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후원 | MG새마을금고중앙회

Intergenerational transmission of parental education in Malawi

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KADP
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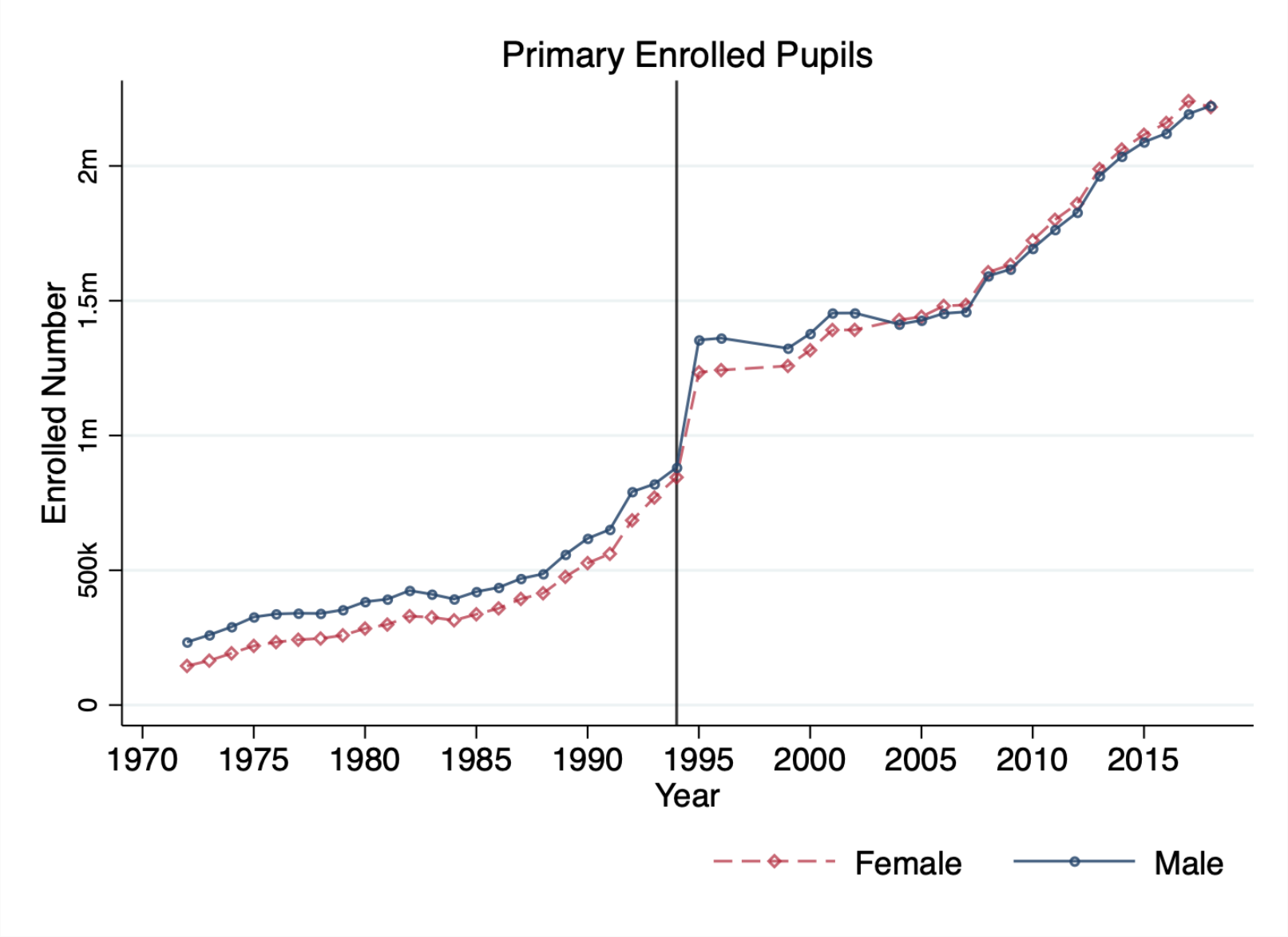
Introduction

Motivation

- Over the past 50 years, primary school enrollment has dramatically increased in sub-Saharan Africa (SSA)
  - 54% in 1960 $\Rightarrow$ 108% in 2010 (Glewwe and Muralidharan, 2016)
- The dramatic increase is driven by a universal primary education program implemented since the mid-1990s in SSA
  - In Malawi, Free Primary Education program (FPE) was implemented in 1994, which removed all school-related fees to improve access to education
- Education has far-reaching intergenerational consequences that go beyond the impact on the affected women and men

Number of pupils enrolled in primary school



This Paper

Question

- Does parental schooling matter for human capital accumulation?
- If so, by how much?
- What may be the mechanism?

Contribution

- First paper to document male's schooling increase induced by FPE and explore intergenerational effects
- Estimate the effect of parental education on children's schooling and child labor in a developing country setting
- Separately estimate the effect based on both the giver and the recipients' gender

Literature

- Effect of increased female education by FPE
  - On fertility (Osili and Long, 2008) and on female HIV status (Alsan and Cutler, 2013; Behrman, 2015)
  - On child health (Keats, 2018) and child mortality (Andriano and Monden, 2019; Makate and Makate, 2016)
  - Effect of male schooling increase has largely been overlooked, despite the fact that FPE removed fees for both boys and girls.

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  - On child health (Keats, 2018) and child mortality (Andriano and Monden, 2019; Makate and Makate, 2016)
  - Effect of male schooling increase has largely been overlooked, despite the fact that FPE removed fees for both boys and girls.
- Intergenerational effect of education
  - A large literature exists in developed countries (Black et al., 2005)
  - In developing countries, studies mainly focus on the effect of maternal schooling on children's health (Grépin and Bharadwaj, 2015; Keats, 2018)
  - Most closely related to Agüero and Ramachandran (2020)
    - Intergenerational effect of secondary schooling in Zimbabwe
    - Baseline schooling level is higher in Zimbabwe

Literature

- Determinants of child labor
  - Previous studies find poverty (Edmonds and Schady, 2012; Edmonds, 2005), household income shocks (Beegle et al., 2006), household composition (Patrinos and Psacharopoulos, 1997) as determinants
  - Emerson and Souza (2003) finds that children are more likely to work when they come from households with parents who were child laborers
  - We find that parental education is another factor that affects child labor

Preview of Findings

- The FPE increases average schooling of mothers by 0.60 years and of fathers by 0.70 years
- One extra year of mother's schooling increases child's
  - schooling by 0.23 years
  - school attendance by 7.3 pp
- One extra year of father's schooling increases child's
  - schooling by 0.14 years
  - school attendance by 7.2 pp
- Some evidence that child's labor decreases with mother's schooling. No such effect for father's education.
- Decreased fertility, delayed age at birth, increased asset, and better spousal quality are potential mechanisms for the improved educational outcomes of children

Outline

Introduction

Background & Data

Empirical Strategy

Results

Discussion

Background & Data

Malawi's education system

- 8-4-4 system: Primary (Standards 1-8), Secondary (Forms 1 to 4), and Higher Education
  - Less than 1% of students enter university and continue their studies beyond the secondary level (The World Bank, 2011)

- In 1994, Malawi ended its one-party rule system, and brought up the first administration through multi-party democratic election since its independence in 1964.

- The new government introduced FPE, which abolished all school-related fees to improve access to education and reduce the education inequality.

Child labor

- Child labor is most prevalent in Africa (19.6%) followed by Asia and the pacific (7.4%) (ILO, 2017)

- Child labor is common in Malawi as well, with about 26% of children aged 5-14 engaging in child labor (MCIS, 2006)

- In a setting where child labor is prevalent, better-off households are less likely to have their children engage in child labor (Edmonds, 2005; Beegle et al., 2006)

Data & Analysis Sample

1. **2008 Population and Housing Census, Malawi**
   - Parents ages are restricted to +/- 5 age range around 1979 birth year (age 24 to 34)
   - Foreign born are excluded (2 %)
   - Includes parents of children of primary schooling age, 6-13
   - Constructs mother-child and father-child samples

2. **1987 Population and Housing Census, Malawi**
   - Used to conduct balance tests

Summary statistics

	Mean	SD
Panel A. Children with matched mothers		
Child's characteristics		
Age	8.839	2.158
Female	0.505	0.500
Completed schooling years	2.098	1.662
Attending school	0.751	0.433
Ever attended primary school	0.842	0.364
Literate	0.428	0.495
Working in domestic sector	0.041	0.199
Working in market sector	0.149	0.356
Working in domestic or market sector	0.191	0.393
Father exists	0.816	0.387
Mother's characteristics		
Age	29.614	2.715
Completed schooling years	4.391	3.791
Ever attended primary school	0.687	0.464
Graduated primary school	0.235	0.424
Ever attended secondary school	0.125	0.330
Graduated secondary school	0.049	0.216
Obs.	105,861	

	Mean	SD
Panel B. Children with matched fathers		
Child's characteristics		
Age	8.312	2.011
Female	0.505	0.500
Completed schooling years	1.785	1.480
Attending school	0.730	0.444
Ever attended primary school	0.821	0.383
Literate	0.351	0.477
Working in domestic sector	0.043	0.203
Working in market sector	0.166	0.372
Working in domestic or market sector	0.209	0.406
Mother exists	0.957	0.203
Father's characteristics		
Age	30.680	2.454
Completed schooling years	6.018	4.003
Ever attended primary school	0.817	0.387
Graduated primary school	0.395	0.489
Ever attended secondary school	0.246	0.431
Graduated secondary school	0.126	0.332
Obs.	47,081	

Empirical Strategy

Empirical Strategy

- Using the across-birth cohort differences in the exposure to the FPE program, regression discontinuity design (RDD) is applied
- The birth year cutoff is 1979 (1994-15)
  - Although the official age of primary schooling is up to 13, up to age 15 is affected by the reform due to delayed entry and grade repetition.
- The intergenerational effect is estimated by 2SLS

$$1st : Educ_p = \gamma_p + \delta_p Treat + g(Birthyear_p - C) + \sigma X_p + \psi_p$$

$$2nd : Y_i = \alpha + \beta \widehat{Educ_{pi}} + f(Birthyear_{pi} - C) + \theta X_i + \epsilon_{pi}$$

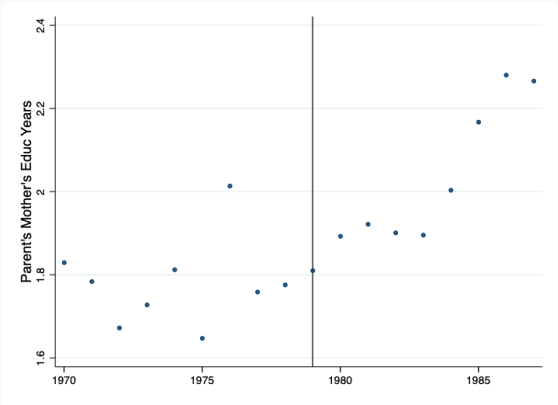
- where $p = (Mother, Father)$ and child i, $C = 1979$, and $Treat = 1$ if birth year of parent $p \geq C$. X includes FEs for region, religion, ethnicity, child's gender and child's age. SE clustered at birth year-birth region level.
- $g(\cdot)$ and $f(\cdot)$ is a quadratic spline

Validity of Identification

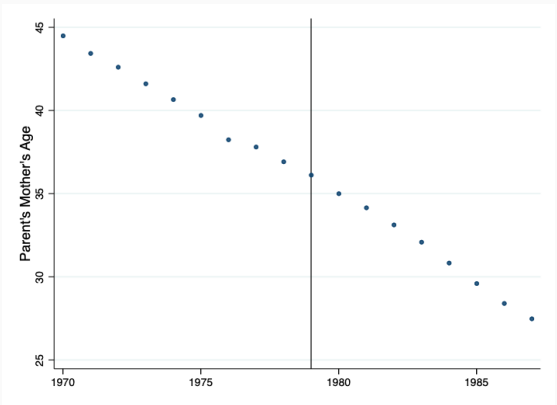
- Identifying assumption: No policy changes that sharply affect education and related behavior of the birth cohort of 1979 and beyond

- Check whether parents who gave birth around 1979 experienced different shocks
  - Using 1987 Census, we test whether the socioeconomic characteristics of affected mother's and father's parents (i.e. grandparents of the children with affected mothers and fathers) differ discontinuously at the 1979 birth year threshold

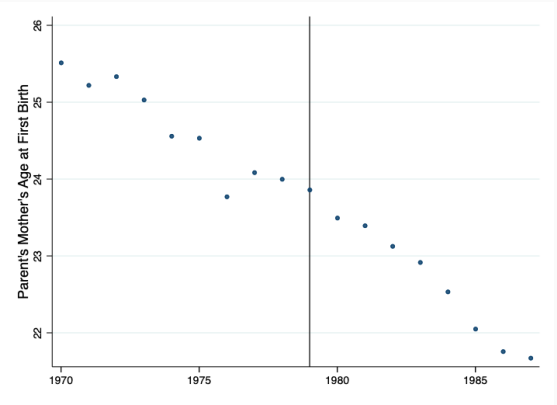
Balance Checks: Parental Characteristics



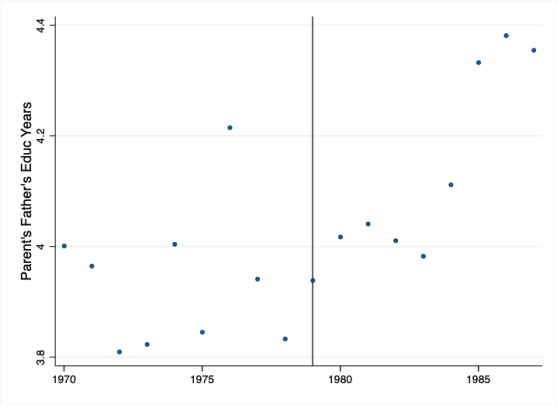
A. Mother's years of schooling



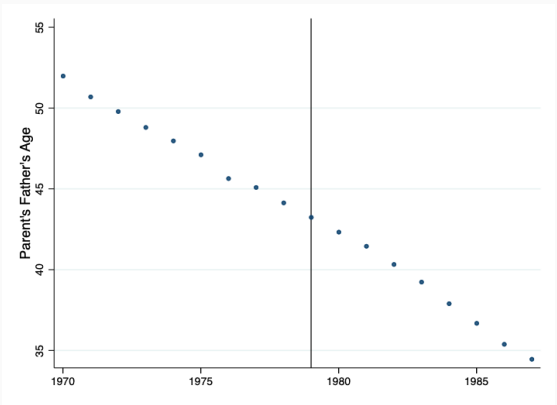
B. Mother's Age



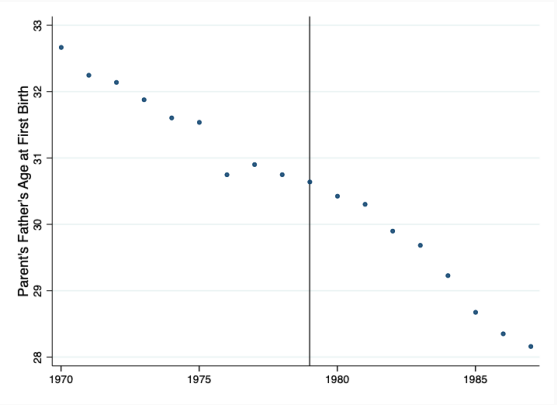
C. Mother's Age at First Birth



D. Father's years of schooling

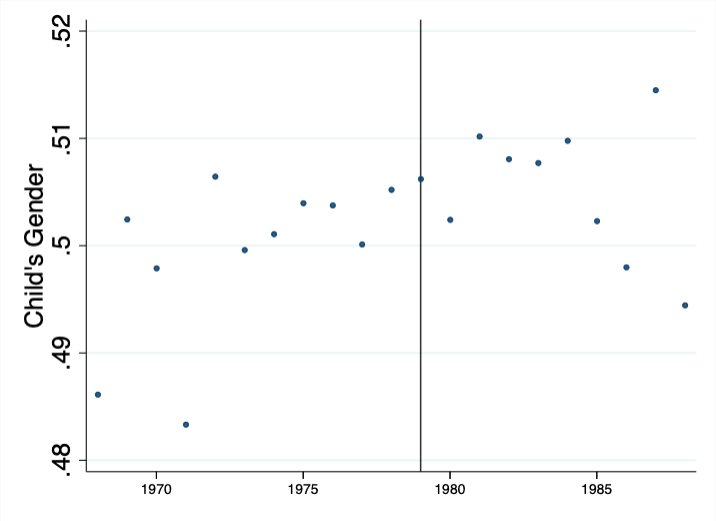


E. Father's Age

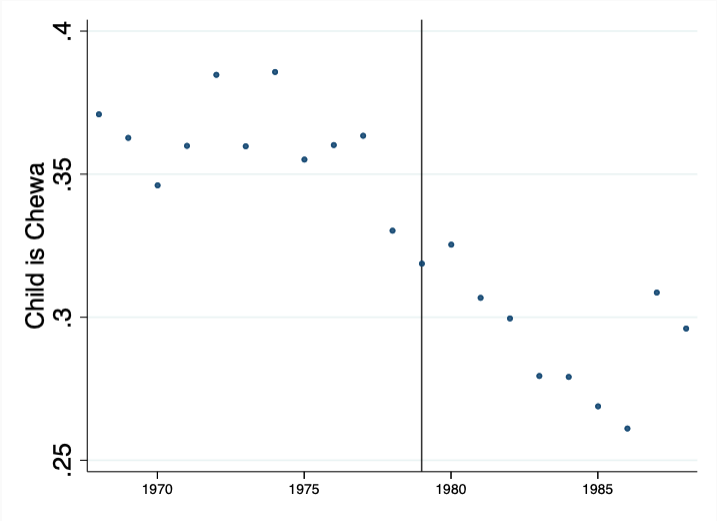


F. Father's Age at First Birth

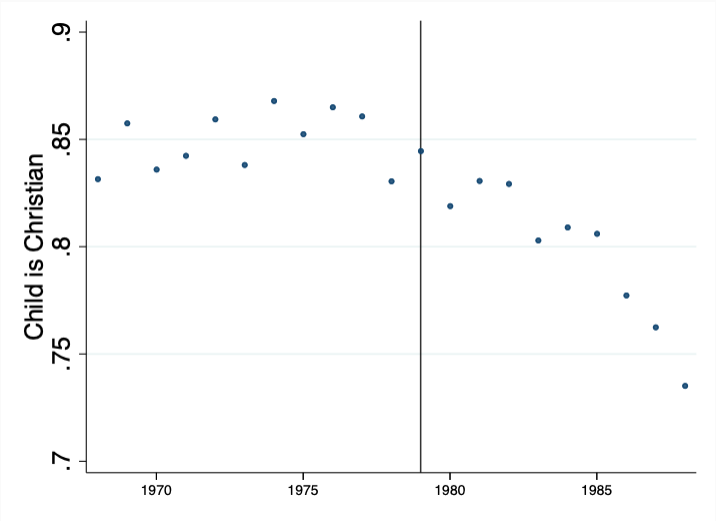
Balance Checks: Children characteristics



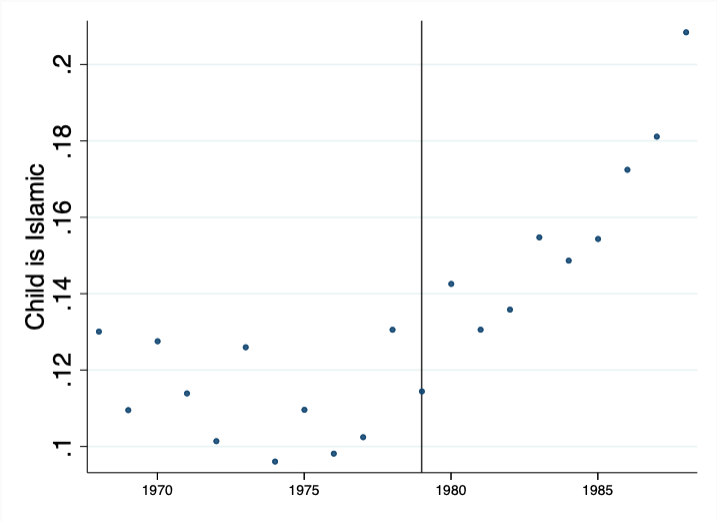
A. Whether child is female



B. Child is Chewa

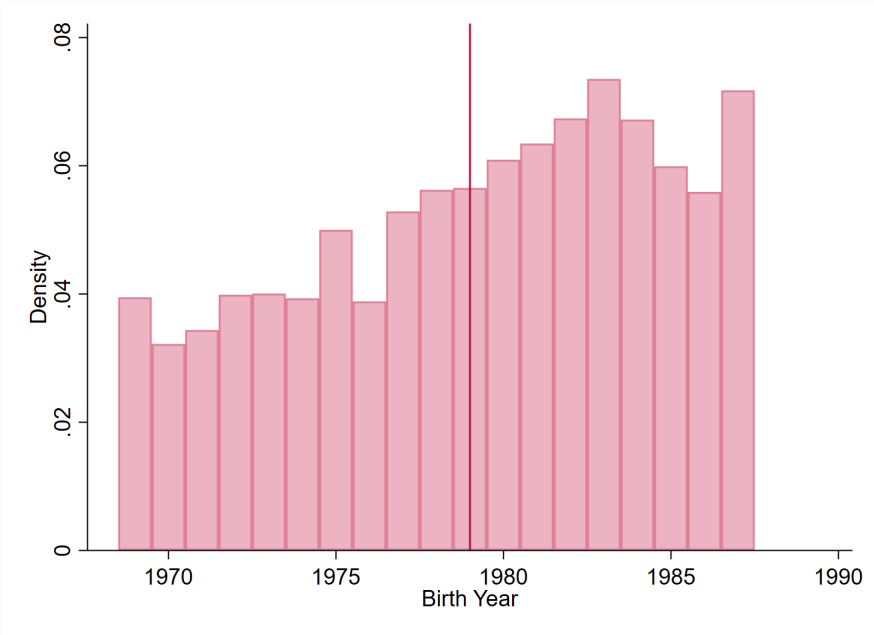


C. Child is Christian

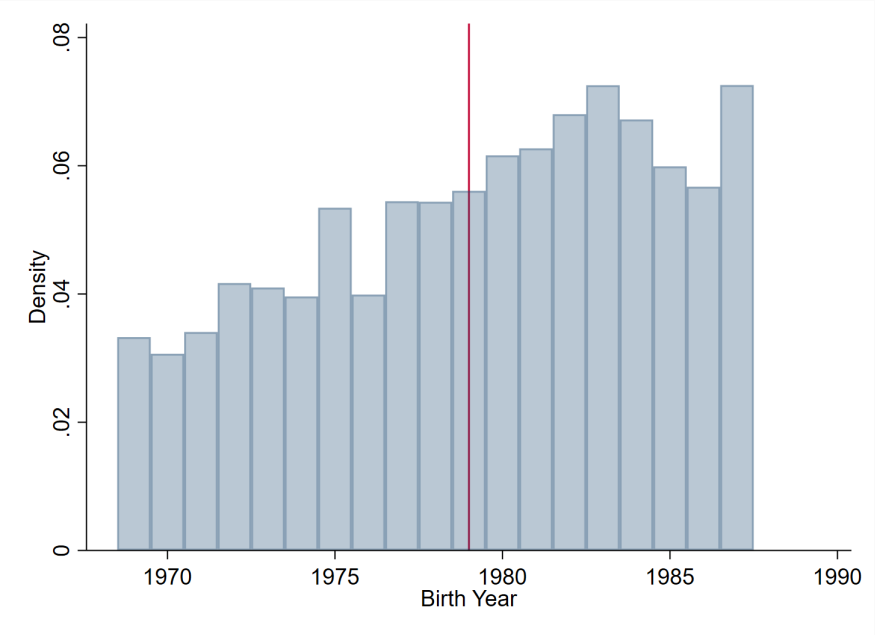


D. Child is Islamic

No Sorting



A. Female



B. Male

Results

First Stage

A. Female

B. Male

First Stage: The effect of FPE on mothers' and fathers' schooling

Table 1: First-stage Outcomes

	(1) Schooling Years	(2) Enrolled in Primary	(3) Graduated Primary	(4) Enrolled in Secondary	(5) Graduated Secondary	(6) Literacy
A. Mothers						
Eligibility	0.595***	0.084***	0.040***	0.021***	0.008	0.081***
	(0.112)	(0.015)	(0.011)	(0.007)	(0.006)	(0.015)
Mean Dep. Var.	4.567	0.698	0.251	0.140	0.057	0.678
Obs.	60,510	61,254	61,254	61,254	61,254	60,681
B. Fathers						
Eligibility	0.684***	0.060***	0.063***	0.058***	0.011	0.066***
	(0.133)	(0.015)	(0.014)	(0.013)	(0.012)	(0.016)
Mean Dep. Var.	6.176	0.826	0.411	0.263	0.136	0.820
Obs.	30,529	30,725	30,725	30,725	30,725	30,647

- Comparable to Adu Boahen and Yamauchi (2018) of 0.9 yrs from 6.02 yrs in Ghana, 0.72 yrs from 5.82 yrs for women in Uganda (Keats, 2018).
- Agüero and Ramachandran (2020): mothers' by 0.82 yrs and fathers' by 0.68 yrs in Zimbabwe from the mean of 8.1 and 9.7 yrs

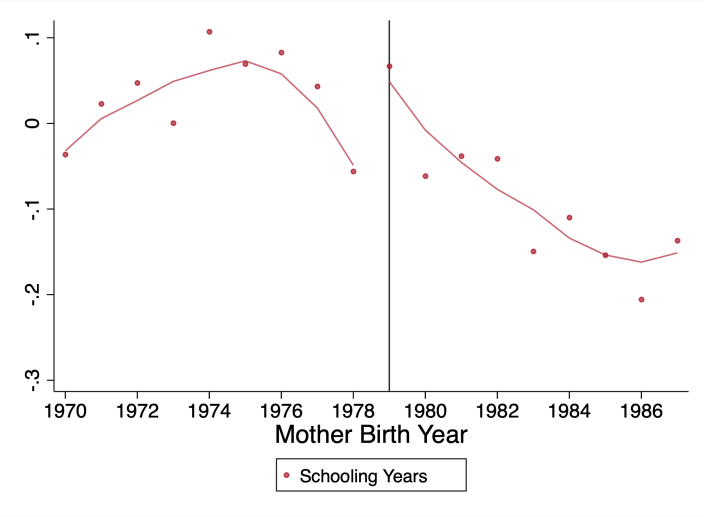
▸ Full sample ▸ By grade

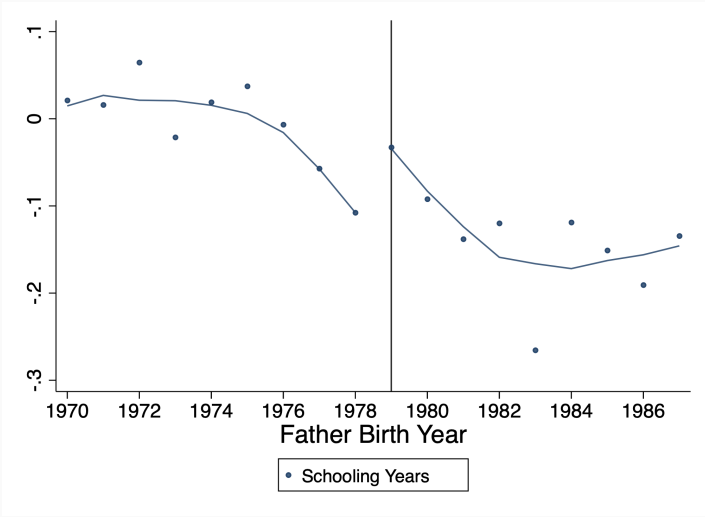
Effect of parent's education on child education

		(1) Schooling Years	(2) School Attendance	(3) Literacy
A. Mothers				
Reduced Form	*Eligibility*	0.135***	0.045***	0.022*
		(0.045)	(0.013)	(0.012)
OLS	Mother's education	0.096***	0.014***	0.025***
		(0.002)	(0.001)	(0.001)
IV	Mother's education	0.228***	0.073***	0.037*
		(0.070)	(0.025)	(0.019)
Mean Dep. Var.		2.091	0.751	0.426
Obs.		104,410	104,928	104,928
F		12.134	12.224	12.224
B. Fathers				
Reduced Form	*Eligibility*	0.095**	0.047***	0.010
		(0.037)	(0.013)	(0.014)
OLS	Father's education	0.067***	0.015***	0.019***
		(0.002)	(0.001)	(0.001)
IV	Father's education	0.137***	0.072***	0.014
		(0.050)	(0.024)	(0.019)
Mean Dep. Var.		1.778	0.730	0.348
Obs.		46,009	46,297	46,297
F		14.616	15.385	15.385

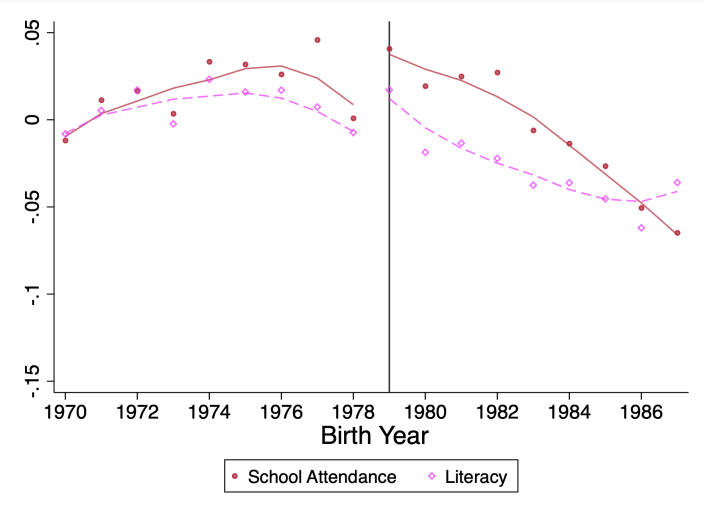
Effect of parent's education on child education

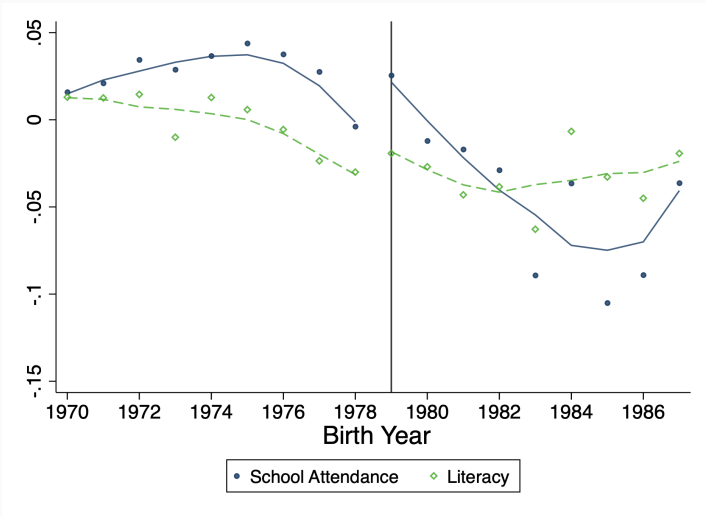
A. Child's Education Years



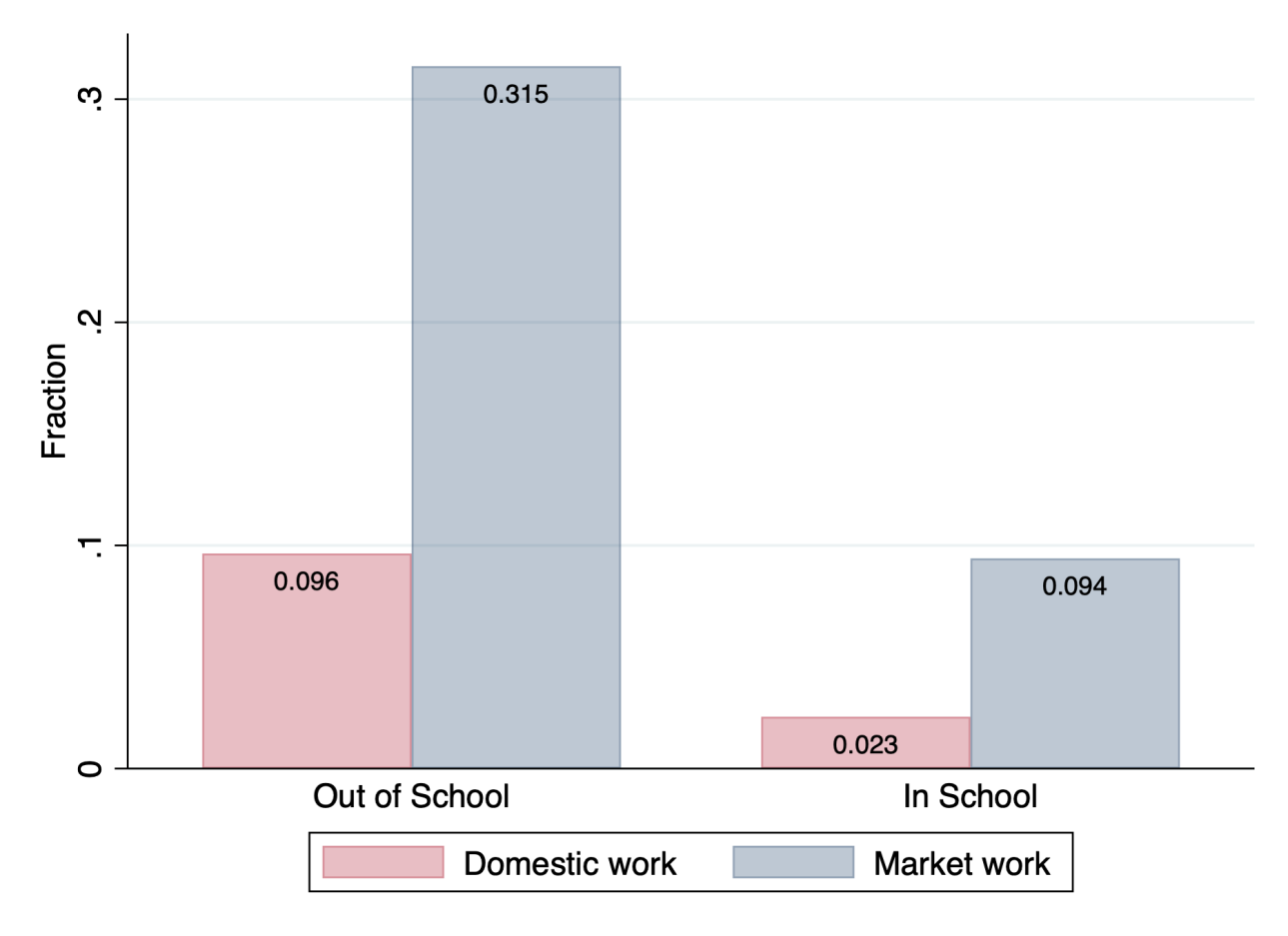


B. Child's School Attendance & Literacy





Effect of parent's education on child labor



- Trade-offs between schooling and child labor

Effect of parent's education on child labor

		(1) Domestic Work	(2) Market Work	(3) Domestic or Market Work
A. Mothers				
Reduced Form	*Eligibility*	-0.012**	-0.017*	-0.028***
		(0.006)	(0.009)	(0.010)
OLS	Mother's education	-0.004***	-0.004***	-0.008***
		(0.000)	(0.000)	(0.000)
IV	Mother's education	-0.020*	-0.028*	-0.048**
		(0.012)	(0.016)	(0.022)
Mean Dep. Var.		0.042	0.149	0.191
Obs.		104,928	104,928	104,928
F		12.224	12.224	12.224
B. Fathers				
Reduced Form	*Eligibility*	-0.000	-0.011	-0.011
		(0.007)	(0.013)	(0.014)
OLS	Father's education	-0.003***	-0.004***	-0.008***
		(0.000)	(0.001)	(0.001)
IV	Father's education	0.000	-0.016	-0.016
		(0.010)	(0.020)	(0.021)
Mean Dep. Var.		0.044	0.165	0.209
Obs.		46,297	46,297	46,297
F		15.385	15.385	15.385

Heterogeneity

- The transmission of intergenerational resources may depend on the gender of the giver or the recipient (Duflo, 2003; Barcellos et al., 2014; Breierova and Duflo, 2004; Qian, 2008)

- The impact of free compulsory education reform on child labor may vary by gender of child (Tang et al., 2020)

Heterogeneous Effect of Mother's Education on Child Education and Labor Outcomes

	(1) Schooling Years	(2) School Attendance	(3) Literacy	(4) Domestic Work	(5) Market Work	(6) Domestic or Market Work
A. Mothers						
a. Daughters						
Parent's education	0.254***	0.115***	0.032	-0.008	-0.033	-0.041
	(0.082)	(0.043)	(0.021)	(0.015)	(0.023)	(0.030)
Mean of Dep. Var	2.151	0.756	0.438	0.042	0.145	0.187
Obs.	52,646	52,902	52,902	52,902	52,902	52,902
b. Sons						
Parent's education	0.208***	0.041**	0.041*	-0.030**	-0.023	-0.053**
	(0.074)	(0.020)	(0.023)	(0.013)	(0.018)	(0.022)
Mean of Dep. Var	2.029	0.746	0.414	0.041	0.153	0.194
Obs.	51,764	52,026	52,026	52,026	52,026	52,026
c. Rural						
Parent's education	0.212***	0.069***	0.032	-0.023*	-0.025	-0.048**
	(0.069)	(0.024)	(0.020)	(0.012)	(0.017)	(0.023)
Mean of Dep. Var	1.964	0.738	0.389	0.047	0.156	0.203
Obs.	89,553	90,026	90,026	90,026	90,026	90,026
d. Urban						
Parent's education	0.360	0.122	0.066	0.018	-0.056	-0.038
	(0.475)	(0.197)	(0.089)	(0.031)	(0.099)	(0.079)
Mean of Dep. Var	2.856	0.831	0.651	0.868	0.104	0.117
Obs.	14,857	14,902	14,902	14,902	14,902	14,902

