Cornell University
Policy Analysis and Management

香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

Five Reasons to Reopen Schools Now

: Scientific Evidence on the Effects of School Closures

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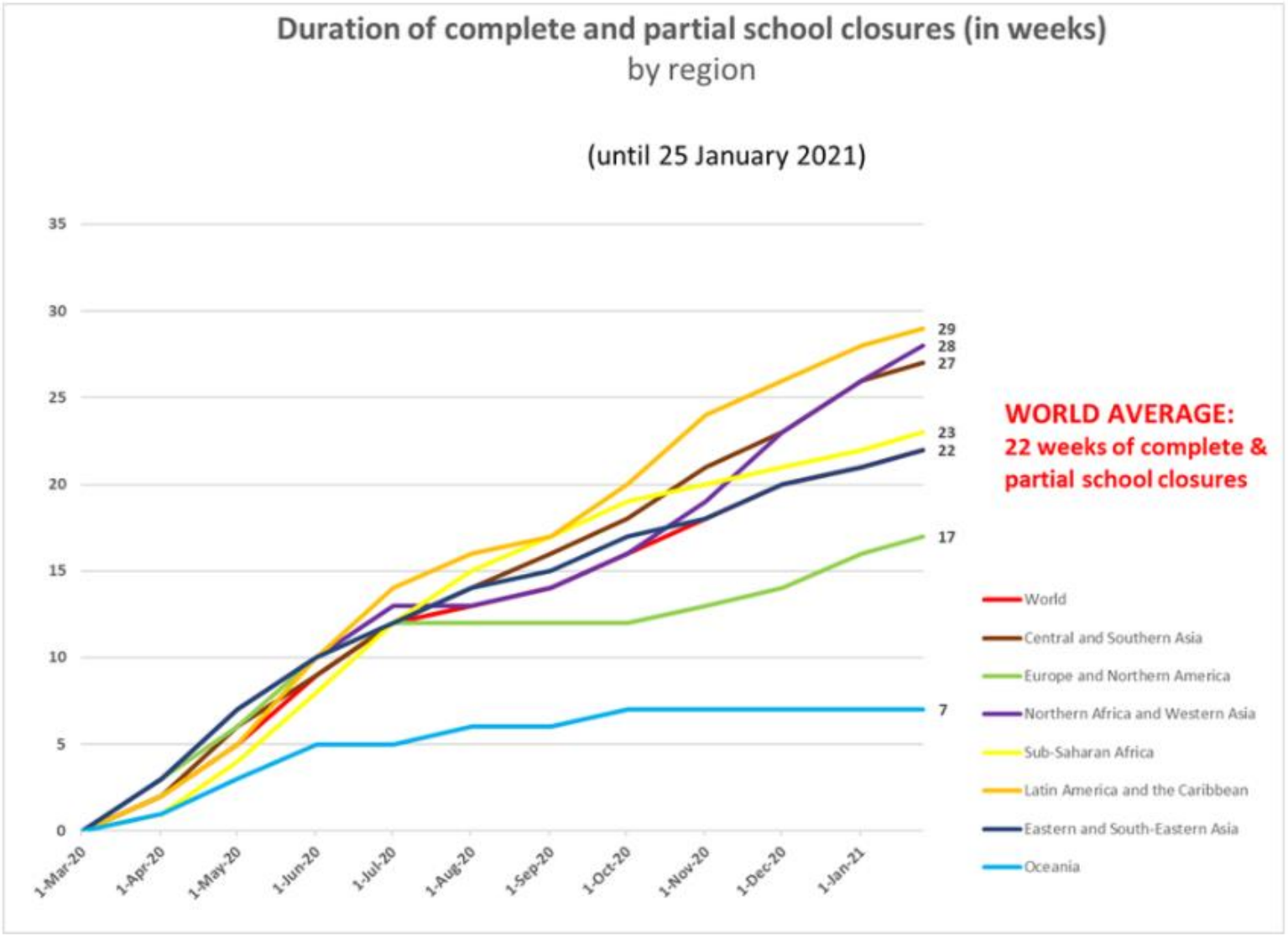
How long COVID-19 crisis will persist?

- The war against the COVID-19 is still in the first half.
- Some expect that the vaccination will bring life back to normal within a year in developed countries, but this is the most optimistic scenario with many assumptions.
  - Vaccines must be provided enough
  - More than 60%-80% people will get vaccinated within relatively short period time (Herd Immunity)
  - Vaccines should be effective for relatively long period of time
  - People wear mask well after vaccination (no risk compensation)
  - Vaccine would work for new variants
- It would take at least several years for developing countries.

School closures status



UNESCO school closure monitoring database

Should children stay at home during pandemic?

- Some people agree:
  - Duterte wants kids aged 10-14 to stay inside homes

Philippines' Duterte Tells Children To Stay Home And Watch TV

By AFP - Agence France Presse January 26, 2021

- Some people do not agree:

Statement

Children cannot afford another year of school disruption

Statement by UNICEF Executive Director Henrietta Fore

12 January 2021

unicef | for every child

Scope of the talk

- This webinar is about why we need to open schools now.

- I will not focus on *how* to open schools
  - UN-WB school reopening framwork.

    https://www.unicef.org/media/71366/file/Framework-for-reopening-schools-2020.pdf
  - JAMA guideline

    Honein MA, Barrios LC, Brooks JT. Data and Policy to Guide Opening Schools Safely to Limit the Spread of SARS-CoV-2 Infection. JAMA. Published online January 26, 2021. doi:10.1001/jama.2021.0374

SUMMARY
Five Reasons to Reopen Schools Now

- School closure appears to have no effect.
- The loss of opportunities to attend school causes irreparable damage to children
- Children are much less likely to be infected by COVID-19.
- School restrictions intensify inequality.
- School restrictions put mothers and grand-mother at risk

1. School closure appears to have no effect.

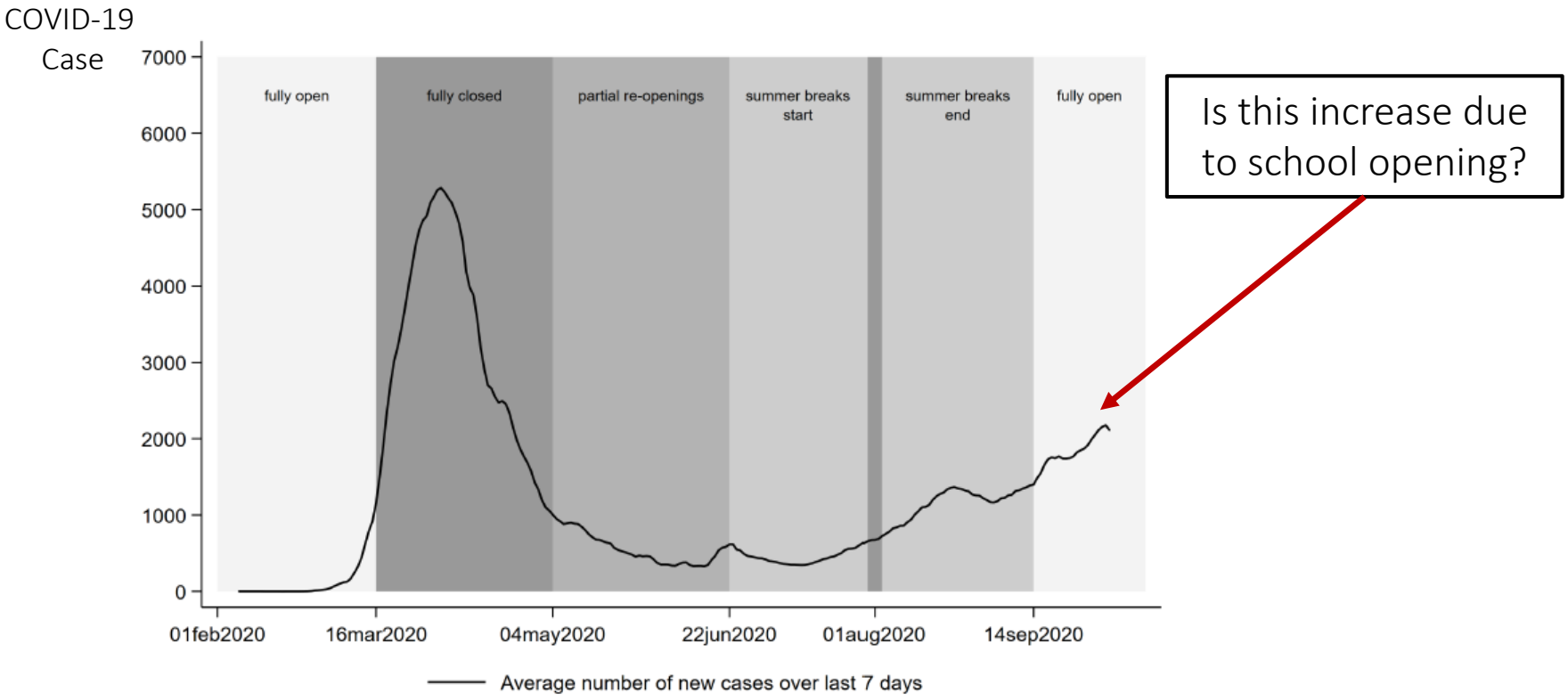
Studies on impacts of school closure/reopening on COVID-19 transmission

