The Math Gender Gap: The Role of Culture

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Online Appendix

Table A. 1. Sample Size by Country of Ancestry and Destiny

		ARG	AUS	AUT	BEL	CHE	ISR	LUX	NLD	NZL	Total
1	Albania					132					**132**
2	Australia									36	**36**
3	Austria					46					**46**
4	Belgium							159			**159**
5	Bolivia	131									**131**
6	Chile	24									**24**
7	China		410						27	130	**567**
8	Croatia			77							**77**
9	Ethiopia						151				**151**
10	Fiji									35	**35**
11	France				102	203	67	242			**614**
12	Germany		21	38	41	176		116			**392**
13	Greece		46								**46**
14	India		158								**158**
15	Italy		88			739		256			**1,083**
16	Korea		31							15	**46**
17	Malaysia		34								**34**
18	Morocco								192		**192**
19	Netherlands				50						**50**
20	New Zealand		376								**376**
21	Paraguay	63									**63**
22	Philippines		240								**240**
23	Poland			47							**47**
24	Portugal					777		2,069			**2,846**
25	Romania			58							**58**
26	Russian Fed.						491				**491**
27	Viet Nam		291								**291**
28	South Africa		60								**60**
29	Spain					246					**246**
30	Suriname								107		**107**
31	Turkey			509	440	591			222		**1,762**
32	Macedonia			20							**20**
33	United		651							168	**819**
34	United States		29				82				**111**
35	Uruguay	17									**17**
	Total	**235**	**2,435**	**749**	**633**	**2,910**	**791**	**2,842**	**548**	**384**	**11,527**

Notes: Final sample of second-generation immigrants from 2003, 2006, 2009 and 2012 PISA datasets. ARG=Argentina, AUS=Australia, AUT=Austria, BEL=Belgium, CHE=Switzerland, ISR=Israel, LUX=Luxembourg, NLD=Netherlands, NZL= New Zealand.

Table A.2. Gender Gap in Math Scores and Gender Equality by Country of Ancestry

	Country of ancestry	Math Gender Gap	GGI	*N*
1	Korea	-78.24	0.61	*46*
2	Macedonia	-72.64	0.69	*34*
3	Uruguay	-40.31	0.69	*111*
4	Fiji	-38.99	0.64	*35*
5	Greece	-35.53	0.67	*46*
6	Malaysia	-35.19	0.65	*192*
7	United States	-34.75	0.72	*819*
8	Croatia	-31.74	0.69	*77*
9	Morocco	-31.70	0.59	*50*
10	Romania	-30.52	0.68	*491*
11	Spain	-25.55	0.73	*246*
12	UK	-23.73	0.74	*20*
13	Italy	-22.65	0.68	*1,083*
14	China	-21.69	0.69	*567*
15	Albania	-21.16	0.66	*132*
16	Poland	-20.11	0.70	*2,846*
17	Russian Fed.	-16.88	0.70	*291*
18	India	-16.45	0.62	*158*
19	Belgium	-15.56	0.72	*159*
20	Bolivia	-14.36	0.67	*131*
21	Turkey	-13.77	0.58	*1,762*
22	Ethiopia	-10.69	0.59	*151*
23	Suriname	-10.39	0.67	*107*
24	Philippines	-9.66	0.76	*47*
25	South Africa	-9.56	0.77	*60*
26	Portugal	-8.53	0.70	*58*
27	Germany	-6.96	0.74	*392*
28	France	-6.43	0.73	*614*
29	Viet Nam	-6.34	0.68	*17*
30	New Zealand	2.42	0.79	*63*
31	Paraguay	12.61	0.69	*240*
32	Australia	32.26	0.73	*36*
33	Austria	32.29	0.70	*46*
34	Chile	33.52	0.69	*24*
35	Netherlands	47.53	0.75	*376*
	Mean	-15.70	0.69	*11,527*
	St. Dev.	26.04	0.05	

Notes: Table A.1 displays the means of the math gender gap and the GGI by country of ancestry estimated using our sample of second-generation immigrants from 2003, 2006, 2009 and 2012 PISA. Countries are ordered by the gender gap in math scores. It was obtained from estimating a linear regression using the plausible values provided by the PISA data sets as LHS variable and a female indicator as RHS (we estimated one regression for each PV and present the average of the 5 coefficients estimated). See Appendix Table A.3 for details about gender equality measures. The last two rows of Table A.1 display the mean and cross-country standard deviation.

