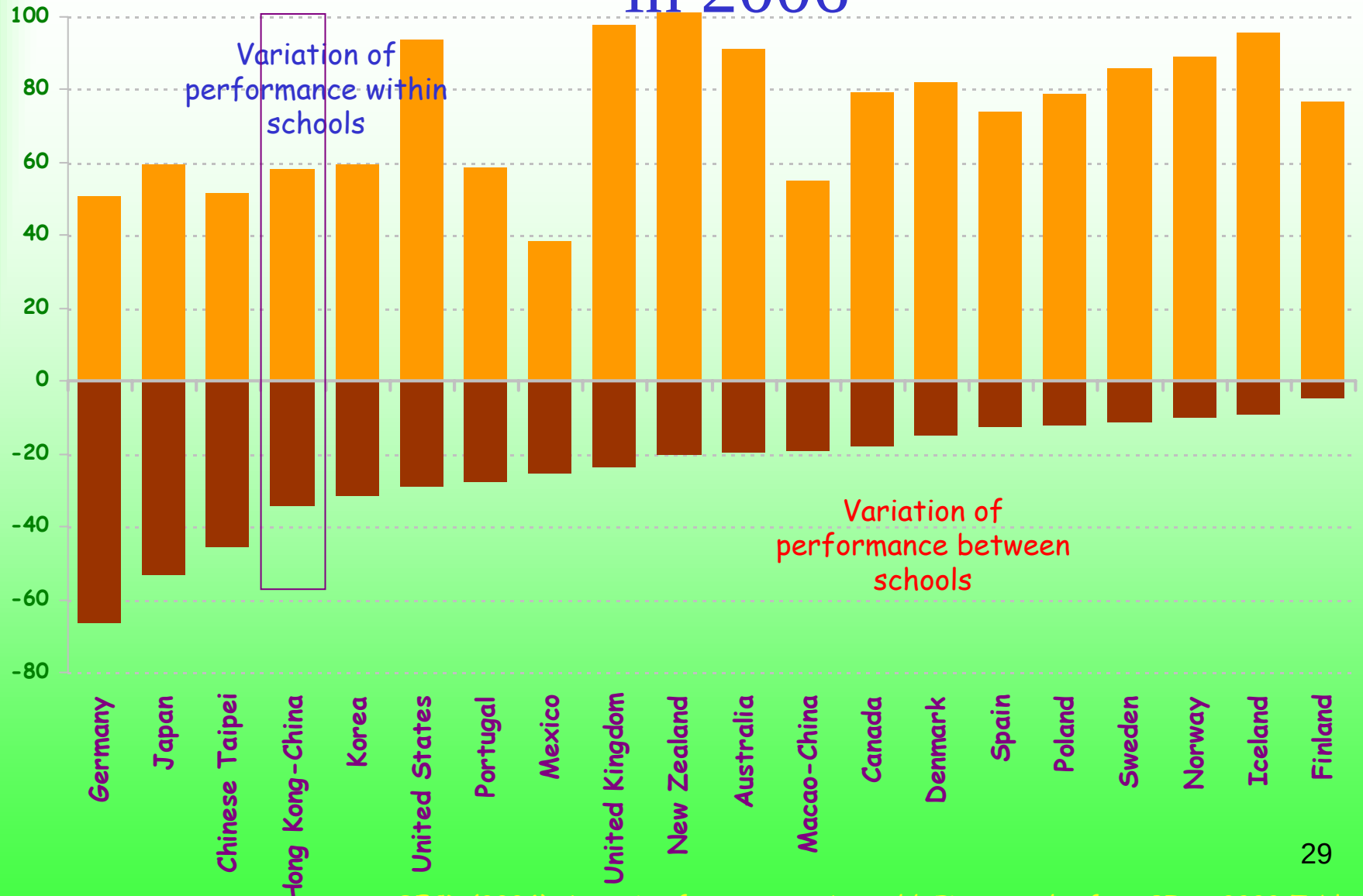
Relative Effect of Parent Factors



Policy Concern

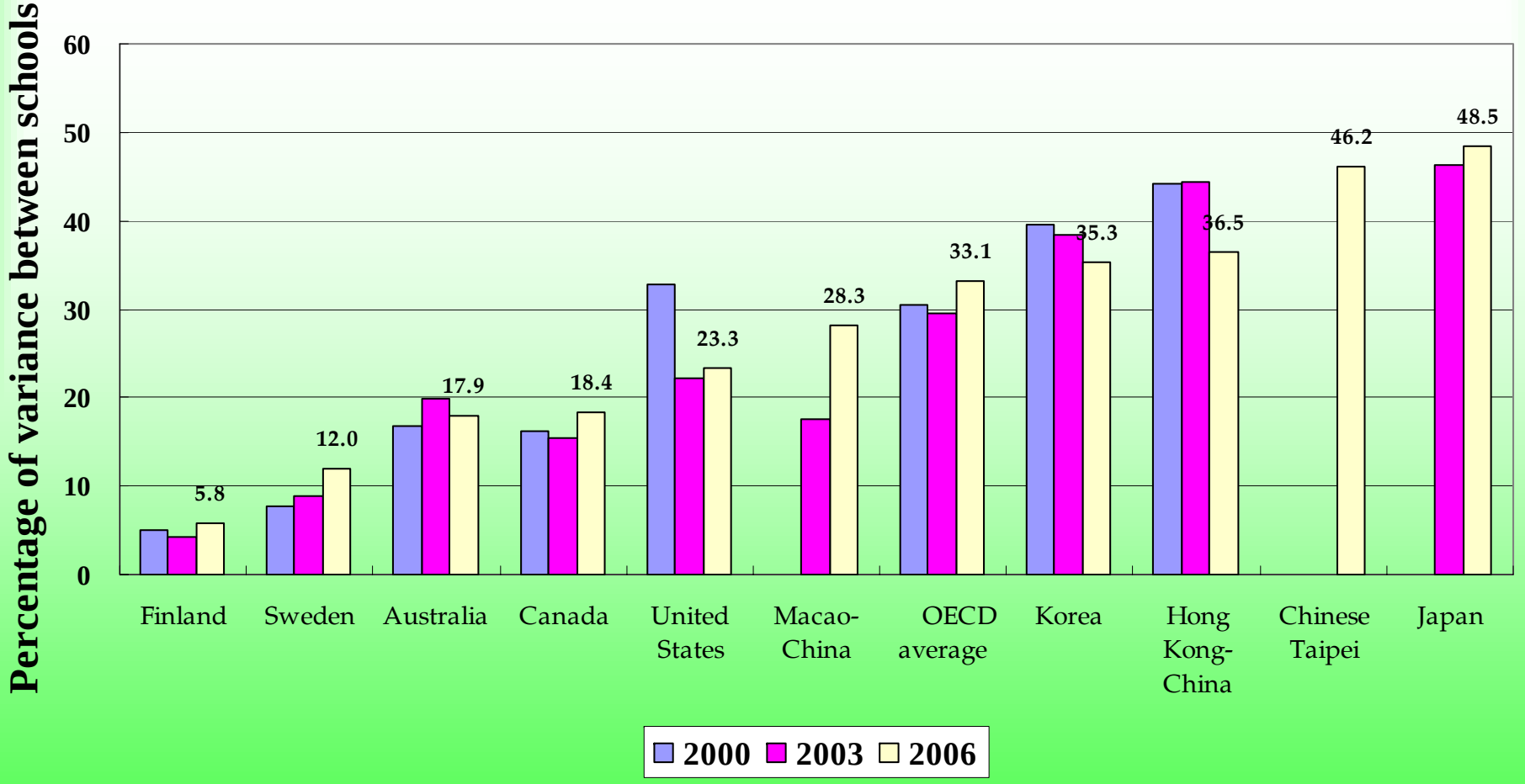
- School Academic Segregation
- Educational Expenditure
- Medium of Instruction

Variation in student performance in Science in 2006



OECD (2004), *Learning for tomorrow's world: First results from PISA 2003*, Table 4.1a