- Measure COVID-19 incidence before and after the school closure and reopening.
  - More robust if the study has the control group (other districts without the change of school closure/open)
  - Isphording, Ingo E., Marc Lipfert, and Nico Pestel. School re-openings after summer breaks in Germany did not increase SARS-CoV-2 Cases. No. 13790. IZA Discussion Papers, 2020.

- Study where students get infected when schools are open.
  - Kim, Eun Young, et al. "Children with COVID-19 after Reopening of Schools, South Korea." Pediatric Infection & Vaccine 27.3 (2020): 180-183.
  - Macartney, Kristine, et al. "Transmission of SARS-CoV-2 in Australian educational settings: a prospective cohort study." The Lancet Child & Adolescent Health 4.11 (2020 Aug): 807-816.
  - Buonsenso, Danilo, et al. "SARS-CoV-2 infections in Italian schools: preliminary findings after one month of school opening during the second wave of the pandemic." medRxiv (2020).

Impacts of school reopening in Germany

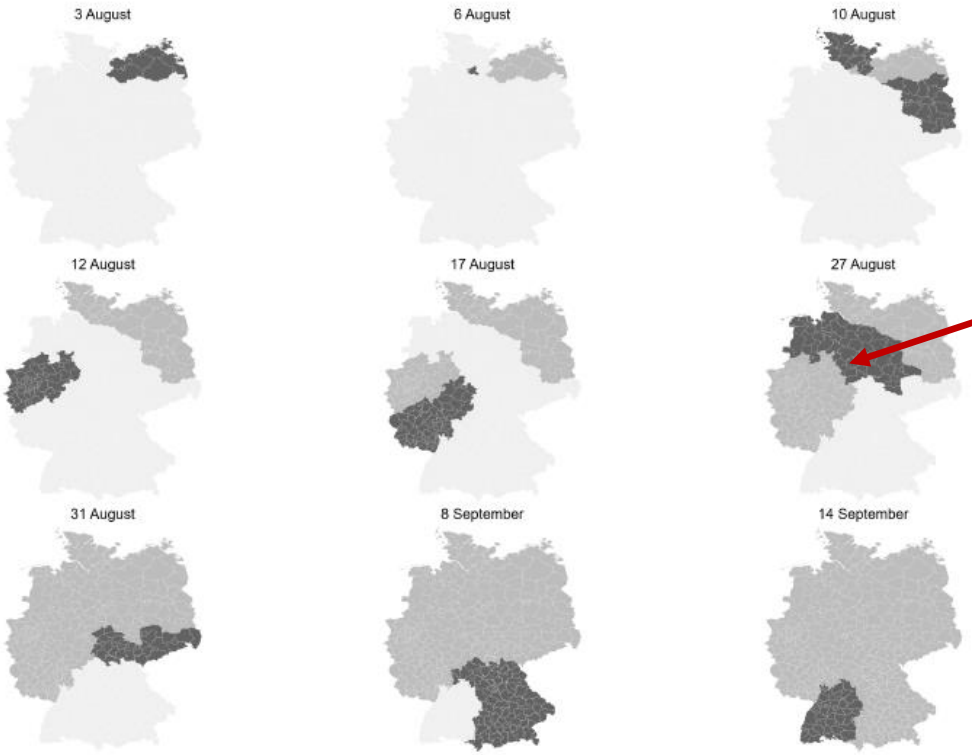
- Timelines of COVID-19 pandemic and school closure/opening



Isphording, Ingo E., Marc Lipfert, and Nico Pestel. School re-openings after summer breaks in Germany did not increase SARS-CoV-2 Cases. No. 13790. IZA Discussion Papers, 2020.

Impacts of school reopening in Germany

- School re-opening dates

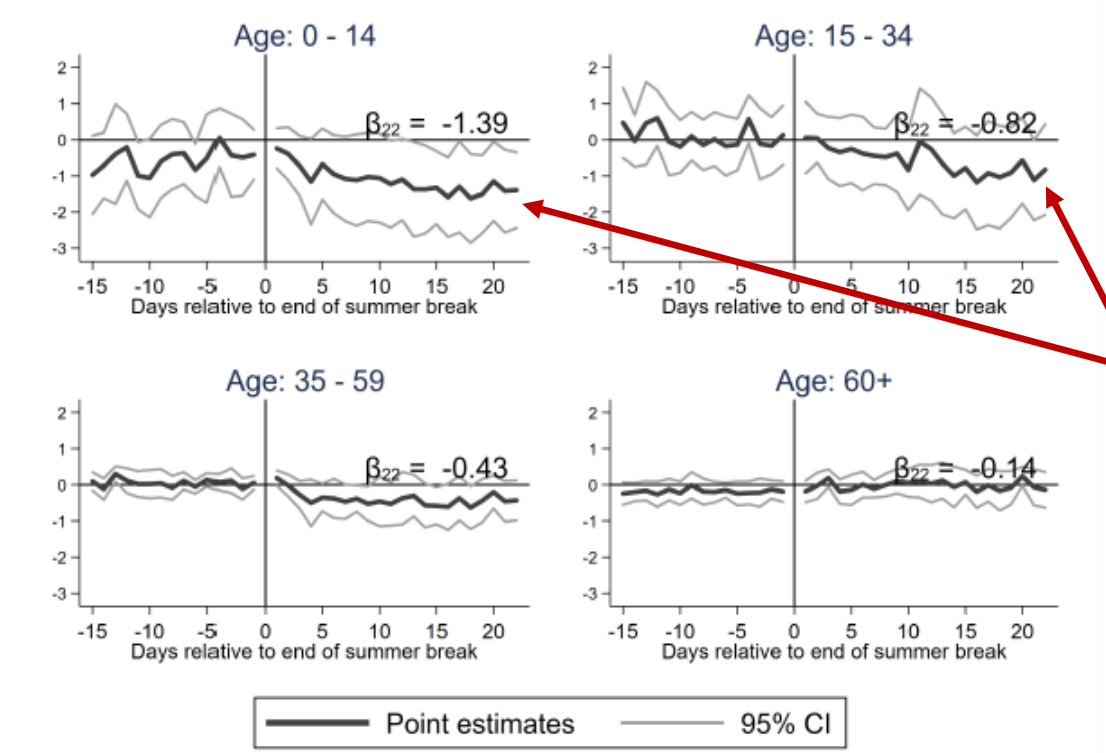


Counties (states) highlighted in dark gray start the new school year

Isphording, Ingo E., Marc Lipfert, and Nico Pestel. School re-openings after summer breaks in Germany did not increase SARS-CoV-2 Cases. No. 13790. IZA Discussion Papers, 2020.

