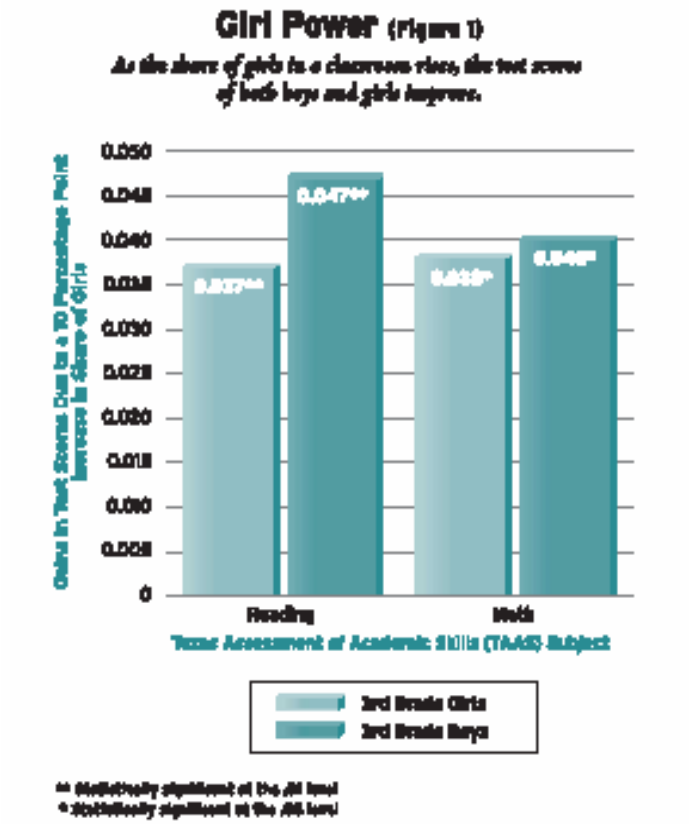
Peer Effects

- Why might peers matter?
  - Changes distribution of teacher time
  - Changes curriculum
  - Is it better to be around higher ability students?
    - Is this effect symmetric or asymmetric?

- Is it better to be around more female students?
  - Is this effect symmetric or asymmetric?

Gains in test scores due to a
10 percent increase in the share
of girls in a cohort.

Where a 0.05 average test score
Is approximately 1/5 of a
standard deviation.

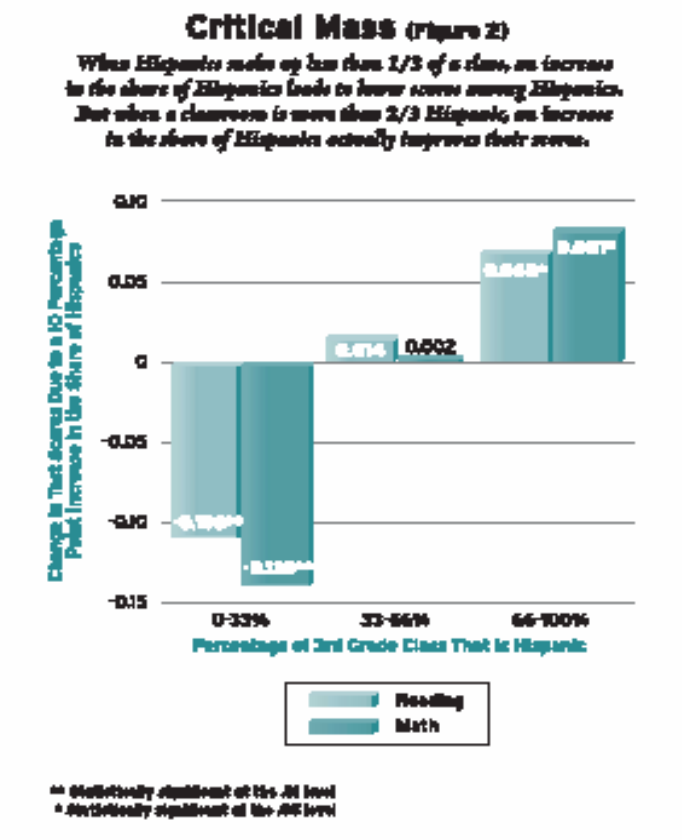


- Is it better to be around more minority students?
  - Is this effect symmetric or asymmetric?

Gains/losses in test scores due to a 10 percent increase in the share of Hispanics in a cohort.