Figure 8. School Academic Segregation over Three Cycles

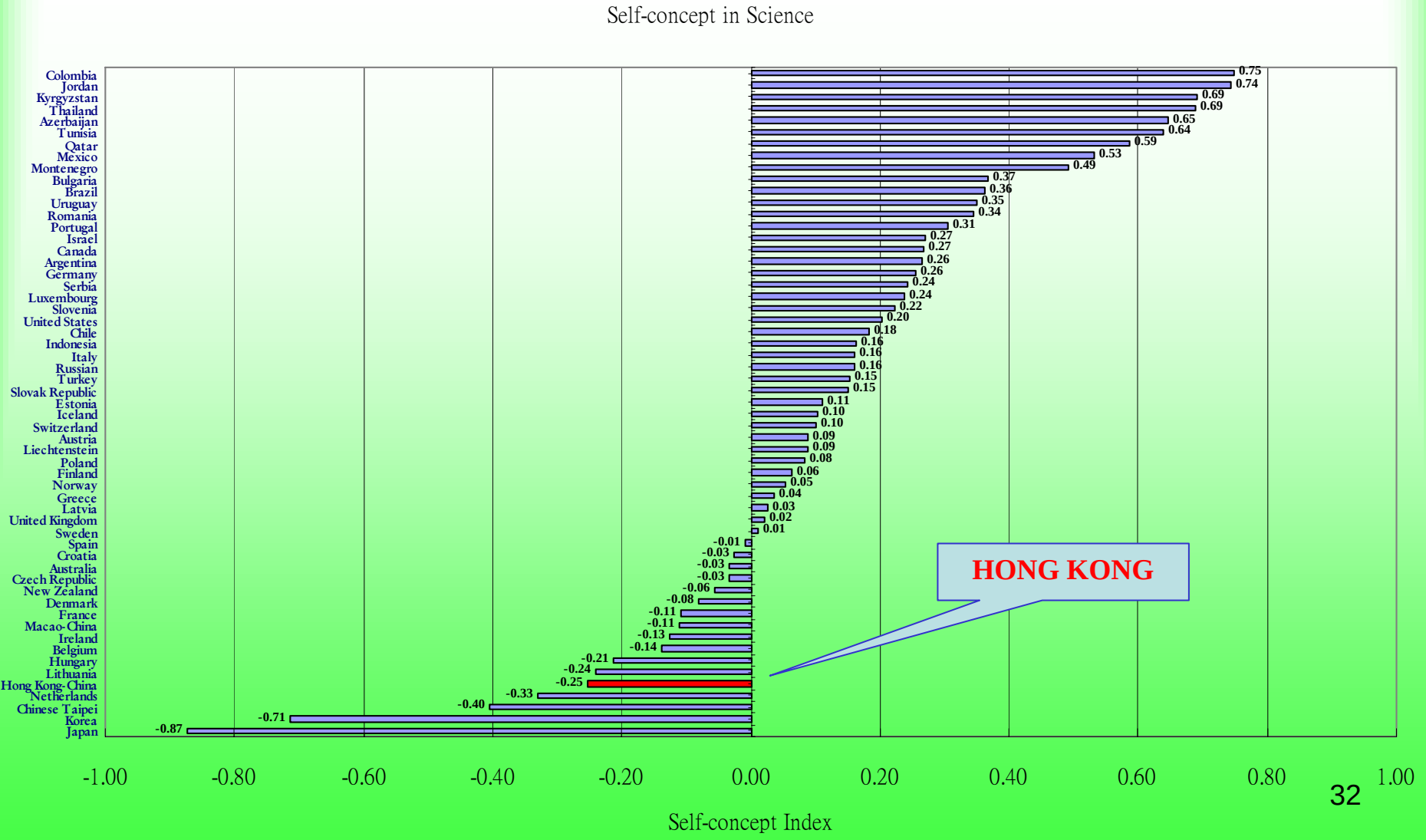


Possible explanation - between school variance

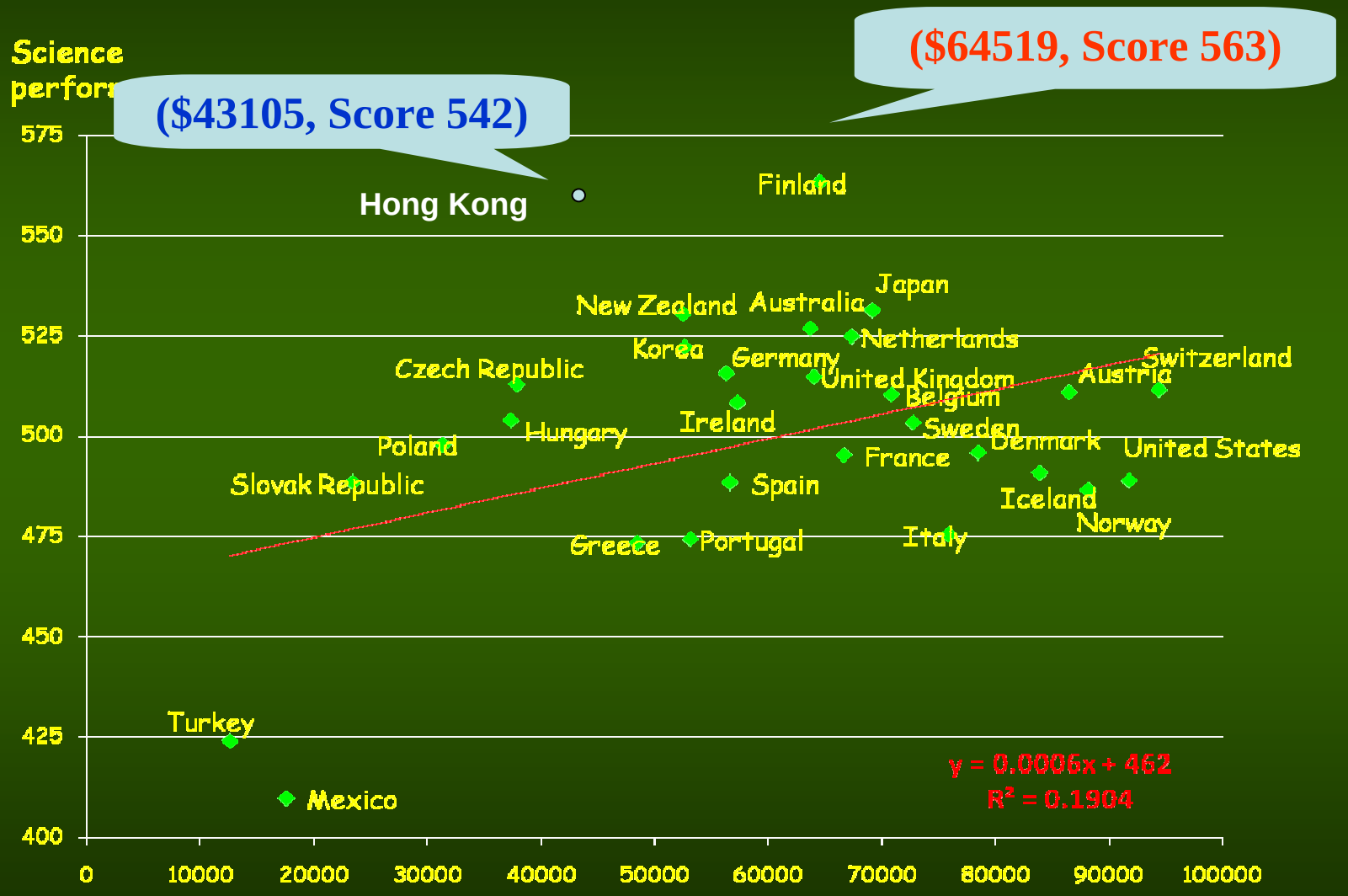
- Difference in student academic intake:

  Evidence : between school variance in AAI= [129/(129+76)]= 63%
- Both student AAI and school mean AAI have significant associations with Science performance
- AAI at the two level explained 89.8% of the between school variance.
- School Intake have the strongest impact on the variation of science performance between schools.