Impacts of school reopening in Germany

- School reopening decreased COVID-19 cases – at least did not increase



Negative, but marginally significant

Isphording, Ingo E., Marc Lipfert, and Nico Pestel. School re-openings after summer breaks in Germany did not increase SARS-CoV-2 Cases. No. 13790. IZA Discussion Papers, 2020.

Child and Adolescent infections in South Korea

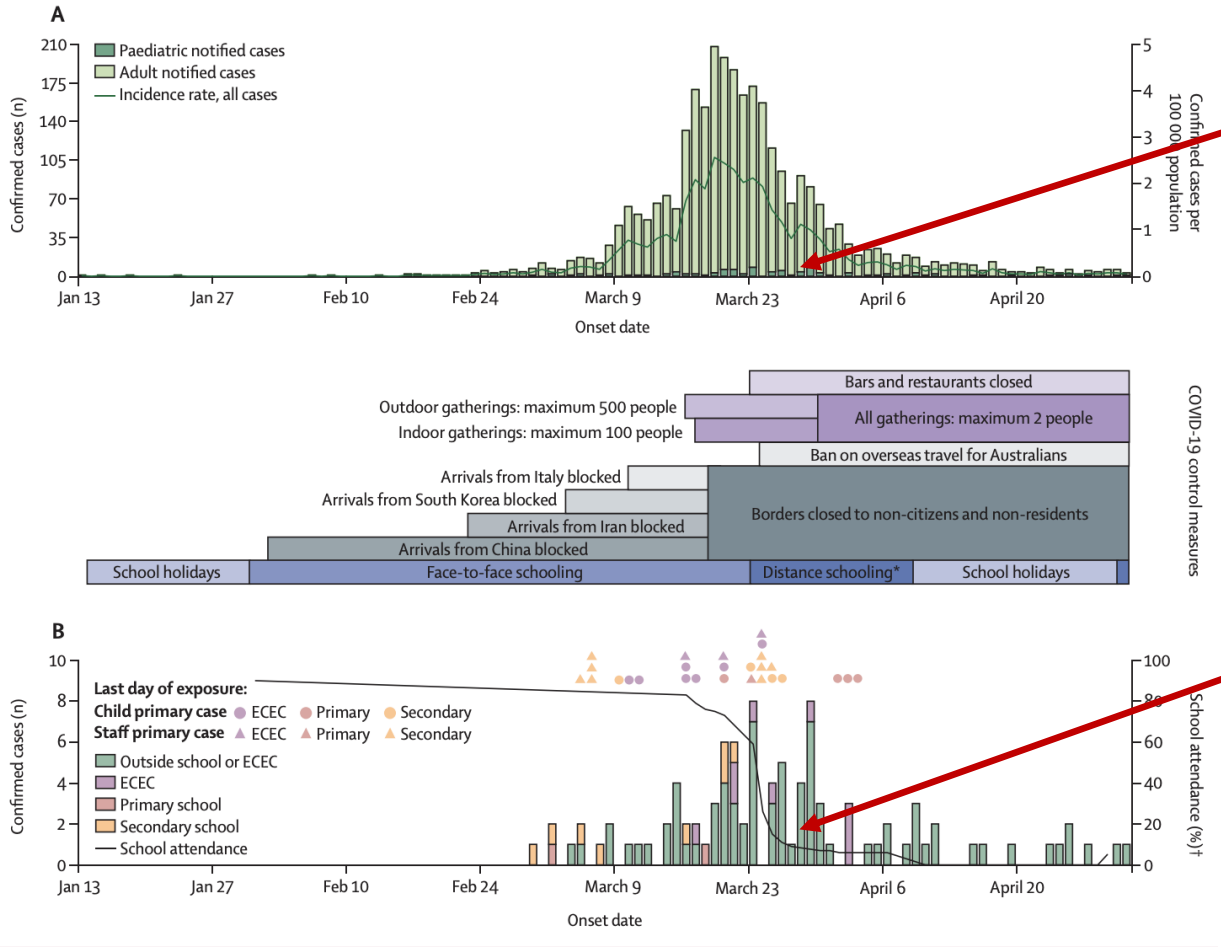
Schools in Korea reopened from May to July in 2020

Characteristics	No. (%)
Age distribution (yr)	
3–6	24 (18.9)
7–12	46 (36.2)
13–15	32 (25.2)
16–18	25 (19.7)
Sex	
Female	43 (33.9)
Male	84 (66.1)
Attendance in public education/childcare system	
Preschool and kindergarten	12 (9.4)
Elementary school (1st–6th graders)	36 (28.3)
Middle school (7th–9th graders)	22 (17.3)
High school (10th–12th graders)	25 (19.7)
Exposure to SARS-CoV-2	
Family and relatives	59 (46.5)
Cram schools, private lessons	18 (14.2)
Multi-use facilities	8 (6.3)
Public education/childcare system	3 (2.4)
Total	127 (100.0)

Only 3 out of 127 confirmed people aged 3 to 18 years old were infected at school after school reopened

Kim, Eun Young, et al. "Children with COVID-19 after Reopening of Schools, South Korea." Pediatric Infection & Vaccine 27.3 (2020): 180-183.

COVID-19 incidence in Australia



COVID-19 Incidence for those <18 is very low

Most child and adolescent cases are from outside school

Macartney, Kristine, et al. "Transmission of SARS-CoV-2 in Australian educational settings: a prospective cohort study." The Lancet Child & Adolescent Health 4.11 (2020 Aug): 807-816.

Child and Adolescent infections in Italy

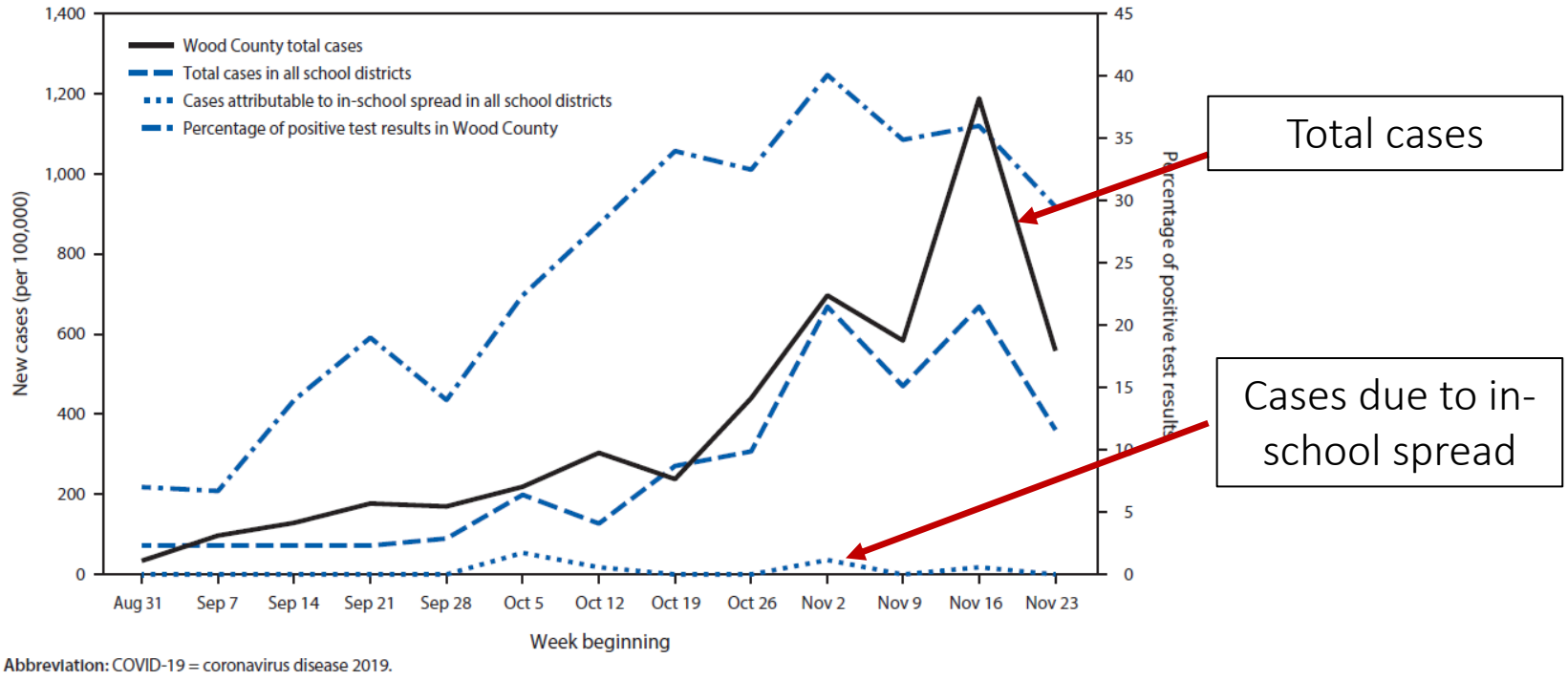
- Schools are open in Italy since September 2020.
- After school reopen in Italy, there were 1350 cases in 1212 schools (1.8%) out of 65104 schools.
- 1091 schools out of 1212 schools with COVID-19 incidence reported a single case (no within school transmission)
  - 121 schools (0.2%) out of 65104 have more than two cases.
- Only 1 school has more than 10 cases