Where a 0.05 average test score Is approximately 1/5 of a standard deviation.

X-axis is percent Hispanic.



Are single-sex classes the right approach?

- One thing we know, is that boys out score girls in math and science in most developed countries.

- Trends in International Mathematics and Science Study
  - Three test years: 1995, 1999, and 2003
  - Focus on 27 OECD countries (66 countries participated)
  - Students in Grade 3/4 and Grade 7/8
  - All models include basic socioeconomic controls

TIMSS Data

- Trends in International Mathematics and Science Study
  - Three test years: 1995, 1999, and 2003
  - We focus on 27 OECD countries (66 countries participated)
  - Students in Grade 3/4 and Grade 7/8
  - All test scores are internationally standardized to mean 50 and standard deviation 10
  - Basic socioeconomic controls

The gender test score gap

- Consider a simple model of the gender test score gap

$$S_{ic} = X_{ic}\gamma + \beta_c F_{ic} + u_{ic}$$

S_{ic} math/science test score of individual *i* in country *c*
F_{ic} female indicator
X_{ic} immigrant status of child and parents, number of people living in the household, child lives with both mother and father, number of books in the home, whether or not there is a computer in the home, whether or not there is a calculator in the home, parental education, grade indicators, and year indicators

- All models are estimated separately by country

Grade 4

	Math	Science		Math	Science
Australia	**-1.9** (0.6)	**-2.1** (0.6)	Italy	**-3.6** (0.9)	**-2.0** (0.9)
Austria	**-4.2** (0.9)	**-4.4** (0.9)	Japan	**-1.2** (0.4)	**-2.2** (0.5)
Belgium - Flemish	**-1.7** (0.7)	**-2.3** (0.7)	Korea	**-4.1** (0.6)	**-4.5** (0.6)
Canada	**-3.0** (0.7)	**-3.0** (0.7)	Netherlands	**-3.1** (0.5)	**-5.0** (0.6)
Czech Republic	**-2.5** (0.7)	**-5.6** (0.7)	New Zealand	-0.2 (0.6)	0.3 (0.6)
England	**-2.4** (0.6)	**-1.3** (0.6)	Norway	**-2.8** (0.5)	**-2.5** (0.6)
Greece	**-2.8** (0.8)	**-4.2** (0.7)	Portugal	**-2.1** (0.7)	**-3.4** (0.7)
Hungary	**-1.1** (0.6)	**-4.1** (0.5)	Scotland	**-2.4** (0.5)	**-3.5** (0.6)
Iceland	**-3.1** (0.8)	**-4.1** (0.9)	United States	**-1.4** (0.4)	**-3.2** (0.5)
Ireland	0.1 (0.7)	**-2.8** (0.7)			

All models are population weighted and heteroskedastic-consistent standard errors are in parentheses. Bold coefficents are significant at the 5 percent level.

Grade 8

	Math	Science		Math	Science
Australia	-0.9	**-5.1**	Ireland	**-5.6**	**-5.6**
	(0.4)	(0.5)		(0.7)	(0.7)
Austria	**-2.8**	**-5.9**	Italy	**-3.0**	**-4.9**
	(0.8)	(0.8)		(0.5)	(0.5)
Belgium - Flemish	-0.3	**-6.6**	Japan	**-1.4**	**-3.5**
	(0.6)	(0.6)		(0.4)	(0.4)
Belgium - French	**-3.0**	**-7.0**	Korea	**-1.5**	**-5.4**
	(0.8)	(0.7)		(0.4)	(0.5)
Canada	-0.4	**-4.9**	Netherlands	**-2.5**	**-6.3**
	(0.5)	(0.5)		(0.6)	(0.6)
Czech Republic	**-4.4**	**-9.4**	New Zealand	**0.0**	**-4.4**
	(0.6)	(0.6)		(0.5)	(0.5)
Denmark	**-4.1**	**-9.2**	Norway	**-1.5**	**-5.1**
	(1.0)	(0.9)		(0.5)	(0.6)
England	**-2.9**	**-6.3**	Portugal	**-2.2**	**-6.1**
	(0.7)	(0.7)		(0.5)	(0.6)
Finland	-1.5	**-3.5**	Scotland	**-3.4**	**-7.2**
	(0.9)	(1.0)		(0.5)	(0.5)
France	**-2.4**	**-6.6**	Slovak Republic	**-1.8**	**-6.9**
	(0.7)	(0.6)		(0.5)	(0.5)
Germany	**-2.2**	**-6.2**	Spain	**-2.3**	**-7.2**
	(0.7)	(0.8)		(0.5)	(0.6)
Greece	**-3.2**	**-5.1**	Sweden	-0.2	**-3.7**
	(0.6)	(0.6)		(0.5)	(0.5)
Hungary	-0.7	**-6.5**	Switzerland	**-3.3**	**-7.1**
	(0.5)	(0.5)		(0.6)	(0.6)
Iceland	-0.6	**-6.4**	United States	**-2.4**	**-5.7**
	(0.9)	(0.9)		(0.4)	(0.4)