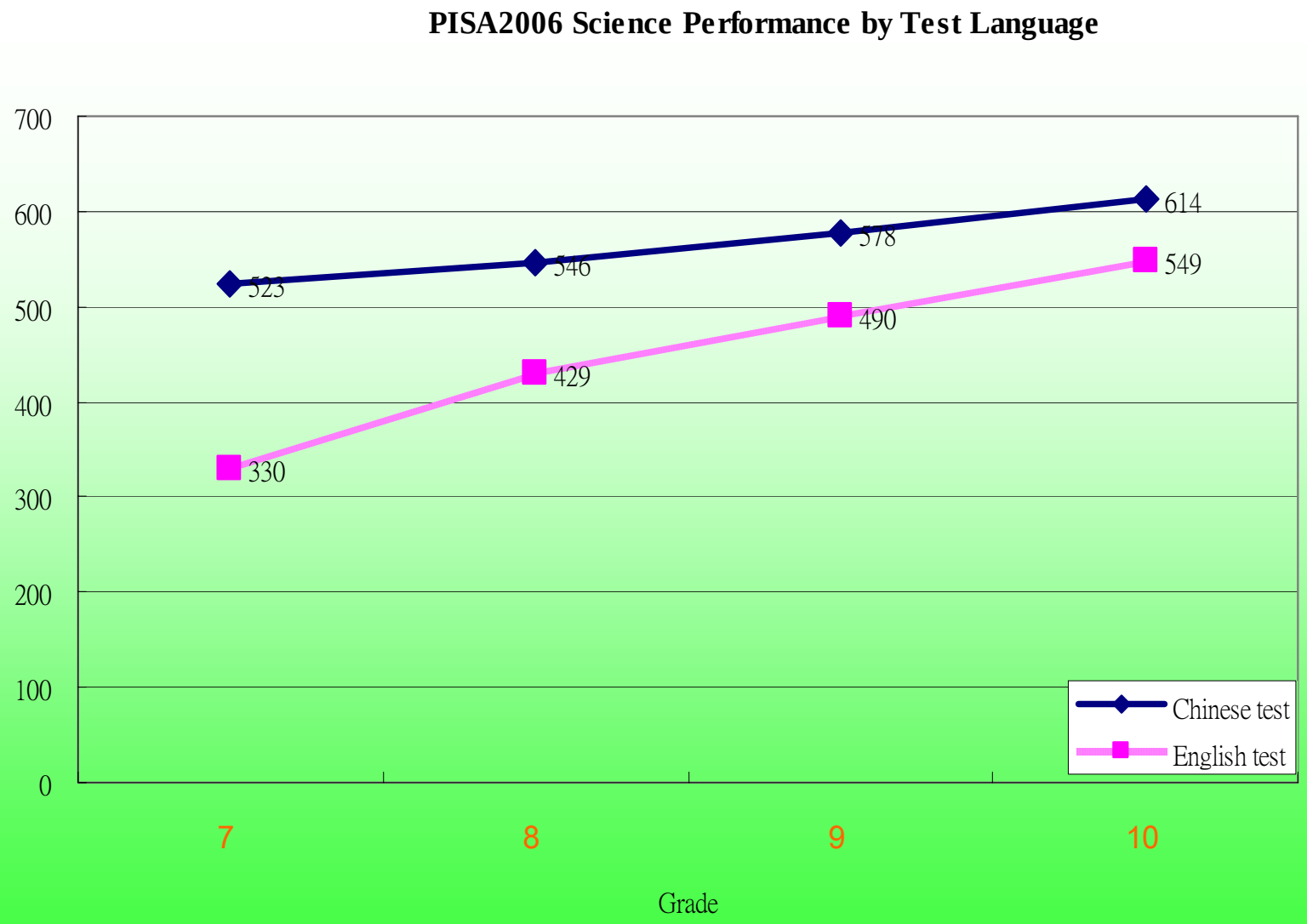
Possible Impact-
Self-concept in Science