Heterogeneous Effect of Father's Education on Child Education and Labor Outcomes

	(1) Schooling Years	(2) School Attendance	(3) Literacy	(4) Domestic Work	(5) Market Work	(6) Domestic or Market Work
B. Fathers						
a. Daughters						
Parent's education	0.155**	0.094***	0.002	0.004	-0.030	-0.026
	(0.063)	(0.033)	(0.024)	(0.012)	(0.024)	(0.025)
Mean of Dep. Var	1.828	0.734	0.362	0.045	0.162	0.207
Obs.	23,222	23,363	23,363	23,363	23,363	23,363
b. Sons						
Parent's education	0.115	0.041	0.031	-0.004	-0.001	-0.004
	(0.072)	(0.030)	(0.028)	(0.014)	(0.029)	(0.031)
Mean of Dep. Var	1.727	0.726	0.335	0.043	0.169	0.212
Obs.	22,787	22,934	22,934	22,934	22,934	22,934
c. Rural						
Parent's education	0.131***	0.053***	0.017	0.001	-0.012	-0.011
	(0.046)	(0.019)	(0.018)	(0.010)	(0.018)	(0.019)
Mean of Dep. Var	1.669	0.716	0.312	0.048	0.173	0.221
Obs.	39,171	39,423	39,423	39,423	39,423	39,423
d. Urban						
Parent's education	0.285	0.573	-0.128	-0.029	-0.109	-0.137
	(1.037)	(1.684)	(0.593)	(0.112)	(0.371)	(0.450)
Mean of Dep. Var	2.401	0.810	0.558	0.016	0.125	0.141
Obs.	6,838	6,874	6,874	6,874	6,874	6,874

Discussion

Mechanisms and Implications

- Fertility and marital outcomes
  - We investigate fertility and quantity-quality tradeoff as one possible channel.
- Own labor market outcomes and wealth
  - Ability-to-pay channel
- Spouse quality
  - Assortative matching

Fertility and marital outcomes

		Children Ever Born (1)	% Children Died (2)	Age Gap (3)	Extreme Age Gap (4)	Age at Marriage (5)	Married Age <= 18 (6)	Age at Birth (7)
A. Female								
Reduced form	*Eligibility*	-0.266***	-0.018***	-1.366***	-0.031***	0.165***	-0.034***	0.268***
		(0.049)	(0.004)	(0.177)	(0.011)	(0.062)	(0.010)	(0.088)
OLS	Own education	-0.111***	-0.005***	-0.114***	-0.006***	0.163***	-0.025***	0.097***
		(0.002)	(0.000)	(0.008)	(0.000)	(0.004)	(0.001)	(0.004)
IV	Own education	-0.446***	-0.030***	-2.428***	-0.054**	0.286***	-0.059***	0.474***
		(0.110)	(0.009)	(0.540)	(0.023)	(0.104)	(0.017)	(0.174)
Mean Dep. Var.		3.994	0.110	6.153	0.142	18.344	0.589	18.823
Obs.		60,510	59,687	48,107	48,107	59,887	59,887	59,162
F		28.387	30.516	20.923	20.923	26.606	26.606	25.152
B. Male								
Reduced form	*Eligibility*	-	-	-0.358***	0.002	0.061	-0.011	0.420***
		-	-	(0.133)	(0.005)	(0.094)	(0.011)	(0.099)
OLS	Own education	-	-	-0.044***	-0.001***	0.139***	-0.010***	0.069***
		-	-	(0.007)	(0.000)	(0.005)	(0.001)	(0.005)
IV	Own education	-	-	-0.570**	0.003	0.087	-0.016	0.598***
		-	-	(0.248)	(0.007)	(0.142)	(0.017)	(0.159)
Mean Dep. Var.		-	-	-3.398	0.025	21.196	0.148	21.356
Obs.		-	-	28,910	28,910	30,480	30,480	30,177
F		-	-	21.898	21.898	26.623	26.623	29.607

Own labor market outcomes and wealth

		Employed	Agriculture	Wage Worker	Asset Score
		(1)	(2)	(3)	(4)
A. Female					
Reduced form	*Eligibility*	0.012	-0.004	0.009	0.051**
		(0.014)	(0.016)	(0.010)	(0.022)
OLS	Own education	0.003***	-0.018***	0.013***	0.064***
		(0.001)	(0.001)	(0.001)	(0.002)
IV	Own education	0.020	-0.006	0.015	0.085**
		(0.023)	(0.026)	(0.016)	(0.034)
Mean Dep. Var.		0.578	0.718	0.124	-0.006
Obs.		60,510	35,121	35,121	60,220
F		28.387	23.908	23.908	28.736
B. Male					
Reduced form	*Eligibility*	0.005	-0.021	-0.017	0.041
		(0.013)	(0.020)	(0.015)	(0.026)
OLS	Own education	0.005***	-0.024***	0.019***	0.047***
		(0.001)	(0.001)	(0.001)	(0.002)
IV	Own education	0.007	-0.028	-0.023	0.061
		(0.018)	(0.027)	(0.022)	(0.041)
Mean Dep. Var.		0.831	0.520	0.249	-0.034
Obs.		30,529	25,420	25,420	30,388
F		26.331	27.259	27.259	24.459

▸ Full sample

Spouse quality

		Spouse Schooling Years (1)	Spouse Employed (2)	Spouse Agriculture (3)	Spouse Wage worker (4)
A. Female					
Reduced form	*Eligibility*	0.615***	-0.009	-0.027**	0.034**
		(0.120)	(0.009)	(0.013)	(0.013)
OLS	Own education	0.523***	0.006***	-0.021***	0.020***
		(0.005)	(0.000)	(0.001)	(0.001)
IV	Own education	1.101***	-0.016	-0.057**	0.071***
		(0.177)	(0.017)	(0.028)	(0.027)
Mean Dep. Var.		6.104	0.838	0.514	0.278
Obs.		47,836	48,005	40,296	40,296
F		20.505	20.801	13.170	13.170
B. Male					
Reduced form	*Eligibility*	0.706***	-0.021	-0.019	0.003
		(0.106)	(0.016)	(0.018)	(0.012)
OLS	Own education	0.450***	-0.003***	-0.010***	0.005***
		(0.006)	(0.001)	(0.001)	(0.001)
IV	Own education	1.092***	-0.032	-0.020	0.004
		(0.201)	(0.027)	(0.019)	(0.013)
Mean Dep. Var.		4.704	0.545	0.762	0.101
Obs.		28,829	28,897	15,829	15,829
F		21.950	22.131	23.627	23.627

▸ Full sample

Robustness

- Our results are robust to
  - Various bandwidths
  - Non-parametric functional form ▸ robustness I
  - Various clusters
  - Multiple hypothesis testing robust p-value (Anderson, 2008) ▸ robustness II

Conclusion

- Increase in parental schooling from the introduction of FPE in malawi increases children's human capital attainment
- Potential mechanisms
  - A reduction in fertility, smaller age gap between husband and wife, and delayed age at birth for mothers.
  - Some evidence of assortative mating for both treated men and women in that they are more likely to match with spouse with more years of schooling.
  - Women are also more likely to match with spouse who are less likely to work in agriculture and more likely to be a wage worker
  - Own asset score increases with increased years of schooling for women.
- Reducing costs of schooling in developing countries has intergenerational spillovers, even at the primary school level. Increasing access to schooling at higher levels of education may have even larger effects.

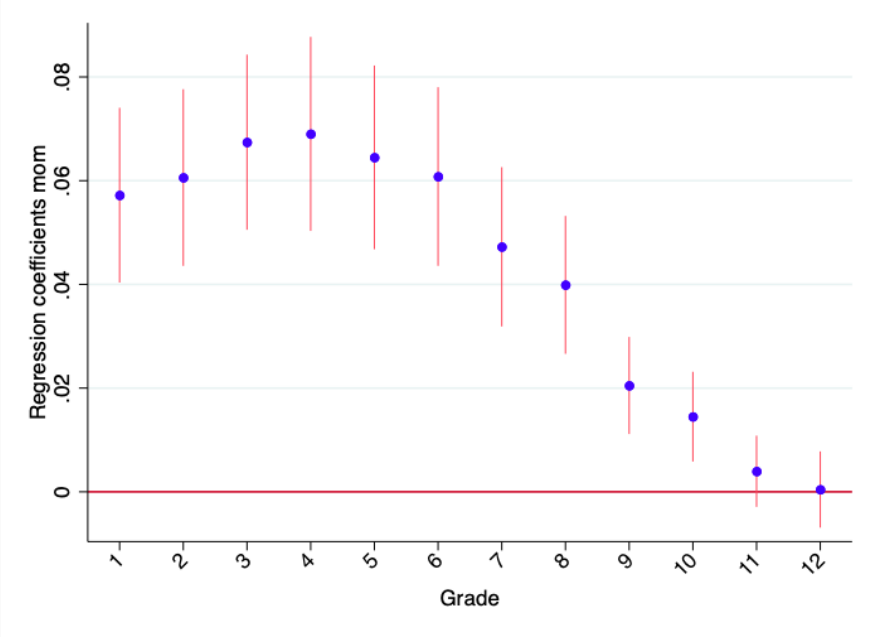
Thank you!

First stage: Full sample

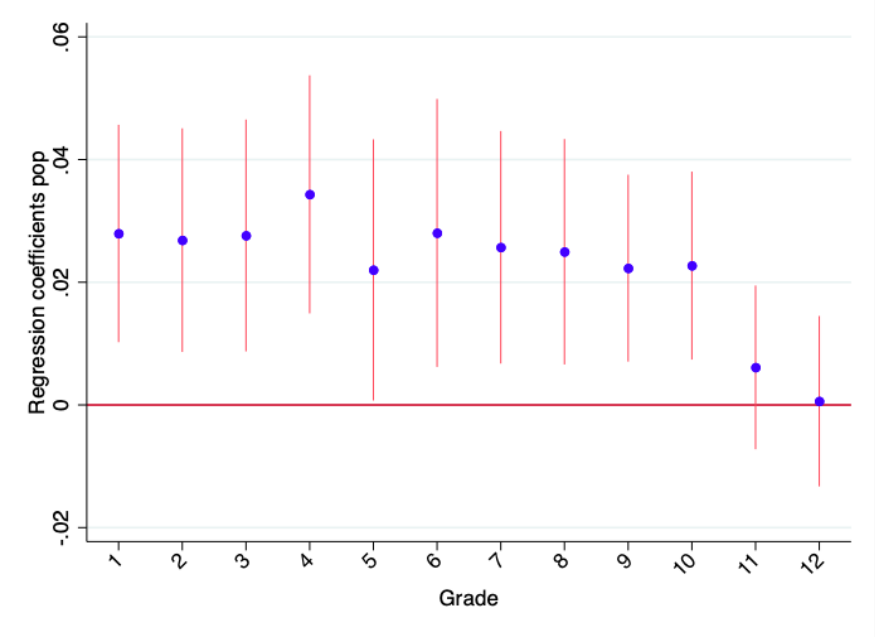
	(1) Schooling Years	(2) Enrolled in Primary	(3) Graduated Primary	(4) Enrolled in Secondary	(5) Graduated Secondary	(6) Literacy
A. Female						
Eligibility	0.720***	0.090***	0.045***	0.032***	0.016**	0.091***
	(0.095)	(0.013)	(0.009)	(0.007)	(0.007)	(0.015)
Mean Dep. Var.	5.067	0.704	0.300	0.191	0.095	0.702
Obs.	95,812	98,875	98,875	98,875	98,875	96,108
B.Male						
Eligibility	0.663***	0.057***	0.064***	0.066***	0.030***	0.052***
	(0.112)	(0.011)	(0.010)	(0.011)	(0.007)	(0.012)
Mean Dep. Var.	6.890	0.822	0.472	0.339	0.193	0.845
Obs.	93,368	97,155	97,155	97,155	97,155	93,744

▸ Back

First Stage by grade



A. Mother's



B. Father's

- FPE effect positive and significant up to grade 10
- Mothers: larger effects at primary schooling levels (Standards 1-8)
- Fathers: relatively uniform effect

▸ Back

Robustness

Independent Variable: Parent's Education	(1) Schooling Years	(2) School Attendance	(3) Literacy	(4) Domestic work	(5) Market work	(6) Domestic or Market work
A. Mothers						
Quadratic with ±5 years (benchmark)	0.228***	0.073***	0.037*	-0.020*	-0.028*	-0.048**
	(0.070)	(0.025)	(0.019)	(0.012)	(0.016)	(0.022)
±4 years	0.238***	0.077***	0.036**	-0.022**	-0.036**	-0.059***
	(0.063)	(0.023)	(0.017)	(0.011)	(0.015)	(0.022)
±6 years	0.192***	0.059***	0.033***	-0.020***	-0.016	-0.036**
	(0.044)	(0.015)	(0.013)	(0.007)	(0.011)	(0.014)
±7 years	0.191***	0.054***	0.027*	-0.023***	-0.019	-0.042***
	(0.051)	(0.016)	(0.015)	(0.009)	(0.012)	(0.016)
Local linear RD with ±5 years	0.172***	0.058***	0.026*	-0.019**	-0.019*	-0.037**
	(0.047)	(0.016)	(0.013)	(0.008)	(0.011)	(0.015)
Benchmark p-val.	[0.001]	[0.003]	[0.054]	[0.081]	[0.082]	[0.030]
FDR p-val.	[0.007]	[0.008]	[0.058]	[0.058]	[0.058]	[0.042]
B. Fathers						
Quadratic with ±5 years	0.137***	0.072***	0.014	0.000	-0.016	-0.016
	(0.050)	(0.024)	(0.019)	(0.010)	(0.020)	(0.021)
±4 years	0.092*	0.068***	0.008	0.009	-0.020	-0.011
	(0.051)	(0.025)	(0.020)	(0.011)	(0.022)	(0.023)
±6 years	0.157***	0.064***	0.040**	0.000	-0.029*	-0.029
	(0.047)	(0.020)	(0.017)	(0.009)	(0.018)	(0.018)
±7 years	0.144**	0.074**	0.037	0.005	-0.048*	-0.043
	(0.065)	(0.030)	(0.024)	(0.014)	(0.026)	(0.027)
Local linear RD with ±5 years	0.167***	0.067***	0.031	0.005	-0.033	-0.028
	(0.054)	(0.024)	(0.022)	(0.012)	(0.020)	(0.022)
Benchmark p-val.	[0.006]	[0.003]	[0.465]	[0.976]	[0.422]	[0.453]
FDR p-val.	[0.019]	[0.019]	[0.593]	[1.000]	[0.593]	[0.593]

▸ Back

First-stage outcomes with different clusters

Independent Variable: *Eligibility*	(1) Schooling Years	(2) Enrolled in Primary	(3) Graduated Primary	(4) Enrolled in Secondary	(5) Graduated Secondary	(6) Literacy
A. Mothers						
Birth Year and District Cluster (benchmark)	0.595***	0.084***	0.040***	0.021***	0.008	0.081***
	(0.112)	(0.015)	(0.011)	(0.007)	(0.006)	(0.015)
P-value	[0.000]	[0.000]	[0.000]	[0.004]	[0.157]	[0.000]
FDR P-value	[0.001]	[0.001]	[0.001]	[0.002]	[0.027]	[0.001]
Birth Year Cluster P-value	[0.001]	[0.002]	[0.002]	[0.003]	[0.074]	[0.003]
Birth year cluster p-val (wild bootstrapped)	[0.049]	[0.047]	[0.046]	[0.048]	[0.237]	[0.056]
District Cluster P-value	[0.000]	[0.000]	[0.001]	[0.008]	[0.178]	[0.000]
Wild bootstrapped p-val	[0.000]	[0.000]	[0.000]	[0.006]	[0.194]	[0.000]
Mean Dep. Var.	4.567	0.698	0.251	0.140	0.057	0.678
Obs.	60,510	61,254	61,254	61,254	61,254	60,681
B. Fathers						
Birth Year and District Cluster (benchmark)	0.684***	0.060***	0.063***	0.058***	0.011	0.066***
	(0.133)	(0.015)	(0.014)	(0.013)	(0.012)	(0.016)
P-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.341]	[0.000]
FDR P-value	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Birth Year Cluster P-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.241]	[0.001]
Wild bootstrapped p-val	[0.000]	[0.019]	[0.010]	[0.001]	[0.493]	[0.023]
District Cluster P-value	[0.000]	[0.001]	[0.000]	[0.000]	[0.335]	[0.002]
Wild bootstrapped p-val	[0.000]	[0.000]	[0.000]	[0.000]	[0.344]	[0.000]
Mean Dep. Var.	6.176	0.826	0.411	0.263	0.136	0.820
Obs.	30,529	30,725	30,725	30,725	30,725	30,647

▸ Back

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Intergenerational transmission of parental education in Malawi: 토론

2022.04

박명호 (한국 외대)

연구 내용

- 발표 논문은 높은 완성도를 지니고 있으며 중요한 정책적 함의를 포함하고 있음
  - 부모의 학령 경험이 아프리카의 인구 증가, 인적 자원 개발, 부의 측면에서 개발 측면에서 긍정적 효과를 기대
  - 개발협력 또는 국가 정책의 관점에서 무상교육의 도입과 경제성장을 연결시키기 위해서는 고려해야 할 내용이 매우 많다는 점에서 앞으로 연구가 기대됨
  - 한국의 무상의무 교육과 산업화를 연결시킨 경험은 개도국에게 중요한 함의를 제공할 것으로 기대
- 말라위는 1994년 민주화와 다당제 + 무상교육을 도입
- 교육이 주는 긍정적인 효과는 매우 큼. 말라위 사례를 대상으로 무상교육 강화로 인한 부모의 학령기간 연장이 자녀 인적자본 향상에 기여했음을 보여주고자 함
  - 1987, 2008년 말라위 인구 및 주거 조사 토대로 분석

연구 내용

- 연구 결과
  - 1) 무상교육이 부모에 미친 효과: 학령기간, 취학률, 졸업, 중등 진학, 문해율에 모두 긍정적
  - 2) 부모가 자식에게 미친 효과: 학령기간, 출석률에 긍정적 단지 문해율 경우 부모에 따라 달리 나타남
  - 3) 부모 교육과 아동노동에 미친 효과: 모의 교육은 가사노동, 시장 노동에 영향을 미치나 부의 경우 유의미한 효과 없음
  - 4) 부모와 자녀의 성별 감안한 효과 분석
  - 5) 노동시장 성과와 부
  - 6) 배우자 특성: 여성 경우 남편 학령, 직업과 유의미 (농업은 아니고 임노동은 맞고); 남성 경우 부인 학령기간과 유의미한 관계

토론 내용

- 말라위에서 (부모의) 의무 무상 교육이 자녀에게 주는 효과를 짜임새 있게 잘 보여준 매우 흥미로운 논문입니다.

- 1. 샘플의 크기/대표성에 대한 추가적인 설명이 필요해 보입니다. 인구 주거 조사에서 일부 통계만 가져다 쓴 것인지 전국 데이터를 모두 가져다 쓴 것인지 파악하기 어렵네요. (Observation 수가 너무 적어서)

- 2. 학령 기간 및 학령 인구 통계만 제시하고 있고 국가차원에서 중요한 취학률 데이터는 보이지 않습니다. 취학률에 대한 시계열 자료가 있다면 1994년 이전 이후를 구분해서 분석한다면 좀 더 의미 있는 연구결과를 볼 수 있다고 생각합니다. 마찬가지로 성인 문해율 관련 시계열 데이터를 찾을 수 있다면 이 역시 큰 도움이 되리라 생각합니다.

토론 내용

- 3. 초등과정의 의무화는 시행하지만 현실적으로 학교 건물 부족, 교사 임금 지급 해야 할 예산 부족 등 살펴봐야 할 변수가 많이 있다고 봅니다. 교육 환경은 아프리카 국가별로 크게 다른지 아니면 유사한지 논의가 필요하다고 봅니다.

- 4. 한국의 초등교육 의무화 정책 및 아동 취학률, 성인 문해율에 대한 연구는 말라위 뿐 아니라 아프리카 국가의 초등교육 의무화에 주는 시사점이 적지 않아 보입니다. 특히 한국의 경우 **농지개혁은 초등교육 의무화에 매우 중요한 영향을** 미쳤다는 점을 볼 때 교육 정책을 따로 떼어서 보는 경우 전체적인 그림을 놓질 수 있다고 봅니다. 한국에서는 농지개혁 결과 한편으로는 소작농이 자영농으로 전환되면서 자녀를 학교에 보낼 여력이 생겼고, 다른 한편으로는 농지개혁에서 교육 및 종교 재단의 경우 농지개혁의 대상에서 제외함으로써 이들 재단의 학교 설립이 초등교육 확산에 결정적인 역할을 합니다.

What Explains Vietnam's Exceptional Performance in Education Relative to Other Countries? Analysis of the 2012 and 2015 PISA Data

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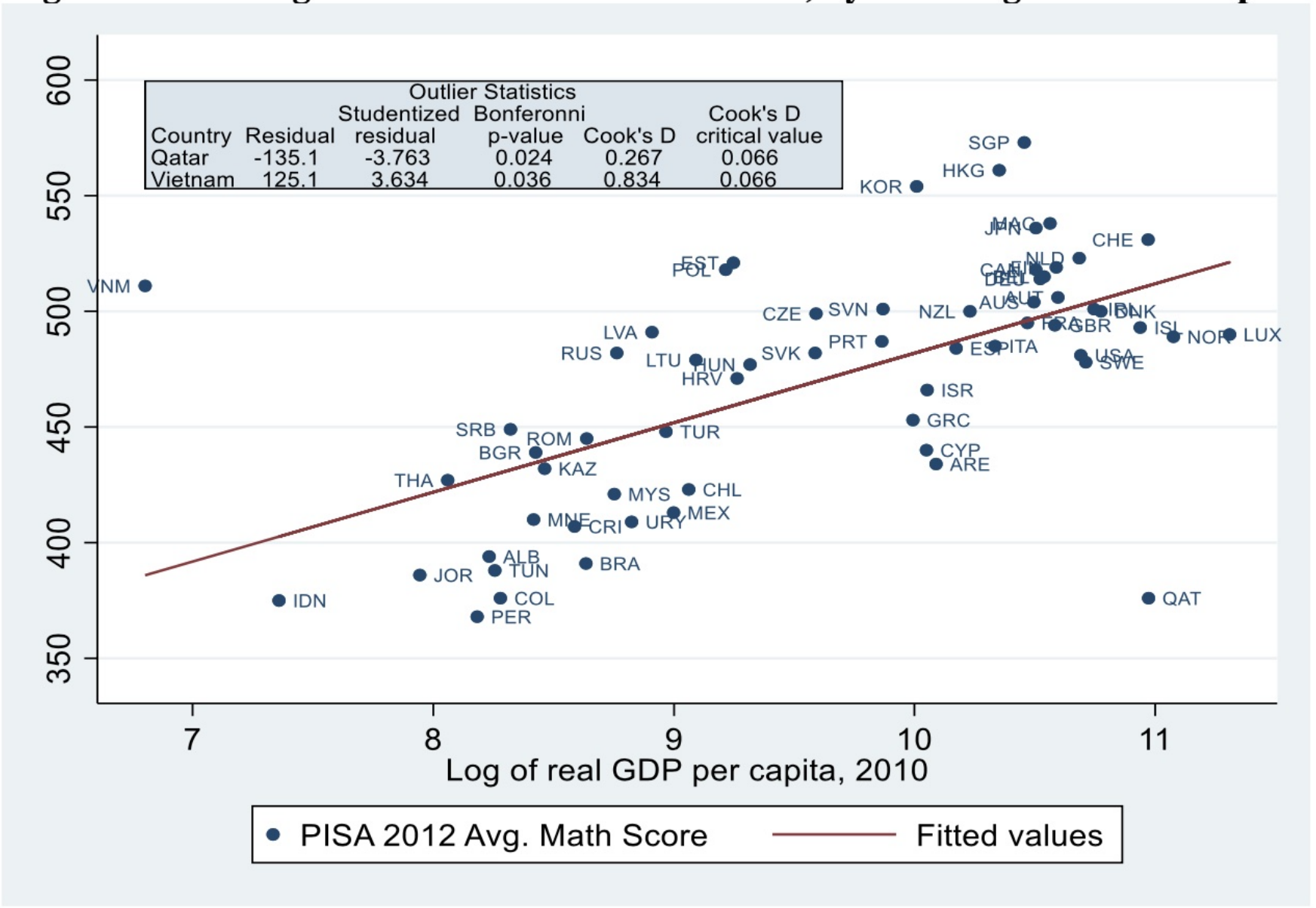
April 29, 2022

Vietnam: An Apparent International Education Success Story...

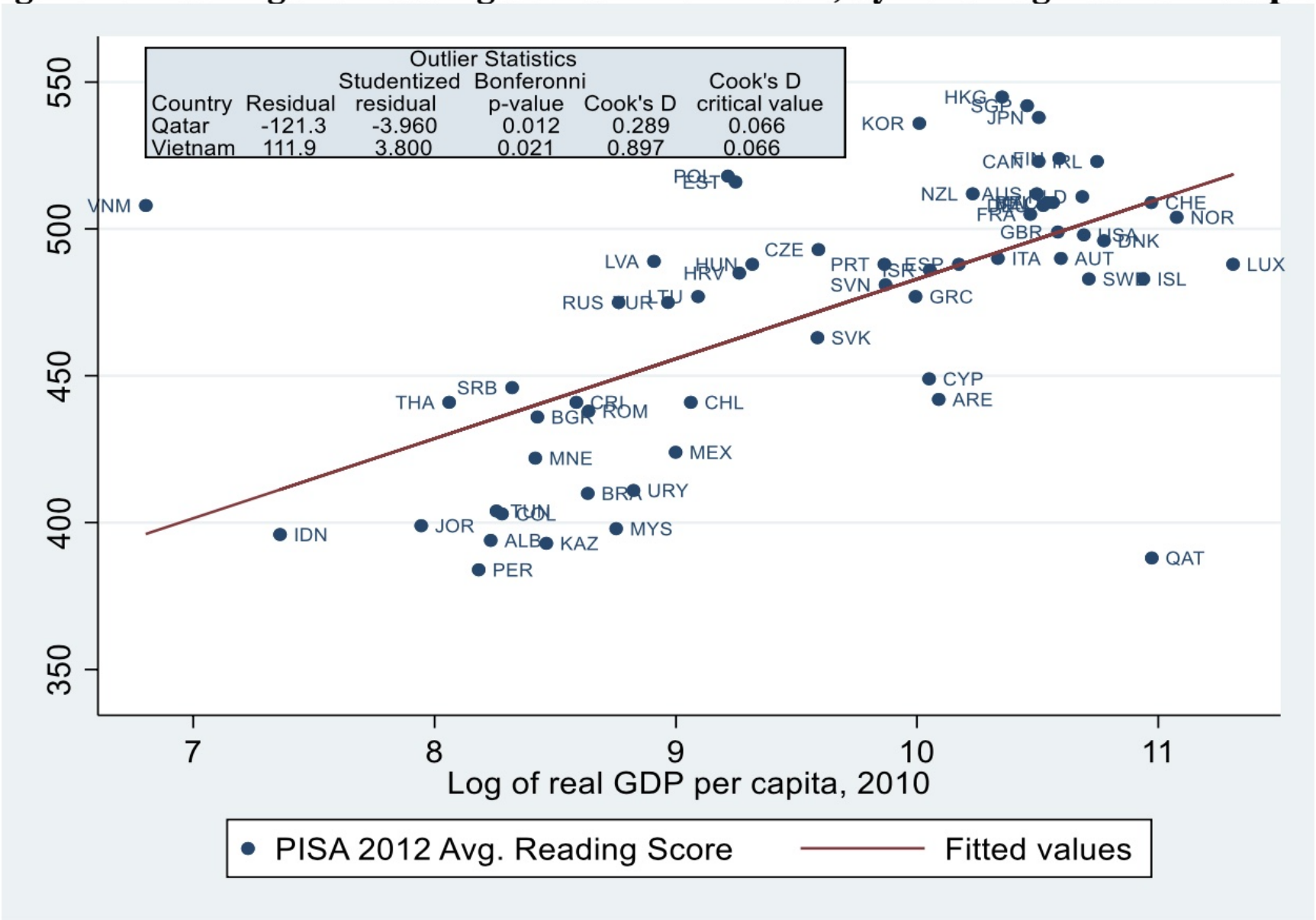
- Vietnam's achievements have generated a great deal of international attention
  - Primary completion rate 97%
  - Lower secondary enrollment rate of 95%
  - 2012 PISA (Programme for International Student Assessment)
    - 16th in math (out of 63 participating countries)
    - 18th in reading (out of 63 participating countries)
    - Ahead of U.S. and U.K.!
    - Vietnam's scores much higher than predicted by its income level.
    - Note 1: The same pattern is found when PPP-adjusted GDP per capita is used.
    - Note 2: Vietnam's performance on 2015 was similar, though slightly lower.

Figure 1. Mean Age 15 Math Scores in 2012 PISA, by 2010 Log Real GDP/capita



Note: The outlier statistics are shown only for countries that are outliers by one or both of the two criteria.

Figure 2. Mean Age 15 Reading Scores in 2012 PISA, by 2010 Log Real GDP/capita



Note: The outlier statistics are shown only for countries that are outliers by one or both of the two criteria.

Figure 3. Mean Age 15 Math Scores in 2015 PISA, by 2010 Log Real GDP/capita

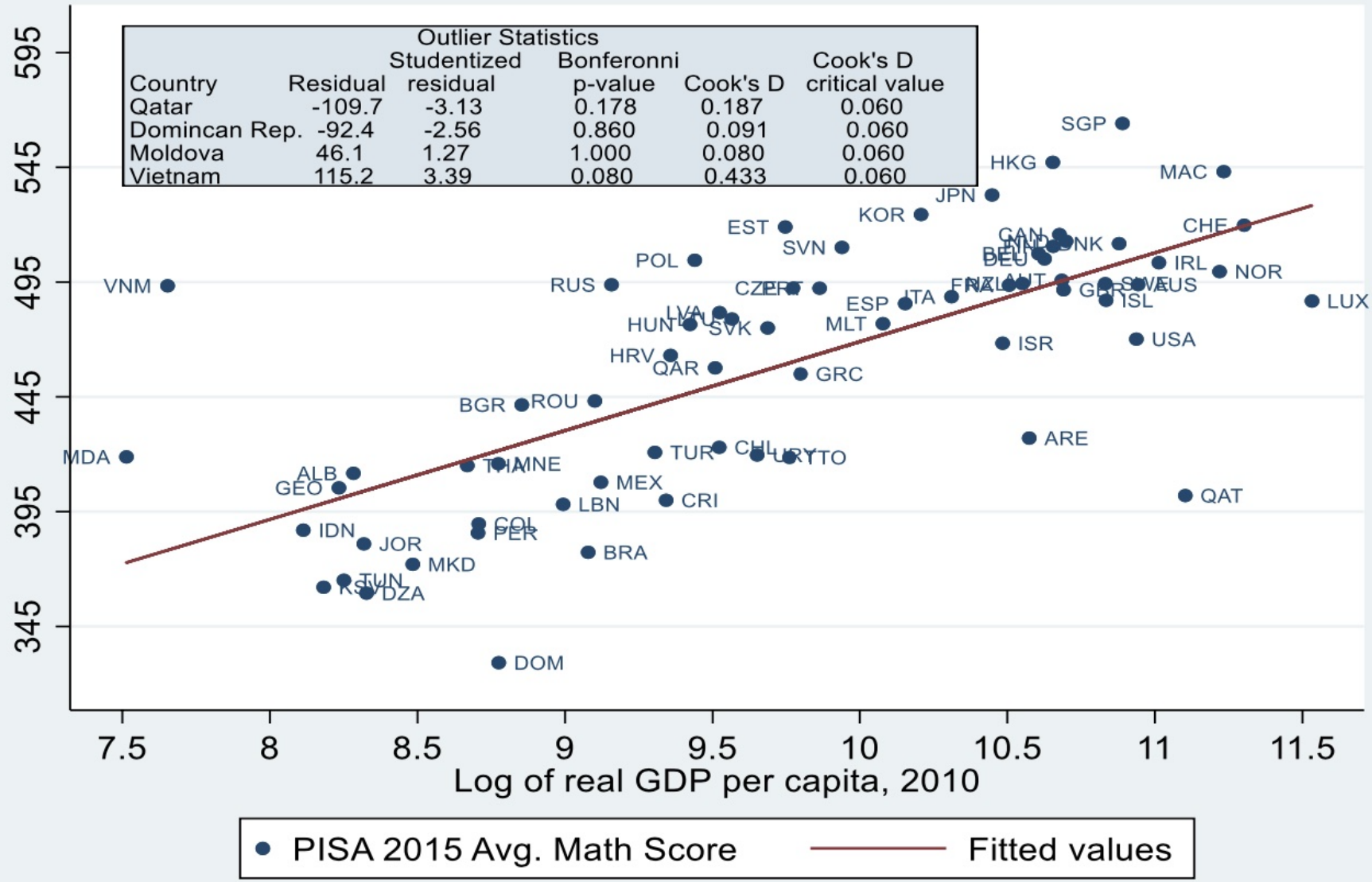
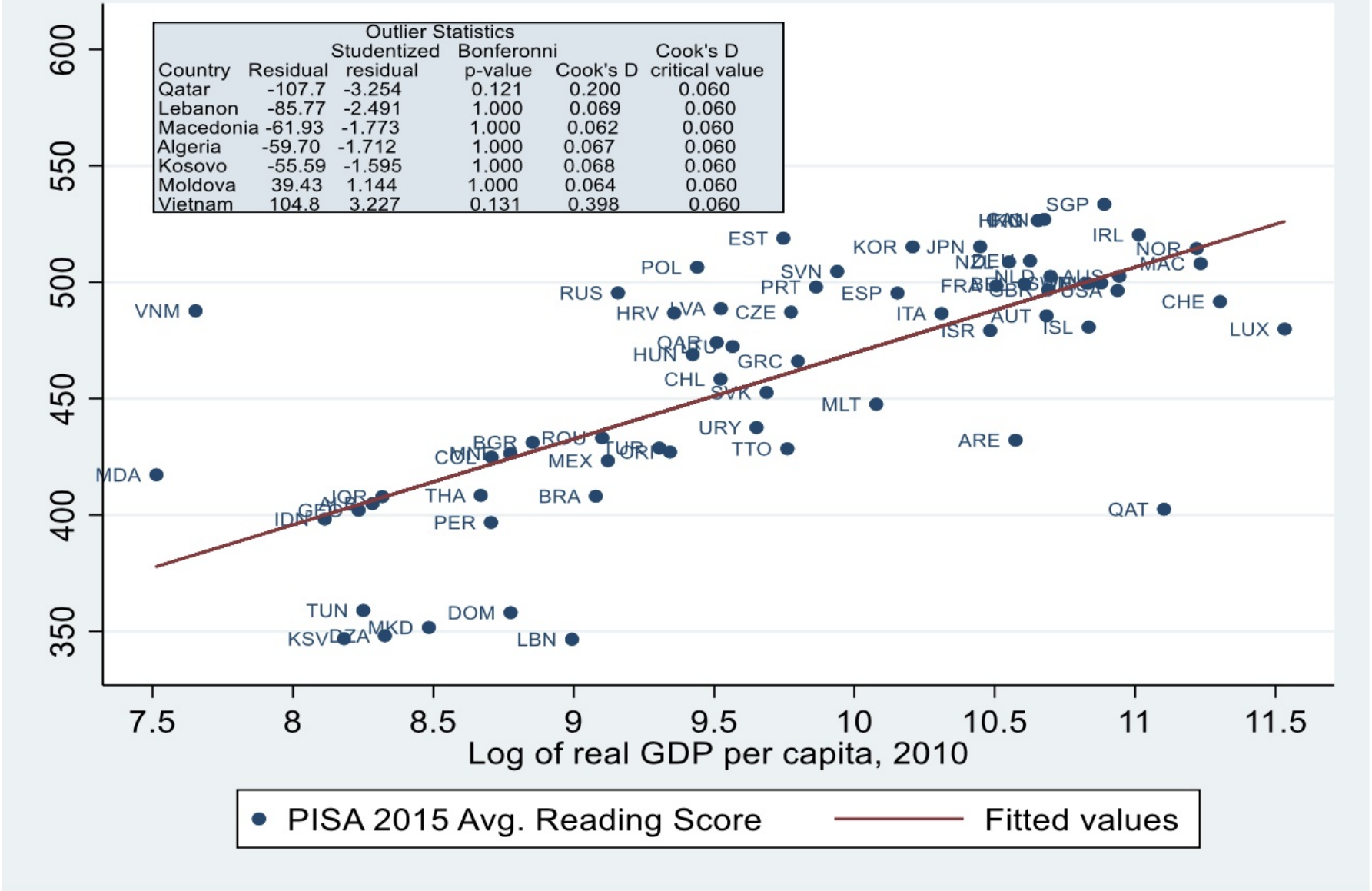


Figure 4. Mean Age 15 Language Scores in 2015 PISA, by 2010 Log Real GDP/capita



This study...

- It examines wherther Vietnam's impressive performance on the PISA assessments may be exaggerated.
  1. Were Vietnam's PISA participants above average students?
  2. Vietnam's relatively low entollment rate for 15-year-olds?
  3. Were VN students more motivated to exert effort on the PISA?
  4. Did VN students perform better because they were coached?
- It investigates whether family, teacher, or school characteristics can explain Vietnamese students' high performance.
- It applies the Oaxaca-Blinder decomposition to diagreegregate the difference in average test scores between VN students and students in the other countries.