Buonsenso, Danilo, et al. "SARS-CoV-2 infections in Italian schools: preliminary findings after one month of school opening during the second wave of the pandemic." *medRxiv* (2020).

COVID-19 incidence in Wisconsin

Wisconsin, only 7 out of 191 students and teachers were infected within schools during the 13-week face-to-face school period

FIGURE 2. Community and school-associated COVID-19 incidence (cases per 100,000) and percentage of positive test results, by week - Wood County, Wisconsin, August 31–November 29, 2020



Abbreviation: COVID-19 = coronavirus disease 2019.

Falk A, Benda A, Falk P, et al. COVID-19 cases and transmission in 17 K-12 schools-Wood County, Wisconsin, August 31-November 29, 2020. MMWR Morb Mortal Wkly Rep.

COVID-19 incidence in Israel

- Israel : schools opened March-July 2020
  - The incidence of SARS-CoV-2 infections gradually increased following school reopening in all age groups
  - No increase was observed in COVID-19 associated hospitalizations and deaths following school reopening

Why isn't school closure so helpful?

- "Students not going to school" doesn't mean "they stay at home".
  - If they meet friends outside of school, closure is meaningless.
  - Schools that follow social distancing can be safer for children.

Children at friends home and playground without mask

VS.

Students at school wearing mask under teacher's supervision

Developing vs. Developed countries

- School could safer if
  - Vaccine matters, but may not available in 2021
  - Masks
  - Lower density
  - Ventilation
    - Nice illustration

    https://www.nytimes.com/interactive/2021/02/26/science/reopen-schools-safety-ventilation.html

2. The loss of opportunities to attend school causes irreparable damage to children.

Benefits of Education 1
Labor Income

The impacts of Early Childhood Education

Carolina Abecedarian Project (ABC) and the Carolina Approach to Responsive Education (CARE)

When they turned 35, program beneficiaries outperformed non-beneficiaries in all measures such as education level, employment rate, wages, and health outcomes such as hypertension.

TABLE 1
SUMMARY OF TREATMENT EFFECTS FOR INPUTS GENERATING LABOR INCOME ($X^d_{k,a}$)

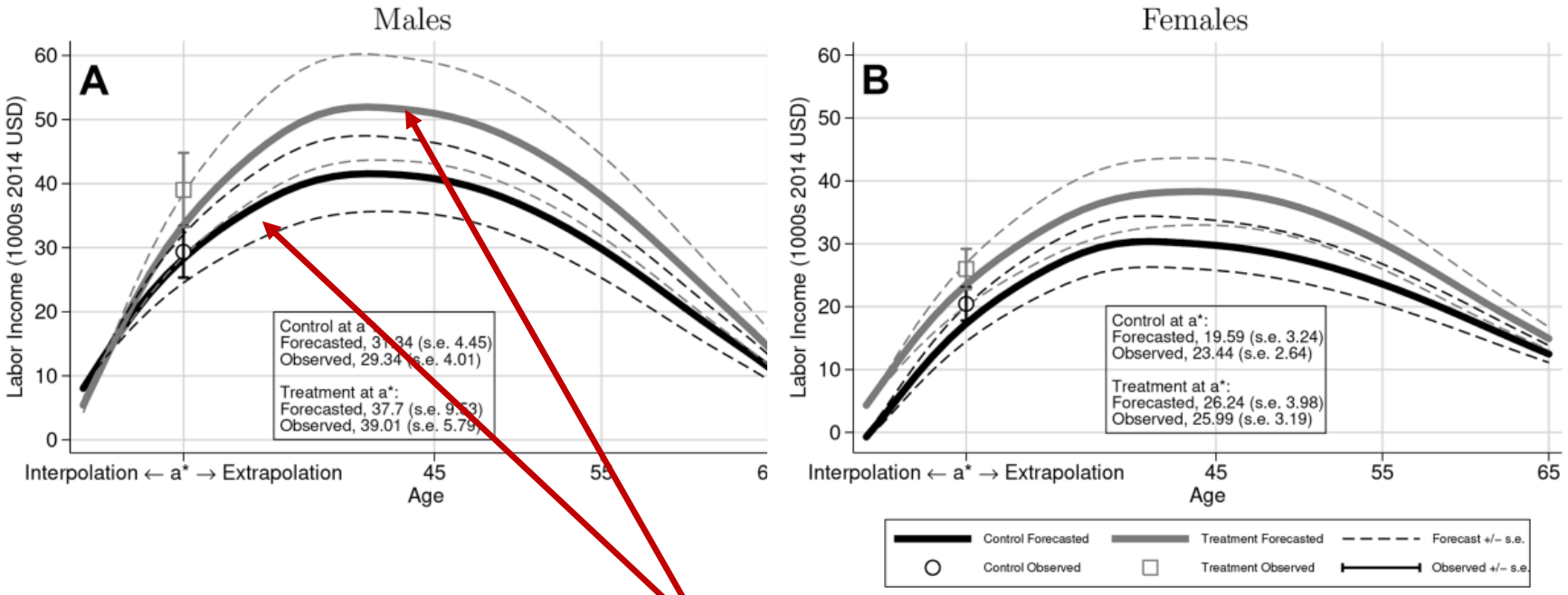
	Females		Males	
Inputs	Control Mean	Average Treatment Effect	Control Mean	Average Treatment Effect
PIAT scores	95.63	**4.92**	93.46	**7.70**
High school graduation	.51	**.25**	.61	.07
College graduation	.08	.13	.12	**.17**
Years of education	11.76	**2.14**	12.90	**.66**
Labor income at 30	23,443.42	2,547.50	29,340.31	**19,809.74**

NOTE.—This table shows the control-group level and the raw mean difference between treatment and control (average treatment effects), by gender. PIAT scores have a sample mean of 100 and a standard deviation of 15. High school and college graduation are expressed in rates. Labor income is in 2014 USD. Average treatment effects in boldface are statistically significant at the 10% level.

García, Jorge Luis, et al. "Quantifying the life-cycle benefits of an influential early-childhood program." *Journal of Political Economy* 128.7 (2020): 2502-2541.