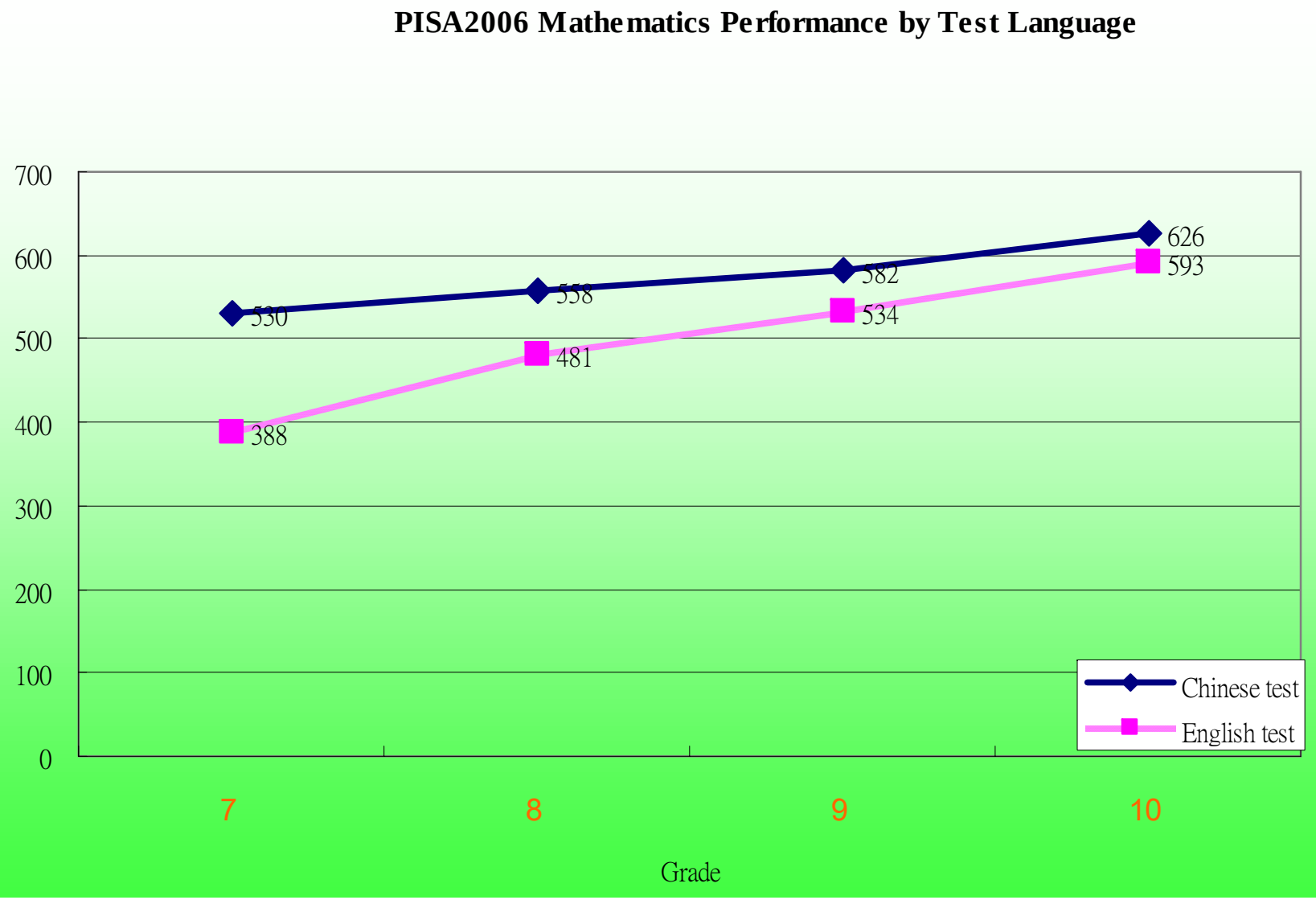
Education Expenditure – Creation of Human Capital



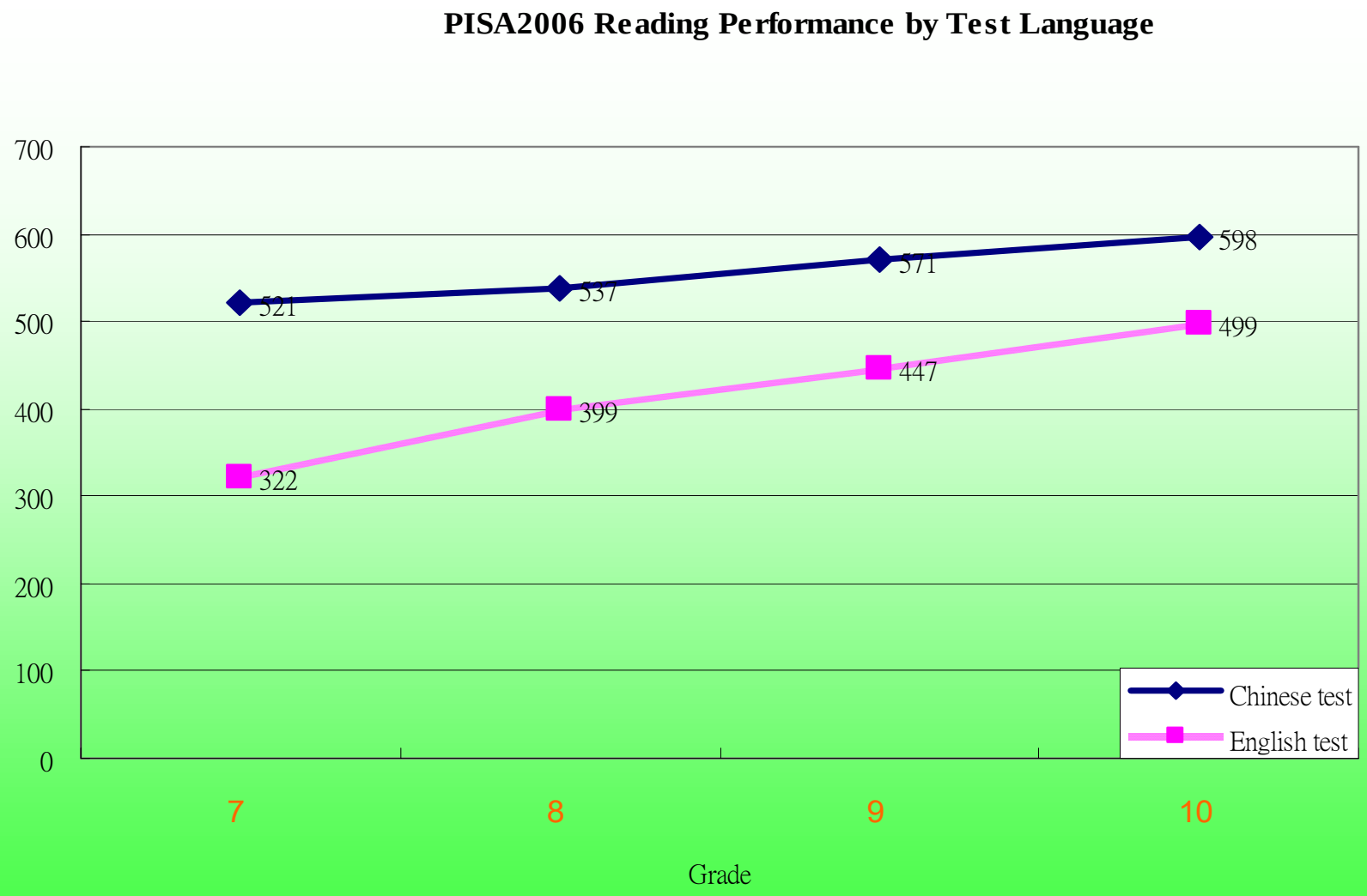
Science Performance by Test Language (34 EMI schools)