1. Were Vietnam's PISA Participants Above Average Students?

- 2012 PISA participants were to be a random sample of all children born in 1996 (15 yrs old in Jan. 2012) who were enrolled in school in 2012.
- VN students in 2012 VHLSS are compared with 2012 VN PISA participants.
  - To check whether VN students participated in 2012 PISA represent the students that PISA was intended to sample

Table 1: Student Characteristics in 2012 (born in 1996) and 2015 (born in 1999): PISA vs. VHLSS

	2012 PISA and 2012 VHLSS				2015 PISA and 2014 & 2016 VHLSS			
	PISA	VHLSS (PISA-eligible only)			PISA	VHLSS (PISA-eligible only)		
Variable		All	Mar.-July	Difference		All	Mar.-July	Difference
	(1)	(2)	(3)	(3) – (1)	(4)	(5)	(6)	(6) – (4)
Urban	50.3%	26.0%	25.3%	-24.9***	49.6%	30.5%	28.6%	-21.0***
	(4.2)	(2.3)	(3.2)	(5.2)	(4.0)	(1.9)	(2.7)	(4.9)
Female	53.8%	51.7%	51.7%	-2.1	51.4%	51.4%	47.1%	-4.3
	(0.8)	(2.6)	(3.5)	(3.6)	(1.0)	(1.9)	(2.6)	(2.8)
Current grade: 10 or higher	86.1%	84.3%	75.7%	-10.4***	85.5%	90.5%	84.3%	-1.2
	(2.6)	(1.8)	(3.0)	(3.9)	(3.0)	(1.0)	(1.8)	(3.5)
Current grade: 9 or lower	10.3%	14.0%	22.2%	11.9***	9.0%	8.5%	15.1%	6.2**
	(2.2)	(1.7)	(2.8)	(3.6)	(2.2)	(1.0)	(1.8)	(2.8)
Current grade: unknown/other[a/]	3.6%	1.7%	2.1%	-1.5	5.5%	1.0%	0.6%	-4.9**
	(1.5)	(0.7)	(1.3)	(2.0)	(2.3)	(0.4)	(0.4)	(2.3)
Father's years of schooling	8.95	7.18	7.19	-1.76***	8.4	7.1	6.9	-1.47***
	(0.17)	(0.22)	(0.32)	(0.37)	(0.17)	(0.17)	(0.23)	(0.29)
Mother's years of schooling	8.34	6.80	6.93	-1.41***	7.9	6.6	6.4	-1.41***
	(0.19)	(0.19)	(0.26)	(0.32)	(0.20)	(0.15)	(0.22)	(0.29)
Owns an air-conditioner	16.0%	7.1%	7.1%	-8.8***	20.7%	19.2%	15.2%	-5.5**
	(2.1)	(1.4)	(2.1)	(3.0)	(1.6)	(1.7)	(2.2)	(2.8)
Owns a motorbike	93.1%	91.0%	90.7%	-2.4	93.9%	94.0%	93.8%	-0.2
	(0.5)	(1.4)	(2.0)	(2.1)	(0.5)	(0.8)	(1.3)	(1.4)
Owns a car	7.3%	0.7%	1.0%	-6.3***	7.9%	2.0%	2.6%	-5.3***
	(0.8)	(0.3)	(0.7)	(1.1)	(0.7)	(0.5)	(0.9)	(1.1)
Owns a computer	39.1%	24.5%	25.1%	-14.1***	44.1%	29.5%	28.5%	-15.6***
	(2.2)	(2.3)	(3.2)	(3.9)	(1.9)	(1.8)	(2.4)	(3.1)
Number of televisions owned	1.39	1.00	1.00	-0.38***	1.42	1.09	1.05	-0.36***
	(0.03)	(0.02)	(0.03)	(0.04)	(0.03)	(0.02)	(0.03)	(0.04)
Sample size	4,771	455	236		5687	849	415	
PISA coverage/eligibility rate	56%	75%	78%		49%	76.4%	77.8%	

- How would VN students have scored on PISA if the sample had had the same student characteristics as VHLSS sample?

$$PISAscore_i = \beta' \boldsymbol{X_i} + u_i \tag{1}$$

  - $\boldsymbol{X_i}$ is a vector of the characteristics student i.

$$\overline{PISAscore} = \widehat{\beta}'_{\boldsymbol{OLS}} \overline{\boldsymbol{X}}_{\boldsymbol{PISA}} \tag{2}$$

  - The horizental bars indicate mean values.
  - $\widehat{\beta}_{\boldsymbol{OLS}}$ is the OLS estiamte of β.

Table B1: Predictors of 2012 and 2015 PISA Scores in Vietnam

Variables	2012 Math	2012 Reading	2015 Math	2015 Reading
Rural	-18.04***	-11.56**	-18.86***	-9.822
	(6.775)	(5.699)	(4.98)	(5.908)
Female	-16.58***	24.61***	15.97***	-8.461***
	(2.317)	(2.009)	(2.05)	(2.272)
Grade 10	105.8***	95.14***	69.85***	74.61***
	(6.809)	(6.077)	(7.19)	(6.07)
Father years of schooling	2.231***	1.536***	0.893**	1.460***
	(0.495)	(0.395)	(0.408)	(0.541)
Mother years of schooling	1.879***	1.661***	1.646***	2.041***
	(0.489)	(0.422)	(0.328)	(0.373)
Owns an air conditioner	5.456	-0.626	-0.712	-2.685
	(6.279)	(4.450)	(4.126)	(4.971)
Owns a motorbike	--	--	15.83***	6.451
			(5.01)	(5.974)
Owns a car	-6.723	-3.442	5.202	-1.249
	(4.645)	(3.892)	(4.758)	(5.950)
Owns a computer	17.35***	10.86***	16.61***	23.39***
	(3.511)	(2.810)	(2.611)	(3.34)
Number of televisions owned	0.526	2.977	7.284***	6.734**
	(2.425)	(2.187)	(2.141)	(2.601)
Constant	396.7***	385.2***	376.9***	386.4***
	(8.881)	(8.545)	(9.31)	(10.41)
Observations	4771	4771	5687	5687
R-squared	0.310	0.341	0.274	0.207

Table 2: Predicted PISA Math Scores Based on VHLSS Data, Decomposed by Variable (Using March – July Means of VHLSS data)

A. 2012 PISA Data and 2012 VHLSS Data

Variable	Variable Means		Difference in Means	Math Coeff.	Math Coefficient Multiplied by:		
	PISA	VHLSS			PISA Mean	VHLSS Mean	Difference in Means
Rural	0.497	0.747	-0.250	-18.04	-9.0	-13.5	4.5
Female	0.538	0.517	0.021	-16.58	-8.9	-8.6	-0.4
Grade 10	0.861	0.757	0.104	105.8	91.0	80.1	11.0
Dad Yrs. Sch.	8.81	7.19	1.62	2.231	19.7	16.0	3.6
Mom yrs. sch.	8.23	6.93	1.306	1.879	15.5	13.0	2.4
Air condit.	0.160	0.071	0.089	5.456	0.9	0.4	0.5
Car	0.094	0.010	0.084	-6.723	-0.6	-0.1	-0.6
Computer	0.391	0.251	0.140	17.35	6.8	4.4	2.4
TVs	1.39	1.00	0.39	0.526	0.7	0.5	0.2
Constant	1.000	1.000	0.000	396.7	396.7	396.7	0.0
Column sum	--	--	--	--	512.7	489.0	23.7

Table 3 Predicted Reading Scores Based on VHLSS Data, Decomposed by Variable (Using March – July Means for the VHLSS data)

A. 2012 PISA and 2012 VHLSS Data

Variable	Variable Means		Difference in Means	Reading Coeff.	Reading Coefficient Multiplied by:		
	PISA	VHLSS			PISA Mean	VHLSS Mean	Difference in Means
Rural	0.497	0.747	-0.250	-11.56	-5.7	-8.6	2.9
Female	0.538	0.517	0.021	24.61	13.2	12.7	0.5
Grade 10	0.861	0.757	0.104	95.14	81.9	72.0	9.9
Dad Yrs. Sch.	8.81	7.19	1.62	1.536	13.5	11.0	2.5
Mom yrs. sch.	8.23	6.93	1.30	1.661	13.7	11.5	2.2
Air condit.	0.160	0.071	0.089	-0.626	-0.1	-0.0	-0.1
Car	0.094	0.010	0.084	-3.442	-0.3	-0.0	-0.3
Computer	0.391	0.251	0.140	10.86	4.2	2.7	1.5
TVs	1.39	1.00	0.39	2.977	4.1	3.0	1.1
Constant	1.000	1.000	0.000	385.2	385.2	385.2	0.0
Column sum	--	--	--	--	509.8	489.5	20.3

2. Adjusting Vietnam's Loow Enrollment Rate

- A relatively larger proportion of academically weaker VN 15-yr-olds did not participate in the PISA?
- Coverage index
  - 55.7% of VN 15-yr-olds participated in 2012 PISA (3rd lowest coverage rate)
  - 49.0% of VN 15-yr-olds participated in 2015 PISA (1st lowest coverage rate)
- Three methods to adjust the low coverage rate
  - Focus on the top 50%
  - Adjust with auxiliary data
  - Bounds analysis

Method 1: Focus on the Top 50%

- Assume that if non-participating 15-yr-olds had participate, they would have scored in the lowest 50% of the distribution of test scores among 15-yr-olds in their respective countries.
- Countries with a lower coverage rate, this adjustment underestimate the performance of the rop 50% of students.
  - b/c for these countries it is more likely that some not in school would be in the top 50% if they were in school.
- Results
  - VN's top 50% scores are not much higher than unadjusted scores.
  - The increase in top 50%'s scores was much higher for other countries.
  - The increases were highest in the wealthier countries (with high PISA participation rates)

  $\Rightarrow$ Vietnam is still the largest positive outlier.

Table B2: PISA Assessment Country 2012 Rankings, Overall and Top 50% of Overall Population

	Math (all students)		Reading (all students)		Math (top 50% of pop.)		Reading (top 50% of pop.)	
Rank	Country	Avg. score	Country	Avg. score	Country	Avg. score	Country	Avg. score
1	Singapore	573	Hong Kong	545	Singapore	648	Singapore	612
2	Hong Kong	561	Singapore	542	Taiwan	639	Japan	607
3	Taiwan	559	Japan	538	Hong Kong	623	Hong Kong	599
4	South Korea	554	South Korea	536	South Korea	622	South Korea	594
5	Macao	538	Finland	524	Japan	602	Belgium	587
6	Japan	536	Canada	523	Belgium	596	Finland	585
7	Liechtenstein	535	Taiwan	523	Macao	595	Taiwan	585
8	Switzerland	531	Ireland	523	Netherlands	592	New Zealand	585
9	Netherlands	523	Poland	518	Liechtenstein	589	France	584
10	Estonia	521	Liechtenstein	516	Switzerland	586	Ireland	583
11	Finland	519	Estonia	516	Germany	586	Netherlands	580
12	Poland	518	New Zealand	512	Poland	583	Poland	580
13	Canada	518	Australia	512	Czech Republic	583	Germany	575
14	Belgium	515	Netherlands	511	Estonia	578	Estonia	573
15	Germany	514	Macao	509	Finland	573	Norway	572
16	**Vietnam**	**511**	Belgium	509	Austria	569	Czech Republic	571
17	Austria	506	Switzerland	509	New Zealand	568	Canada	569
18	Australia	504	**Vietnam**	**508**	France	566	Israel	567
19	Ireland	501	Germany	508	Canada	563	Australia	567
20	Slovenia	501	France	505	Ireland	560	United Kingdom	565
21	Denmark	500	Norway	504	Iceland	559	Liechtenstein	565
22	New Zealand	500	United Kingdom	499	Slovakia	558	Sweden	561
23	Czech Republic	499	United States	498	Australia	557	Switzerland	560
24	France	495	Denmark	496	United Kingdom	556	United States	560
25	United Kingdom	494	Czech Republic	493	Luxembourg	556	Luxembourg	560
26	Iceland	493	Austria	490	Spain	555	Macao	558
27	Latvia	491	Italy	490	Norway	553	Italy	557
28	Luxembourg	490	Latvia	489	Italy	551	Spain	555
29	Norway	489	Spain	488	Slovenia	549	Austria	553
30	Portugal	487	Luxembourg	488	Portugal	548	Iceland	553
31	Italy	485	Portugal	488	Denmark	547	Hungary	551
32	Spain	484	Hungary	488	Latvia	547	Latvia	549
33	Russian Federation	482	Israel	486	Sweden	544	Portugal	548
34	Slovakia	482	Croatia	485	**Vietnam**	**543**	Denmark	546
35	United States	481	Iceland	483	Russian Federation	543	Croatia	546
36	Lithuania	479	Sweden	483	United States	542	Slovakia	542
37	Sweden	478	Slovenia	481	Israel	541	Greece	541
38	Hungary	477	Greece	477	Hungary	540	Russian Federation	538
39	Croatia	471	Lithuania	477	Lithuania	536	**Vietnam**	**537**
40	Israel	466	Turkey	475	Croatia	533	Lithuania	534
41	Greece	453	Russian Federation	475	Greece	510	Slovenia	530
42	Serbia	449	Slovakia	463	Romania	504	Turkey	512
43	Turkey	448	Serbia	446	Serbia	503	Chile	511
44	Romania	445	United Arab Emirates	442	Bulgaria	492	Bulgaria	509
45	Bulgaria	439	Chile	441	Chile	499	Romania	505
46	United Arab Emirates	434	Costa Rica	441	United Arab Emirates	486	Serbia	503

Figure 5. Mean Age 15 Top 50% Math Scores in 2012 PISA, by 2010 Log Real GDP/capita

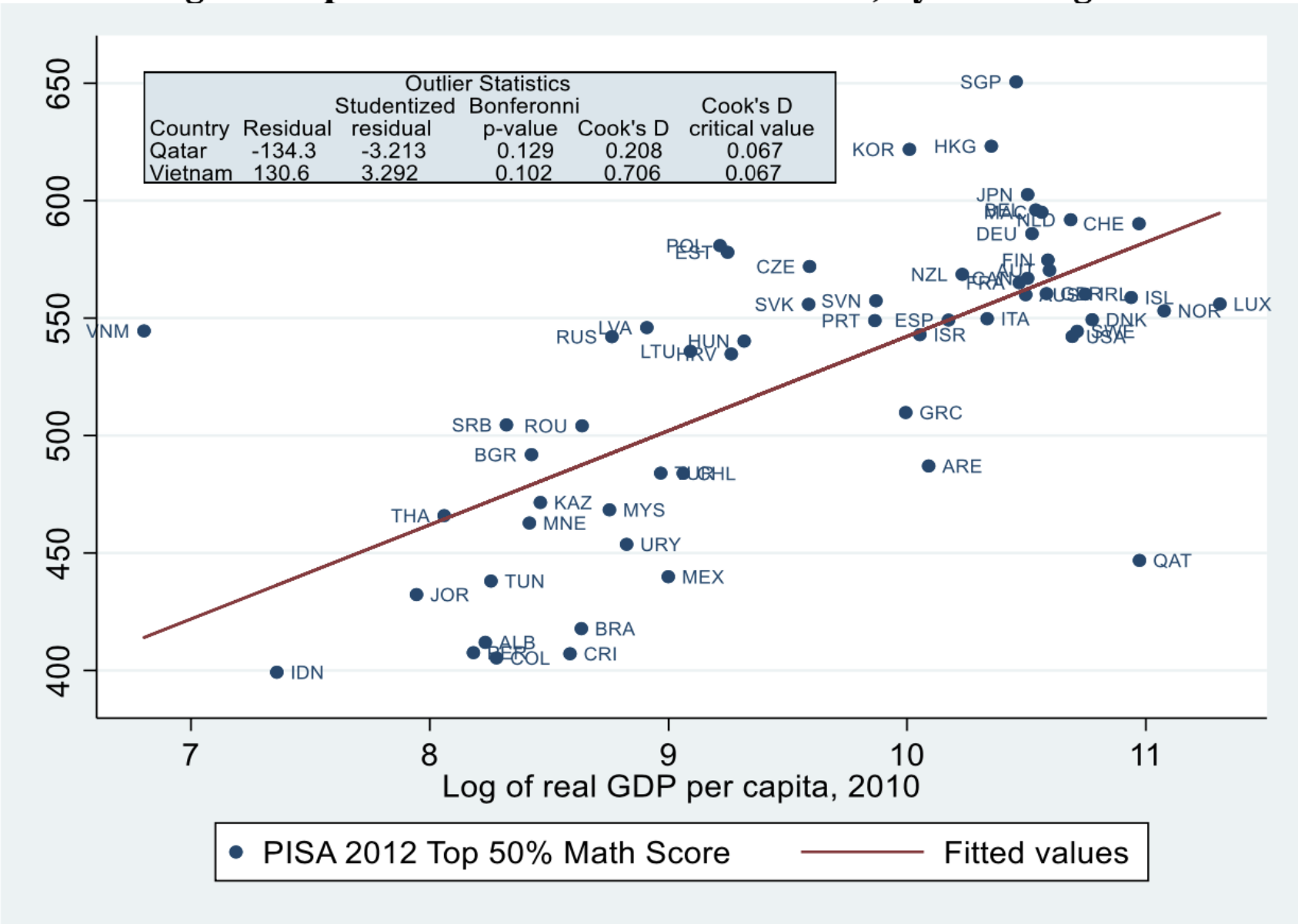
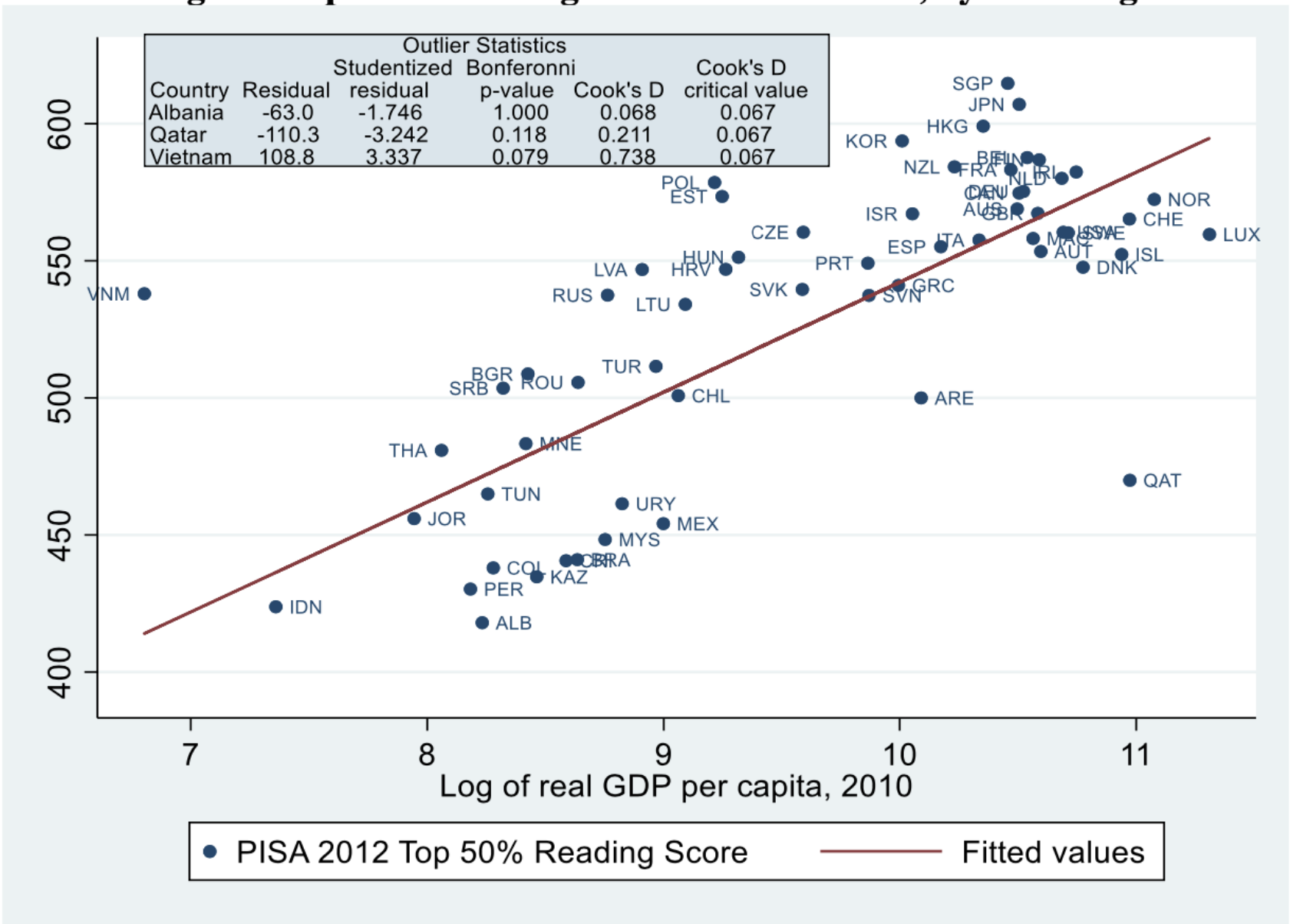


Figure 6. Mean Age 15 Top 50% Reading Scores in 2012 PISA, by 2010 Log Real GDP/cap



Method 2: Adjustment with Auxiliary Data

- Adjust the mean test scores for VN students to include the scores of the PISA non-participants using Young Lives data
  - Adjusting only VN data will be biased against VN being an outlier
- Assume YL test scores assigs ranks to 15-yr-olds that are similar to the PISA rankings
  - YL younger cohort were 15 yrs old in Round 5 in 2016 (1,940 15-yr-olds in and not in school).
- Adjustment
  - YL sample was sorted into 10 deciles based on test scores.
  - Proportion of YL 15-yr-olds in school was calculated in each decile.
  - Calculate the inflation factor for PISA sample.

  $\Rightarrow$ Assign students in VN PISA sampls to deciles of the distribution of all 15-yr-olds including those not in school.

Table B4. Adjusted PISA Test Scores Using YL Attrition Data

Test Score Decile	(1) Proportion in School in Young Lives Data	(2) Proportions Divided by 0.831 ((1) ÷ 0.831)	(3) Inflation Factor for PISA Sample (1/(2))	(4) Adjusted 2012 PISA Scores, by Decile (all 15-year-olds)		(5) Original 2012 PISA Scores, by Decile (in school only)	
				Math	Reading	Math	Reading
1	0.582	0.701	1.427	358.0	363.4	364.3	370.3
2	0.646	0.776	1.289	409.4	419.2	421.5	432.1
3	0.746	0.897	1.115	442.1	449.6	454.3	461.7
4	0.761	0.915	1.093	463.2	472.1	477.2	484.8
5	0.849	1.022	0.978	483.2	492.6	498.7	502.7
6	0.885	1.065	0.939	507.2	509.4	521.2	520.1
7	0.920	1.106	0.904	530.1	528.2	543.8	539.5
8	0.951	1.144	0.874	555.4	548.1	568.5	558.8
9	0.973	1.171	0.854	586.6	570.8	600.6	583.2
10	1.000	1.203	0.831	648.7	615.9	662.6	630.1
Average	0.831	1.000		498.4	496.9	511.2	508.2

- This adjustment decreases 2012 PISA scores by 12.8 pts for math and 11.3 pts for reading.
- These relatively small changes do not change the overall findings that VN PISA performance was exceptional.

Method 3: Bounds Analysis

- Assume that PISA test scores follow normal distribution when the entire population of 15-yr-olds is included, and test scores of all children not in school would be lower than those of all children in school.
- Proposition 1: Estimating lower and upper bounds of test score

1.1 If PISA tested samples capture only academically better-performing children, the true mean test scores (μ_{lt}, lower truncated) is given by:

$$\mu_{lt} = \overline{T}_b - \lambda_b(\alpha)\frac{\overline{T}_b - T_{min}}{\lambda_b(\alpha) - \alpha}, \tag{3}$$

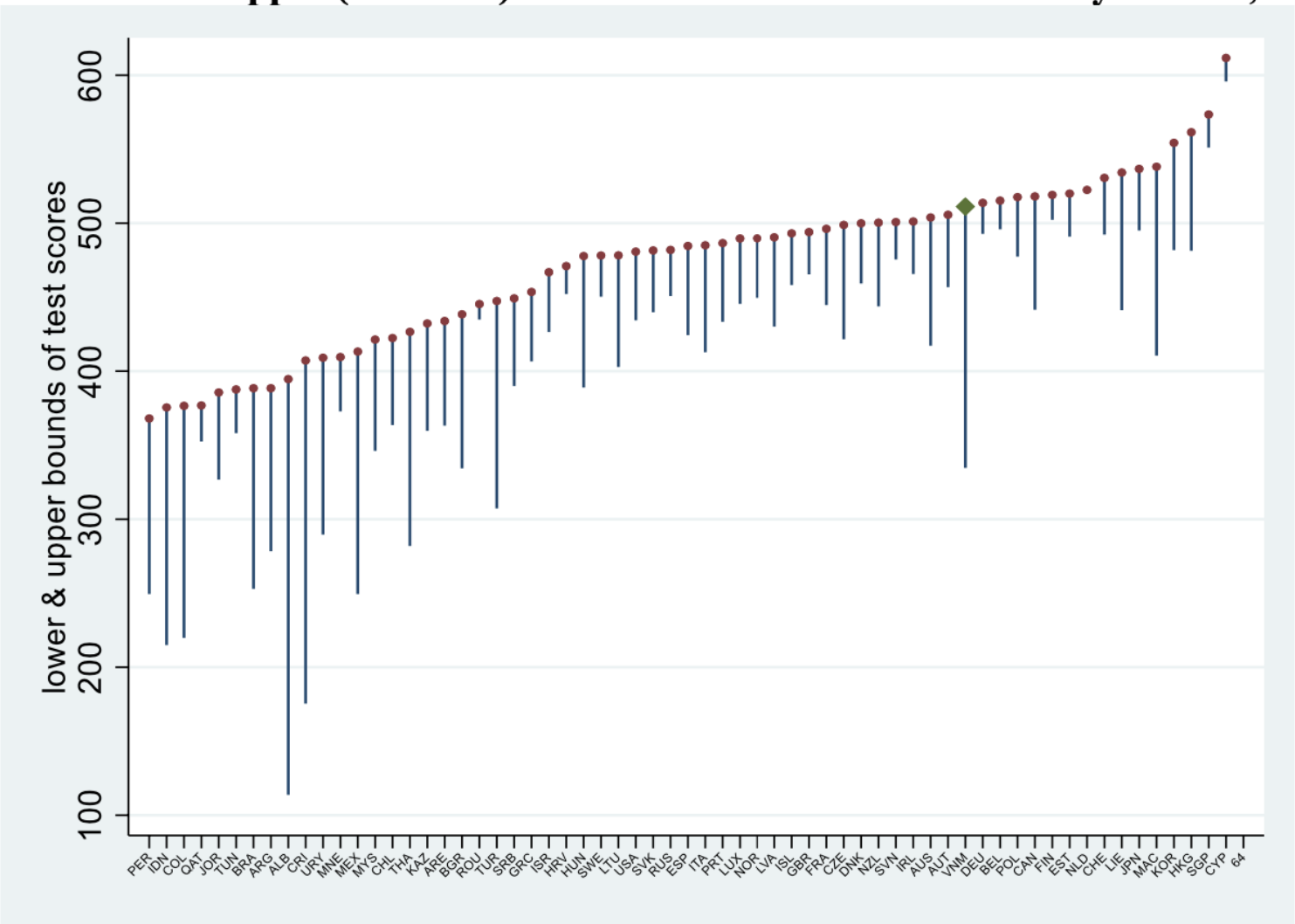
where $\overline{T}_b = E(T|T > \tau)$, $\alpha = \Phi^{-1}(1-r)$, $\lambda_b(\alpha) = \frac{\phi(\alpha)}{1-\Phi(\alpha)}$, and the truncation point τ is given by T_{min}, the lowest observed test score in the data.

1.2 If PISA tested samples capture only academically worse-performing children, the true mean test scores (μ_{ut}, upper truncated) is given by:

$$\mu_{ut} = \overline{T}_a + \lambda_a(\alpha)\frac{T_{max} - \overline{T}_a}{\lambda_a(\alpha) + \alpha}, \tag{4}$$

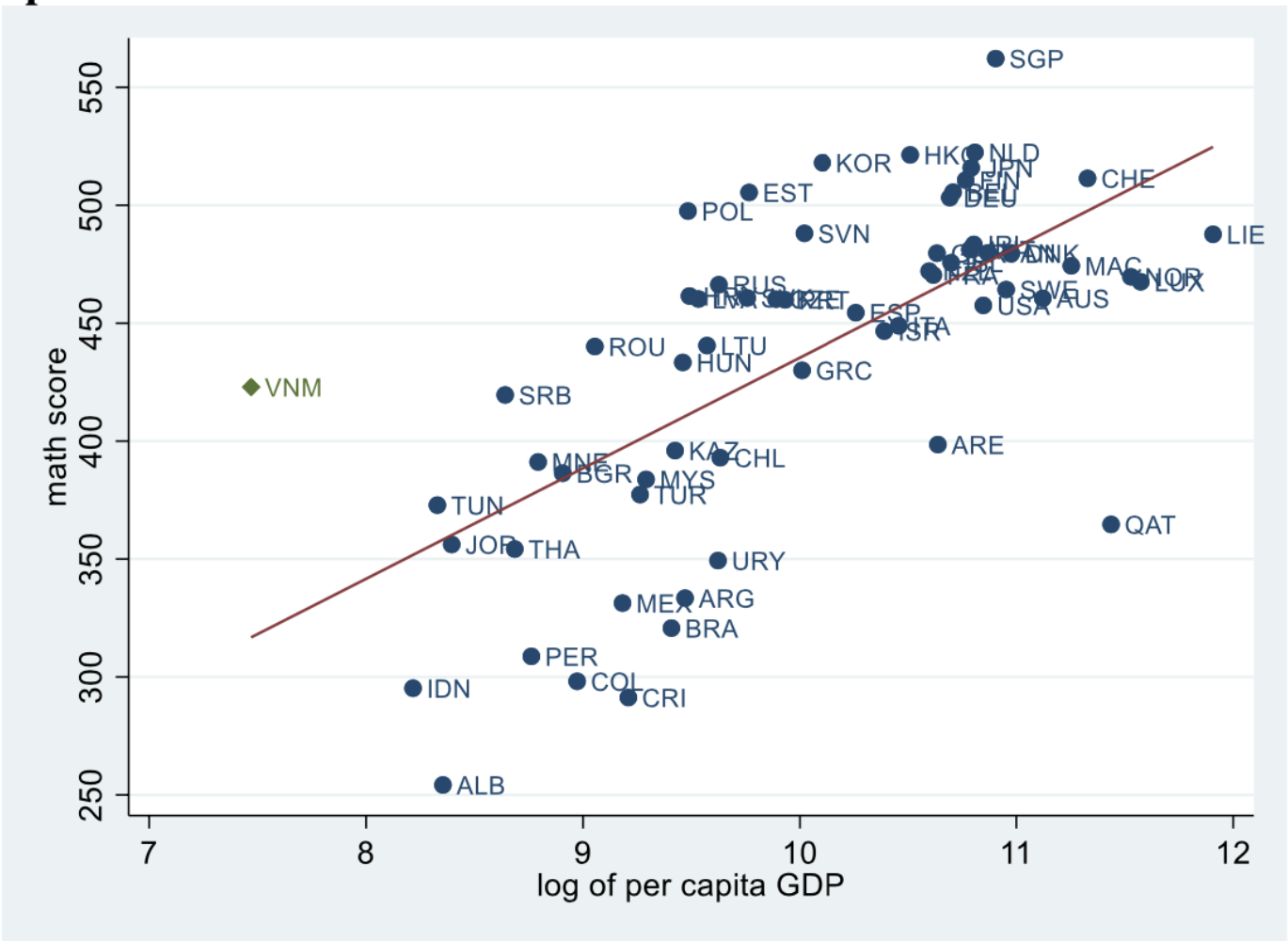
where $\overline{T}_a = E(T|T < \tau)$, $\alpha = \Phi^{-1}(r)$, $\lambda_a(\alpha) = \frac{\phi(\alpha)}{\Phi(\alpha)}$, and τ is given by T_{max}.

Figure B7: Lower and Upper (observed) Bounds of Math Scores for All 15-year-olds, PISA 2012



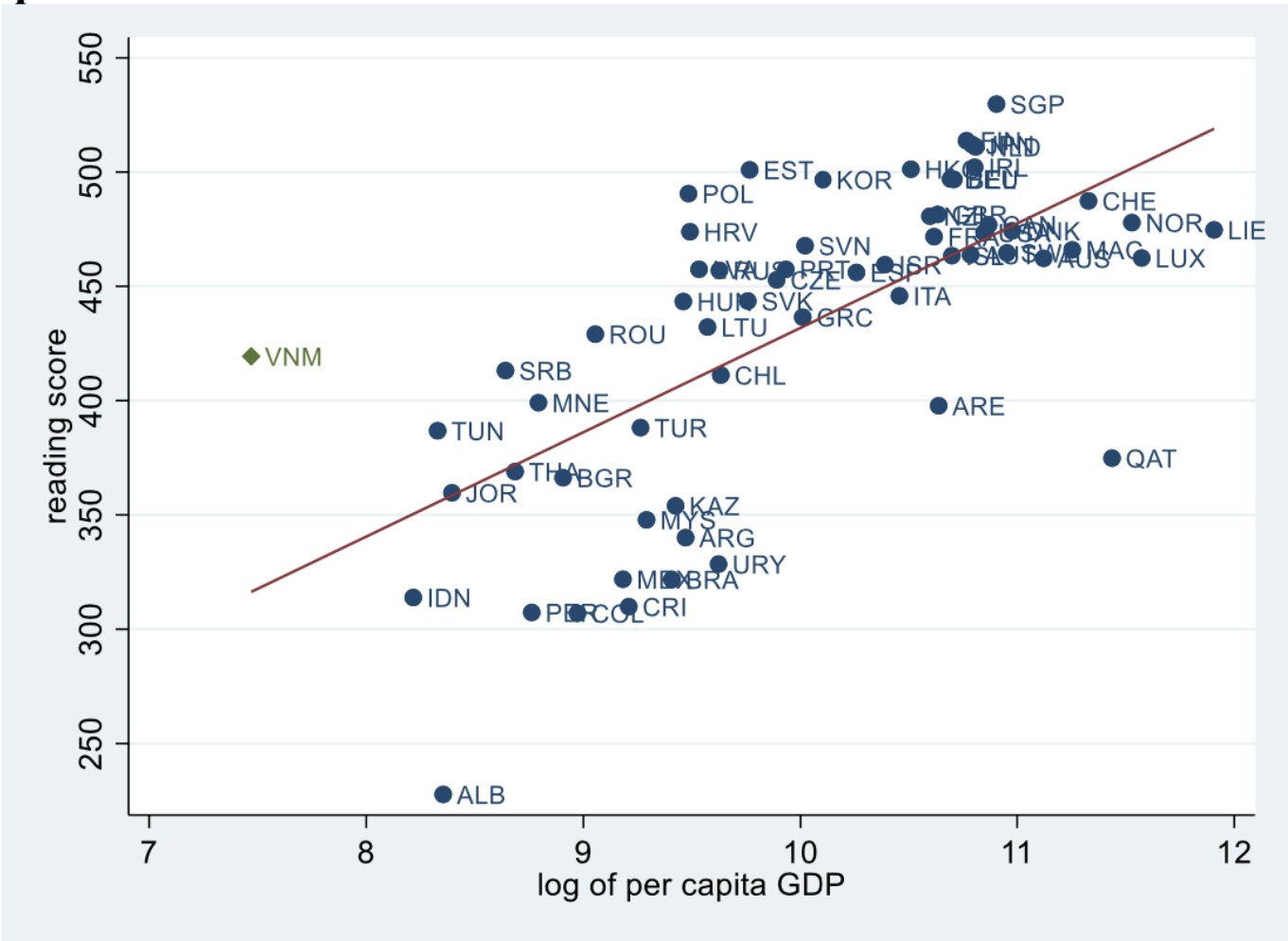
Note: All countries are sorted in an increasing order of the upper bound (observed mean from PISA participants) of test scores. The dots represent the observed mean test scores. Vietnam is indicated by the larger diamond.

Figure 9: Midpoint of Upper and Lower Bounds of 2012 PISA Math Scores, by Log of GDP/capita



Note: Adjusted test scores for each country are the mid-point value of the observed test scores and the theoretical lower bounds based on Proposition 1.

Figure 10: Midpoint of Upper and Lower Bounds of 2012 PISA Reading Scores, by Log of GDP/capita



Note: Adjusted test scores for each country are the mid-point value of the observed test scores and the theoretical lower bounds based on Proposition 1.

3. Were VN Students More Motivated to Exert Effort on the PISA?

- Anecdote
  - VN students are very competitive test takers.
  - Students in developed countries exert little effort on tests for which there are no consequences.
- Gneezy et al. (2019) administered tests (using previous PISA math tests) to Chinese students and U.S. students.
  - Chinese stuednts scored much higher than U.S. students under standard conditions.
  - Randomly selected U.S. students who were offered financial incentives for high scores on the exam performed much better.
  - Randomly selected Chinese students who were offered financial incentives for high scores on the exam performed not differently.

  $\Rightarrow$ Chinese students are highly motivated to take tests despite no direct benefits.

3. Were VN Students More Motivated to Exert Effort on the PISA?

- Akyol, Krishna, and Wang (2021) uses 2015 PISA, administered using computers in most (53 of 66) of the participating countries, to correct for lack of effort.
  - Imputed values for unanswered questions based on students' performance on the questions they answered.
  - Also treated questions that students spent very little time (less than 5s) but did answer as questions that students exerted little effort.
  - This adjusts 2015 PIDA science test scores upwards.

$\Rightarrow$ Other countries test scores adjusted.

$\Rightarrow$ This adjustment did not explain much about VN performance on PISA.

4. Did VN Students Perform Better Because They Were Coached?

- Evidence that teachers and schools prepared VN students to take 2012 and 2015 PISA tests.
- Bangert-Drowns et al. (1983): coaching sessions of over 9 hrs duration increased average test scores by 0.39 SDs.
- Brunner et al. (2007) examined the impact of a coaching program in Germany on the PISA exam.
  - Increased math scores by 10.4 pts (statistically insignificant) for students who plan to enroll in a university.
  - Increased reading scores by 27.2 pts (statistically significant) for students who plan to enroll in a university.
- Other countries (Abu Dhabi, Canada, Colombia) have also tried to raise their students' PISA socres.

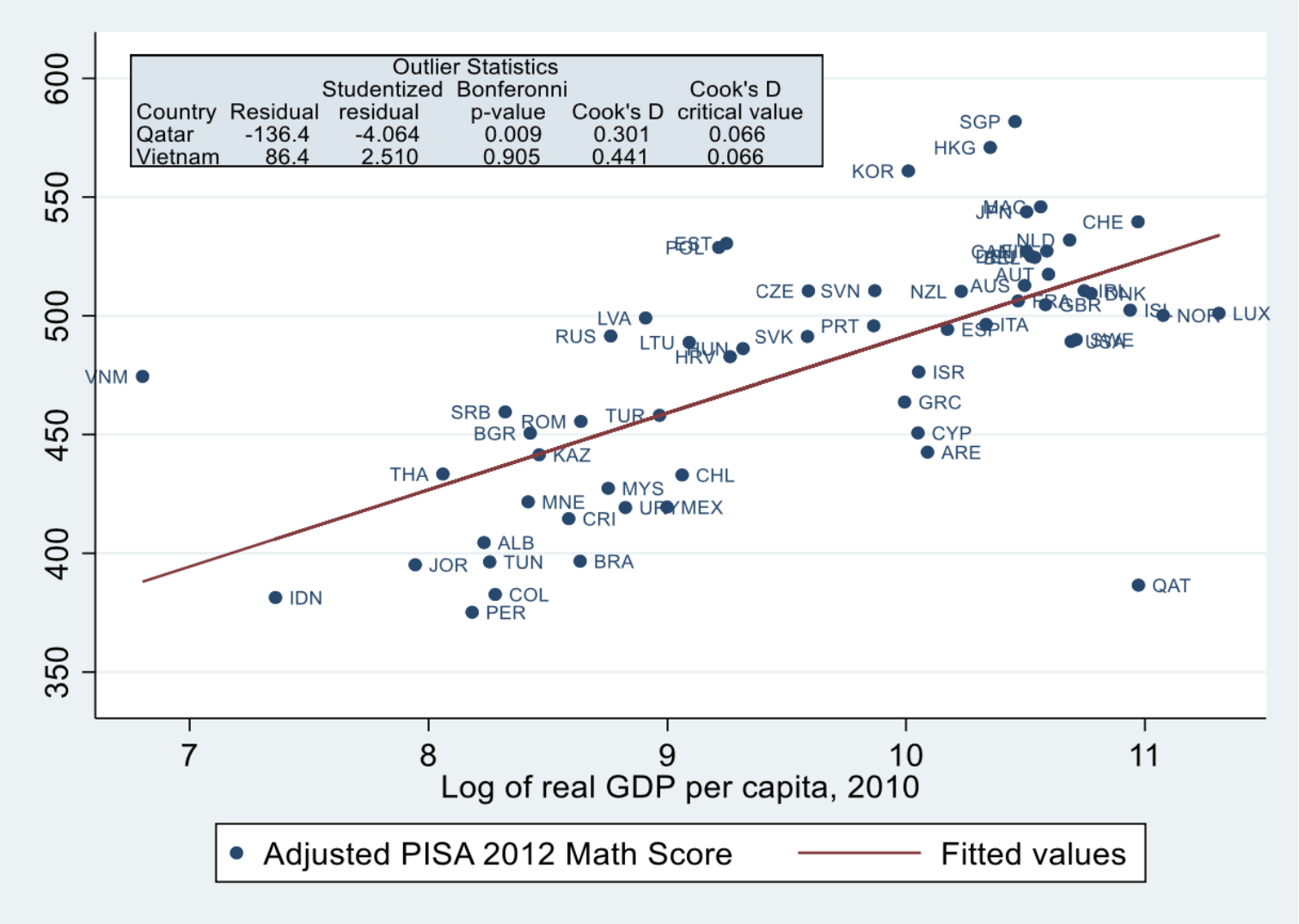
$\Rightarrow$ Any correction (might be modest) of VN PISA scores to account for coaching would also require correction for other countries.