All models are population weighted and heteroskedastic-consistent standard errors are in parentheses. Bold coefficents are significant at the 5 percent level.

Are single-sex classes the right approach?

- The evidence on single sex classes are less clear.

- Using the same data: Trends in International Mathematics and Science Study
  - Focus on 15 countries with at least 5 percent of students in single-sex eighth grade classes

- Equations (1) and (2) measure the impact of single-sex schooling without and with peer group controls.
- All models are estimated separately by gender and country.
- Substantial differences in the estimated single-sex coefficients across (1) and (2) suggests that pre-enrollment differences in student characteristics between single- and mixed-sex schools are an important component of observed differences in student outcomes across school types.

(1) $$Y_{is} = \beta\, SG_s + X_{is}\delta + \varepsilon_{is}$$

(2) $$Y_{is} = \beta\ SG_s + X_{is}\delta\ + \overline{X}_{(-i)s}\lambda\ + \varepsilon_{is}$$

Table 2. The peer group effects in single-sex schools

	% in single-sex schools		The effect of single-sex schooling			
	Boys	Girls	Boys		Girls	
			(1)	(2)	(3)	(4)
Australia	18.2	24.4	4.34	**-5.75**	3.66	-1.07
			(3.04)	(2.43)	(2.62)	(2.40)
Austria	8.3	7.5	2.16	-1.37	6.27	1.60
			(4.46)	(5.16)	(3.63)	(4.60)
Belgium(fl)	22.6	15.1	-6.58	**-4.65**	**8.62**	**5.54**
			(3.96)	(1.99)	(3.69)	(2.29)
Belgium(fr)	10	2.5	**-14.53**	**-9.27**	6.42	5.21
			(3.16)	(2.95)	(5.55)	(5.05)
England	14.8	15.8	**11.83**	-0.34	**11.38**	-0.38
			(3.81)	(2.90)	(3.06)	(2.28)
Germany	4.1	8.1	9.80	**9.90**	**13.70**	**9.43**
			(8.75)	(4.44)	(4.50)	(4.22)
Hongkong	21.1	24.4	1.02	-2.13	**13.00**	**6.20**
			(3.20)	(2.25)	(1.90)	(1.79)
Ireland	40	55.7	4.95	2.64	-0.20	-2.82
			(4.00)	(2.39)	(3.41)	(2.84)
Israel	10.3	12.9	**5.58**	1.33	0.88	-0.77
			(2.40)	(2.64)	(2.07)	(2.09)
Korea	59.2	59.8	-0.42	0.09	-0.11	0.45
			(0.71)	(0.72)	(0.76)	(0.82)
Malaysia	5.6	20.8	5.53	3.15	5.95	-5.22
			(8.11)	(5.02)	(3.74)	(3.16)
New Zealand	31.9	33.2	2.94	-1.18	**4.40**	1.06
			(2.65)	(1.73)	(1.92)	(1.48)
Singapore	20.1	22.5	**10.27**	**-5.89**	**10.24**	**-3.83**
			(1.82)	(1.96)	(1.33)	(1.37)
Spain	3.7	8.7	**7.89**	**15.61**	-1.24	-5.02
			(3.83)	(6.45)	(3.58)	(3.74)
Taiwan	3.5	7.9	3.64	0.48	**5.71**	**5.77**
			(3.97)	(2.26)	(2.25)	(1.42)
FB control			x	x	x	x
Peer control			-	x	-	x

Notes: The **bold** coefficients are statistically significant at 10 % level. Robust standard errors, adjusted for clustering on school level, are in parenthesis. All models are population weighted. All models include control variables listed in data section. Please refer Table 1 for the sample size of each country. All test scores are converted to percentile scores.

Evidence from the US