Math Performance by Test Language (34 EMI schools)



Reading Performance by Test Language (34 EMI schools)

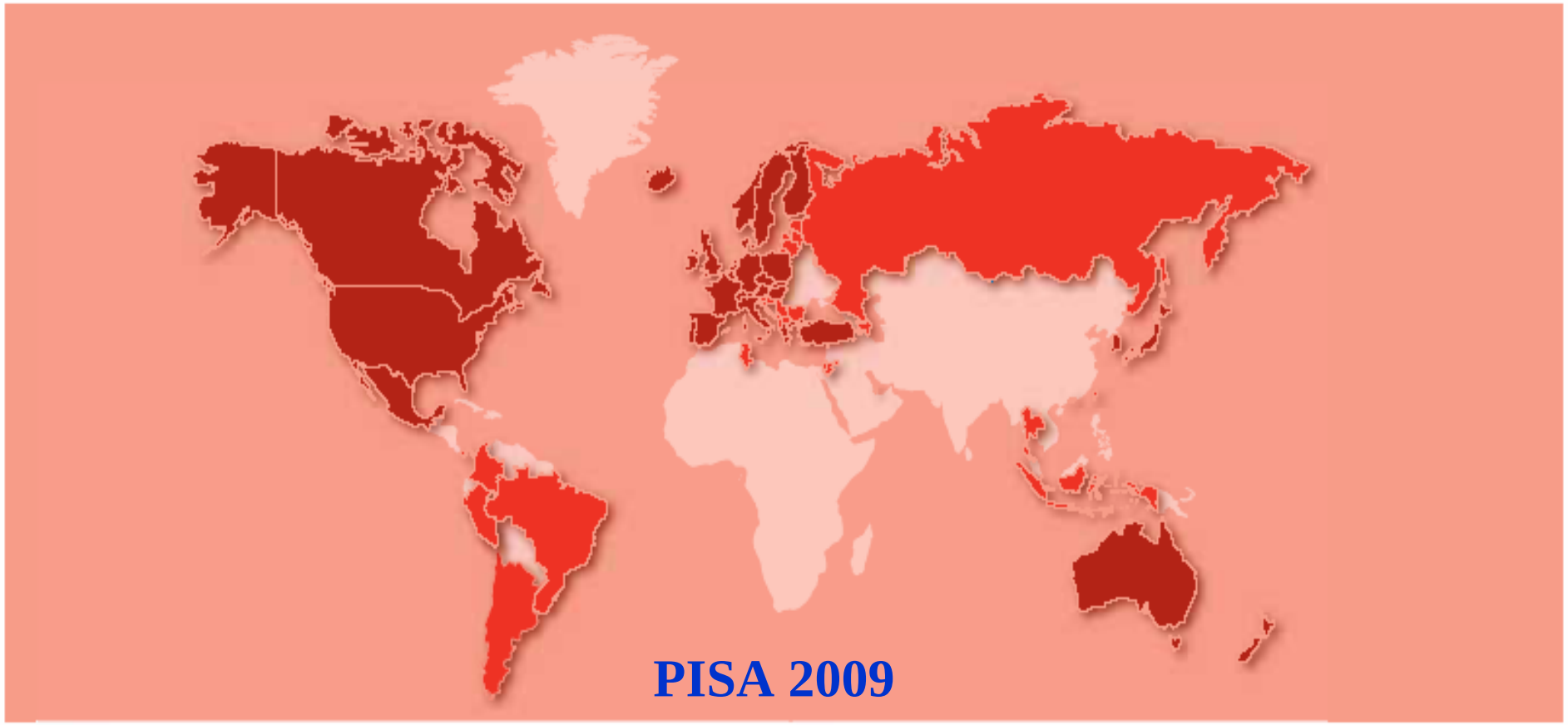


Comparison for 34 EMI schools

PISA2006 - Test Lanuguage comparision for 34 schools		
Domains	Chinese test > English test	No Sign Difference
Science	31/34 schools	3/34 schools
Reading	29/34 schools	5/34 schools
Math	14/34 schools	20/34 schools