5. Is VN Still an Outlier after Adjusting for All Potential Exaggerations?

- None of the 4 possible sources of exaggerations seem to explain VN exceptional performance on the 2012 and 2015 PISA assessments.
- If they are combined, is VN still an outlier?

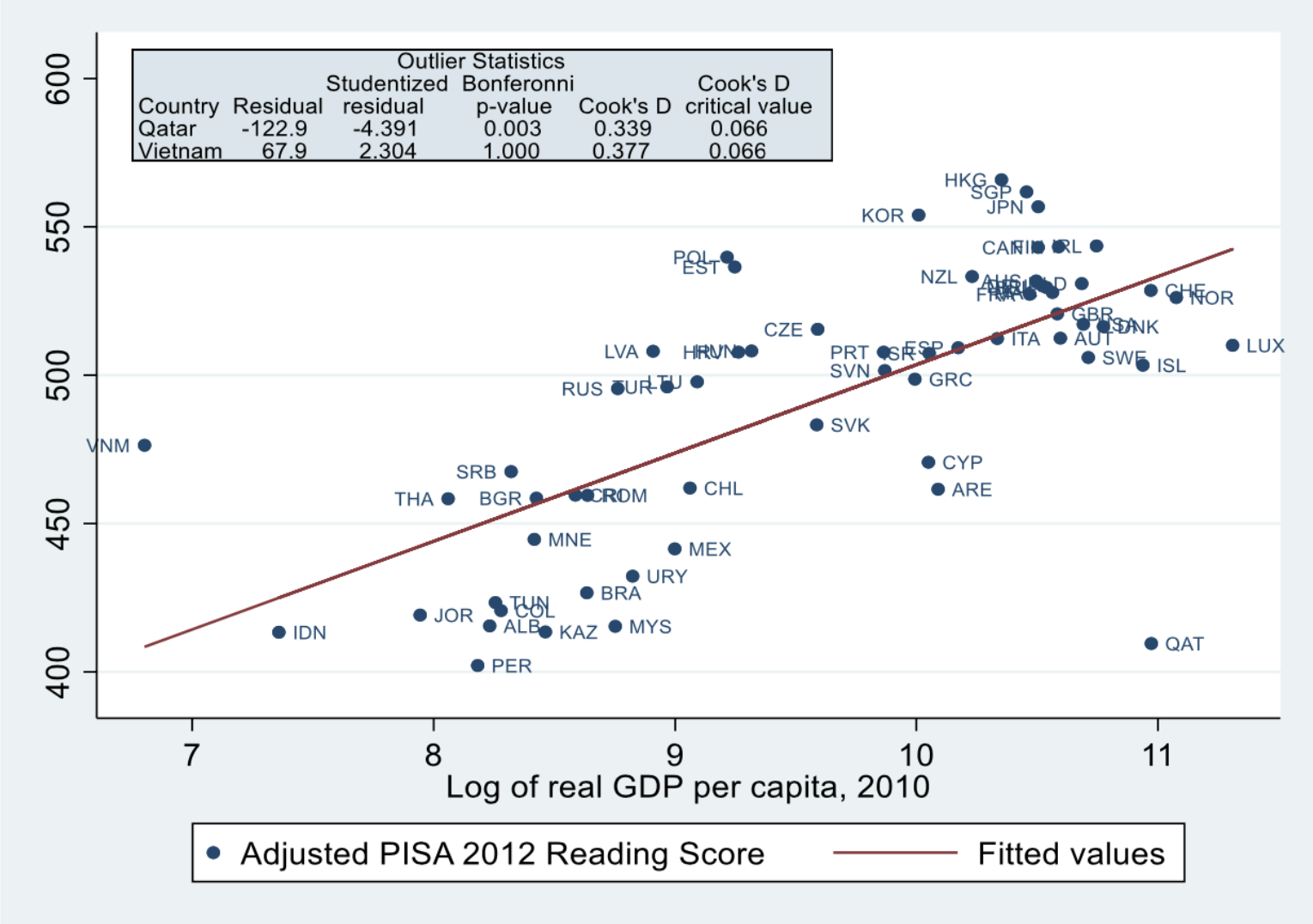
$\Rightarrow$ Relative to its income, VN is still the largest positive outlier among all the countries in the 2012 PISA, after correcting for all four potential biases that favor Vietnam.

Figure 13. "Adjusted" Mean Age 15 Math Scores in 2012 PISA, by 2010 Log Real GDP/capita



Note: The outlier statistics are shown only for countries that are outliers by one or both of the two criteria.

Figure 14. "Adjusted" Mean Age 15 Reading Scores in 2012 PISA, by 2010 Log Real GDP/capita



Note: The outlier statistics are shown only for countries that are outliers by one or both of the two criteria.

From Country Level to Student Level Regression

- $TestScore = \beta_0 + \beta_{gdp} \times Log(GDP/capita) + u$
- The weights for VN in PISA are adjusted using VN census data.
- Stratification (48=3X2X2X2X2)
  - 3 regions: north, central, and south
  - Urban and rural
  - Whether students weere enrolled in grade 10
  - Whether students' mothers had upper secondary education
  - Whether the family owned a computer
- Wealth veriables
  - Log of per capita GDP (national level)
  - Wealth index (national average)
  - Wealth index (student specific)

Table B5: Student Characteristics in 2012 (born in 1996) and 2015 (born in 1999): PISA, VHLSS, PISA with 2009 Census Weights

	2012 PISA and 2012 VHLSS			2015 PISA and 2014 & 2016 VHLSS		
	PISA		VHLSS (PISA-eligible only)	PISA		VHLSS (PISA-eligible only)
Variable	PISA weights (1)	Census weights (2)	Mar.-July (3)	PISA weights (4)	Census weights (5)	Mar.-July (6)
Urban	50.3%	26.9%	25.3%	49.6%	27.1%	28.6%
Female	53.8%	52.5%	51.7%	51.4%	49.5%	47.1%
Current grade: 10 or higher	86.1%	80.2%	75.7%	85.5%	79.4%	84.3%
Current grade: 9 or lower	10.3%	16.4%	22.2%	9.0%	14.5%	15.1%
Current grade: unknown/other[a/]	3.6%	3.4%	2.1%	5.5%	6.1%	0.6%
Father's years of schooling	8.95	8.26	7.19	8.4	8.02	6.9
Mother's years of schooling	8.34	7.88	6.93	7.9	7.81	6.4
Owns an air-conditioner	16.0%	9.2%	7.1%	20.7%	12.8%	15.2%
Owns a motorbike	93.1%	91.2%	90.7%	93.9%	93.0%	93.8%
Owns a car	7.3%	6.8%	1.0%	7.9%	4.9%	2.6%
Owns a computer	39.1%	17.9%	25.1%	44.1%	24.2%	28.5%
Number of televisions owned	1.39	1.24	1.00	1.42	1.27	1.05
Sample size	4,771	4,771	236	5,687	5,687	415

Table 4. Regressions of PISA Test Scores on Log(GDP)/capita or Wealth/capita: Student-Level Data

Variables	(1) Math	(2) Reading	(3) Math	(4) Reading	(5) Math	(6) Reading	(7) Math	(8) Reading
A. 2012 PISA Assessment								
Log of per capita GDP	31.63***	29.25***						
	(1.56)	(1.44)						
Wealth (national average)			27.84***	25.73***				
			(1.10)	(1.04)				
Wealth (student specific)					20.93***	19.58***	16.26***	15.21***
					(0.57)	(0.55)	(0.53)	(0.46)
Constant	151.41***	182.55***	455.69***	463.91***	459.39***	468.01***	--	--
	(15.4)	(14.19)	(1.18)	(1.12)	(1.09)	(1.02)		
Vietnam residual (average)	**128.7**	**112.6**	**108.8**	**94.2**	**94.4**	**80.2**	**74.7**	**67.9**
Residual rank	**1**	**1**	**2**	**1**	**4**	**2**	**6**	**4**
More highly ranked	**none**	**none**	**HK**	**none**	**HK**	**HK**	**HK**	**HK**
					S. Korea		**S. Korea**	**S. Korea**
					Singap.		**Macedon.**	**Singap.**
							Singap.	
							Taiwan	
Observations	473,236	473,236	473,236	473,236	455,971	455,971	455,971	455,971
R-squared	0.108	0.095	0.121	0.106	0.143	0.130	0.345	0.276

Adding Other Variables to Explain VN's Performance

$$S_{ic} = \beta' \boldsymbol{X_{ic}} + \epsilon_{ic}, \tag{6}$$

$$\begin{aligned} S_{ic} &= \beta^{o\prime} \boldsymbol{X_{ic}^{o}} + \beta^{u\prime} \boldsymbol{X_{ic}^{u}} + \epsilon_{ic} \\ &= \beta^{o\prime} \boldsymbol{X_{ic}^{o}} + \beta^{u\prime} \overline{\boldsymbol{X}}_{\boldsymbol{c}}^{\boldsymbol{u}} + \beta^{u\prime} \boldsymbol{X_{ic}^{u,d}} + \epsilon_{ic} \end{aligned} \tag{7}$$

- Superscripts *o* and *u* indicate observed and unobserved, respectively.
- $\boldsymbol{X_{ic}^{u}}$ disaggregated into its country specific mean ($\overline{\boldsymbol{X}}_{\boldsymbol{c}}^{\boldsymbol{u}}$) and the within-country deviation from the mean for student *i* ($\boldsymbol{X_{ic}^{u,d}}$).

Table 5A: Regressions of 2012 Test Scores on Wealth/capita and Student and Household Variables

Variables	Math	Reading	Math	Reading	Math	Reading	Math	Reading
Wealth index	15.92***	14.71***	10.04***	9.61***	15.78***	14.54***	4.86***	4.22***
	(0.53)	(0.48)	(0.44)	(0.41)	(0.53)	(0.49)	(0.39)	(0.35)
Girl			-8.41***	33.58***			-17.36***	24.42***
			(0.78)	(0.76)			(0.70)	(0.66)
Sibling index			-1.67***	-2.29***			-1.733***	-2.24***
			(0.53)	(0.55)			(0.50)	(0.50)
Sibling index missing			-19.43***	-15.62***			-16.36***	-12.41***
			(0.80)	(0.85)			(0.75)	(0.76)
Mom years school			2.97***	2.89***			1.41***	1.32***
			(0.14)	(0.14)			(0.13)	(0.12)
Dad years school			3.27***	3.02***			1.87***	1.66***
			(0.13)	(0.13)			(0.12)	(0.12)
Grade							30.80***	32.24***
							(0.89)	(0.86)
Years of preschool							10.26***	9.53***
							(0.68)	(0.68)
Educational input index							6.84***	7.38***
							(0.27)	(0.29)
Attendance (past 2 weeks)							7.09***	7.02***
							(0.36)	(0.36)
Books at home							0.070***	0.061***
							(0.002)	(0.003)
Hours of study							3.02***	2.86***
							(0.09)	(0.09)
Extra math classes (tutored)							-0.28	
							(0.21)	
Extra math variable missing							-2.53***	
							(0.52)	
Extra read. classes (tutored)								-4.06***
								(0.23)
Extra read. variable missing								-2.73***
								(0.56)
Vietnam fixed effect	**70.1**	**62.9**	**72.2**	**65.7**	**73.3**	**65.7**	**57.6**	**51.3**
Fixed effect rank	**6**	**5**	**6**	**2**	**5**	**4**	**8**	**5**
More highly ranked:	**HK Macao**	**HK Japan**	**HK Macao**	**HK**	**HK S. Korea**	**HK S. Korea**	**Finland HK**	**Finland HK**

Table 6A: Regressions 2012 Test Scores on Wealth/capita and Student, Household and School Variables

Variables	Math	Reading	Math	Reading
Wealth	15.29***	13.76***	4.50***	3.86***
	(0.58)	(0.51)	(0.42)	(0.39)
Class size (student/teacher ratio)			0.08	0.20**
			(0.08)	(0.08)
Ratio qualified teachers			13.03***	11.65***
			(3.28)	(3.19)
Qual. tchr. ratio missing			-1.92	-3.71
			(3.45)	(3.27)
Square root of computers/pupil			-3.07	-1.68
			(3.20)	(2.95)
Stud. perf. used to assess tchrs			1.75	2.21
			(1.86)	(1.81)
Teacher absenteeism			-3.16***	-2.66***
			(0.95)	(0.95)
Parents pressure teachers			11.74***	11.49***
			(1.24)	(1.21)
Principal observes teachers			-3.49*	-0.40
			(1.98)	(1.86)
Inspector observes teachers			-4.71***	-6.32***
			(1.78)	(1.78)
Tchr pay linked to stud perf			-2.40**	-2.33**
			(0.96)	(0.93)
Teacher mentoring index			5.45***	5.27***
			(1.76)	(1.78)
Vietnam fixed effect	**71.5**	**63.5**	**51.4**	**44.5**
Fixed effect rank	**5**	**5**	**11**	**9**
More highly ranked:	**HK**	**HK**	**Estonia**	**Estonia**
	S. Korea	**Japan**	**Finland**	**Finland**
	Singap.	**S. Korea**	**Germany**	**Germany**

What Can Be Learned from Oaxaca-Blinder Decomposition?

$$S_{vn} = \beta'_{\boldsymbol{vn}} \boldsymbol{X_{vn}} + u_{vn}, \tag{8}$$

$$S_o = \beta'_{\boldsymbol{o}} \boldsymbol{X_o} + u_o, \tag{9}$$

$$\overline{S}_{vn} - \overline{S}_o = \beta'_{\boldsymbol{VN}} \overline{\boldsymbol{X}}_{\boldsymbol{vn}} - \beta'_{\boldsymbol{o}} \overline{\boldsymbol{X}}_{\boldsymbol{o}} \tag{12}$$

$$= \overline{\beta}' (\overline{\boldsymbol{X}}_{\boldsymbol{vn}} - \overline{\boldsymbol{X}}_{\boldsymbol{o}}) + [(\beta_{\boldsymbol{VN}} - \overline{\beta})' \overline{\boldsymbol{X}}_{\boldsymbol{vn}} + (\overline{\beta} - \beta_{\boldsymbol{o}})' \overline{\boldsymbol{X}}_{\boldsymbol{o}}] \tag{13}$$

- where $\overline{\beta} = (\beta_{\boldsymbol{vn}} + \beta_{\boldsymbol{o}})/2$

Table 8A: Math Decomposition, 2012 (diff = 503.89– 462.83 = 41.06)

Variable	β_{vn}	$\bar{x}_{vn}$	$\beta_{vn}'\bar{x}_{vn}$	β_o	$\bar{x}_o$	$\beta_o'\bar{x}_o$	$\bar{\beta}$ (= (β_{vn}+β_o)/2	$\bar{\beta}'(\bar{x}_{vn}-\bar{x}_o)$	(β_{vn} - $\bar{\beta}$)'$\bar{x}_{vn}$ + ($\bar{\beta}$ –
Wealth	6.475***	2.741	17.75	8.433***	5.200	43.86	7.454	-18.34*	-7.77
Girl	-20.03***	0.535	-10.72	-17.79***	0.509	-9.06	-18.91	-0.49*	-1.17
Grade (yrs in secondary)	55.94***	3.810	213.11	18.86***	3.806	71.75	37.40	0.148	141.21
Sibling index	4.824***	1.048	5.05	-1.496***	1.086	-1.63	1.664	-0.06	6.74
Sibling index missing	-0.717	0.143	-0.10	-17.23***	0.238	-4.10	-8.974	0.85	3.14
Mom years schooling	0.507	7.984	4.05	1.511***	10.977	16.59	1.009	-3.02	-9.52
Dad years schooling	0.953***	8.351	7.96	2.407***	11.088	26.69	1.680	-4.60	-14.13
Years in preschool	4.750***	1.576	7.48	14.09***	1.488	20.96	9.421	0.84	-14.31
Education inputs index	4.552***	3.978	18.11	7.829***	4.654	36.44	6.190	-4.19**	-14.14
Books in home	-0.0016	52.00	-0.08	0.090***	114.10	10.26	0.044	-2.74	-7.60
Days attend past 2 wks	11.53***	9.837	113.40	8.003***	9.622	77.01	9.765	2.10*	34.29
Hours study per week	2.991***	5.519	16.51	2.610***	5.362	14.00	2.801	0.44	2.07
Extra math class, hrs/wk	3.730***	2.567	9.57	-0.663***	1.325	-0.88	1.534	1.90	8.55
Extra math class missing	7.235***	0.342	2.47	-3.202***	0.358	-1.15	2.017	-0.03	3.65
Class size	0.167*	42.82	7.15	0.149***	32.62	4.85	0.158	1.61	0.69
Proport. qualified tchrs	11.05***	0.800	8.84	45.80***	0.834	38.18	28.43	-0.97	-28.38
Prop. qual. tchr. missing	-14.87***	0.057	-0.85	-31.50***	0.188	-5.92	-23.19	3.04	2.03
Square root comp/pupil	0.533	0.407	0.22	2.841***	0.623	1.77	1.687	-0.36	-1.19
Stud perf. to assess tchrs	16.34	0.995	16.26	-6.268***	0.708	-4.44	5.037	1.44	19.25
Teacher absenteeism	0.939	0.695	0.65	-7.336***	0.779	-5.71	-3.198	0.27	6.10
Parents pressure tchrs	19.82***	1.297	25.70	5.765***	0.957	5.52	12.79	4.35	15.84
Principal observes tchrs	-1.551	0.986	-1.53	-3.506***	0.802	-2.81	-2.529	-0.47	1.75
Inspector observes tchrs	-16.97***	0.888	-15.07	-10.74***	0.406	-4.36	-13.86	-6.68	-4.03
Tchr pay link stud. perf.	3.718***	1.461	5.43	-1.339***	0.704	-0.94	1.189	0.90	5.47
Teachers are mentored	19.44***	0.833	16.18	7.260***	0.684	4.96	13.35	1.99	9.23
Constant	36.36***	1.000	36.36	130.99***	1.000	130.99	83.68	0.00	-94.63
Column sum:	--	--	503.89	--	--	462.83	--	-22.07	63.13**

Table 9A: Reading Decomposition, 2012 (diff = 503.48– 472.56 = 30.92)

Variable	β_{vn}	$\bar{x}_{vn}$	$\beta_{vn}'\bar{x}_{vn}$	β_o	$\bar{x}_o$	$\beta_o'\bar{x}_o$	$\bar{\beta}$ (= $(\beta_{vn}+\beta_o)/2$	$\bar{\beta}'(\bar{x}_{vn}-\bar{x}_o)$	$(\beta_{vn}-\bar{\beta})'\bar{x}_{vn}+(\bar{\beta}-\beta$
Wealth	4.833***	2.741	13.25	8.505***	5.200	44.23	6.669	-16.40**	-14.58
Girl	22.57***	0.535	12.08	23.75***	0.509	12.90	23.16	0.604*	-0.61
Grade (yrs in secondary)	48.04***	3.810	183.00	22.23***	3.806	84.60	35.13	0.139	98.27
Sibling index	2.764	1.048	2.90	-2.070***	1.086	-2.25	0.347	-0.01	5.16
Sibling index missing	-0.434	0.143	-0.06	-12.39***	0.238	-2.95	-6.411	0.61	2.28
Mom years schooling	0.871**	7.984	6.95	1.012***	10.977	11.10	0.941	-2.82	-1.34
Dad years schooling	0.324	8.351	2.71	2.032***	11.088	22.53	1.178	-3.22	-16.60
Years in preschool	2.680	1.576	4.22	11.05***	1.488	16.44	6.864	0.61	-12.82
Education inputs index	5.731***	3.978	22.90	7.518***	4.654	34.99	6.625	-4.48**	-7.71
Books in home	-0.007	52.00	-0.37	0.077***	114.10	8.78	0.035	-2.17	-6.97
Days attend past 2 wks	13.88***	9.837	136.50	7.114***	9.622	68.46	10.50	2.25*	65.79
Hours study per week	2.340***	5.519	12.92	2.517***	5.362	13.49	2.429	0.38	-0.96
Extra reading class hr/wk	-1.798***	1.344	-2.42	-4.881***	0.994	-4.61	-3.340	-1.34**	3.53
Extra reading class miss.	-0.201	0.343	-0.07	-3.113***	0.358	-1.12	-1.657	0.03	1.02
Class size	0.396	42.82	16.95	0.295***	32.62	9.62	0.345	3.52	3.81
Proport. qualified tchrs	10.63*	0.800	5.50	35.38***	0.834	29.50	23.00	-0.78	-20.22
Prop. qual. tchr. missing	-16.37**	0.057	-0.93	-27.05***	0.188	-5.08	-21.71	2.85	1.31
Square root comp/pupil	1.345	0.407	0.55	3.813	0.623	2.38	2.579	-0.56	-1.27
Stud perf. to assess tchrs	4.980	0.995	4.95	-6.334***	0.708	-4.48	-0.677	-0.19	9.63
Teacher absenteeism	2.549	0.695	1.77	-6.743***	0.779	-5.25	-2.097	0.18	6.85
Parents pressure tchrs	14.90***	1.297	19.32	7.045***	0.957	6.74	10.97	3.73	8.85
Principal observes tchrs	32.79***	0.986	32.32	-1.359	0.802	-1.09	15.71	2.89	30.52
Inspector observes tchrs	-19.56***	0.888	-17.37	-12.18***	0.406	-4.95	-15.87	-7.65	-4.78
Tchr pay link stud. perf.	5.123	1.461	7.48	-3.207***	0.704	-2.26	0.958	0.73	9.02
Teachers are mentored	12.92*	0.833	10.76	6.500***	0.684	4.44	9.711	1.45	4.87
Constant	24.77	1.000	24.77	137.20***	1.000	137.20	80.98	0.00	-112.43
Column sum:	--	--	503.48	--	--	472.56	--	-19.67	50.59**

Thank you

Questions?

(jongwooklee@snu.ac.kr)

Comments:
"What explains Vietnam's exceptional performance in education relative to other countries?"

강창희 (중앙대 경제학부)

2022년 4월

Summary

- The paper addresses various concerns over Vietnam's high performance in the 2012 and 2015 PISA assessments.
  - Corrections for a low enrollment rate.
  - Students' high effort on PISA tests.
  - Possibility of coaching for PISA tests.
- Examines factors explaining Vietnam's performance via Oaxaca-Blinder decomposition.
  - Productivity over characteristics.

Comments

- Authors meticulously and painstakingly examine whether Vietnam's high performance is statistical artifact.
  - It seems to be reality rather than statistical artifact.
  - Given that east Asian countries (e.g., South Korea, Japan, HK, SG, Taiwan) traditionally show high performance in international tests (TIMSS, PIRLS, PISA), it is no surprise that Vietnam is one of such countries.
- The difficult question is "WHY?"
  - This question is similar to "how and why have east Asian countries grown so fast since 1960s?".

Comments

- Woessmann (2016, J. of Economic Perspectives).
  - <1> Resource inputs such as expenditure per student or class size appear to have limited effects.
  - <2> Instruction time and measures of teacher quality matter.
  - <3> Institutional features school systems: external exit exams, accountability, competition from privately operated schools, early tracking into differing-ability schools.

Minor comments

- Decomposition analysis
  - The OB decomposition examines differences in means.
  - Questions arise as to how family characteristics affect different-ability students.
  - Fortin, Lemieux, Firpo(2011, HOLE): Decomposition methods in Economics.
    Unconditional quatile regression + OB decomp.

Cupping in Context: Establishing Quality-Based Conventions for Pricing Specialty Coffees

Özgecan Koçak
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Emory University

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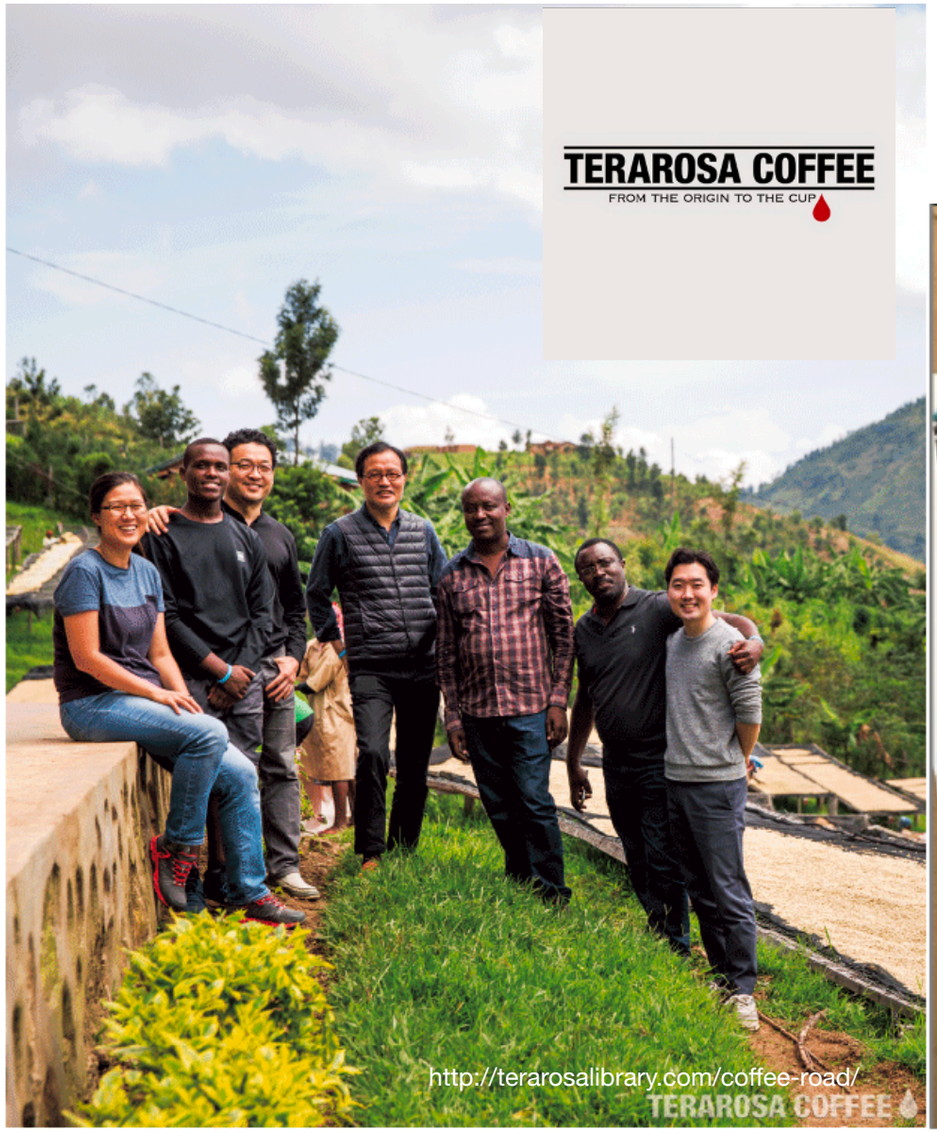


Specialty Coffee

Development in a cup

A paradox in specialty coffee markets

- Boom in consumption combined with falling real prices paid to producers (Daviron and Ponte 2005)

Prevailing commodity logic in green coffee markets:

➡ Market inefficiency: oversupply of commodity grade coffee and undersupply of specialty coffee

➡Inequity in the supply chain: coffee farmers are not compensated for the quality of their coffee while it is re-sold as high-priced specialty coffee to consumers.

Interventions to price specialty coffees for quality

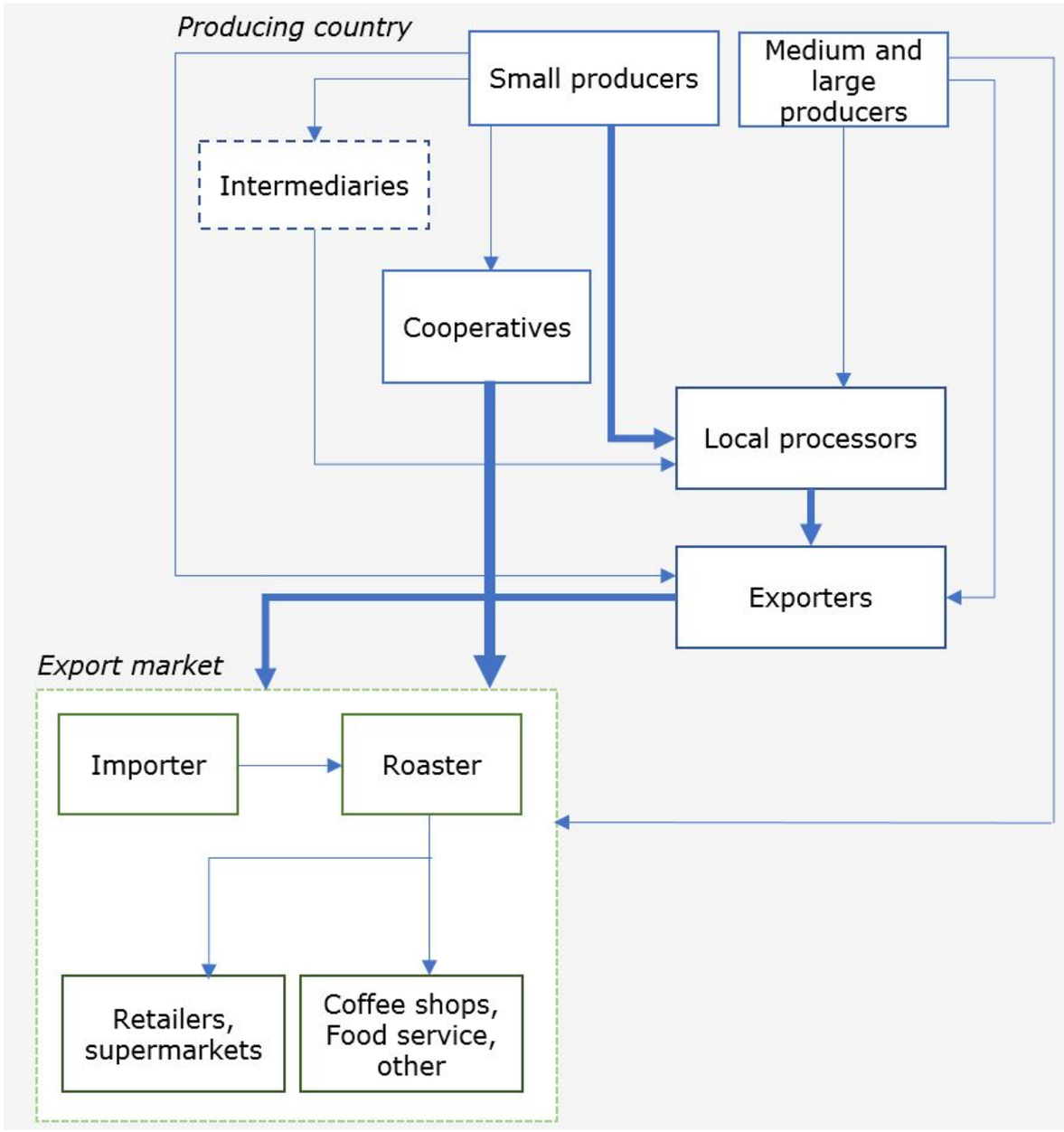
- Quality conventions to replace the New York C price
    - Specialty Coffee Association of America (SCAA), Coffee Quality Institute
        - trained and certified ‘cuppers’
- Specialty coffee cupping events and auctions
    - Cup of Excellence (by Alliance for Coffee Excellence)
    - transparent & public quality ratings + online auctions

Coffee in Dev't Literature

- Economic upgrading through the global value chain of coffee (Grabs & Ponte, 2019; Ponte, 2019; Vicol et al. 2018)

- Impact of certification for consumers (Hainmueller et al. 2015) or producers (Dragusanu, Montero & Nunn, 2022; Minten et al. 2018; Ruben & Fort, 2012; Weber, 2011)

- Relationship bt/ price and quality using CoE auction data (Donnet et al 2007; Wilson and Wilson 2014; Traor et 2018)



https://www.cbi.eu/

CUP OF EXCELLENCE

How Your Cup Becomes Excellent

#CUPOFEXCELLENCE
#BACKCOFFEEFARMERS

COFFEE FARMERS

Producers submit their coffee and wait in anticipation until the awards ceremony.

150 COFFEES
1,800 CUPS

PRE-SELECTION ROUND 1

Every sample entered is cupped once by the National Jury. Those that score 86 or over advance (max 150).

90 COFFEES
1,080 CUPS

NATIONAL JURY ROUND 2

Coffees with a score 86 or over advance (max 90).

40 COFFEES
1,120 CUPS

NATIONAL JURY ROUND 3

Coffees with a score 86 or over advance (max 40).

30 COFFEES
840 CUPS

INTERNATIONAL JURY ROUND 4 & 5

All coffees passed are cupped. The top 30 coffees with scores 87 or over are Cup of Excellence winners. Coffees that scored between 85 and 86.99 or 87 or over in this stage that did not make the top 30 are National Winners.

TOP 10
280 CUPS

INTERNATIONAL JURY ROUND 6

The top ten highest scoring samples are cupped one final time to give them special attention, to determine the final score and ranking.

RECOGNITION

AWARDS

Producers find out how their coffee fared.

REWARD

INTERNATIONAL AUCTION

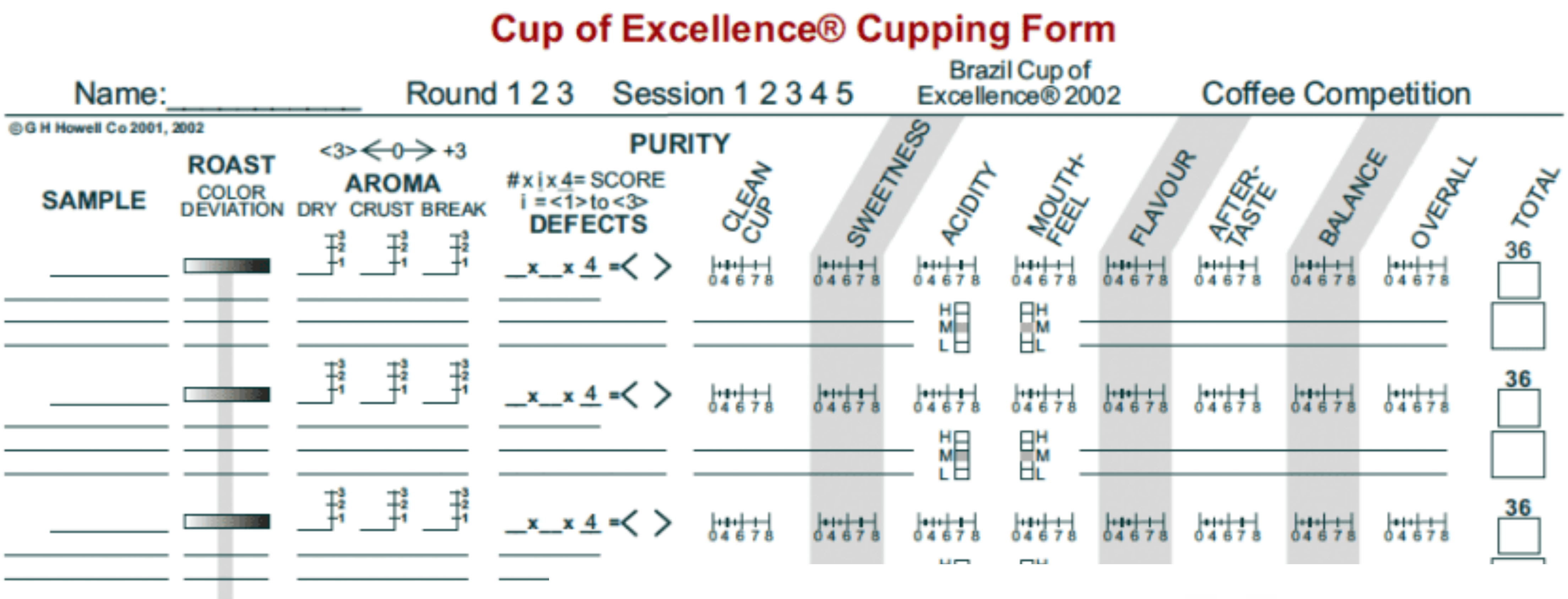
Roasters and importers from around the world bid on their favorite coffees.

YOUR CUP OF EXCELLENCE

It took 8,720 cups to find one of the best coffees you've ever had.

CUP OF EXCELLENCE

https://cupofexcellence.org/



탑오브탑 : COE커핑기준 90점 이상

C.O.E 레벨 : COE커핑기준 86점 이상

스페셜티 커피: COE커핑기준 80점 이상

프리미엄 커피 : COE커핑기준 76점 이상

커머셜 커피: COE커핑기준 76점 미만

https://cafenamooo.modoo.at/

Two caveats

Corresponding to two key pillars of CoE:
expert judges & public competition

1. Attention on rank vs. conventionalization of the quality score as a determinant of price at all levels of quality
(Wilson and Wilson 2014; Traore et al 2018)

2. Expert judges lending credibility to scores vs. establishing universal trust in the quality rubric itself (Hsu, Roberts & Swaminathan, 2012; Roberts & Reagans, 2007)

Research design

- Separate effects of quality score and competition rank on prices

- Do these effects get stronger over time, with increasing experience at global and local levels?

- What role does jury experience play?