Life-cycle benefits of an early-childhood program

Forecast life-cycle labor income profiles for ABC/CARE males (A) and females (B) by treatment status



Those who were treated by high quality early childhood program increase labor income by about 10%

Benefits of Education 2
Health Behaviors

Education lowers the likelihood of smoking and heavy drinking

Table 3
Current Smoking Status

	Men				Women			
Variable	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
High school completer	−.264***	−.226***	−.229***	−.169**	−.245***	−.194***	−.102	.038
	(.027)	(.029)	(.088)	(.085)	(.029)	(.030)	(.124)	(.089)
GED	−.099***	−.080**	.068	.211*	−.015	.004	.116	.154
	(.034)	(.034)	(.110)	(.110)	(.036)	(.037)	(.108)	(.100)
Schooling of parent with highest level		.000	.002			.006***	.006*	
		(.002)	(.003)			(.002)	(.003)	
Mother has highest schooling		−.002	−.002			−.004	−.001	
		(.015)	(.016)			(.014)	(.016)	
Magazines in home when age 14		.027*	.022	.021		−.034**	−.019	−.023
		(.017)	(.018)	(.019)		(.015)	(.018)	(.018)
AFQT percentile score		−.002***	−.002***	−.001		−.003***	−.004***	−.004***
		(.000)	(.001)	(.001)		(.000)	(.000)	(.000)
Rotter index		.007	.006	−.008		.005	.006	.008*
		(.005)	(.005)	(.005)		(.004)	(.005)	(.005)
N	3,205	3,205	3,205	3,205	3,286	3,286	3,286	3,286
R^2	.299	.300	. . .	. . .	.281	.285	. . .	. . .
$F(k, n-k)$ on 1st-stage IVs:								
High school graduate			35.84	30.42			19.22	27.87
GED			32.42	25.05			38.52	33.98

NOTE.—Columns 1 and 2 contain results from linear probability models. Columns 3 and 4 contain results from two-stage least squares regressions. Column 3 only uses state policies as instruments. Column 4 adds the two parental schooling variables to the instrument set. Standard errors (in parentheses) are adjusted for heteroskedasticity. All models include state fixed effects, indicators for race (black, Hispanic, other), whether the respondent has a health limitation, age, age squared, a measure of state antismoking sentiment, and the average state cigarette tax.

* Statistically different from zero with p-values of <.10.
** Statistically different from zero with p-values of <.05.
*** Statistically different from zero with p-values of <.01.

Kenkel, Donald, Dean Lillard, and Alan Mathios. "The roles of high school completion and GED receipt in smoking and obesity." *Journal of Labor Economics* 24.3 (2006): 635-660.

Benefits of Education 3
Marriage Market (Better Spouse)

TABLE 2—ESTIMATES OF THE EFFECTS OF FEMALE SCHOOLING ON HUSBAND'S SCHOOLING: MARRIED MZ FEMALE TWINS[a]

Cross Section	Within-MZ	Within-MZ + Instruments
0.664	0.243	0.385
(14.4)[b]	(2.16)	(2.12)

[a] Number of twins = 600.
[b] Absolute value of *t*-ratio in parentheses.

Behrman, Jere R., and Mark R. Rosenzweig. "Does increasing women's schooling raise the schooling of the next generation?" American economic review 92.1 (2002): 323-334.

Benefits of Education 4 Mortality

One year increase of primary school education in 1910 increase longevity by 1.7 years in the US

TABLE 4

Effect of education on mortality—IV results

Variables					
Data		NHEFS[(b)]	Census[(a)(c)]	Census[(a)(b)(c)]	Census[(a)(b)(c)]
Method		2SLS	Wald	2SLS	Mixed-2SLS
Level		Individual	Aggregate	Aggregate	Aggregate
Dependent variable		Died 1975–1985	10-Year death rate	10-Year death rate	10-Year death rate
Individual characteristics	Education	−0·017	−0·037**	−0·051**	−0·061**
		(0·058)	(0·006)	(0·026)	(0·025)
	1970 Dummy		0·003	0·003	0·007
			(0·004)	(0·005)	(0·006)
	Female	−0·137**	−0·071**	−0·071**	−0·068**
		(0·027)	(0·004)	(0·004)	(0·004)
State-of-birth characteristics	% Urban	−0·002		0·001	0·001
		(0·006)		(0·001)	(0·001)
	% Foreign	0·004		−0·0001	0·000
		(0·007)		(0·002)	(0·000)
	% Black	−0·012		−0·0009	−0·0005
		(0·009)		(0·002)	(0·0020)
	% Employed in manufacturing	−0·115		−0·110	−0·074
		(0·604)		(0·108)	(0·139)
	Annual manufacturing wage	0·000		0·000	0·000
		(0·000)		(0·000)	(0·000)
	Value of farm per acre	0·000		0·000	0·000
		(0·000)		(0·000)	(0·000)
	Per capita number of doctors	−2·178		7·926	8·59
		(64·968)		(15·059)	(16·47)
	Per capita education expenditures	0·000		0·000	0·000
		(0·000)		(0·000)	(0·000)
	Number of school buildings per sq. mile	0·685*		−0·005	−0·003
		(0·377)		(0·065)	(0·072)
	State-of-birth dummies	Yes	No	Yes	Yes
	Region-of-birth dummies	No	Yes	No	No
	Cohort dummies	Yes	Yes	Yes	Yes
	Region-of-birth*cohort	Yes	No	Yes	Yes
	N	4554	1396	4792	4792

Lleras-Muney, Adriana. "The relationship between education and adult mortality in the United States." The Review of Economic Studies 72.1 (2005): 189-221.

Benefits of Education 5
Economic Rationality (CCEI)

One year secondary school scholarship program

Secondary school education helps students to make a better financial decisions when they become adults.

Rational Decision Making Score (Max 1):
- Treated group (0.84)
- Control group (0.82)

Table 2. Impacts of education support program on economic rationality.
Coefficients are from linear regressions of each rationality measure on the education intervention indicator. Standard errors (in parentheses) are clustered at the classroom level. N/A, not applicable.

Variables	CCEI, risk domain	CCEI, time domain	Compliance with stochastic dominance		Standardized treatment effect
			Freq.	Payoff	
	1	2	3	4	5
			Overall sample		
Treated	0.013	0.014**	0.012*	0.005*	0.020**
	(0.008)	(0.006)	(0.007)	(0.003)	(0.009)
Family-wise adjusted *P* value	0.084	0.018	0.070	0.080	N/A
Control group mean	0.81	0.82	0.83	0.94	0.00
Number of observations	2421	2416	2421	2421	9679
			Baseline 9th graders		
Treated	0.033***	0.031***	0.018**	0.009**	0.038***
	(0.010)	(0.008)	(0.008)	(0.004)	(0.011)
Family-wise adjusted *P* value	<0.001	<0.001	0.025	0.025	N/A
Control group mean	0.83	0.83	0.84	0.94	0.00
Number of observations	1051	1050	1051	1051	4203
			Baseline 10th graders		
Treated	−0.003	0.003	0.006	0.002	0.005
	(0.010)	(0.009)	(0.010)	(0.004)	(0.012)
Family-wise adjusted *P* value	0.871	0.871	0.765	0.862	N/A
Control group mean	0.80	0.82	0.82	0.93	0.00
Number of observations	1370	1366	1370	1370	5476

*$P < 0.10$; **$P < 0.05$; ***$P < 0.01$.

Kim, Hyuncheol Bryant, et al. "The role of education interventions in improving economic rationality." Science 362.6410 (2018): 83-86.