Conclusion

- Quality: Consistent High Achievement but
  Low Self-concept towards learning
- Equality
  - Class (Gentle Social Gradient)
  - Gender (Boys disadvantage in Reading,
    Girls disadvantage in Math),
  - Immigrant students (Disadvantage of first generation)
- Factors related to performance:
  - Student self-belief. motivation, value of science and engagement in environmental issues
  - Parental Involvement at home and in school
- Policy Concern
  - Academic segregation between schools
  - Educational expenditure (Investment for creation of human capital)
  - Achievement gap between the two test languages (Chinese & English)



OECD countries

Australia	Hungary	Norway
Austria	Iceland	Poland
Belgium	Ireland	Portugal
Canada	Italy	Slovak Republic
Czech Republic	Japan	Spain
Denmark	Korea	Sweden
Finland	Luxembourg	Switzerland
France	Mexico	Turkey
Germany	Netherlands	United Kingdom
Greece	New Zealand	United States

PISA partner countries

Albania	*Hong Kong-China*	*Peru*
Argentina	*Indonesia*	*Qatar*
Azerbaijan	*Israel*	*Republic of Montenegro*
Brazil	*Jordan*	*Republic of Serbia*
Bulgaria	*Kyrgyz Republic*	*Romania*
Chile	*Latvia*	*Russian Federation*
China (Shanghai)	*Liechtenstein*	*Singapore*
Chinese Taipei	*Lithuania*	*Slovenia*
Colombia	*Macao-China*	*Thailand*
Croatia	*Macedonia*	*Tunisia*
Estonia	*Panama*	*Uruguay*

Looking forward…

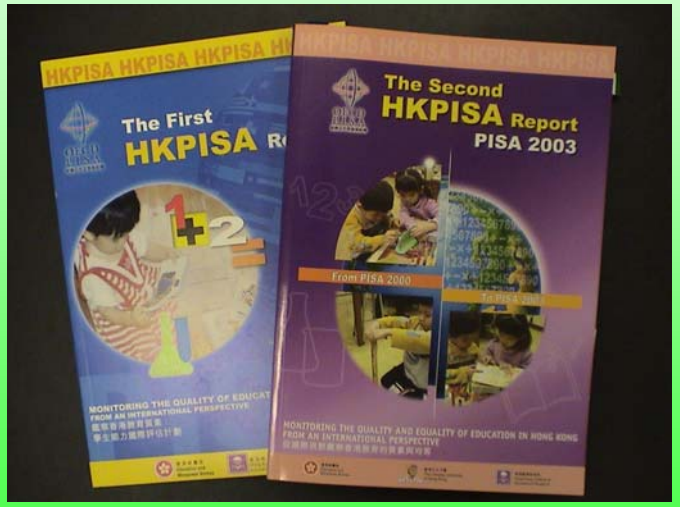
- **Future PISA assessments**

  Fourth Cycle - PISA2009: Reading + Electronic version , Mathematics, Science
- Future international collaboration

  OECD, Mainland China, Macao & Asian Societies

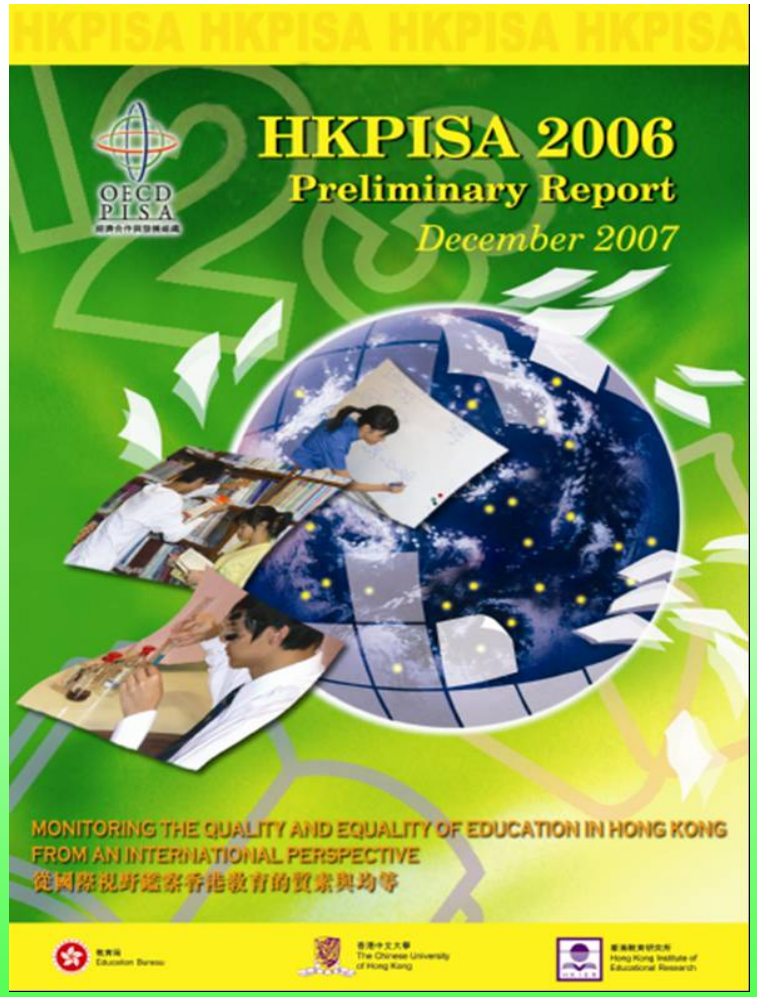
  Norway for Regional and International Conference
- Future local collaboration

  Workshops and Seminars for Teachers and Researchers



Acknowledgement

- The success of HKPISA 2006 is the result of joint effort and support from school principals, teachers (in particular, the PISA School Coordinators), students and their parents, and Education Bureau of the HKSAR Government.
- Our deepest gratitude to the schools participated in HKPISA 2006!