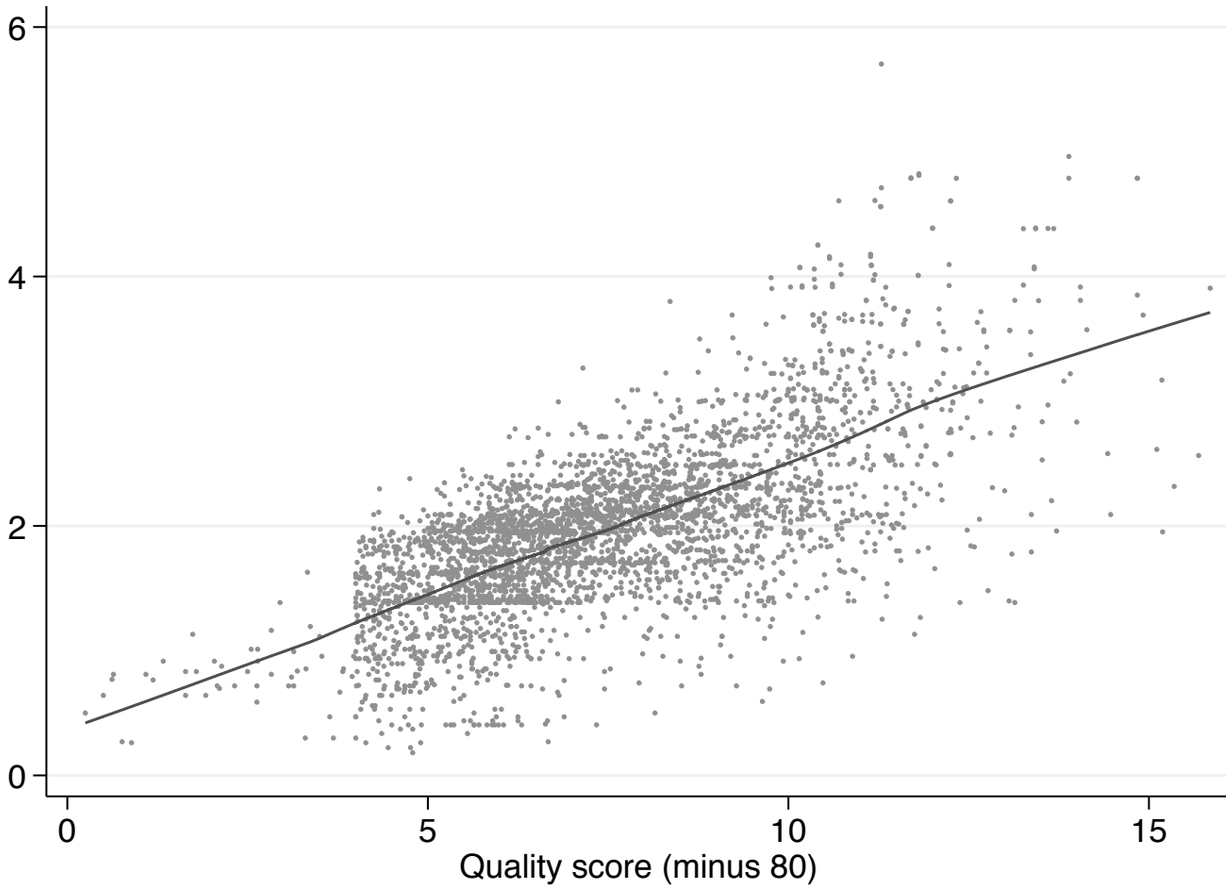
Auction Data

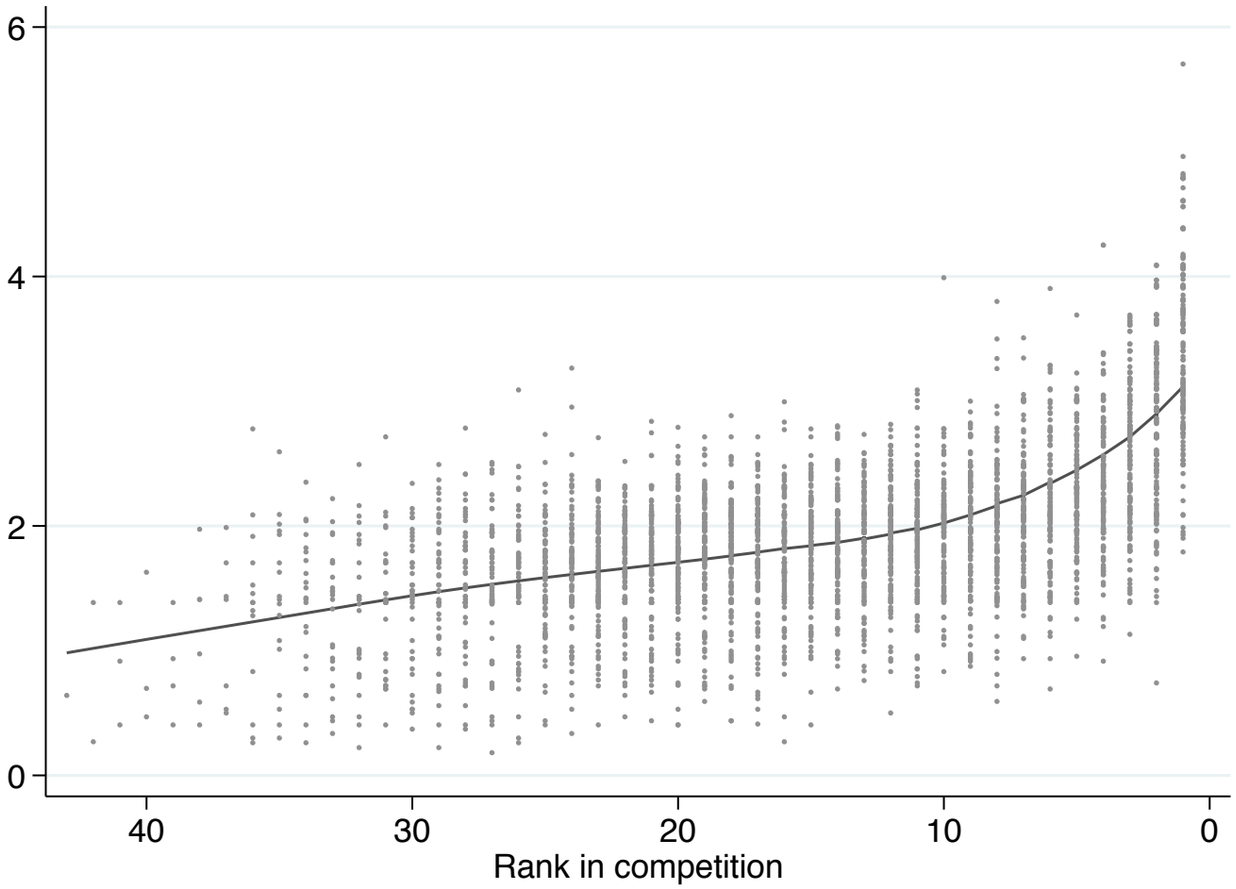
- Data from CoE competitions and auctions in 10 Latin American countries during 2003-2019

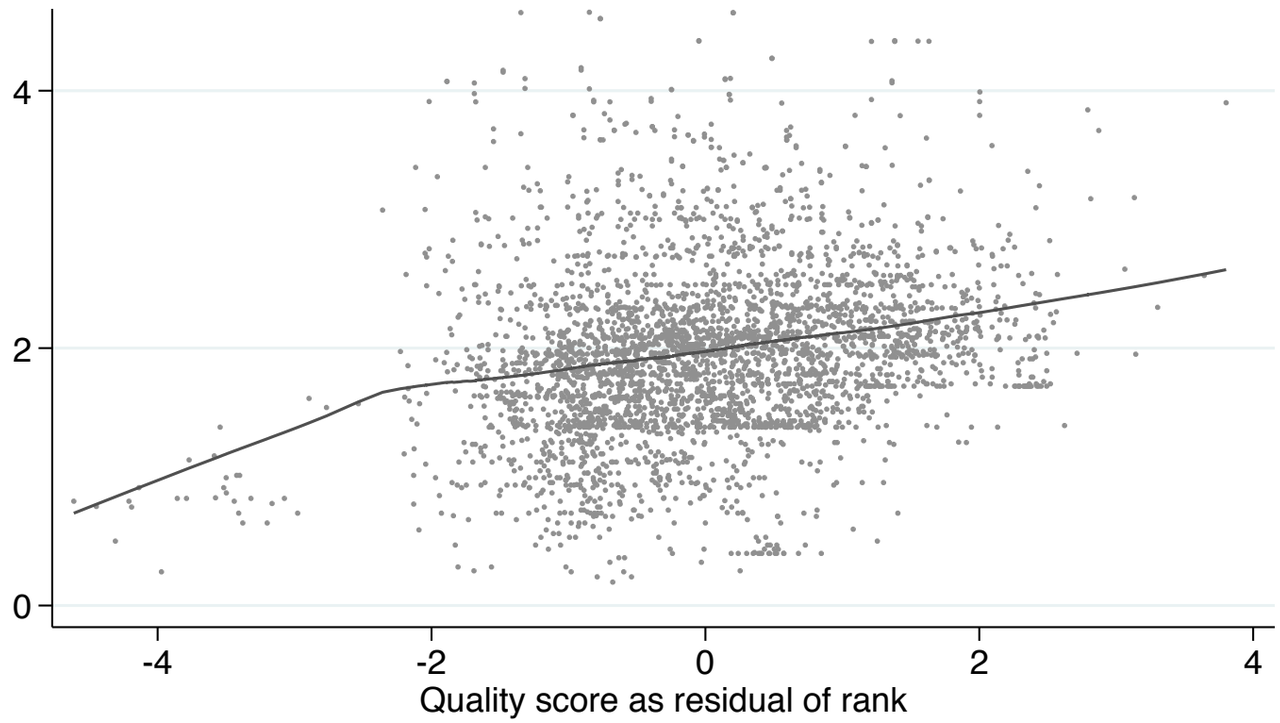
    - 3,532 sales in 127 auctions

Key variables	Mean	St. dev
1. Price per pound (winning bid) in US$	9.25	11.77
2. Quality Score (out of 100)	87.39	2.23
3. Country competition experience (years)	8.20	5.30
4. Cumulative judging experience (# of juries that judges served previously)	89.48	44.73

Log (price) as function of quality & rank

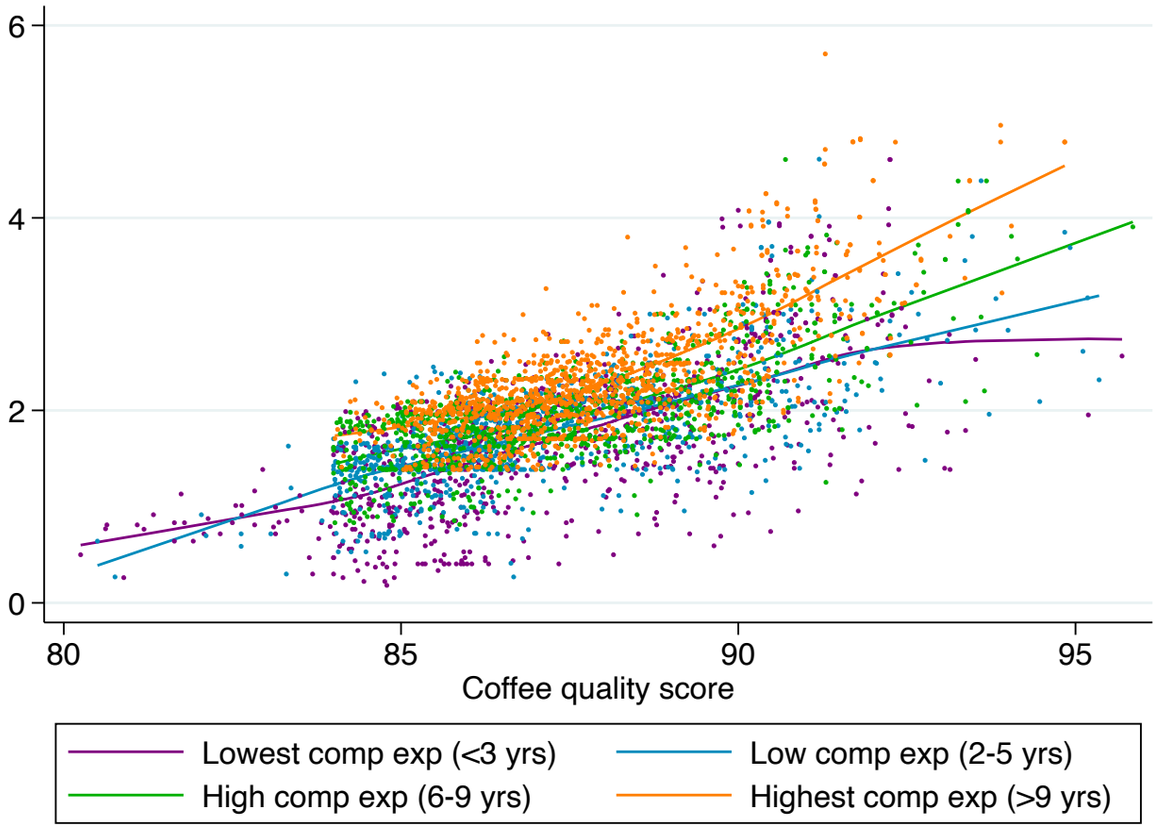


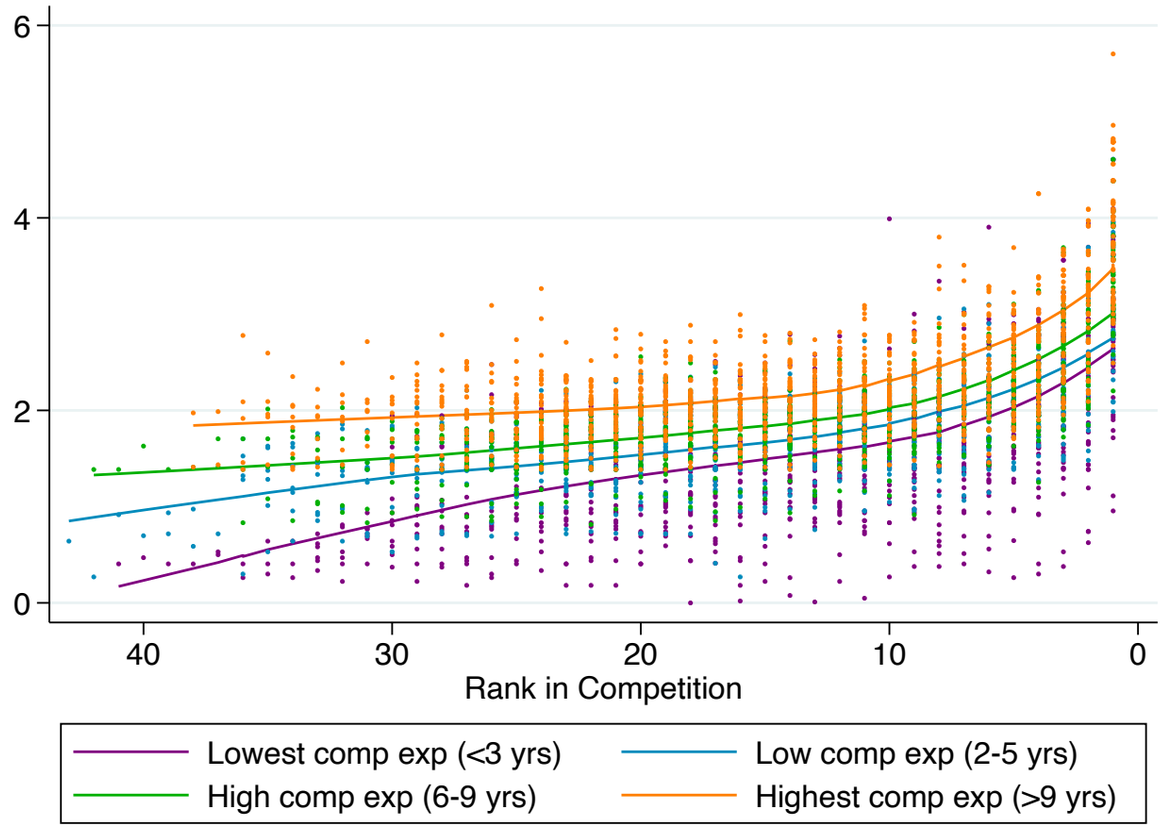




Results

Country competition experience strengthens
the relationship between price and quality/rank





Results

	(1)	(2)	(3)	(4)
Quality score as residual of rank	0.01	.01*	-0.03	-0.02
	(0.01)	(0.01)	(0.05)	(0.05)
Farmer CoE experience (ln)		.02**	.02*	**.02***
		(0.01)	(0.01)	(0.01)
Foreign jury experience (ln)		0.09	.41*	**.47****
		(0.05)	(0.19)	(0.16)
Local jury experience (ln)		-0.03	-0.22	-0.17
		(0.03)	(0.1)	(0.09)
Quality score residual of rank X Foreign jury exp. (ln)			0.01	0.01
			(0.01)	(0.01)
Quality score residual of rank X Local jury exp. (ln)			.02**	**.02***
			(0.01)	(0.01)
Rank in top 3 X Foreign jury experience (ln)				**.05***
				(0.02)
Rank in top 3 X Local jury experience (ln)				0.03
				(0.01)
Observations	3532	3532	3532	3532
Log likelihood	169.66	145.44	157.29	178.76
*Standard errors are in parentheses; *** p<.001, ** p<.01, * p<.05*				

Results recap

- Quality score as a residual of rank does not impact price.
- Effect of ranking at the top of a competition increases in time.
- Local competitions help buyers to accept a country's coffee as legitimately in the realm of specialty coffee. Accumulated experience in country:
    - has positive main effect on coffee prices
    - positively moderates the impact of quality scores and of top 3 ranks on price.
- Local jury experience increases the impact of quality score;
    - foreign jury experience increases impact of ranking in the top 3.
- CoE's global experience increases the impact of top 3 and 10 ranks on price.

Take-aways

- ‘tournaments of value’ (Appadurai, 1988)
    - A focus on prize winners may restrict the impact of the quality score on the market, curtail the expansion of the specialty coffee market, and limit the benefits that might accrue to farmers who do not win but nonetheless produce great coffee
- “expert opinion regimes” (Karpik 2010; Shrum 1996)
    - The accumulating experience of local judges is valued by buyers, who pay more attention to quality ratings and competition rankings determined by juries with more experienced local judges. This suggests that crucial know-how is being transferred to producing countries

Cupping in Context: Establishing Quality-Based Conventions for Pricing Specialty Coffees

Presenter: Semee Yoon, Yonsei University

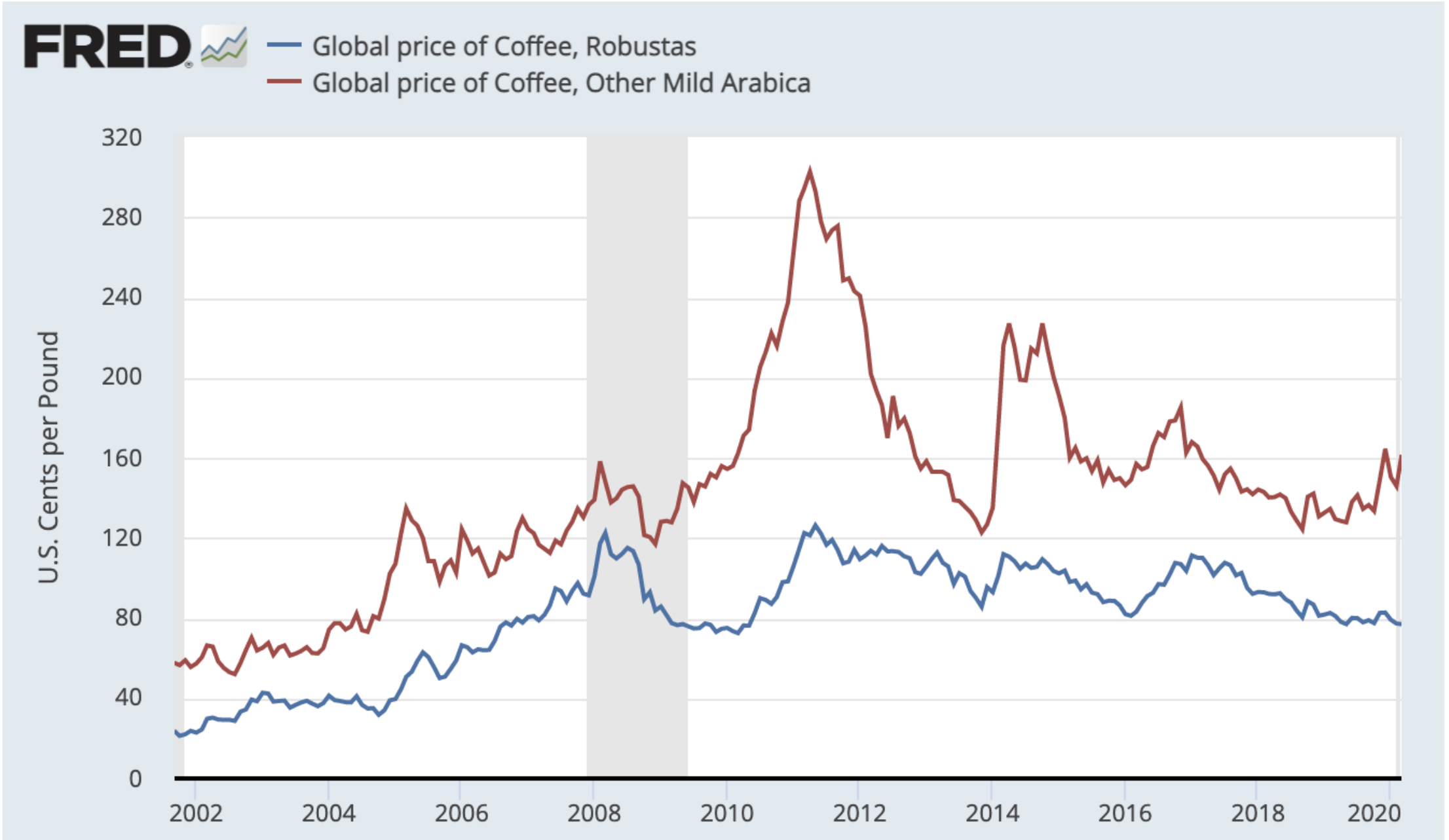
Discussant: Chungeun Yoon, KDI School

Summary

- What are the effects of quality socre and competition rank on coffee prices?
  - Positive effect of competition rank on coffee prices
  - Positive effect of quality socre on coffee prices, but no effect of quality score as residual of rank
- What role does jury experience play?
  - Local jury experience increase the impact of quality score on coffee prices

This paper

- Interesting and charming to coffeeholic
- The first place matters, but the second place also matters
- Experienced local judges play a role
- Summary statistics and data
- Empricial strategy and identifying assumption
- Coffee prices in market?
- What else?


FRED
Global price of Coffee, Robustas
Global price of Coffee, Other Mild Arabica
U.S. Cents per Pound
320
280
240
200
160
120
80
40
0
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

한국개발정책학회
춘계학술포럼

해외직접투자와 신생민주주의

To Stay Or To Go?: The Source of Domestic Support for Foreign Direct Investment in Kenya

이인복 (KDI국제정책대학원)
양준석 (성균관대학교)

INTRO

FDI As Source of Development

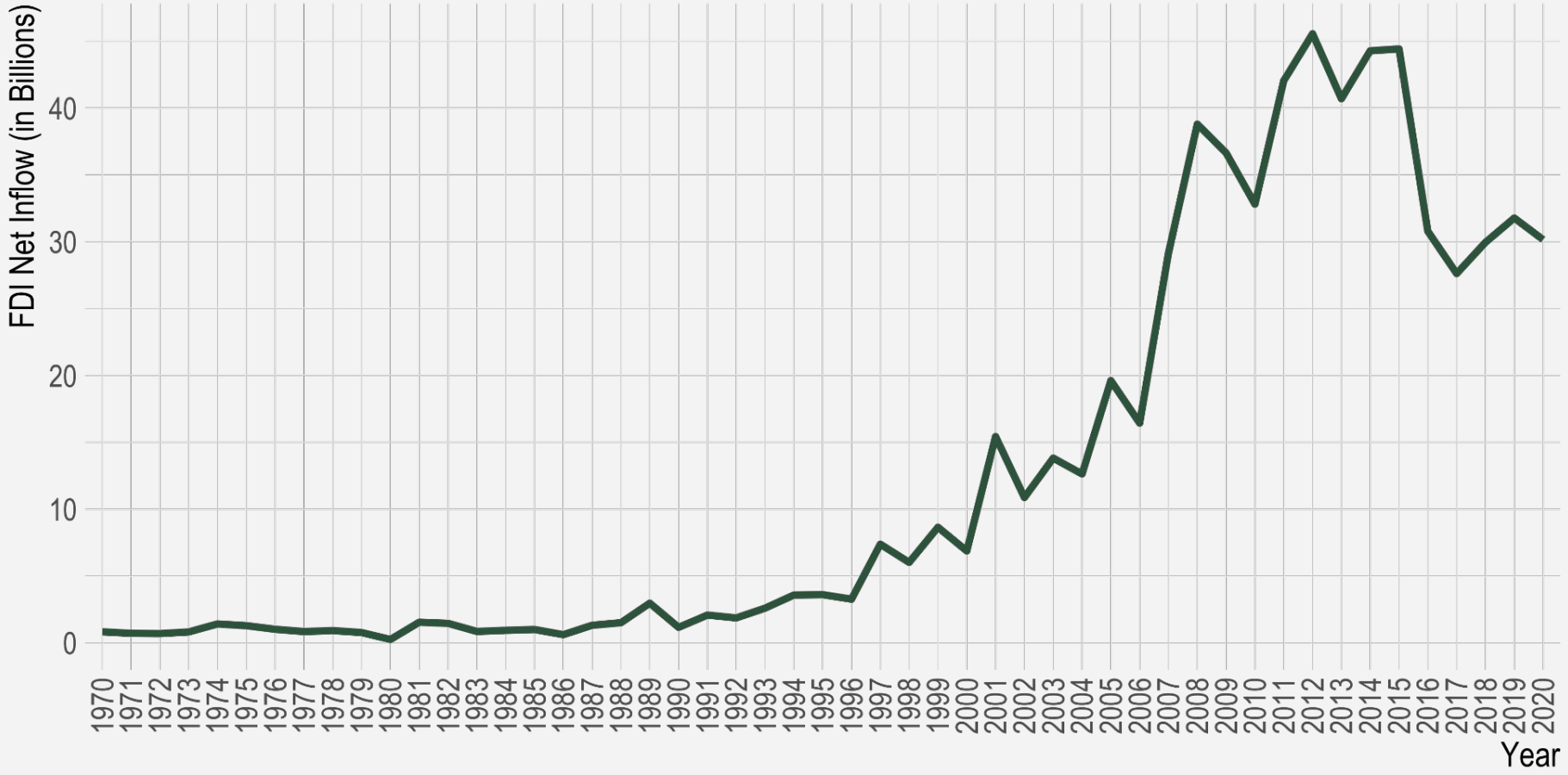
“In the 2000s, Foreign Direct Investment (FDI) inflows were the single biggest source of capital for developing countries and a critical input for technology transfer in developing country firms.”

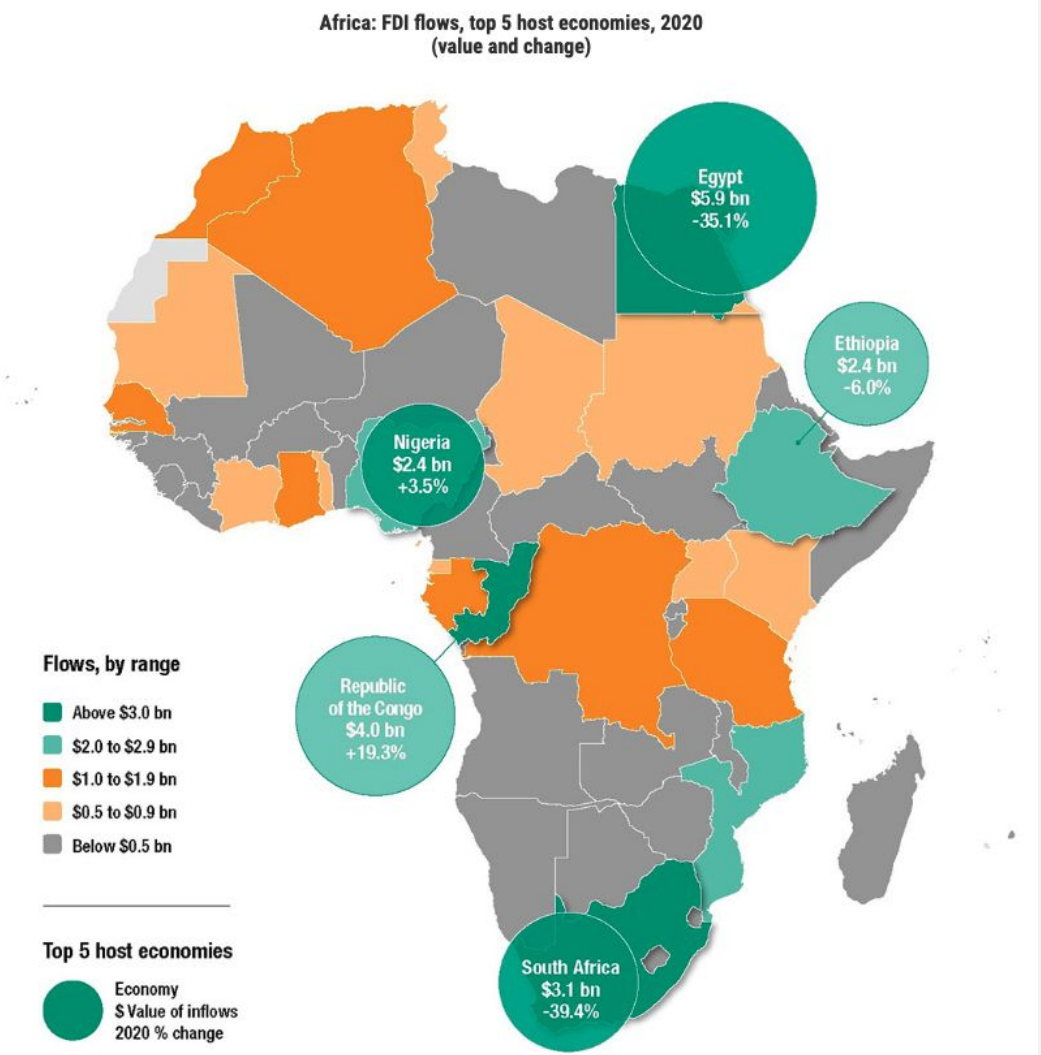
Robert Zoellick, World Bank President

“Democratizing Development Economics”

A Speech Delivered at Georgetown University, Sep 2010

Sub-Saharan Africa Only




Africa: FDI flows, top 5 host economies, 2020
(value and change)
Egypt
$5.9 bn
-35.1%
Ethiopia
$2.4 bn
-6.0%
Nigeria
$2.4 bn
+3.5%
Republic
of the Congo
$4.0 bn
+19.3%
South Africa
$3.1 bn
-39.4%
Flows, by range
Above $3.0 bn
$2.0 to $2.9 bn
$1.0 to $1.9 bn
$0.5 to $0.9 bn
Below $0.5 bn
Top 5 host economies
Economy
$ Value of inflows
2020 % change

BUSINESS DAILY

MARKET NEWS

Kenya rises in investment list on economic diversity

SUNDAY FEBRUARY 09 2020

By GEOFFREY IRUNGU
More by this Author

SUMMARY

- Kenya ranked fifth in 2018 and sixth in 2017, showing that there had been improvement in the past two years on the basis of the Rand Merchant Bank's Investment Attractiveness Index.
- The bank's report said that although Kenya has a relatively small market size, it has a strong manufacturing sector.
- Infrastructure investments are also an essential part of the country's development strategy, for example, the construction of the railway connecting the capital to the port of Mombasa.

Road construction in Nakuru. FILE PHOTO | NMG

NATION

Factcheck: The truth about foreign investment since 2013

Tuesday, June 27, 2017 — updated on August 19, 2021

"... In terms of investments we've increased our (foreign) investments, from the time that H.E. the President took office, 400 per cent. In 2015, our capital, Nairobi, edged Johannesburg out of being the most attractive investment destination city in the world."

- Foreign Affairs *CS, Amina Mohamed, at the Jubilee manifesto launch on June 26, 2017*

The Standard

Njiraini wants tax incentives to foreign investors scrapped

NEWS

By Moses Michira | Mar 26th 2015 | 3 min read

Top taxman John Njiraini wants to scrap all tax breaks in a twist that could jolt foreign investors and rope in more revenue, but could be bring relief to millions of households.

The director general of the Kenya Revenue Authority has proposed that improved service delivery in the public sector will maintain the country's attractiveness as an investment destination among international investors.

Kenya is estimated to lose more than Sh100 billion annually through tax breaks given to multinational firms, to stir up debate on whether there were any gains for the economy.

NO TO COAL

A Chinese coal plant on a UNESCO-protected island in Kenya is facing major protests

Rallying against coal

Question

- When do host country citizens prefer foreign versus domestic investments?
- What characteristics make foreign direct investment more desirable to host country citizens?
- When and from whom can governments claim credit for increased foreign investments?

This Paper

- Using micro-level individual data to analyze public's demand for foreign direct investment
- Case: Kenya
- Departs from observational studies to provide causal estimates using survey experimental evidence
- Implications for development, domestic sources of foreign policy, and democratic accountability

Preview of Findings

- Host country citizens prefer foreign over domestic firms, but the concern for corruption seem minimal
- While job creation or wage levels matters the most, citizens put strong emphasis on social responsibility or minimal policy concessions
- Elected politicians can credit claim even when they are clearly not attributable for success, but only for coethnic voters

EXISTING LITERATURE

Impact of FDI

- Theoretical and empirical models on the politics of FDI

  (e.g. Lu et al., 2017; Demir and Duan, 2018; Owen, 2019)
- Positive impact on economic growth through employment generation or technology transfer

  (e.g., Borensztein et al., 1998; Razin and Sadka, 2007)
- Negative impact on factors such as inequality, corruption, brain drain, environmental degradation, and even incidence of civil war

  (e.g., Basu and Guariglia, 2007; Barbieri and Reuveny, 2015; Zhu and Shin 2015)

Supply and Demand for FDI

- Most predominantly focus on the supply side of FDI policies
  - Strategic interaction at the firm level, or how multinational corporations (MNCs) choose the location of their investment

    (e.g. Lu et al., 2017; Büthe and Milner, 2008)
- On the contrary, study on the demand for FDI still in infancy
  - SES and desire for reciprocity as determinants public opinion about FDI regulation policy

    (e.g., Chilton et al., 2017)

Public Preference on FDI

- Public opinion shapes and constraints foreign policy making

  (e.g., Baum and Potter, 2008; Tomz, 2007; Herrmann, Tetlock, and Visser, 1999; Hartley and Russett, 1992; Sobel, 2001; Kertzer and Zeitzoff, 2017; Eisensee and Str¨omberg, 2007)

- Surge of social protest over FDI policies in various sectors

  (e.g. Robertson and Teitelbaum, 2011)

- What allows countries to pursue FDI liberalization?

  Specifically, how do citizens attribute FDI decisions to governments?

DATA & RESEARCH DESIGN

Data

- Original online survey conducted between Oct-Dec 2021 (EN, SW)
- Recruitment using quota sampling for age, gender and province (quota on ages 55+ eventually relaxed)
- Online representative survey with natural fall out on the distribution of SES and ethnicity
- Final sample of adults with N=1,518 after removing those inattentive
- Captures various aspects of respondent backgrounds, economic evaluations, foreign sentiments, knowledge about FDI or trade, and ethnic and political affiliations

Study 1 Design: Preference for Foreign vs. Domestic

Study 1 Design: Preference for Foreign vs. Domestic

“A Foreign company is preparing to expand its operations in a Kenyan domestic industry in which a small number of firms operate due to its high level of entry barriers.

Typically, some general examples of entry barriers include technology, differentiation of products, sufficient capital, or government screening, approval or licensing.”

Study 1 Design: Preference for Foreign vs. Domestic

*“A **[Kenyan/Foreign]** company is preparing to expand its operations in a Kenyan domestic industry **[in which a small number of firms operate due to its high level of entry barriers / in which a large number of firms operate due to its low level of entry barriers.]***

Typically, some general examples of entry barriers include technology, differentiation of products, sufficient capital, or government screening, approval or licensing.”

Study 1 Design: Preference for Foreign vs. Domestic

- IV: Testing interactive impact of nationality and entry barrier

		Entry Barrier	
		Low	High
Nationality	Foreign		
	Domestic		

- DV (in likert scales)
  - Support or oppose
  - Help or hurt Kenyan / your own economic conditions
  - Help or hurt the electoral chances of elected politicians
  - Increase or decrease corruption for the society, politicians, civil servants

Study 2 Design: Preferable FDI Characteristics

Study 2 Design: Preferable FDI Characteristics

“In this section, you will be presented with the characteristics of two foreign companies which are considering to make foreign direct investment in Kenya.

Please carefully review the characteristics below, and answer the following questions.”

Study 2 Design: Preferable FDI Characteristics

In this section, you will be presented with the characteristics of two foreign companies which are considering to make foreign direct investment in Kenya.

Please carefully review the characteristics below, and answer the following questions.

	Company A	Company B
Wage level	The expected wage level of this company is **similar to** that of a typical Kenyan company in its sector.	The expected wage level of this company is **lower than** that of a typical Kenyan company in its sector.
Expected employment	The expected magnitude of job creation by this company is **higher than** what a typical Kenyan company hires in its sector.	The expected magnitude of job creation by this company is **higher than** what a typical Kenyan company hires in its sector.
	responsibility, and community responsibility.	responsibility, and community responsibility.
Local policy concessions	This company **will be given tax breaks** by the Kenyan government for its investments.	This company **will be given tax breaks** by the Kenyan government for its investments.

Which of these companies do you prefer?

Company A

Company B

Study 2 Design: Preferable FDI Characteristics

- Size
  - Smaller / Similar / Larger
- Magnitude of expected employment
  - Lower / Similar / Higher
- Wage level
  - Lower / Similar / High

Study 2 Design: Preferable FDI Characteristics

- Entry mode
  - Business facilities to locally produce goods and services
  - Joint venture
  - Merger and Acquisition (M&A)
- Local Policy Concessions:
  - Equal treatment for taxation as Kenyan companies
  - Given tax breaks
- Social Responsibility
  - Low / Average / High

Study 2 Design: Preferable FDI Characteristics

- Industry:
  - Wholesale and retail / transportation / tourism / mining and quarrying / manufacturing / infrastructure and construction / information communication and technology / financial and insurance / electricity, gas, and water / education and health / agriculture, forestry, and fishing
- DVs
  - Which of the two do you prefer?
  - Support or oppose each company making FDI
  - Perceived impact on national and personal economic conditions and incidence of corruption

Study 3 Design: Government Credit Claiming

Study 3 Design: Government Credit Claiming

“Imagine the following hypothetical situation. Imagine that during a hypothetical President Kamau’s time in office, the amount of foreign investments in Kenya increased a lot. Experts say that the global economic conditions, rather than actions taken by the Kenyan government, played a major role.”