Benefits of Education 6
Personality (Non-cognitive ability)

Secondary school education helps students to form a **desirable** personality

Table S5: Impacts of education support program on economic preferences, personality, and cognitive skills

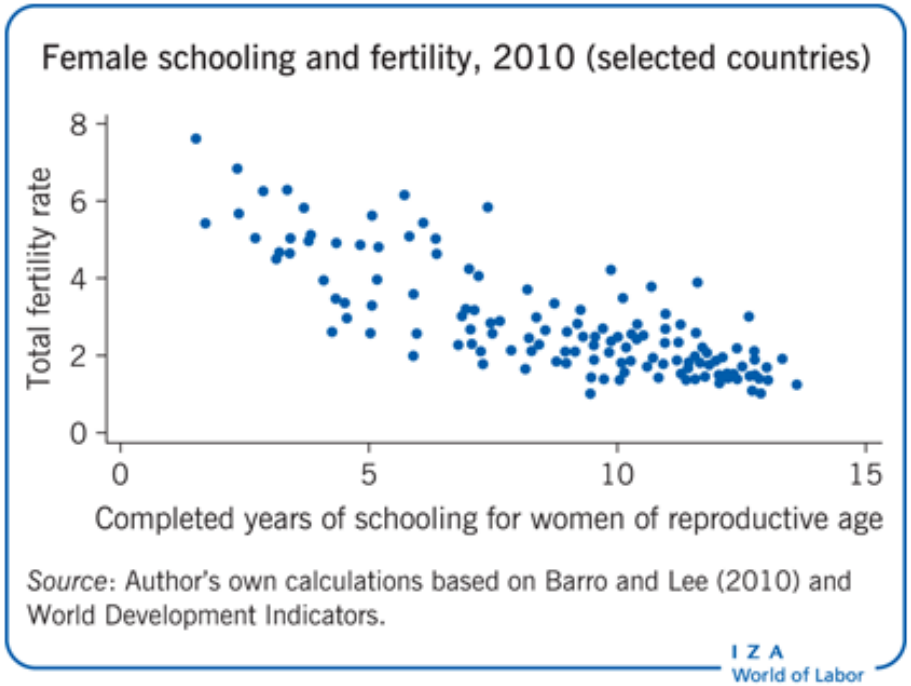
	Economic Preference			Personality					Cognitive skills	
Variables:	Time impatience near frame	Time impatience distant frame	Risk tolerance	Extroversion	Agreeableness	Conscien-tiousness	Emotional stability	Openness to experience	Raven test	Math score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Overall sample										
Differences adjusted	-0.004	-0.002	0.001	0.051*	0.087*	0.131**	0.107*	-0.055	0.089	0.196***
for baseline controls	(0.010)	(0.010)	(0.004)	(0.030)	(0.049)	(0.054)	(0.057)	(0.062)	(0.056)	(0.050)
Number of observations	2,416	2,416	2,421	2,421	2,421	2,421	2,421	2,421	2,421	2,421
Control group mean	0.398	0.400	0.625	3.867	6.211	6.004	5.605	3.840	0	0
Panel B: Baseline 9th graders										
Differences adjusted	-0.015	-0.009	0.002	0.056	0.159**	0.202**	0.203**	0.033	0.161*	0.244***
for baseline controls	(0.014)	(0.014)	(0.006)	(0.045)	(0.078)	(0.083)	(0.095)	(0.102)	(0.081)	(0.066)
Number of observations	1,050	1,050	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051
Control group mean	0.411	0.408	0.632	3.842	6.201	5.992	5.623	3.811	0.053	0.014
Panel C: Baseline 10th graders										
Differences adjusted	0.004	0.004	-0.001	0.049	0.031	0.078	0.030	-0.109	0.023	0.164**
for baseline controls	(0.014)	(0.014)	(0.005)	(0.040)	(0.059)	(0.071)	(0.065)	(0.075)	(0.069)	(0.070)
Number of observations	1,366	1,366	1,370	1,370	1,370	1,370	1,370	1,370	1,370	1,370
Control group mean	0.390	0.396	0.621	8.882	6.218	6.012	5.595	3.856	-0.031	-0.008

Notes: Coefficients are from linear regressions of each outcome on the education intervention indicator. Standard errors (in parentheses) are clustered at the classroom level.
Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Kim, Hyuncheol Bryant, et al. "The role of education interventions in improving economic rationality." Science 362.6410 (2018): 83-86.

Benefits of Education 7
Fertility

Education increases the use of contraceptives and decrease fertility in developing countries



Kim, Jungho. "Female education and its impact on fertility." IZA World of Labor (2016).

Benefits of Education 8
Intergenerational Impact on Human Capital

Mothers education level affect child's health

TABLE IV
THE EFFECT OF MATERNAL EDUCATION ON INFANT HEALTH, AND HEALTH INPUTS

	OLS 24–45 (1)	IV 24–45 (2)	OLS 24–45 (3)	IV 24–45 (4)	OLS 16–45 (5)	IV 16–45 (6)
1. Low birth weight	−0.0050 (0.0001)	−0.0098 (0.0038)	−0.0050 (0.0001)	−0.0099 (0.0038)	−0.0053 (0.0001)	−0.0096 (0.0036)
2. Preterm birth	−0.0044 (0.0001)	−0.010 (0.0044)	−0.0044 (0.0001)	−0.010 (0.0044)	−0.0038 (0.0001)	−0.098 (0.0044)
3. Prenatal care	0.0114 (0.0001)	0.0234 (0.0055)	0.0116 (0.0001)	0.0241 (0.0054)	0.0111 (0.0001)	0.0466 (0.0074)
4. Smoked during pregnancy	−0.0305 (0.0004)	−0.0583 (0.0118)	−0.0305 (0.0004)	−0.0623 (0.0118)	−0.0336 (0.0004)	−0.0364 (0.0159)
5. Married	0.0206 (0.0002)	0.0128 (0.0040)	0.0207 (0.0002)	0.0129 (0.0040)	0.0219 (0.0002)	0.0107 (0.0060)
6. Husband's education	0.607 (0.0019)	0.988 (0.040)	0.604 (0.0019)	0.992 (0.040)	0.595 (0.0019)	0.876 (0.045)
7. Parity	−0.121 (0.000)	−0.092 (0.010)	−0.121 (0.000)	−0.088 (0.010)	−0.124 (0.000)	−0.103 (0.018)
State-mother cohort trends	No	No	Yes	Yes	No	No

Currie, Janet, and Enrico Moretti. "Mother's education and the intergenerational transmission of human capital: Evidence from college openings." The Quarterly journal of economics 118.4 (2003): 1495-1532.

Impacts of lockdown and distance learning on school performance

Table 3: Effects of distance learning methods on evaluation

	France			Italy		
	Kindergarten	Primary	Secondary	Kindergarten	Primary	Secondary
	(1)	(2)	(3)	(4)	(5)	(6)
Lockdown	-5.035***	-3.156***	-4.189***	-8.079***	-5.212***	-5.563***
	(0.936)	(0.139)	(0.182)	(0.307)	(0.296)	(0.907)
Online Lectures	1.742	0.411*	0.633***	2.466***	1.107***	1.830**
· Lockdown	(1.130)	(0.212)	(0.207)	(0.348)	(0.250)	(0.844)
Homewrok	1.784*			1.878***		
· Lockdown	(0.938)			(0.342)		
Observations	1,449	2,395	1,763	2,156	3,414	1,756
R-squared	0.768	0.754	0.802	0.924	0.845	0.832
Adj. R-squared	0.524	0.502	0.599	0.837	0.676	0.646
Child fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Lockdown decrease test score by 5-8% point

Those received online lecture increases test score by 1-2 % point

Champeaux, Hugues, et al. *Learning at Home: Distance Learning Solutions and Child Development during the COVID-19 Lockdown*. No. 13819. IZA Discussion Papers, 2020.