HKPISA

Thank you !

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Visit the websites:
OECD-PISA : www.pisa.oecd.org
HK-PISA: www.fed.cuhk.edu.hk/~hkpisa

PISA 2006

Disadvantage of First-Generation Immigrant Students in Hong Kong

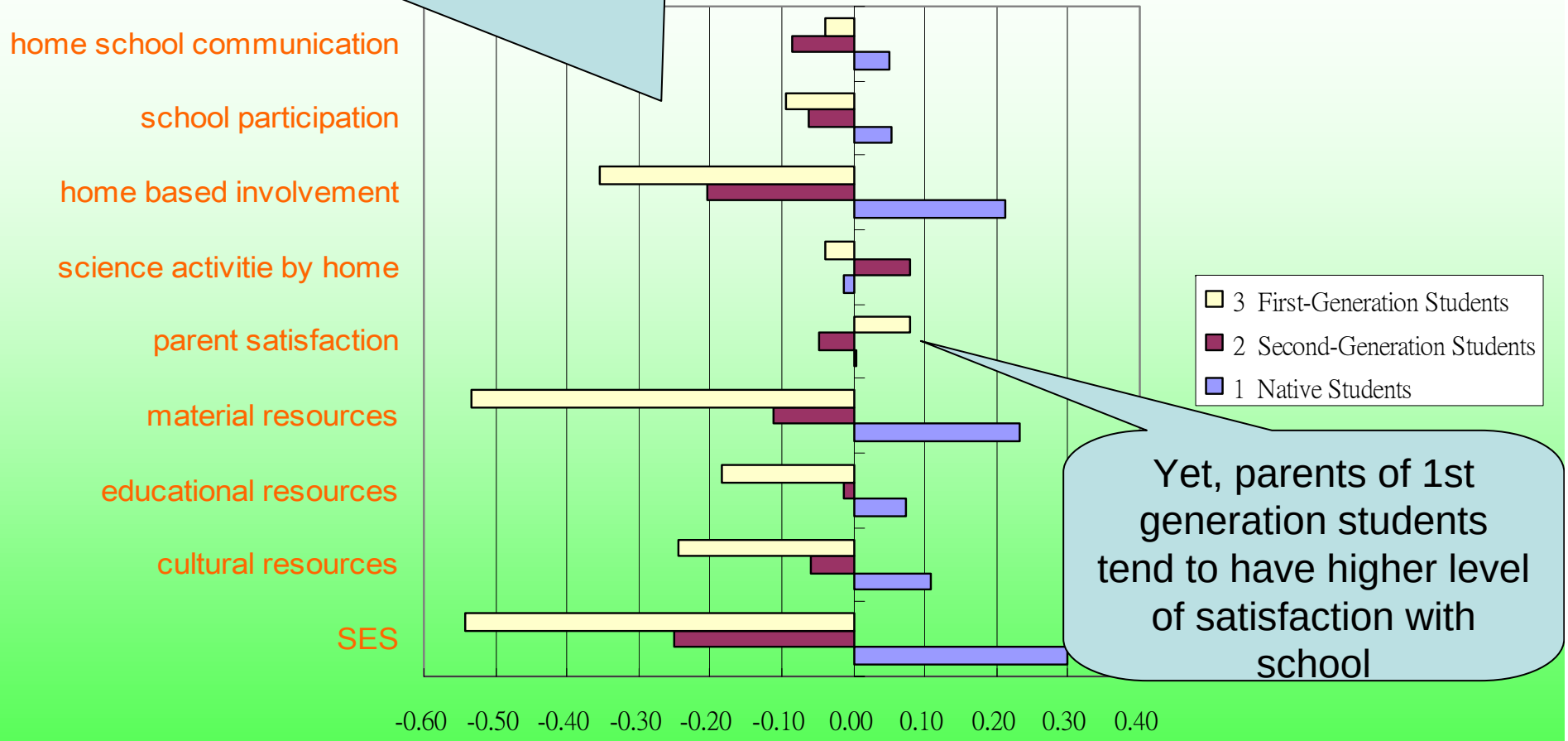
Percentage of Immigrant students by Grade

Grade		Native Students	Second-Generation Students	First-Generation Students
7	Number of student	14	3	89
	% within Grade	13%	3%	84%
8		93	41	281
		22%	10%	68%
9		552	253	319
		49%	23%	28%
10		1933	848	185
		65%	29%	6%
11		3	1	1
		60%	20%	20%
Total		2595	1146	875
		56%	25%	19%

Greater proportion of First-Generation students at lower grade.

Disadvantage of first generation: Parent factors

Non-Native students tend to have less home resources and parental involvement



Yet, parents of 1st generation students tend to have higher level of satisfaction with school

Performance of First Generation by Years arrived HK

The longer the first generation students stayed in HK, the better they perform in science, reading and mathematics