Study 3 Design: Government Credit Claiming

"Imagine the following hypothetical situation. Imagine that during a hypothetical President ***[Onyango/Kamau]****'s time in office, the amount of foreign investments in Kenya increased a lot. Experts say that the* ***[global economic conditions and actions taken by the Kenyan government played a major role / global economic conditions, rather than actions taken by the Kenyan government, played a major role / actions taken by the Kenyan government, rather than the global economic conditions, played a major role / global economic conditions and the Kenyan government played a minor role].***"

Study 3 Design: Government Credit Claiming

- IV: Testing interactive impact of ethnicity and attribution cues

		Attribution Cue			
		Both Major	Gov Major	Global Econ Major	Both Minor
Ethnicity Cue	Onyango				
	Kamau				

- DV (in likert scales)
  - How responsible is the Kenyan government for the increased FDI?
  - How responsible is the global economic conditions?
  - Between the Kenyan government and global economic conditions, who are more responsible?

RESULTS

Study 1 Results: Preference for Foreign vs. Domestic

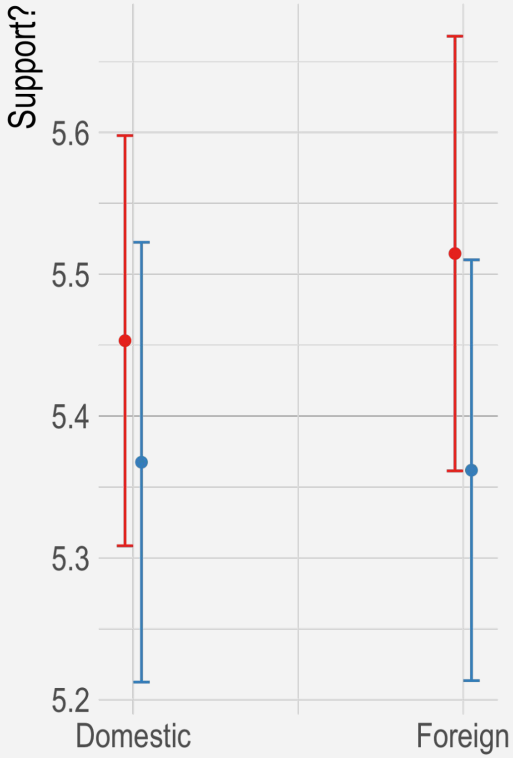
- IV: Testing interactive impact of nationality and entry barrier

		Entry Barrier	
		Low	High
Nationality	Foreign		
	Domestic		

- DV (in likert scales)
  - Support or oppose
  - Help or hurt Kenyan / your own economic conditions
  - Help or hurt the electoral chances of elected politicians
  - Increase or decrease corruption for the society, politicians, civil servants

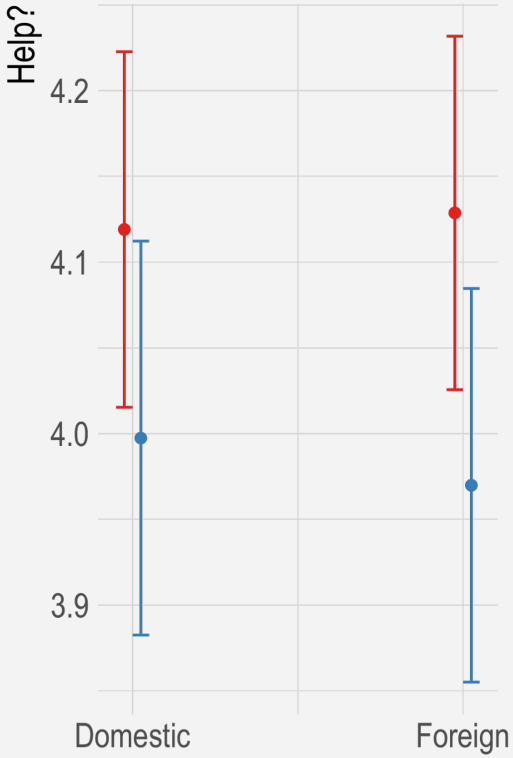
Support?

Red: High, Blue: Low



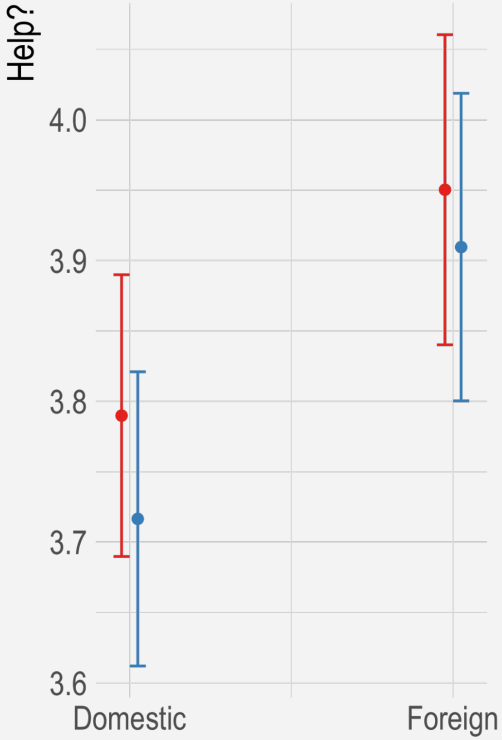
National Economy

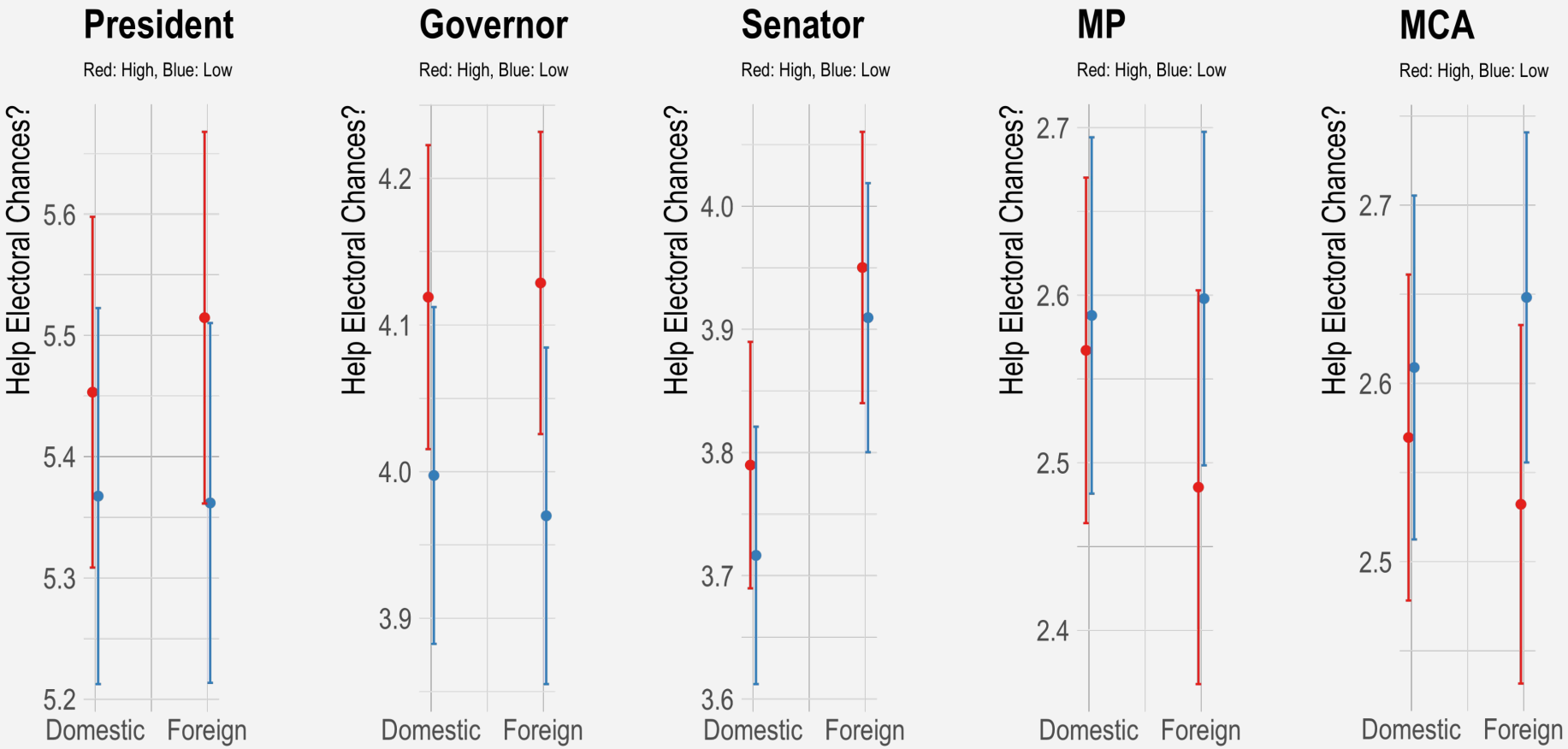
Red: High, Blue: Low

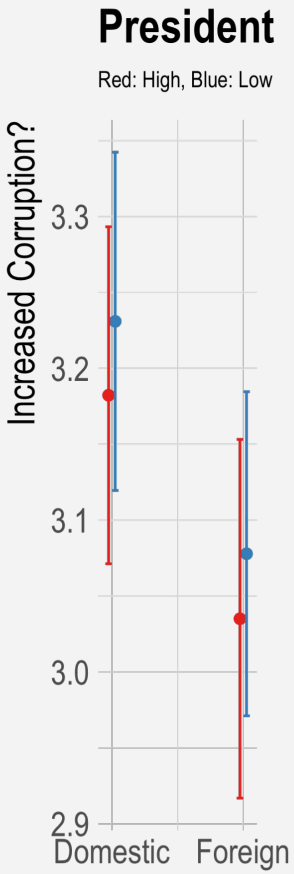


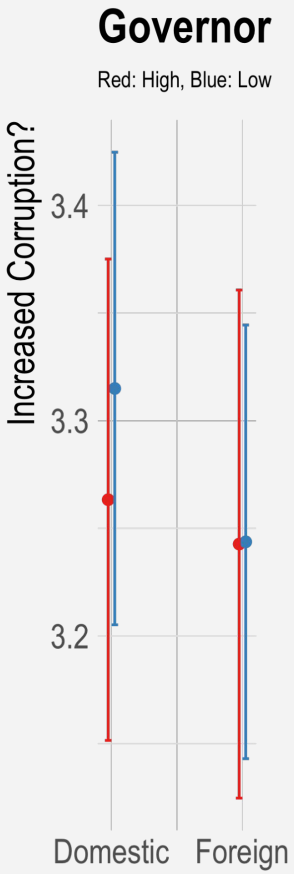
Personal Economy

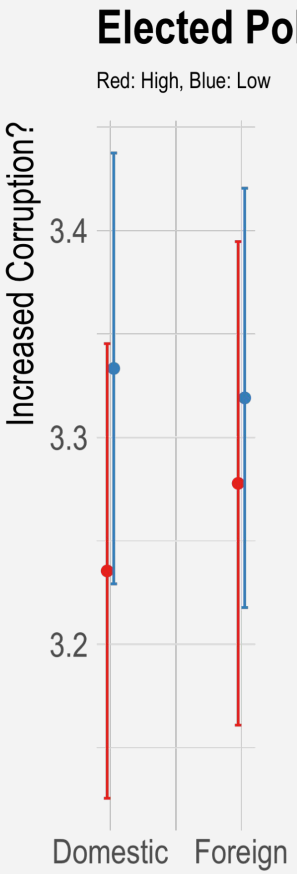
Red: High, Blue: Low

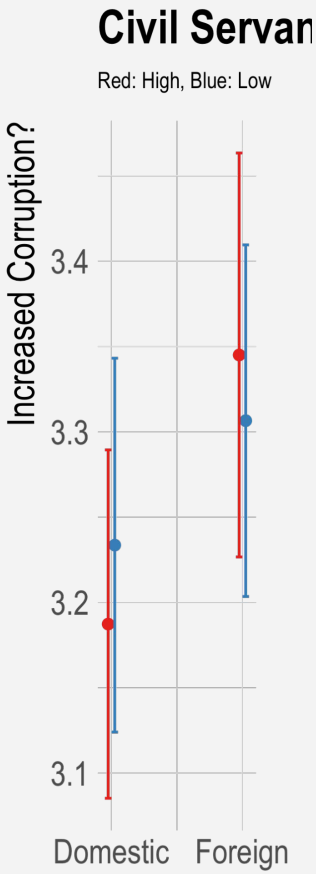


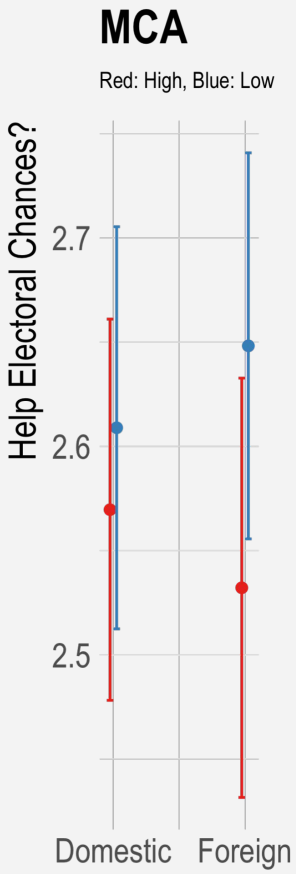

President
Red: High, Blue: Low
Help Electoral Chances?
5.6
5.5
5.4
5.3
5.2
Domestic
Foreign
Governor
Red: High, Blue: Low
Help Electoral Chances?
4.2
4.1
4.0
3.9
Domestic
Foreign
Senator
Red: High, Blue: Low
Help Electoral Chances?
4.0
3.9
3.8
3.7
3.6
Domestic
Foreign
MP
Red: High, Blue: Low
Help Electoral Chances?
2.7
2.6
2.5
2.4
Domestic
Foreign
MCA
Red: High, Blue: Low
Help Electoral Chances?
2.7
2.6
2.5
Domestic
Foreign


President
Red: High, Blue: Low
Increased Corruption?
3.3
3.2
3.1
3.0
2.9
Domestic
Foreign


Governor
Red: High, Blue: Low
Increased Corruption?
3.4
3.3
3.2
Domestic
Foreign


Elected Poli
Red: High, Blue: Low
Increased Corruption?
3.4
3.3
3.2
Domestic
Foreign


Civil Servan
Red: High, Blue: Low
Increased Corruption?
3.4
3.3
3.2
3.1
Domestic
Foreign


MCA
Red: High, Blue: Low
Help Electoral Chances?
2.7
2.6
2.5
Domestic
Foreign

Study 2 Design: Preferable FDI Characteristics

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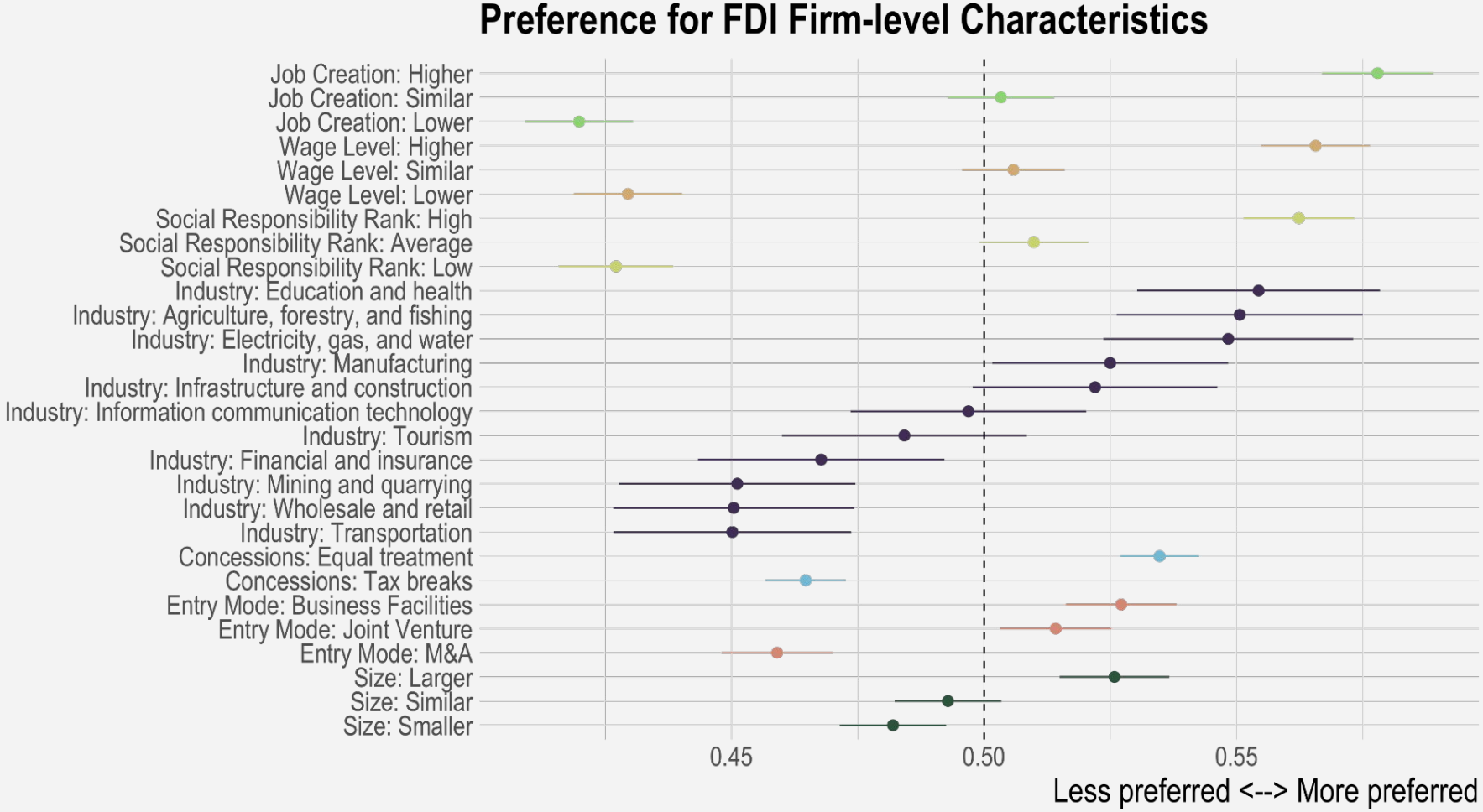
Company A

Company B


Preference for FDI Firm-level Characteristics
Job Creation: Higher
Job Creation: Similar
Job Creation: Lower
Wage Level: Higher
Wage Level: Similar
Wage Level: Lower
Social Responsibility Rank: High
Social Responsibility Rank: Average
Social Responsibility Rank: Low
Industry: Education and health
Industry: Agriculture, forestry, and fishing
Industry: Electricity, gas, and water
Industry: Manufacturing
Industry: Infrastructure and construction
Industry: Information communication technology
Industry: Tourism
Industry: Financial and insurance
Industry: Mining and quarrying
Industry: Wholesale and retail
Industry: Transportation
Concessions: Equal treatment
Concessions: Tax breaks
Entry Mode: Business Facilities
Entry Mode: Joint Venture
Entry Mode: M&A
Size: Larger
Size: Similar
Size: Smaller
0.45
0.50
0.55
Less preferred <--> More preferred

Study 3 Design: Government Credit Claiming

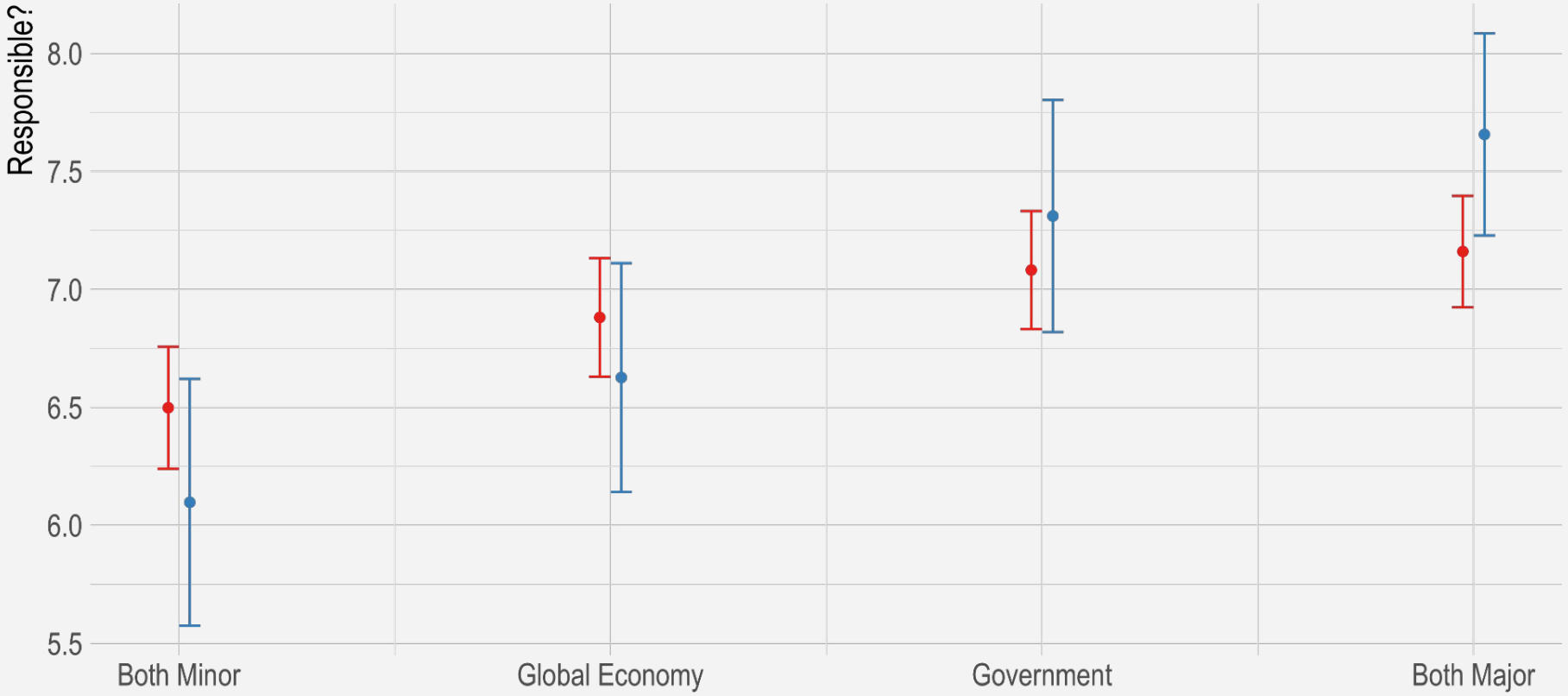
- IV: Testing interactive impact of ethnicity and attribution cues

		Attribution Cue			
		Both Major	Gov Major	Global Econ Major	Both Minor
Ethnicity Cue	Onyango				
	Kamau				

- DV (in likert scales)
  - How responsible is the Kenyan government for the increased FDI?
  - How responsible is the global economic conditions?
  - Between the Kenyan government and global economic conditions, who are more responsible?

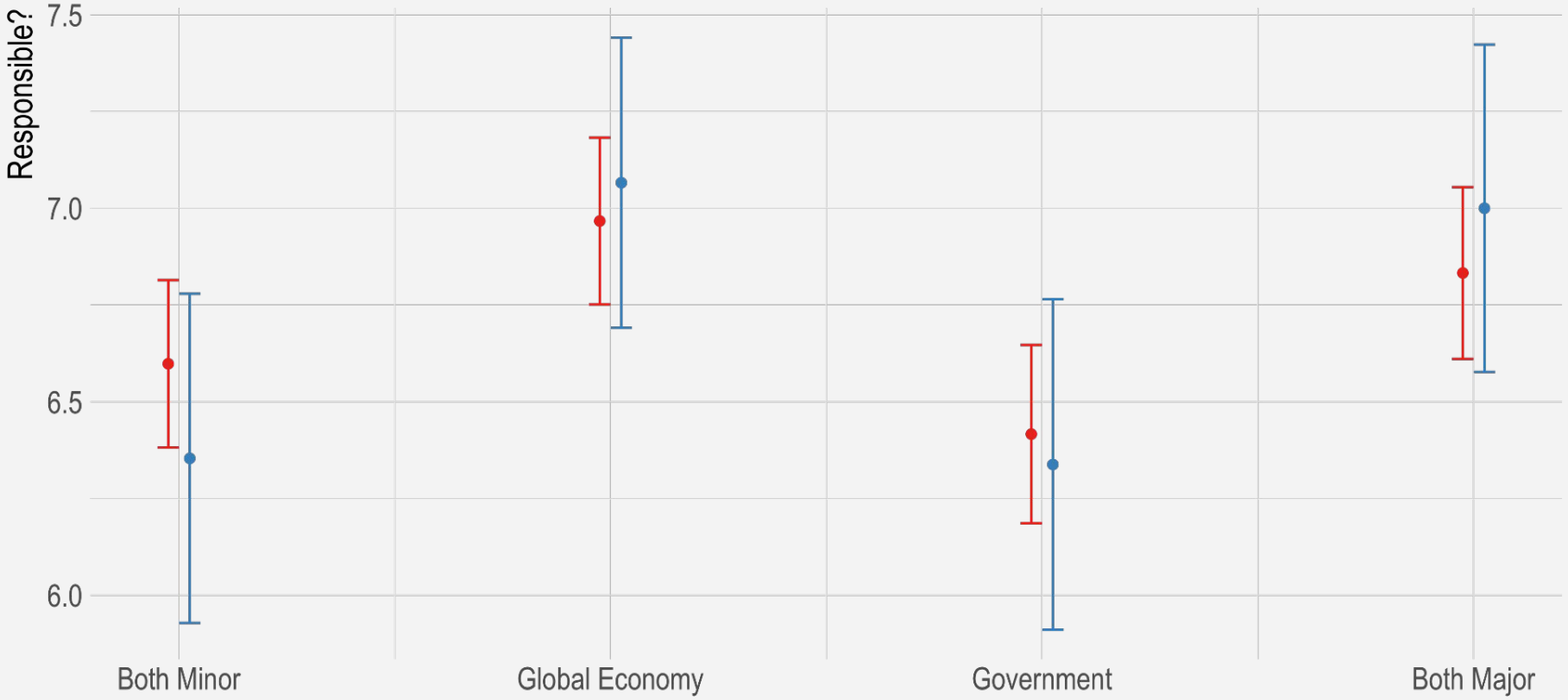
Kenyan Government

Red: Non-Coethnic, Blue: Coethnic



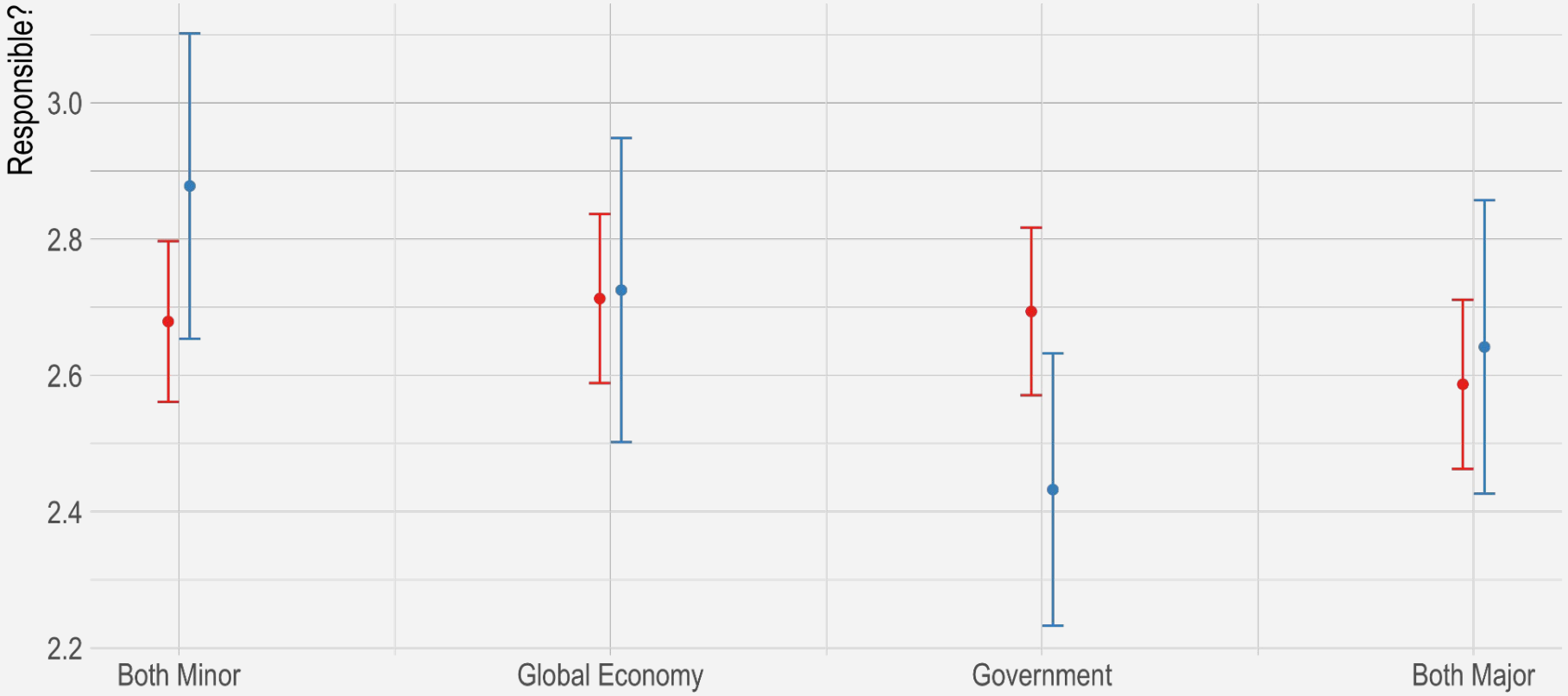
Global Economy

Red: Non-Coethnic, Blue: Coethnic



Global > Government

Red: Non-Coethnic, Blue: Coethnic



DISCUSSIONS & FUTURE DIRECTIONS

Discussions and Future Directions

- Exciting new findings on public perception and demand for FDI, some contrary to conventional expectations
- Further work needed to consider heterogeneity across different respondents (e.g. education level, foreign preference, etc.)
- Additional collection and analysis of existing observational data (survey, newspaper articles, etc) to complement the experimental results

To Stay Or To Go?: The Source of Domestic Support for Foreign Direct Investment in Kenya

이인복 (KDI국제정책대학원)
양준석 (성균관대학교)

토론: 김종섭

Findings of the research

Host country citizens prefer foreign over domestic firms, but the concern for corruption seem minimal

While job creation or wage levels matters the most, citizens put strong emphasis on social responsibility or minimal policy concessions

Elected politicians can credit claim even when they are clearly not attributable for success, but only for coethnic voters

해결되지 않은 궁금증

다른 나라에서보다 케냐에서 사람들이 더 외국기업을 좋아하는 것인가?

- 그런데 다른 나라에서도 모두 그렇다면?

만약 다른 나라에서보다 케냐에서 외국기업을 더 좋아한다는 것이 사실이라면 왜 그런가?

FDI에 대한 부정적 인식의 원인

Nationalism

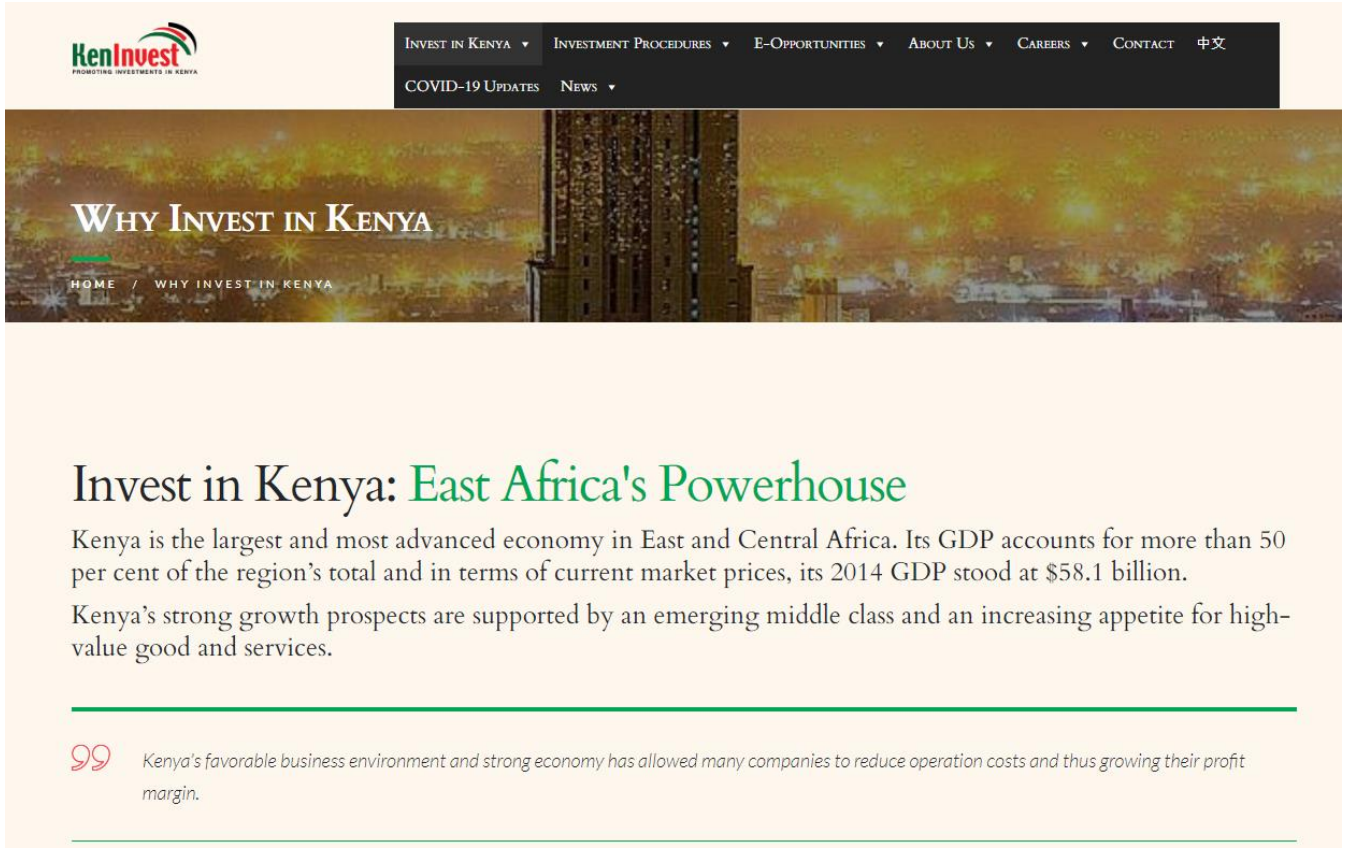
정부정책과 홍보

과거 경험

중국의 투자 – 중국 노동자의 유입, 부실시공 등

투자 업종 - 1차 산업에 대한 투자와 환경 훼손

케냐 정부의 FDI 정책


KenInvest
PROMOTING INVESTMENTS IN KENYA
INVEST IN KENYA
INVESTMENT PROCEDURES
E-OPPORTUNITIES
ABOUT US
CAREERS
CONTACT
中文
COVID-19 UPDATES
NEWS
WHY INVEST IN KENYA
HOME / WHY INVEST IN KENYA
Invest in Kenya: East Africa's Powerhouse
Kenya is the largest and most advanced economy in East and Central Africa. Its GDP accounts for more than 50 per cent of the region's total and in terms of current market prices, its 2014 GDP stood at $58.1 billion.
Kenya's strong growth prospects are supported by an emerging middle class and an increasing appetite for high-value good and services.
99
Kenya's favorable business environment and strong economy has allowed many companies to reduce operation costs and thus growing their profit margin.

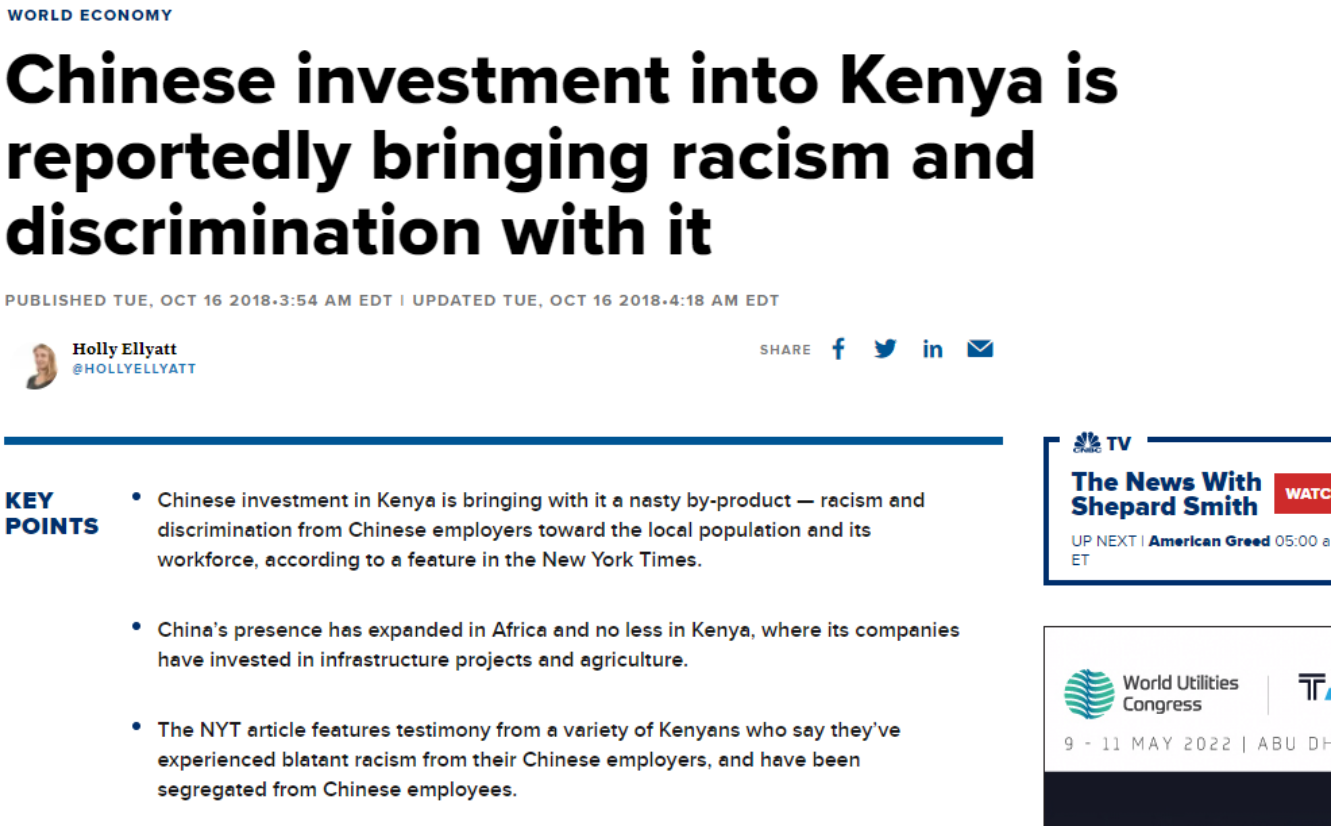
다른 국가들의 FDI 정책

케냐가 특별한 국가인가?