Impacts of lockdown and distance learning on emotional status

Table 4: Effects of distance learning methods on emotional status

	France			Italy		
	Kindergarten	Primary	Secondary	Kindergarten	Primary	Secondary
	(1)	(2)	(3)	(4)	(5)	(6)
Lockdown	-0.284	-0.252***	-0.304***	-0.569***	-0.657***	-0.562**
	(0.199)	(0.0568)	(0.0542)	(0.0779)	(0.0915)	(0.220)
Online Lectures	0.0694	0.0183	0.156**	-0.0335	0.0705	0.0757
· Lockdown	(0.217)	(0.0790)	(0.0669)	(0.0909)	(0.0587)	(0.201)
Homewrok	0.0405			-0.0205		
· Lockdown	(0.158)			(0.111)		
Observations	1,449	2,395	1,763	2,156	3,414	1,756
R-squared	0.552	0.547	0.533	0.628	0.657	0.603
Adj. R-squared	0.0795	0.0857	0.0547	0.199	0.286	0.163
Child fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Lockdown decrease emotion score by 0.2-0.7 point

Those received online lecture compensate only a little

Champeaux, Hugues, et al. *Learning at Home: Distance Learning Solutions and Child Development during the COVID-19 Lockdown*. No. 13819. IZA Discussion Papers, 2020.

Developing vs. Developed countries

- Schooling could be more important in developed countries
  - Other sources of learning is limited
  - Distance learning is unlikely to work

		Share of households possessing:					
Income Level	**Indicator**	**mobile telephone**	**radio**	**telephone**	**television**	**internet access**	**personal computer**
HIC	share (%)					78.8	80.8
	countries					48	48
UMC	share (%)	92.1	51.2	18.7	83.3	41.2	43.5
	countries	12	12	12	12	41	42
LMC	share (%)	84	43.7	7	58.5	19	20.9
	countries	23	23	23	23	33	33
LIC	share (%)	74.8	49	3.1	34.8	6	6.6
	countries	24	24	24	24	20	21
Column Average	share (%)	81.8	47.3	7.8	53.9	43.8	45.3
Column Total	countries	59	59	59	59	142	144

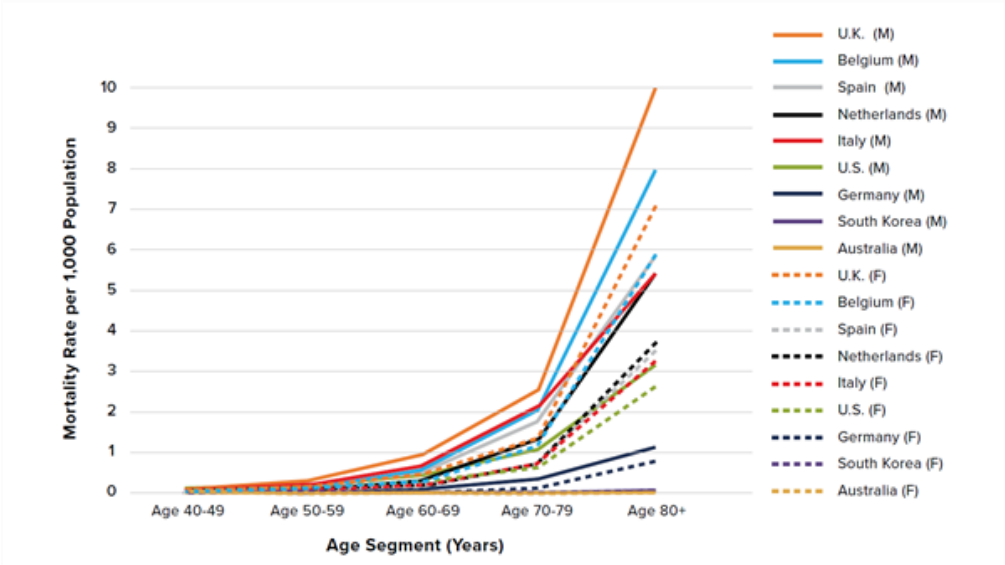
Source: UNICEF as of May 28th 2020 (https://public.tableau.com/profile/unicefdata#!/vizhome/EduViewv1_0/home)

3. children are much less likely to be infected by COVID-19.

Age-specific COVID-19 incidence and mortality (Developed countries)

1. COVID-19 is a risk only for those 65 and over.

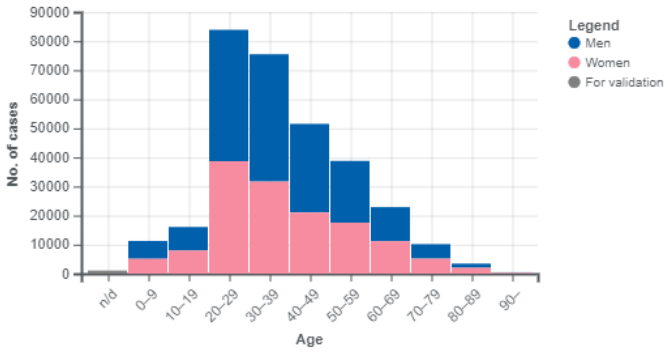
2. For those below 60, COVID-19 is not a serious risk at all in developed countries.



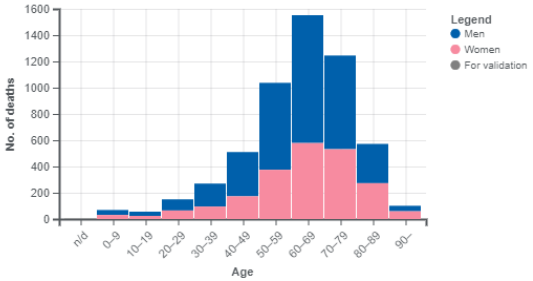
Age group (years)	Population distribution (%)	Total cases n (%)	Hospitalised		Severe hospitalisation		Fatal	
			n (%)	AR, %	n (%)	AR, %	n (%)	AR, %
01-04	3.8	23 182 (1.3)	450 (0.4)	1.94	15 (0.1)	0.06	2 (0)	0.01
05-11	6.8	75 287 (4.2)	464 (0.4)	0.62	21 (0.1)	0.03	4 (0)	0.01
12-15	3.8	67 092 (3.7)	452 (0.4)	0.67	16 (0.1)	0.02	16 (0.1)	0.02
16-18	3.0	66 960 (3.7)	580 (0.5)	0.87	28 (0.2)	0.04	6 (0)	0.01
19-39	26.1	560 665 (31.0)	10 859 (9)	1.94	530 (3.4)	0.09	127 (0.6)	0.02
40-64	35.7	713 368 (39.4)	38 257 (31.5)	5.36	4 777 (31)	0.67	1 693 (8.1)	0.24
65+	20.8	301 905 (16.7)	70 212 (57.9)	23.26	10 025 (65)	3.32	19 036 (91.2)	6.31
Total	**100.0**	**1 808 459 (100.0)**	**121 274 (100.1)**	**6.71**	**15 412 (99.9)**	**0.85**	**20 884 (100)**	**1.15**

COVID-19 cases and mortality (Philippines)