Table A. 3. Individual-level variables: Definition and Descriptive Statistics

Name	Definition	Mean	St. Dev. across countries of ancestry
A. Individual Characteristics			
Female	Dummy variable equal to 1 if the individual is a girl	0.52	0.08
Age	Years and months	15.77	0.06
Different grade	Dummy equal to 1 if the current individual's grade is different from the modal grade at the children age in the host country and 0 otherwise.	0.35	0.17
B. Family characteristics			
Mother highest level of education (MISCED)	Index constructed by the PISA program based upon the highest education level of each parent. It has the following categories: (0) None; (1) ISCED 1 (primary education); (2) ISCED 2 (lower secondary); (3) ISCED Level 3B or 3C (vocational/pre-vocational upper-secondary); (4) ISCED 3A (upper-secondary) and/or ISCED 4 (non-tertiary post-secondary); (5) ISCED 5B (vocational tertiary); and (6) ISCED 5A, 6 (theoretically-oriented tertiary and post-graduate).	3.66	1.04
Father highest level of education (FISCED)		3.85	0.85
Mother works	Dummy equal to one if the mother (father) works, and zero otherwise. Due to the direct question about parents' labor status is not included in all PISA waves, we use students' responses about what is the mother (father) main work. The dummy takes the value of zero when the answer is housewife, student or social beneficiary (unemployed, retired, sickness, etc.) and one otherwise.	0.82	0.14
Father works		0.93	0.05
Index of home possessions (homeposs)	The index of home possessions comprises all items on the indices of wealth, cultural possessions and home educational resources, as well as books in the home recoded into a four-level categorical variable (0-10 books, 11-25 or 26-100 books,101-200 or 201-500 books, more than 500 books). The index of wealth is based on the students' responses on whether they had a room of their own, a link to the Internet, a dishwasher, a DVD player, and three other country-specific items; and their responses on the number of cellular phones, televisions, computers, cars and the rooms with a bath or shower. The index of cultural possessions is based on the students' responses to whether they had the following at home: classic literature, books of poetry and works of art. The index of home educational resources is based on the items measuring the existence of educational resources at home including a desk and a quiet place to study, a computer, educational software, books to help with students' school work, technical reference books and a dictionary.	-0.04	0.53
C. *School characteristics*			
Percentage of girls	PISA index of the proportion of girls enrolled in each school derived from school principals' responses regarding the number of girls divided by the total of girls and boys at a school.	0.49	0.04
Private school	Dummy equal to 1 if school is private and 0 otherwise.	0.24	0.18
School location	Dummy equal to 1 if the school is in a metropolis (one million or more inhab.) and 0 otherwise.	0.29	0.27

Table A.4. Robustness Checks

	Math scores
A. Baseline	
GGI×Female	149.55**
	[62.62]
N	11,527
R^2	0.35
B. Controlling for ancestry-country HDI and its interaction with female	
GGI×Female	158.79**
	[66.52]
N	11,527
R^2	0.35
C. Host-country regional FE	
GGI×Female	133.98**
	[62.69]
N	11,527
R^2	0.36
D. Gender equality measures from 90s	
FLFP(1990) × Female	35.46
	[31.23]
N	11,527
R^2	0.35
Parliament seats held by women (1990-97) × Female	77.60*
	[42.79]
N	11,507
R^2	0.35
E. Adding Year FE × Female	
GGI×Female	150.13**
	[64.12]
N	11,527
R^2	0.35
F. Cluster SE at country of ancestry level	
GGI×Female	149.55***
	[45.98]
N	11,527
R^2	0.35

Notes: Results from estimating equation 1 using alternative specifications. In panel B we replace the GDP per capita in the country of ancestry by a better proxy of the human capital level in the country of ancestry (the Human Development Index). In panel C, host-country regional fixed effects are used instead of host-country fixed effects. Panel D uses alternative measures of gender equality in the country of ancestry, measured in the 1990s. Panel E presents a more flexible specification in which PISA fixed effects are interacted with the gender indicator. Panel F presents estimates with standard errors clustered at the country of ancestry level. In all cases we use the five plausible values of math test scores provided by PISA datasets and report the average coefficient (Stata command *pv*). Except for Panel F, standard errors are adjusted following the Fay's BRR methodology using the 80 alternative weights provided by the PISA datasets.

* p<0.1, ** p<0.05, *** p<0.01

Table A.5. Sensitivity to Sample Selection

	Math scores
Baseline	
GGI×Female	149.55**
	[62.62]
N	11,527
R^2	0.35
A. Dropping the most important country of ancestry (Portugal)	
GGI×Female	144.52**
	[65.15]
N	8,681
R^2	0.36
B. Dropping the most important host country (Switzerland)	
GGI×Female	148.77**
	[74.20]
N	8,617
R^2	0.38
C. Keeping only one host country	
Switzerland	163.12
	[136.34]
N	2910
R^2	0.13
Australia	199.01**
	[91.00]
N	2,450
R^2	0.16
D. Dropping those countries that send immigrants to only one host country	
GGI×Female	228.01**
	[101.93]
N	8,240
R^2	0.29

Notes: Results from estimating our preferred specification (Baseline) with different samples. In panel A we drop those second-generation immigrants whose ancestries come from Portugal (the country of origin with more observations in our sample). In panel B, we drop the host country with more observations in our sample (Switzerland). In panel C, we replicate our analysis using only one host country (Switzerland or Australia). In panel D, we drop those countries that send immigrants to only one host country. In all cases we use the five plausible values of math test scores provided by PISA datasets and report the average coefficient (Stata command *pv*). Standard Errors are adjusted following the Fay's BRR methodology using the 80 alternative weights provided by the PISA datasets.
* $p<0.1$, ** $p<0.05$, *** $p<0.01$