다른 국가들도 모두 FDI를 유치하고자 하는 정책이라면?

2000년대 이후 대부분의 국가들이 FDI를 유치하려는 정책

중국의 투자



WORLD ECONOMY

Chinese investment into Kenya is reportedly bringing racism and discrimination with it

PUBLISHED TUE, OCT 16 2018•3:54 AM EDT | UPDATED TUE, OCT 16 2018•4:18 AM EDT

Holly Ellyatt
@HOLLYELLYATT

SHARE

KEY POINTS

- Chinese investment in Kenya is bringing with it a nasty by-product — racism and discrimination from Chinese employers toward the local population and its workforce, according to a feature in the New York Times.
- China's presence has expanded in Africa and no less in Kenya, where its companies have invested in infrastructure projects and agriculture.
- The NYT article features testimony from a variety of Kenyans who say they've experienced blatant racism from their Chinese employers, and have been segregated from Chinese employees.

중국의 투자

Special Envoy of the People Republic of China, Wang Yong and Cabinet Secretary for Transport, Infrastructure, Housing, Urban Development and Public Works, James Macharia, arrives at the Nairobi Terminus during the commissioning of the Standard Gauge Railway (SGR) Freight Operations to the Naivasha Inland Container Depot in Nairobi, on December 17, 2019. (PATRICK MEINHARDT/AFP VIA GETTY IMAGES)

'Implications of a takeover would be grave.'

BY JEREMIAH JACQUES • DECEMBER 25, 2019

가능성

중국의 투자로 인해 FDI에 대한 인식이 안 좋다.

중국의 투자로 인해 FDI에 대한 인식이 나빠지지 않았다.

- 케냐에는 중국 투자가 별로 없다.
- 케냐에서 중국 투자가 많지만, 별로 부정적인 인식을 유발하지 않았다.
- 케냐 사람들은 중국 투자와 일반적 FDI를 구별하는 경향이 있다.

방법론 관련

질문이 케냐의 일반인이 대답하기에 너무 어려움.

- A Foreign company is preparing to expand its operations in a Kenyan domestic industry in which a small number of firms operate due to its high level of entry barriers.
- Typically, some general examples of entry barriers include technology, differentiation of products, sufficient capital, or government screening, approval or licensing.
- Entry mode

이들의 인식 형성 원인에 관한 질문이 없음.

Smart pandemic response

to secure development with safety and sustainability together

Juhwan Oh
Seoul National University College of Medicine-Hospital

Apr 29, 2022

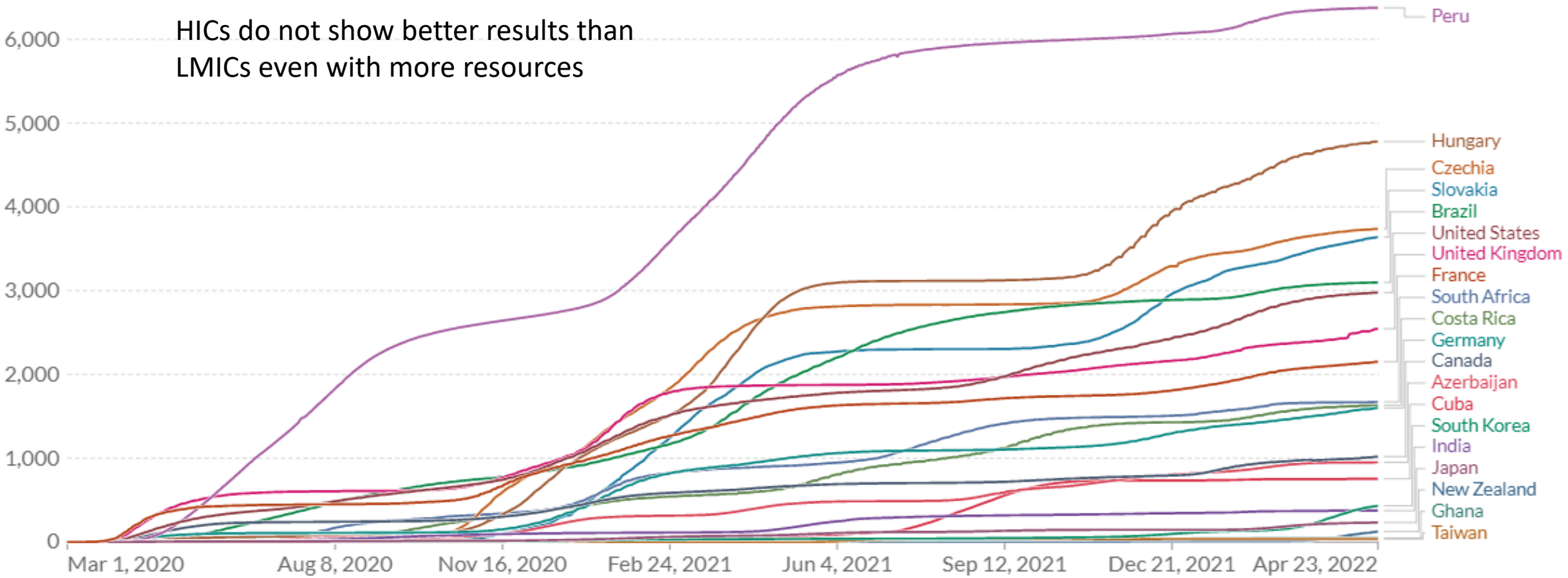
Cumulative confirmed COVID-19 deaths per million people

Due to varying protocols and challenges in the attribution of the cause of death, the number of confirmed deaths may not accurately represent the true number of deaths caused by COVID-19.

Our World in Data

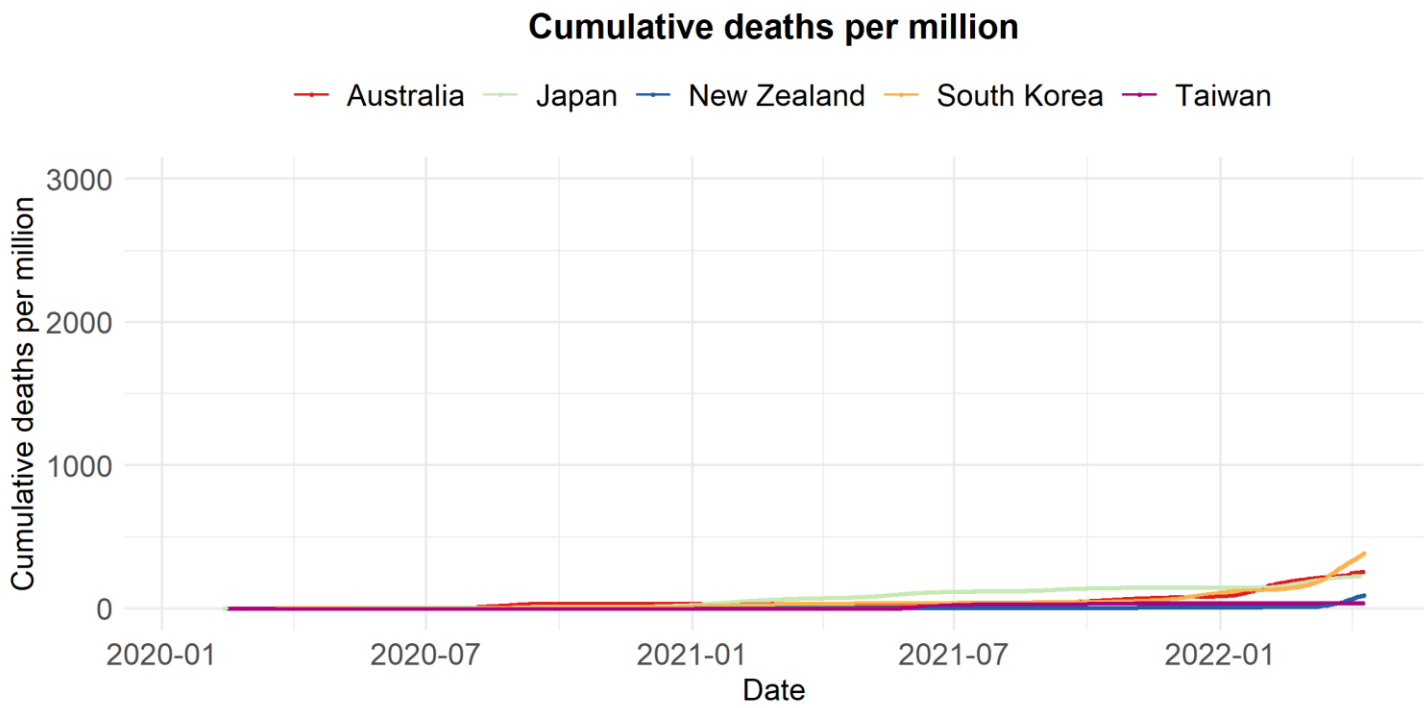
LINEAR LOG

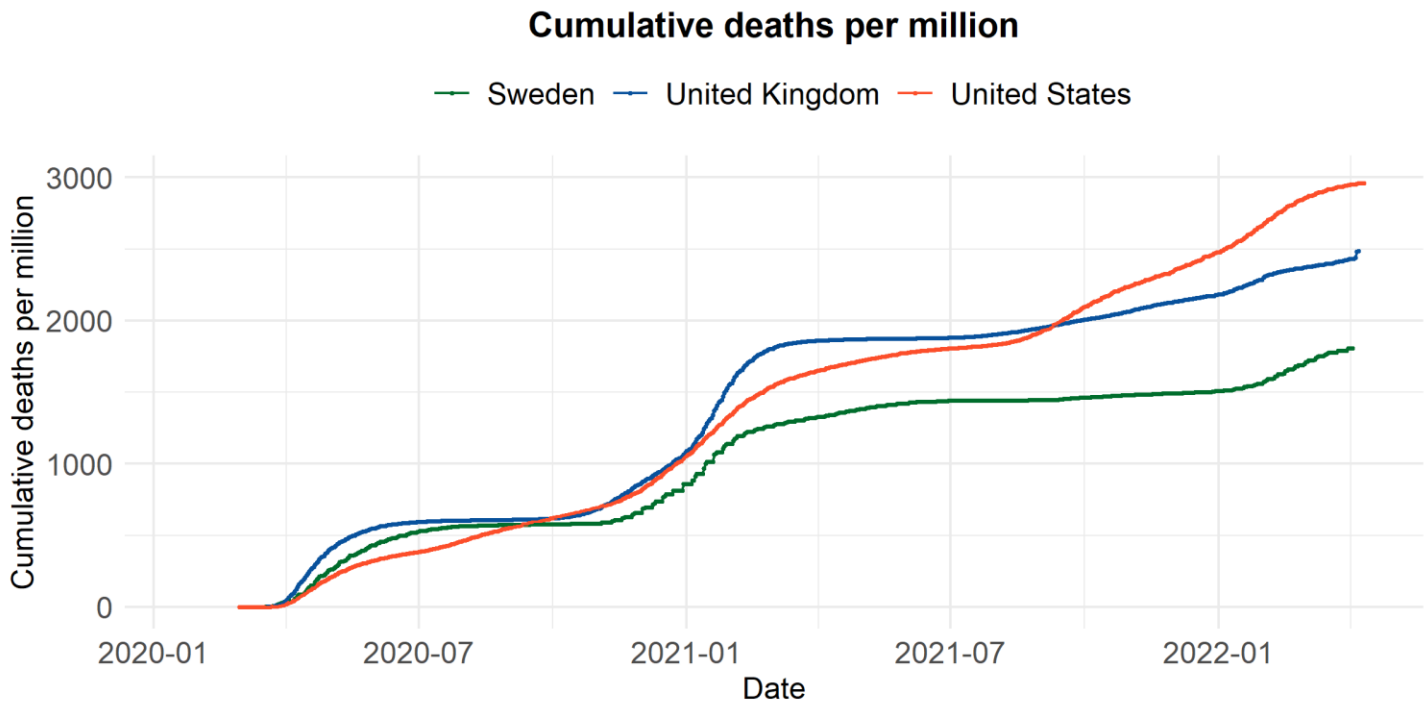
HICs do not show better results than LMICs even with more resources



Source: Johns Hopkins University CSSE COVID-19 Data

Feb 13, 2020 — Apr 23, 2022


Cumulative deaths per million
Australia
Japan
New Zealand
South Korea
Taiwan
Cumulative deaths per million
3000
2000
1000
0
2020-01
2020-07
2021-01
2021-07
2022-01
Date


Cumulative deaths per million
Sweden
United Kingdom
United States
Cumulative deaths per million
3000
2000
1000
0
2020-01
2020-07
2021-01
2021-07
2022-01
Date

Conclusion (in advance) for smart response

- Political leadership, headed by someone
  - who understands the evidence (and accepts the science underlying it),
  - who is engaged with the threat,
  - who can act decisively, instilling trust and confidence in those who must implement his or her decisions,
  - and who have created effective governance arrangements
- Capacity to response in the health and social care sectors, including
  - those in the public health system, but also
  - in other areas, such as other emergency services, procurement, and logistics.
  - Countries will be more likely to succeed if they have a trained and equipped workforce in place and where all of those involved in the pandemic response are working together

  to achieve a shared goal.
- Population supported, by strong safety nets.
  - such as income replacement in a crisis and strong employee rights,
  - high quality infrastructure, for example homes that are not overcrowded and have access to fast broadband

  more likely to survive a pandemic.

Source: interim report to EBRD (Oh J and McKee M)

Eurocentric wrong debate dominated

Health (lives) OR Wealth (economic integrity) debate

- Mostly based on (judgmentally alleged) trade-off frame

  i.e.) Greater Barrington Declaration

- By ignoring synergic relationship (possibility then, now getting close to prove over time) between *better pandemic response* and *better economic integrity* during COVID-19 pandemic

Synergy worked in COVID-19 era

Better pandemic response secured lower disruption in the societal development and integrity

Both

- in socioeconomic activity
- In non-COVID-19 health services

Capacity to response

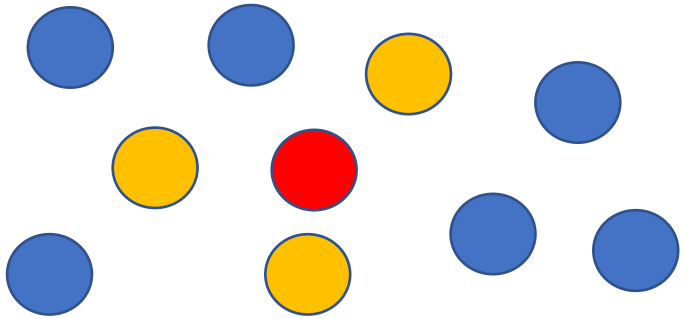
With responsible political action and financial support to affected population

Infected

Contact

The rest

Natural

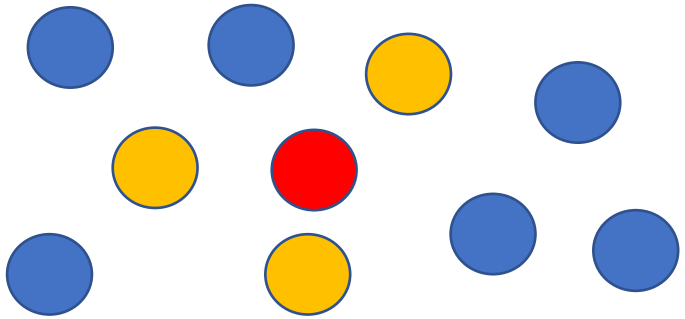


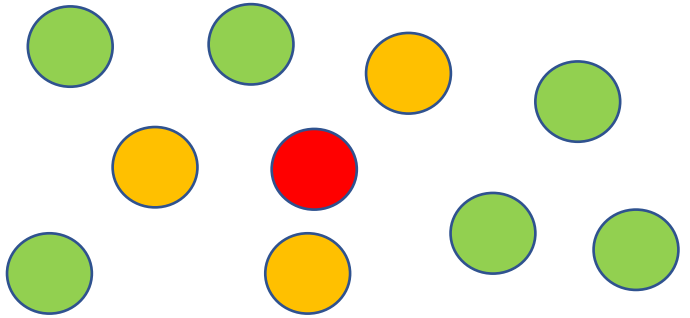
Infected

Contact

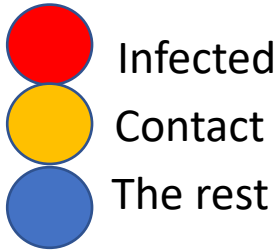
The rest

Natural

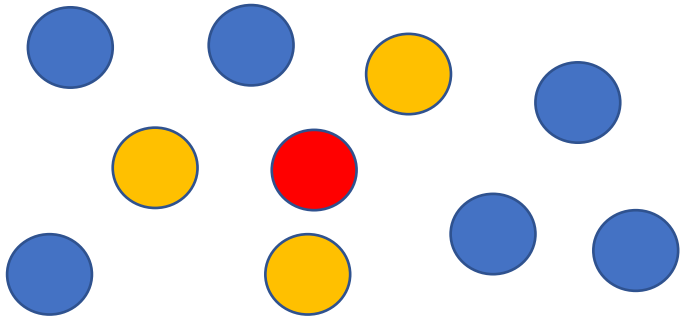




Whole members NO restriction of mobility with safety (Ideal Vaccine option)



Natural



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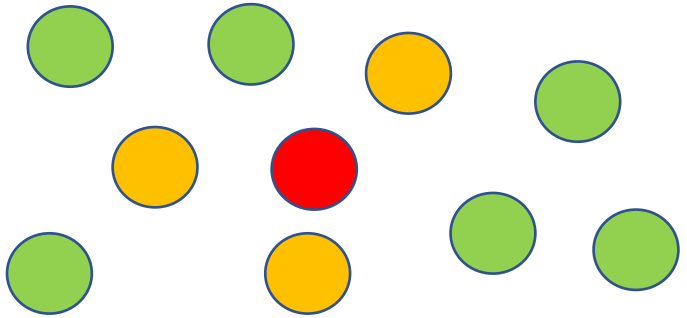
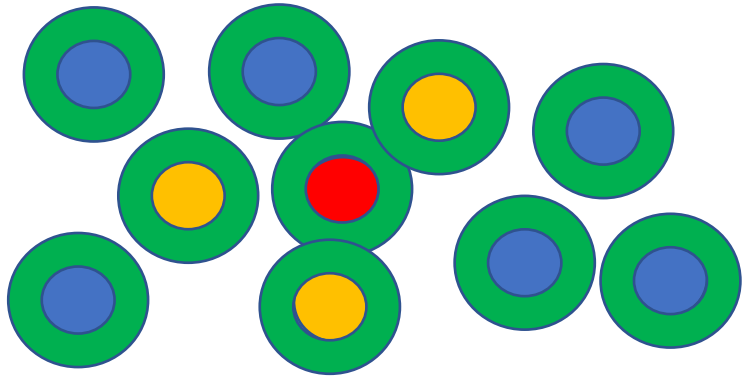
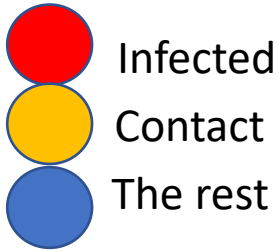
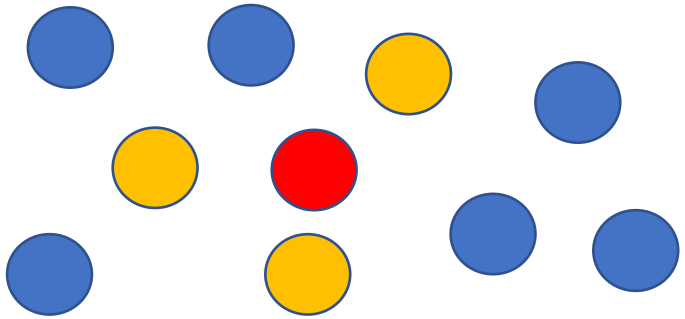




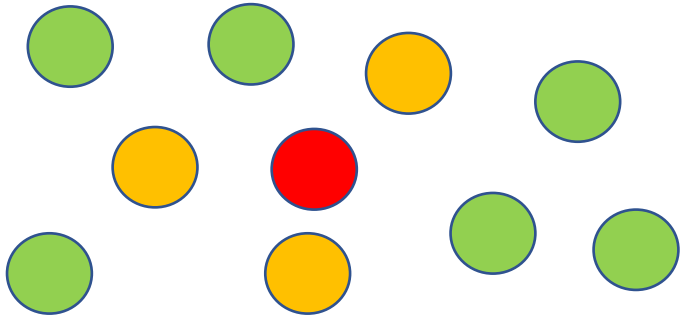
Whole members restriction of mobility with safety(!?) (Lockdown)

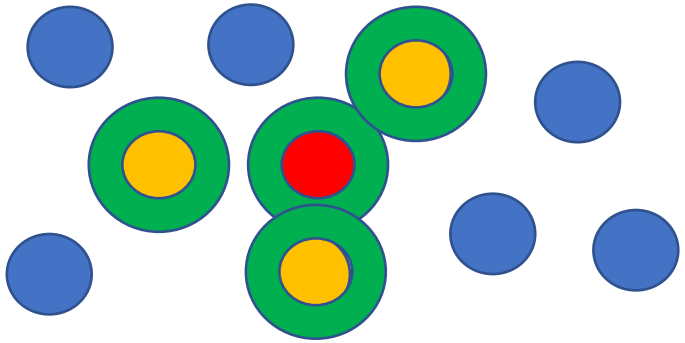


Natural

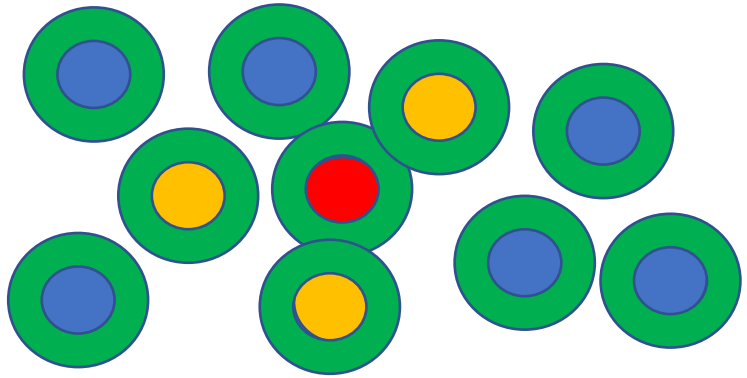


Whole members NO restriction of mobility with safety (Ideal Vaccine option)





Some members restriction of mobility with safety (TTIQ)



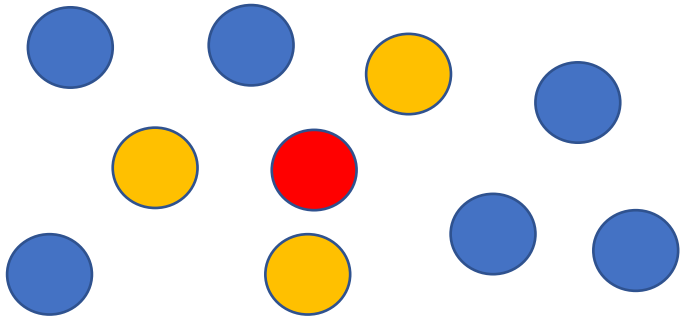
Whole members restriction of mobility with safety(!?) (Lockdown)

Infected

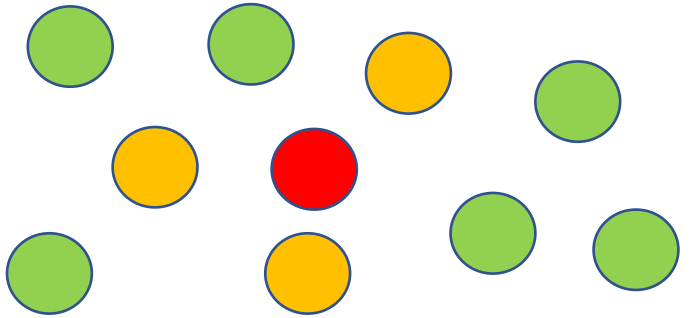
Contact

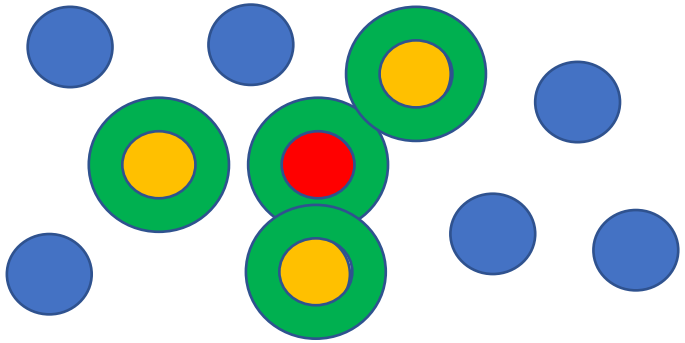
The rest

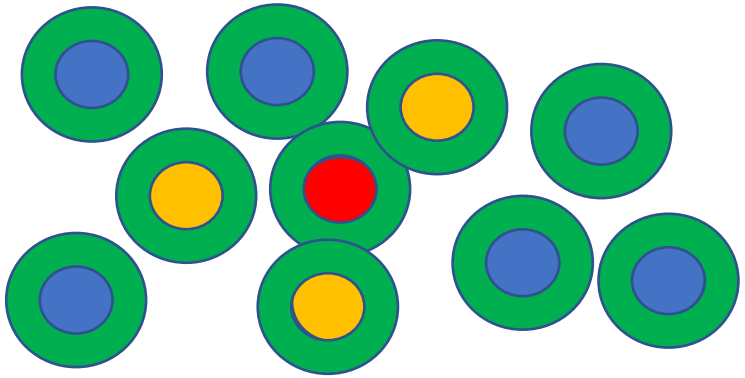
Natural



Whole members NO restriction of mobility with safety (Ideal Vaccine option)







Some members restriction of mobility with safety (TTIQ):

Strategy Category A : Elimination Strategy

Strategy Category B: Mitigation Strategy

Whole members restriction of mobility with safety(!?) (Lockdown)

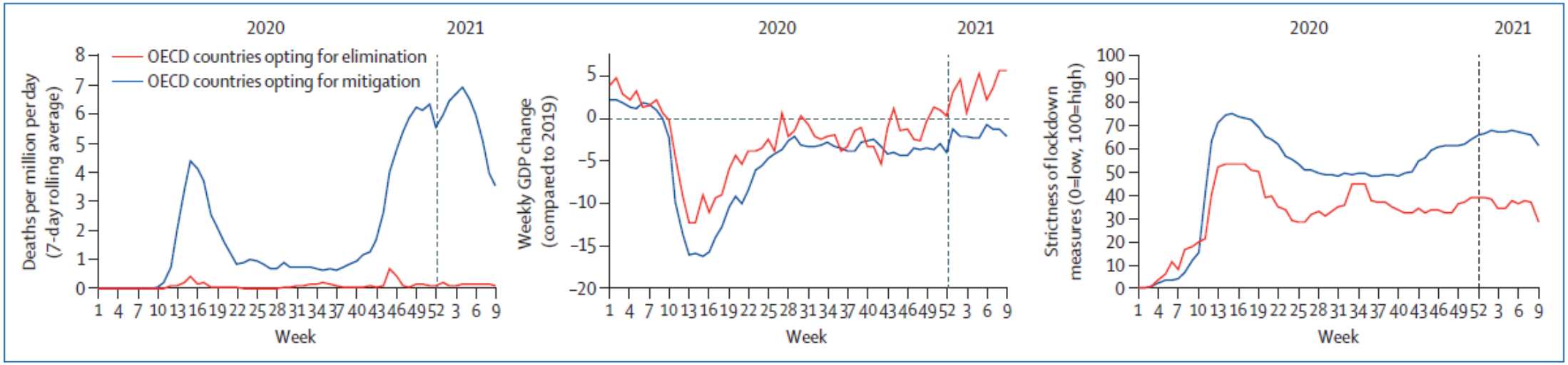


Figure: **COVID-19 deaths, GDP growth, and strictness of lockdown measures for OECD countries choosing SARS-CoV-2 elimination versus mitigation**

OECD countries opting for elimination are Australia, Iceland, Japan, New Zealand, and South Korea. OECD countries opting for mitigation are Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the UK, and the USA. Data on strictness of lockdown measures are from Oxford COVID-19 government response tracker.[2] Data on COVID-19 deaths are from Our World in Data.[3] Data on GDP growth are from OECD Weekly Tracker of economic activity.[4] GDP=gross domestic product. OECD=Organisation for Economic Co-operation and Development.

nature COMMUNICATIONS

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ARTICLE

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https://doi.org/10.1038/s41467-021-23276-9 OPEN

Controlling COVID-19 via test-trace-quarantine

Cliff C. Kerr[1✉], Dina Mistry[1,8], Robyn M. Stuart[2,3,8], Katherine Rosenfeld[1], Gregory R. Hart[1], Rafael C. Núñez[1], Jamie A. Cohen[1], Prashanth Selvaraj[1], Romesh G. Abeysuriya[3], Michał Jastrzębski[4], Lauren George[1], Brittany Hagedorn[1], Jasmina Panovska-Griffiths[5,6], Meaghan Fagalde[7], Jeffrey Duchin[7], Michael Famulare[1] & Daniel J. Klein[1]

Complementary relationship between TTIQ and Mobility Restriction

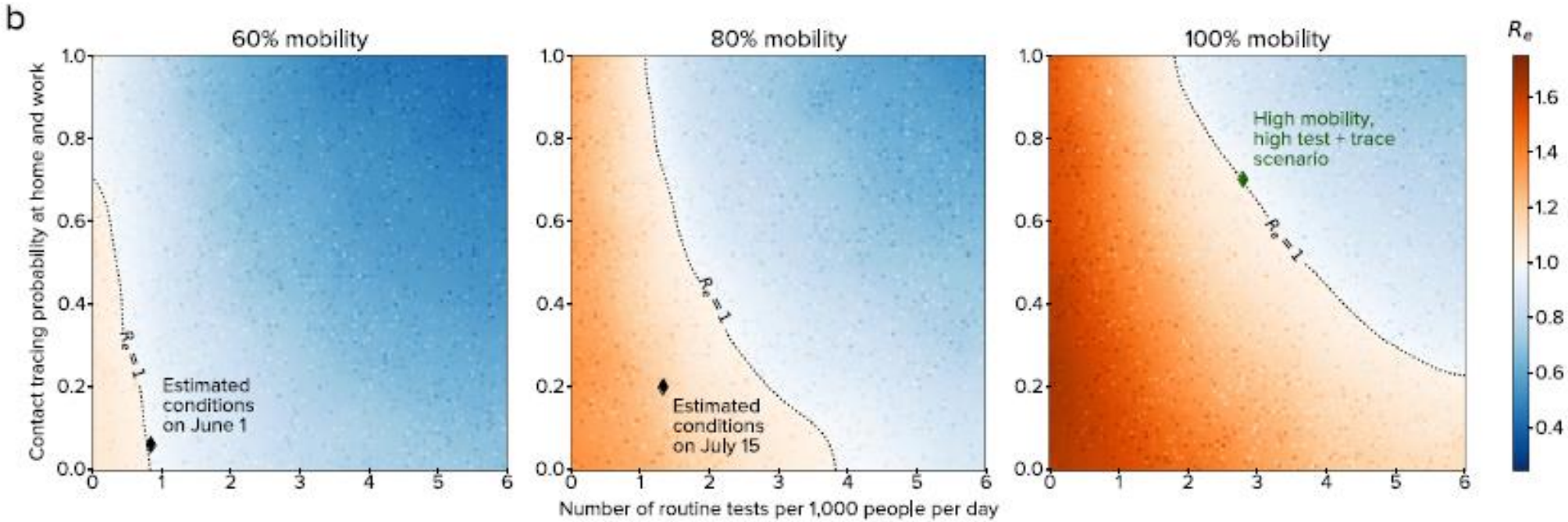

Fig. 4 Impact of testing, tracing, and quarantine. a Relative importance of different aspects of the TTQ strategy for a scenario of high mobility (full return to baseline workplace and community movement patterns), high testing, and high tracing in Seattle. Each dot shows a simulation, with other parameters held constant (at the values indicated by the dashed green lines). Low levels of isolation/quarantine effectiveness or routine testing probability lead to the highest attack rates, although all parameters have a significant impact on epidemic outcomes. **b** Countering the effects of increased mobility via testing, tracing, and quarantine. Current interventions (black diamonds) were estimated to keep $R_e < 1$ for 60% of baseline mobility level (left). Subsequently, increased transmission rates exceeded intervention scale-up, temporarily leading to $R_e > 1$ (center). For a return to full mobility (right), high levels of both testing and tracing are required to maintain epidemic control (green diamond, corresponding to the dashed lines in panel **a**). Dots show individual simulations.

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2020, VOL. 6, NO. 1, e1753464 (10 pages)
https://doi.org/10.1080/23288604.2020.1753464

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National Response to COVID-19 in the Republic of Korea and Lessons Learned for Other Countries

Juhwan Oh [a,b†], Jong-Koo Lee [c†], Dan Schwarz [d,e], Hannah L. Ratcliffe [d], Jeffrey F. Markuns [f], and Lisa R. Hirschhorn [d,g]

[a]Department of Medicine, Seoul National University College of Medicine, Seoul, South Korea; [b]Department of Social and Behavioral Health, Harvard T.H. Chan School of Public Health, Boston, MA, USA; [c]Department of Family Medicine, Seoul National University College of Medicine, Seoul, South Korea; [d]Ariadne Labs, Brigham & Women's Hospital and Harvard T.H. Chan School of Public Health, Boston, Massachusetts, USA; [e]Division of Global Health Equity, Brigham & Women's Hospital, Boston, MA, USA; [f]Global Health Collaborative, Department of Family Medicine, Boston University, Boston, MA, USA; [g]Northwestern University Feinberg School of Medicine, Chicago, IL, USA

ABSTRACT

In the first two months of the COVID-19 pandemic, the Republic of Korea (South Korea) had the second highest number of cases globally yet was able to dramatically lower the incidence of new cases and sustain a low mortality rate, making it a promising example of strong national response. We describe the main strategies undertaken and selected facilitators and challenges in order to identify transferable lessons for other countries working to control the spread and impact of COVID-19. Identified strategies included early recognition of the threat and rapid activation of national response protocols led by national leadership; rapid establishment of diagnostic capacity; scale-up of measures for preventing community transmission; and redesigning the triage and treatment systems, mobilizing the necessary resources for clinical care. Facilitators included existing hospital capacity, the

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KEYWORDS
COVID-19 pandemic; health system reform; national response; South Korea; triage and quarantine

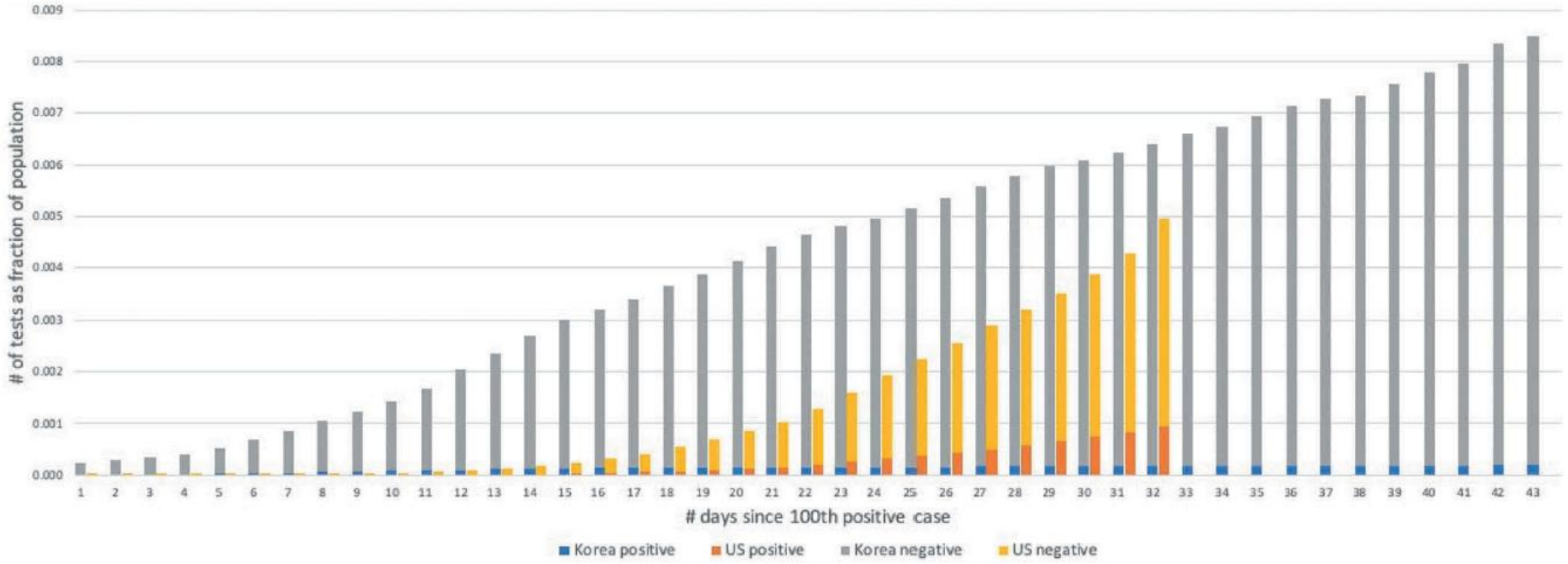

Figure 2. Cumulative Positive and Negative Tests as a Fraction of the Population Since the 100th Case Reported in South Korea and the United States

Sources: Population, total | Data. World Bank Data. https://data.worldbank.org/indicator/sp.pop.totl. Accessed April 5, 2020.. US Historical Data | The COVID Tracking Project. https://covidtracking.com/data/us-daily. Accessed April 5, 2020.

economic collapse. Key features of the response to date included specific strategies and strong national leadership and work to ensure effective coordinated and intersectoral response. The strategies included the following (Table 1):

- Early recognition of the threat and rapid activation of national response protocols led by national leadership;
- Rapid establishment of widespread diagnostic capacity;
- Scale-up of measures for preventing community transmission, including contact tracing, quarantine, and isolation; and
- Redesigning the triage and treatment systems and mobilizing the necessary resources for case management.