- Incidence



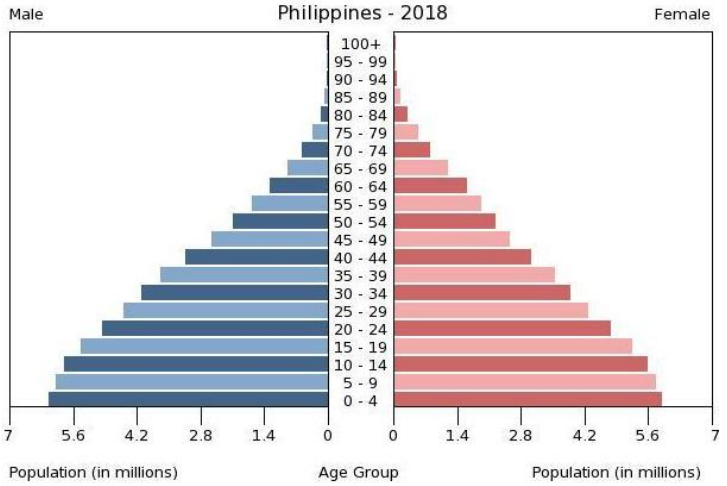
- Mortality



1. COVID-19 is a risk for those in 50's.

2. For those below 19, COVID-19 is not a risk in developing countries.

Population structure

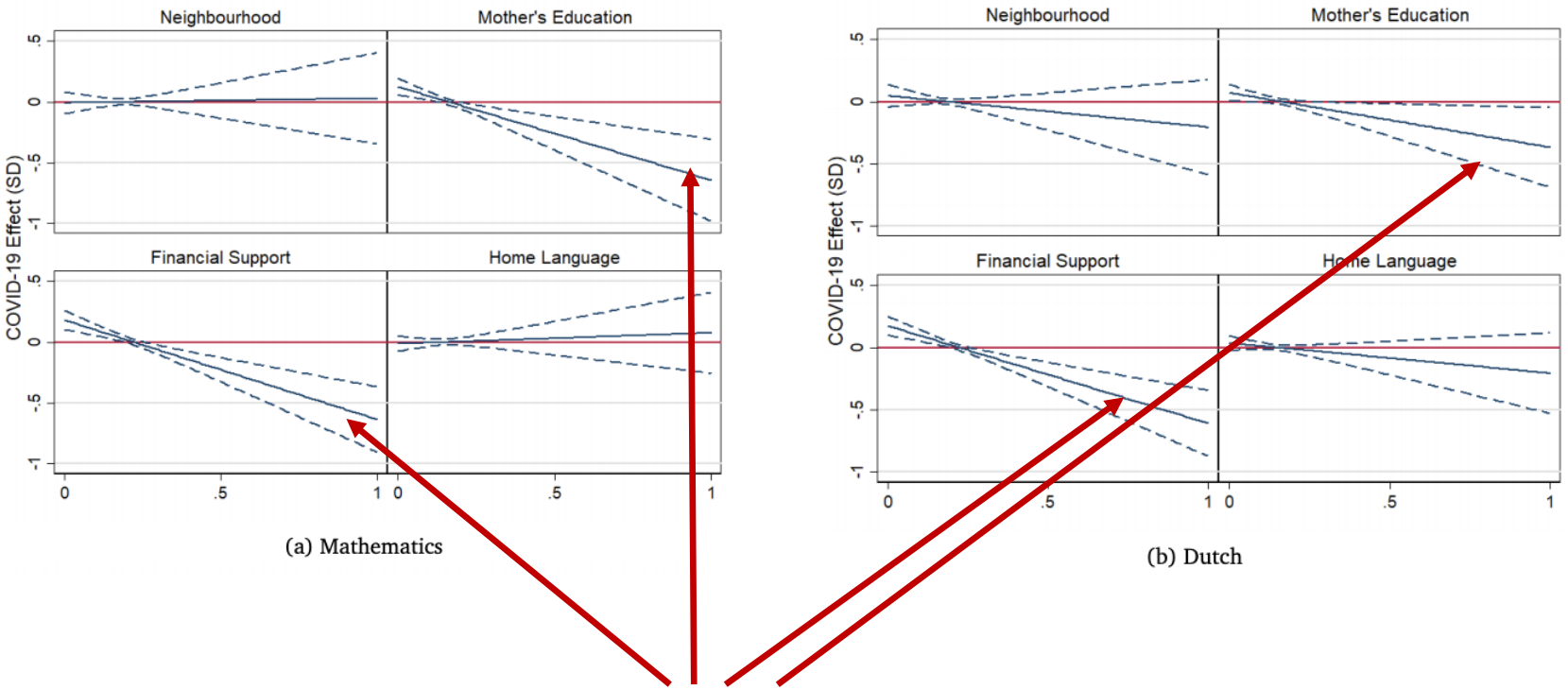


Children are much less likely to be infected by COVID-19.

- Children — especially those under the age of 12–14 — are less susceptible to infection than adults, according to a meta-analysis
  - Viner, R. M., O. T. Mytton, and C. Bonell. "Susceptibility to SARS-CoV-2 infection among children and adolescents compared with adults: a systematic review and meta-analysis [published online ahead of print September 25, 2020]." *JAMA Pediatr*.
- Most of the infected children have mild or no symptoms, except for a few children with serious underlying diseases
- Although they are infected, young children are less likely to pass the virus on to others
  - Carsetti, Rita, et al. "The immune system of children: the key to understanding SARS-CoV-2 susceptibility?." The Lancet Child & Adolescent Health 4.6 (2020): 414-416.

4. School restrictions intensify inequality.

Heterogenous Effects by Socioeconomic Status



Negative effects for students are concentrated in Low SES district

Maldonado, Joana, and Kristof De Witte. "The effect of school closures on standardised student test." *FEB Research Report Department of Economics* (2020).

5. School restrictions put mothers and grand-mother at risk

Parental Labor Participation Responses

Table 1
Labor Supply Response to School Closures of Two-Partnered Households with Children Ages 6-12

	(1)	(2)	(3)	(4)	(5)	(6)
	Employed		Did not Work Last Week		Log (Weekly Work Hours)	
	Men	Women	Men	Women	Men	Women
SC	-0.025	-0.018	0.012	0.028	-0.110***	-0.152***
	(0.027)	(0.027)	(0.016)	(0.021)	(0.022)	(0.051)
Partner employed, not at work last week	0.019**	0.045***	0.202***	0.376***	-0.067***	-0.137***
	(0.007)	(0.014)	(0.012)	(0.018)	(0.016)	(0.023)
Partner employed, at work last week	0.004	0.036***	-0.010***	0.000	-0.009**	-0.057***
	(0.004)	(0.012)	(0.001)	(0.003)	(0.004)	(0.014)
Age	0.021***	0.038***	-0.001	-0.002	0.006*	-0.002
	(0.002)	(0.004)	(0.001)	(0.001)	(0.003)	(0.005)
Age^2/100	-0.027***	-0.044***	0.001	0.002	-0.008**	0.003
	(0.003)	(0.005)	(0.001)	(0.002)	(0.004)	(0.006)
Number of children	0.000	-0.054***	0.000	0.005***	0.004**	-0.045***
	(0.002)	(0.004)	(0.001)	(0.001)	(0.002)	(0.006)
High School	0.025***	0.158***	-0.002	-0.004	0.049***	0.005
	(0.009)	(0.013)	(0.003)	(0.009)	(0.013)	(0.018)
College	0.044***	0.239***	-0.002	0.005	0.057***	-0.052**
	(0.012)	(0.010)	(0.003)	(0.010)	(0.012)	(0.021)
More college	0.090***	0.306***	-0.005	0.000	0.065***	-0.040*
	(0.011)	(0.015)	(0.003)	(0.009)	(0.013)	(0.022)
TNP	-0.021**	-0.028***	0.006	0.004	0.012	0.034*
	(0.009)	(0.009)	(0.005)	(0.007)	(0.008)	(0.018)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean 01/2019-02/2020	0.93	0.68	0.02	0.04	3.73	3.50
Observations	80,787	82,696	74,125	56,472	72,153	53,783
R-squared	0.037	0.092	0.065	0.106	0.025	0.055

School closures during the months of March, April and May of 2020 primarily affected the labor supply of mothers and fathers of younger school-age children in two-partnered households through a reduction in their weekly hours of work, which dropped by 11 percent among men and by 15 percent among women.

Notes: These figures display the coefficients from the event study for our main sample of two-partnered households, along with 95 percent confidence intervals. Estimates are provided in Appendix A in Table A7.

Amuedo-Dorantes, Catalina, et al. *COVID-19 School Closures and Parental Labor Supply in the United States*. No. 13827. IZA Discussion Papers, 2020.

Grandparents (grandmothers) at risk

- The lockdown led to a large increase in childcare and housework, given the closing of schools and the inability to outsource.
- School closure could increase interactions between grand-parents and children

Conclusion

- School closure does not help prevent the spread of COVID-19, and causes tremendous damage to students and society.

- School reopening should be top priority for all countries in 2021.

Thank you very much!