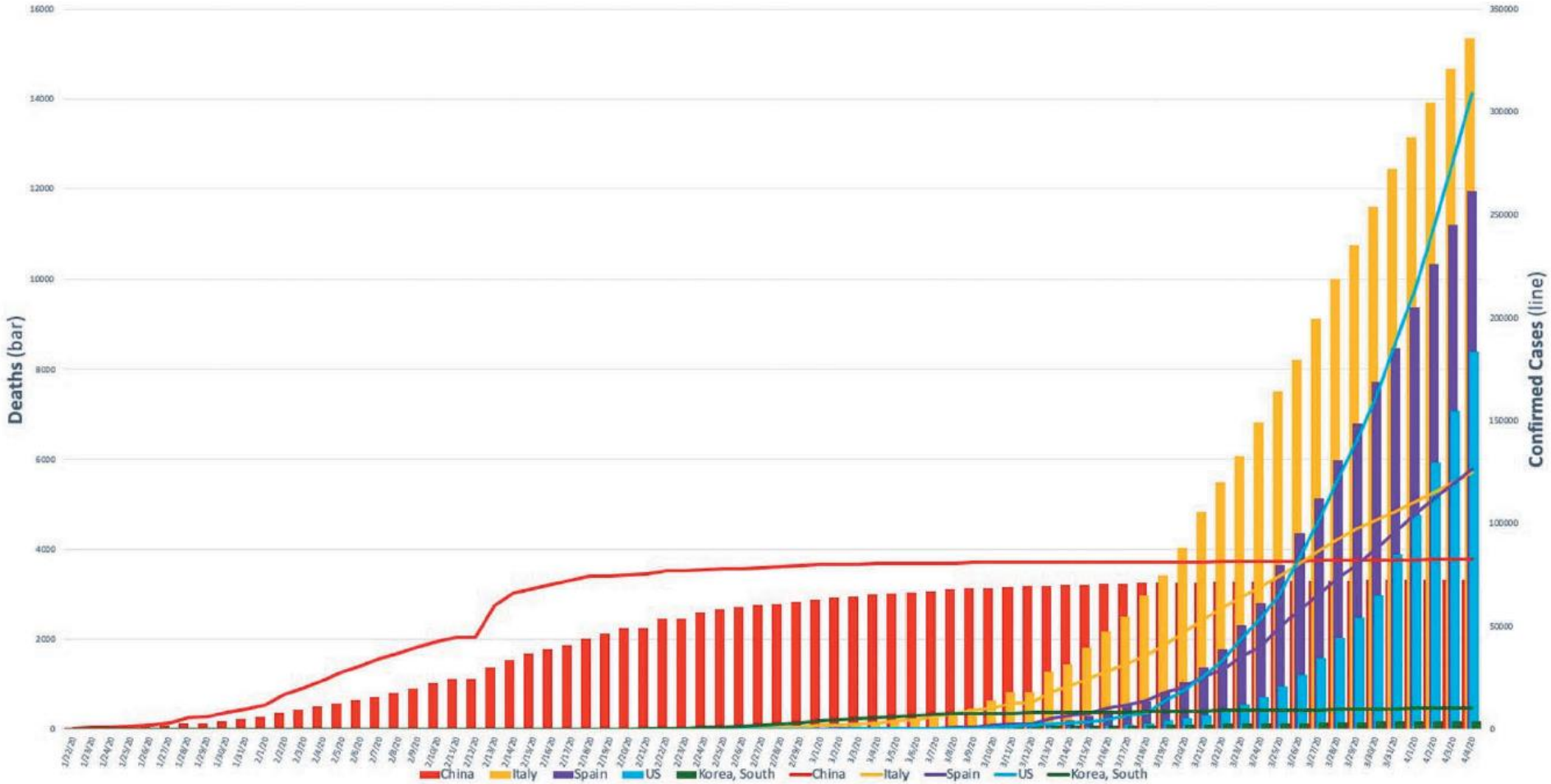

Figure 1. Cumulative Number of Deaths and Confirmed Cases in China, South Korea, Italy, Spain, and the United States

CSSE COVID-19 Dataset: Daily Reports. https://github.com/CSSEGISandData/COVID-19/tree/master/csse_covid_19_data. Accessed April 6, 2020.

Conclusions

A two-track approach to harmonizing strategies through both clinical services (health system redesign through reallocation and prioritization of treatment resources to align with increased demand) and public prevention measures (quarantine, contact tracing, and isolation) were critical and should be quickly considered for application in other affected countries. This approach was facilitated by both decisive central leadership and a strong decentralized system open to the repurposing and flexible reallocation of resources and depended on political leadership and a commitment and willingness to try innovative responses.

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Mobility restrictions were associated with reductions in COVID-19 incidence early in the pandemic: evidence from a real-time evaluation in 34 countries

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Most countries have implemented restrictions on mobility to prevent the spread of Coronavirus disease-19 (COVID-19), entailing considerable societal costs but, at least initially, based on limited evidence of effectiveness. We asked whether mobility restrictions were associated with changes in the occurrence of COVID-19 in 34 OECD countries plus Singapore and Taiwan. Our data sources were the *Google Global Mobility Data Source*, which reports different types of mobility, and COVID-19 cases retrieved from the dataset curated by *Our World in Data*. Beginning at each country's 100th case, and

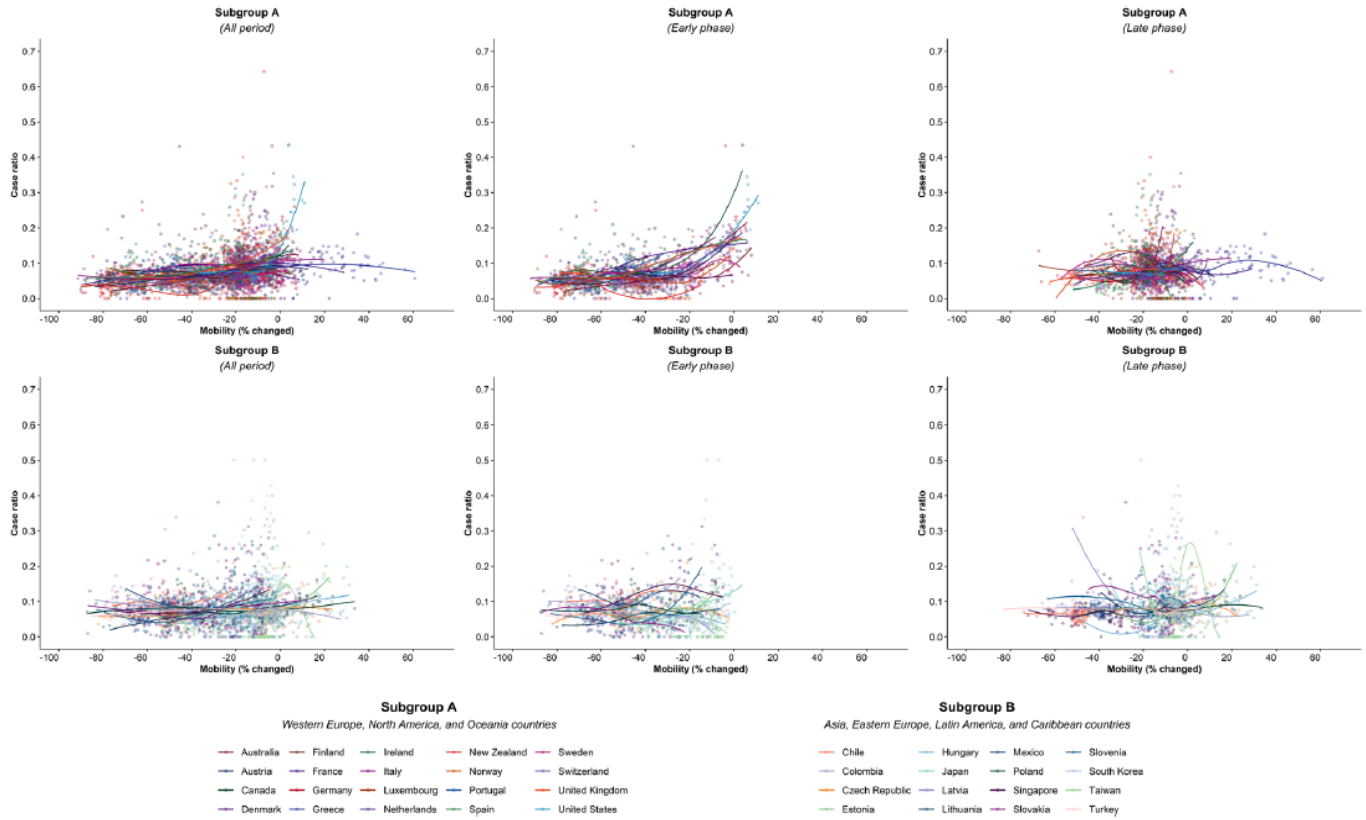

Figure 1. Association between COVID-19 case ratio and mobility changes for 36 countries by pandemic phase, arbitrarily split by geography to allow better resolution of the data. Footnote 1. The mobility change measurement period was from the day of the 100th case in each country through August 31, 2020. Footnote 2. Pandemic phase was defined for each country by the median of the date when the 100th case was detected to the end of the study period: early phase for the period before the median date and late phase for the period after the median date.

Conclusion

Our analysis extends the understanding of the complex dynamics at play when mobility is restricted at a population level in response to a pandemic caused by a respiratory virus. Societal mobility restrictions appear to have reduced COVID-19 spread in many countries, particularly in the early phase of the waves of the pandemic, but in the late phase, once other mitigation measures have been adopted, the magnitude of impact is attenuated. It is critical for policymakers to consider the effectiveness of mobility restriction in COVID 19 response and the economic impacts imposed on society, especially as this pandemic still appears far from an end globally and with an increasing number of variants, societies may need to adjust to the "new normal" way of life. For this, additional evidence, including the relationship with other non-pharmacological interventions, is needed to fully understand the role of mass restrictions on mobility in containing COVID-19 and future infectious diseases with a similar mode of transmission. As the pandemic progresses, governments must develop strategies that limit the amount of circulating virus and allow rapid responses to further outbreaks. The pandemic has brought enormous changes to working and living, some of which will likely persist even with the advent of multiple vaccines. Surveillance that goes beyond incidence of infection, to include risk factors such as mobility, can only improve our ability to develop effective public health responses.

Data availability

All data used are publicly available.

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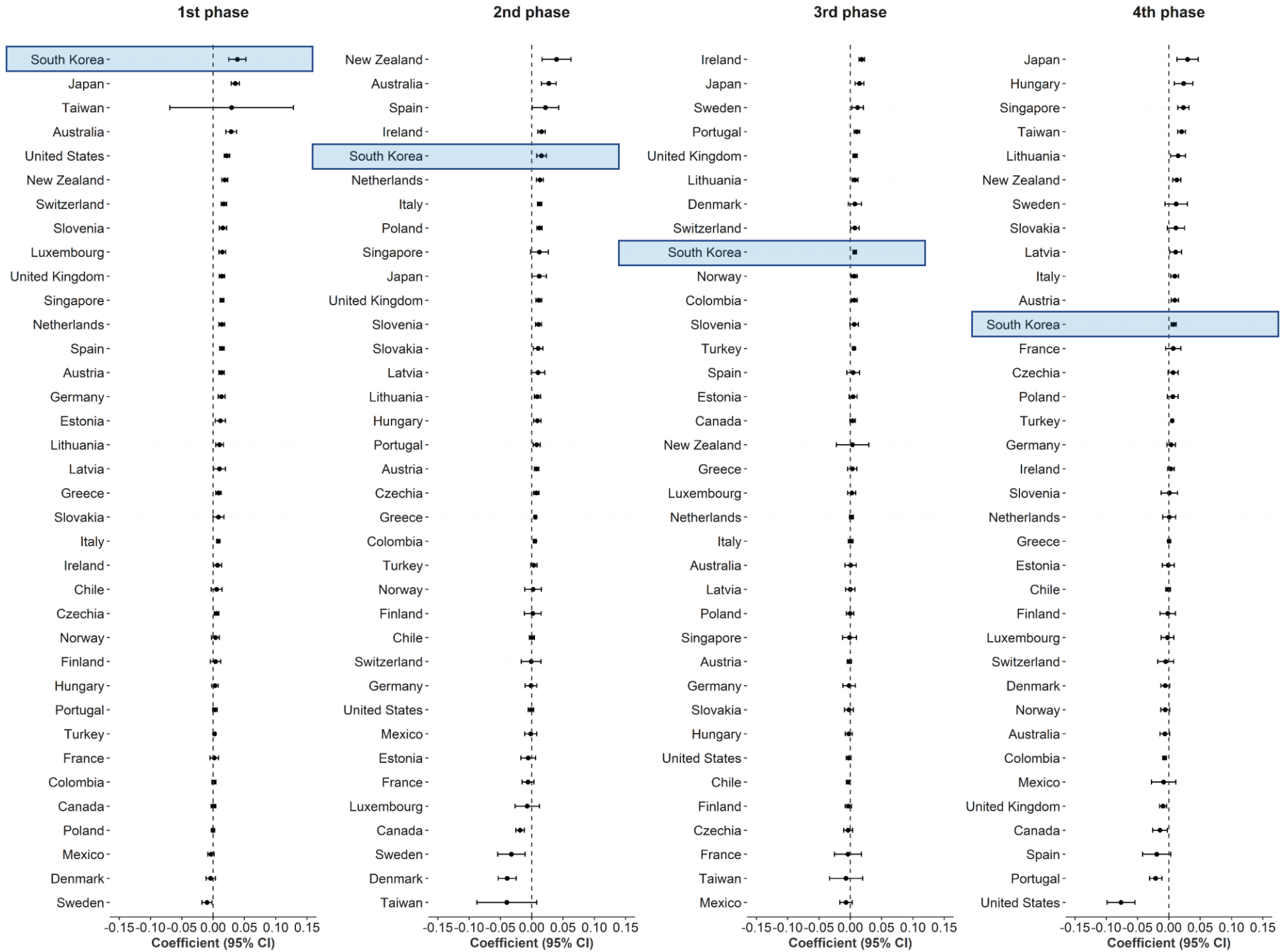
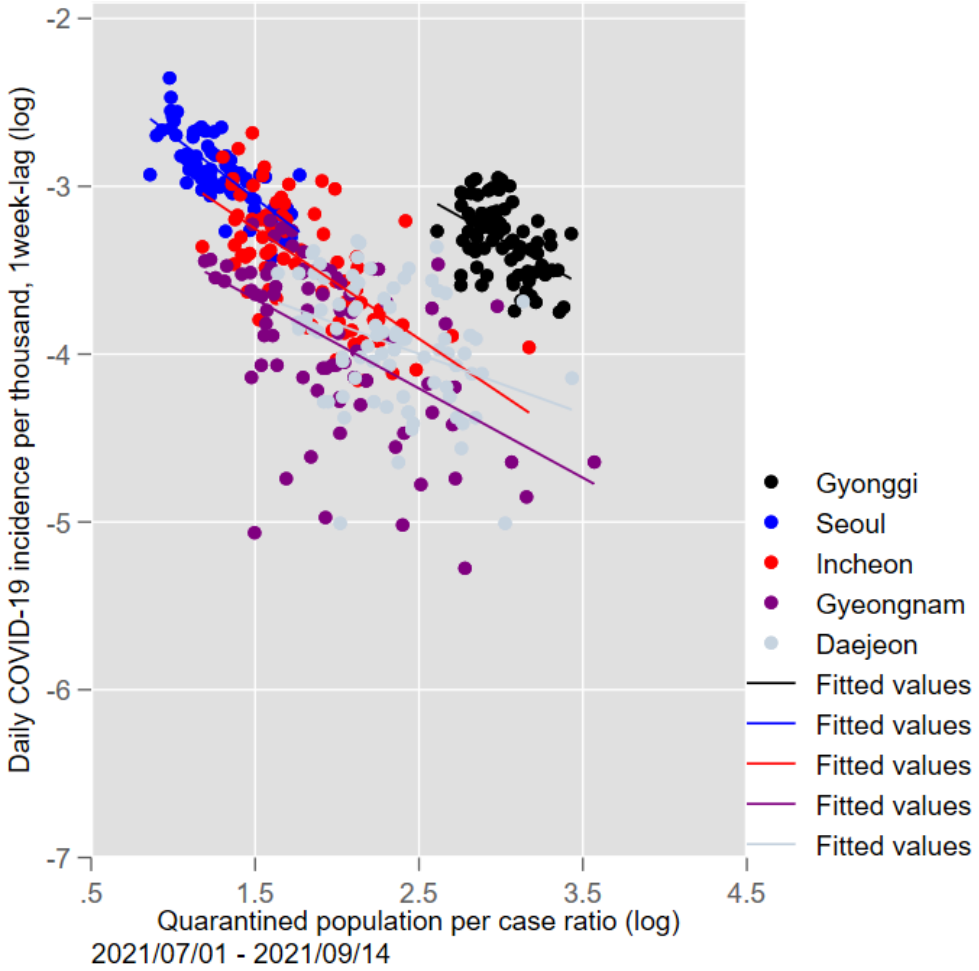

1st phase
South Korea
Japan
Taiwan
Australia
United States
New Zealand
Switzerland
Slovenia
Luxembourg
United Kingdom
Singapore
Netherlands
Spain
Austria
Germany
Estonia
Lithuania
Latvia
Greece
Slovakia
Italy
Ireland
Chile
Czechia
Norway
Finland
Hungary
Portugal
Turkey
France
Colombia
Canada
Poland
Mexico
Denmark
Sweden
-0.15 -0.10 -0.05 0.00 0.05 0.10 0.15
Coefficient (95% CI)
2nd phase
New Zealand
Australia
Spain
Ireland
South Korea
Netherlands
Italy
Poland
Singapore
Japan
United Kingdom
Slovenia
Slovakia
Latvia
Lithuania
Hungary
Portugal
Austria
Czechia
Greece
Colombia
Turkey
Norway
Finland
Chile
Switzerland
Germany
United States
Mexico
Estonia
France
Luxembourg
Canada
Sweden
Denmark
Taiwan
-0.15 -0.10 -0.05 0.00 0.05 0.10 0.15
Coefficient (95% CI)
3rd phase
Ireland
Japan
Sweden
Portugal
United Kingdom
Lithuania
Denmark
Switzerland
South Korea
Norway
Colombia
Slovenia
Turkey
Spain
Estonia
Canada
New Zealand
Greece
Luxembourg
Netherlands
Italy
Australia
Latvia
Poland
Singapore
Austria
Germany
Slovakia
Hungary
United States
Chile
Finland
Czechia
France
Taiwan
Mexico
-0.15 -0.10 -0.05 0.00 0.05 0.10 0.15
Coefficient (95% CI)
4th phase
Japan
Hungary
Singapore
Taiwan
Lithuania
New Zealand
Sweden
Slovakia
Latvia
Italy
Austria
South Korea
France
Czechia
Poland
Turkey
Germany
Ireland
Slovenia
Netherlands
Greece
Estonia
Chile
Finland
Luxembourg
Switzerland
Denmark
Norway
Australia
Colombia
Mexico
United Kingdom
Canada
Spain
Portugal
United States
-0.15 -0.10 -0.05 0.00 0.05 0.10 0.15
Coefficient (95% CI)

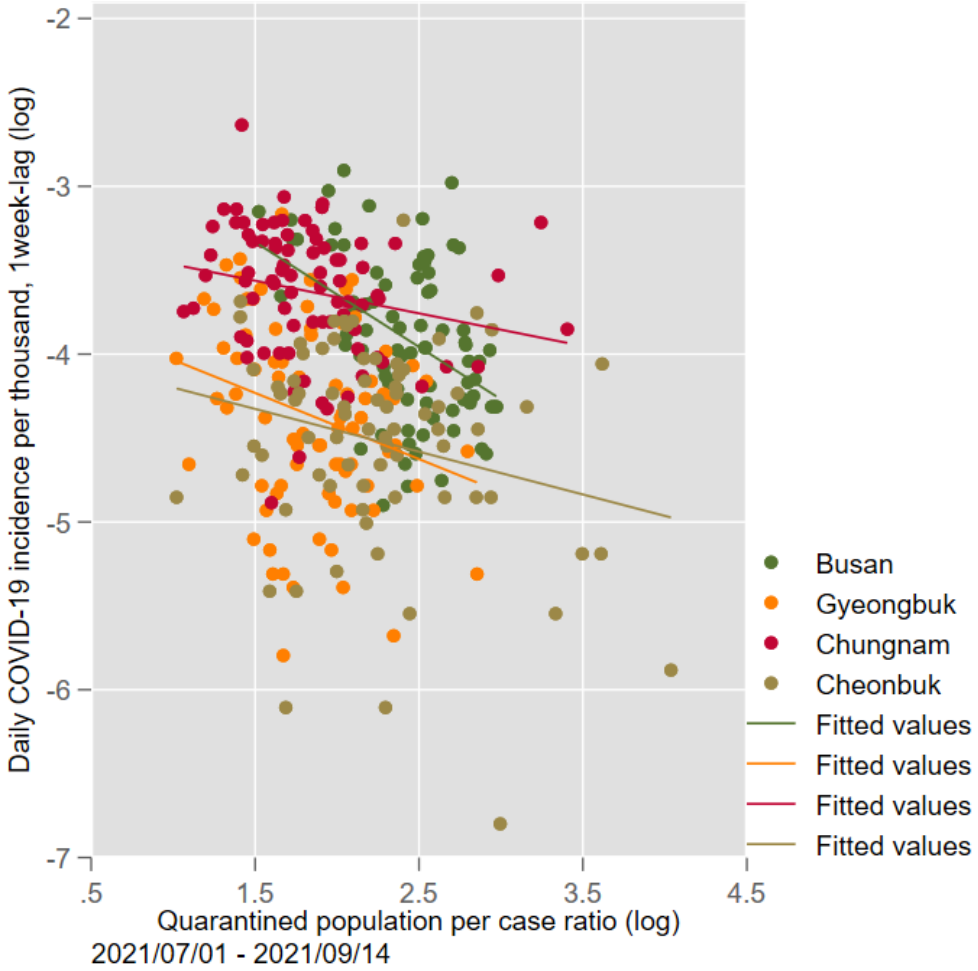
Real world evidence of trace, test, isolation, and quarantine impact on the COVID-19 pandemic response performance

Juhwan Oh[1], Seung-sik Hwang[2*], Khuong Quynh Long[3], Minkyung Kim[4], Kunhee Park[5], Seunghyun Kwon[6], Osvaldo Enrique Artaza Barrios[7], Irene Torres[8], Matthew M. Kavanagh[9], Naoki Kondo[10], S. Patrick Kaucher[11], Hoang Van Minh[12], Dong Roman Xu[13], Mikael Rostila[14], Caroline Benski[15], Mellissa Withers[16], Borwornsom Leerapan[17], Myoungsoon You[2], Cristiani Vieira Machado[18], Chang-Chuan Chan[19], Hwa-Young Lee[20], Jeonghyun Shin[1], Hyejin Jeong[21], Sung-In Kim[22], Soon Ae Kim[4], Soo Kyung Park[23], Judith McCool[24], Lawrence O. Gostin[9], S.V. Subramanian[20], Jeffrey F Markuns[25 27], Yun-Chul Hong[1 27], Chris Bullen[24 27], Jong-Koo Lee [1 27], Martin McKee[26 27]

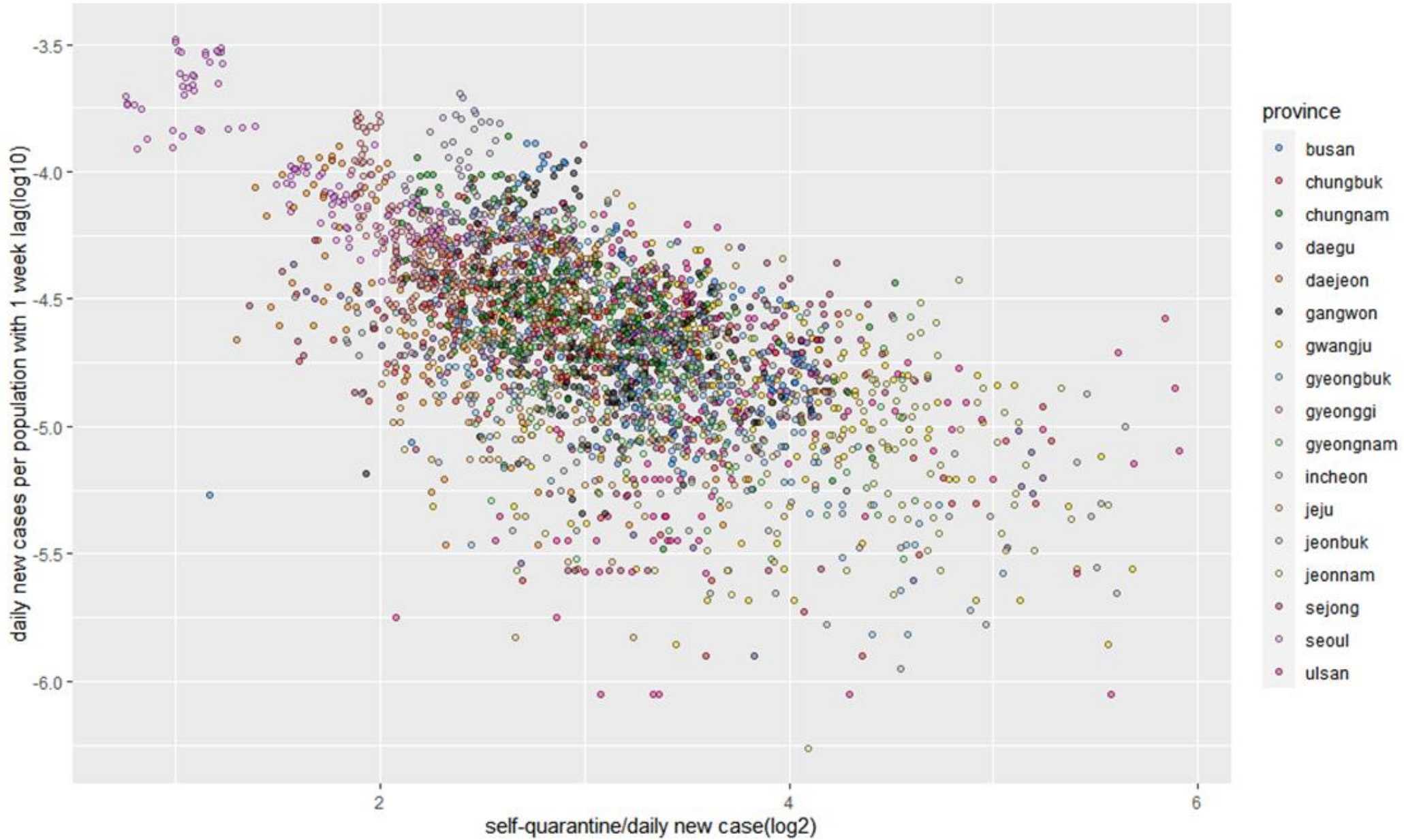
Association between quarantined population per new daily cases (log) and the 1-week lagged confirmed new daily cases (log) from Jul 1, 2021, to Sep 14, 2021 in 9 most COVID-19 prevalent provinces of Republic of Korea

: Higher vaccination coverage provinces (A) vs lower vaccination coverage provinces (B).

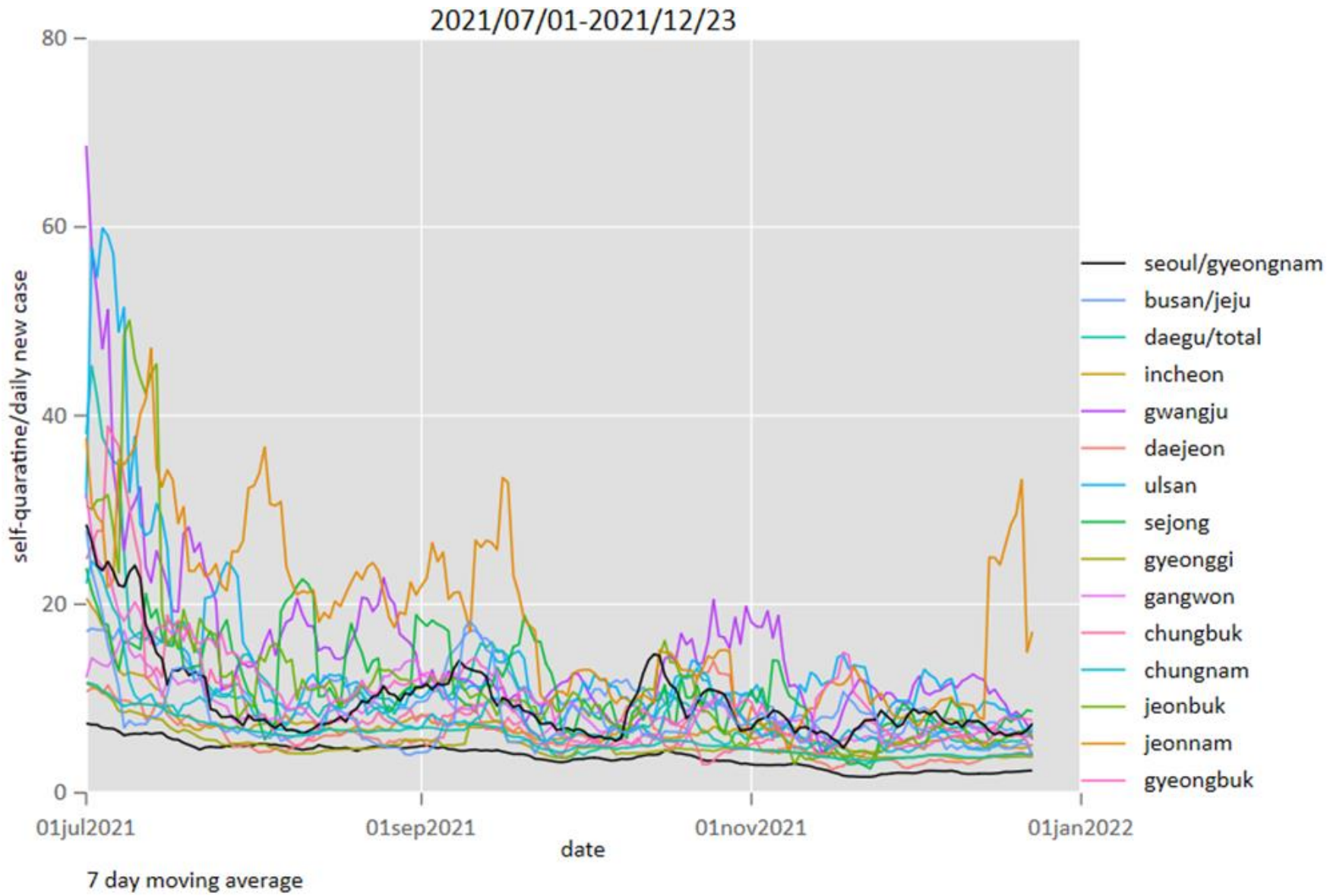




Source: Oh, Juhwan and Hwang, Seungsik and Long, Khuong Quynh and Kim, Minkyung and Park, Kunhee, and Gostin, Lawrence O. and Subramanian, S. V. and Markuns, Jeffrey F. and Hong, Yun-Chul and Bullen, Chris and Lee, Jong-Koo and McKee, Martin, Real World Evidence of Trace, Test, Isolation, and Quarantine Impact on the COVID-19 Pandemic Response Performance. Available at SSRN: https://ssrn.com/abstract=3954082 or http://dx.doi.org/10.2139/ssrn.3954082 (Under-review)



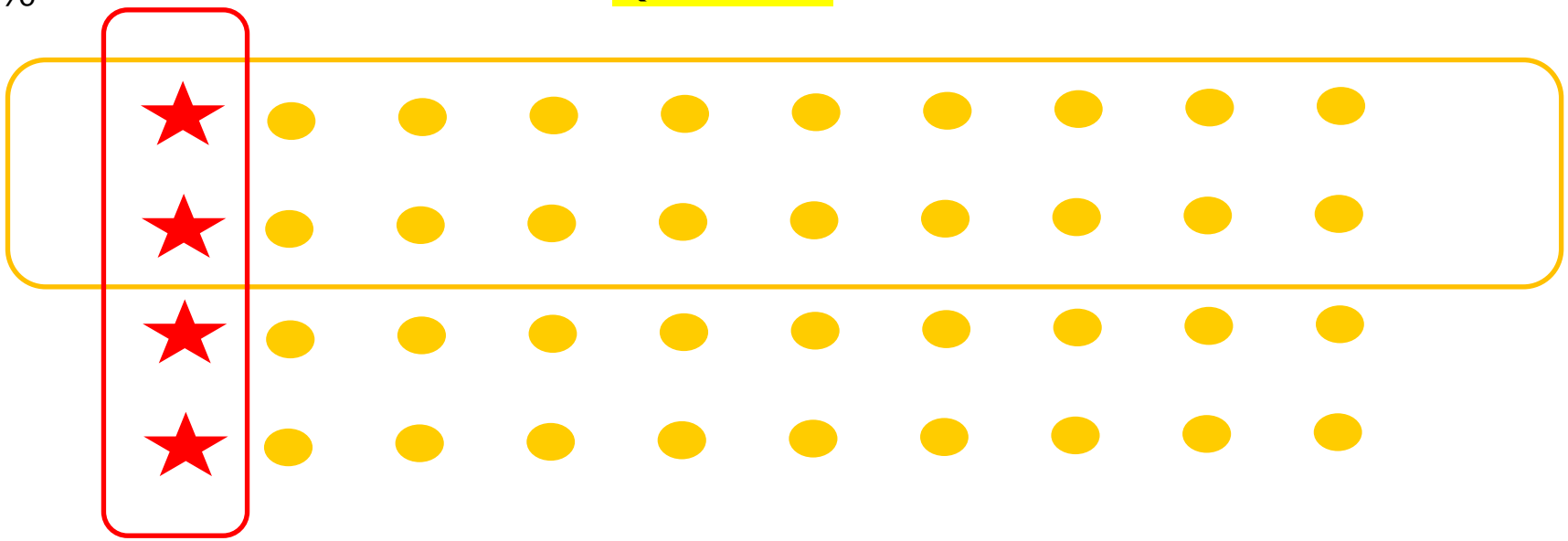
Study Period: 2021. 7. 1 – 2021. 12. 23


2021/07/01-2021/12/23
80
60
40
20
0
self-quarantine/daily new case
01jul2021
01sep2021
01nov2021
01jan2022
date
7 day moving average
seoul/gyeongnam
busan/jeju
daegu/total
incheon
gwangju
daejeon
ulsan
sejong
gyeonggi
gangwon
chungbuk
chungnam
jeonbuk
jeonnam
gyeongbuk

Association between quarantined population proportion among weekly new cases and the 1-week lagged confirmed weekly new cases (log)

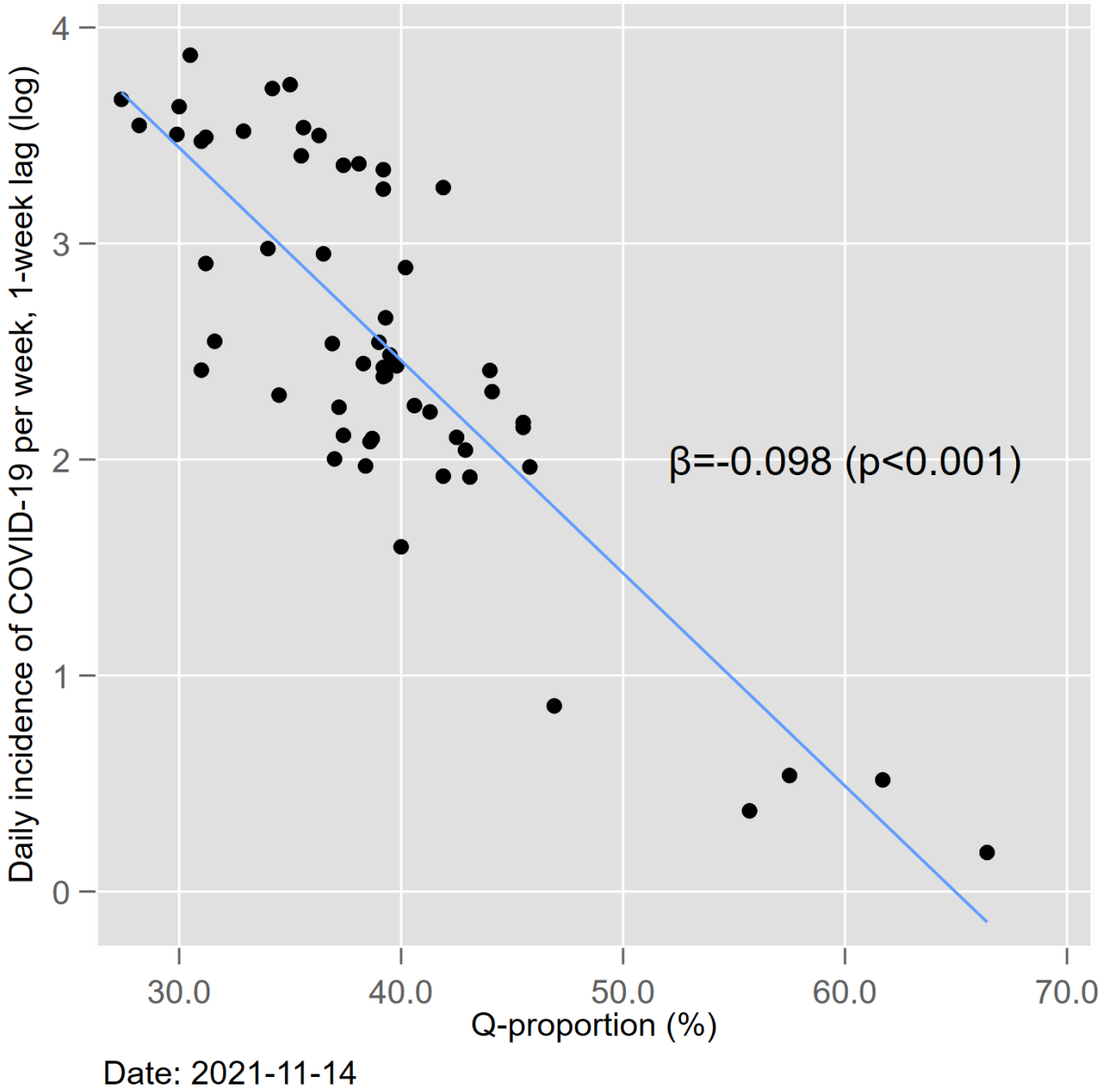
from the week of Oct 3-9, 2020 to the week of Sep 12-18, 2021
in Republic of Korea

In case of Q proportion:
50%



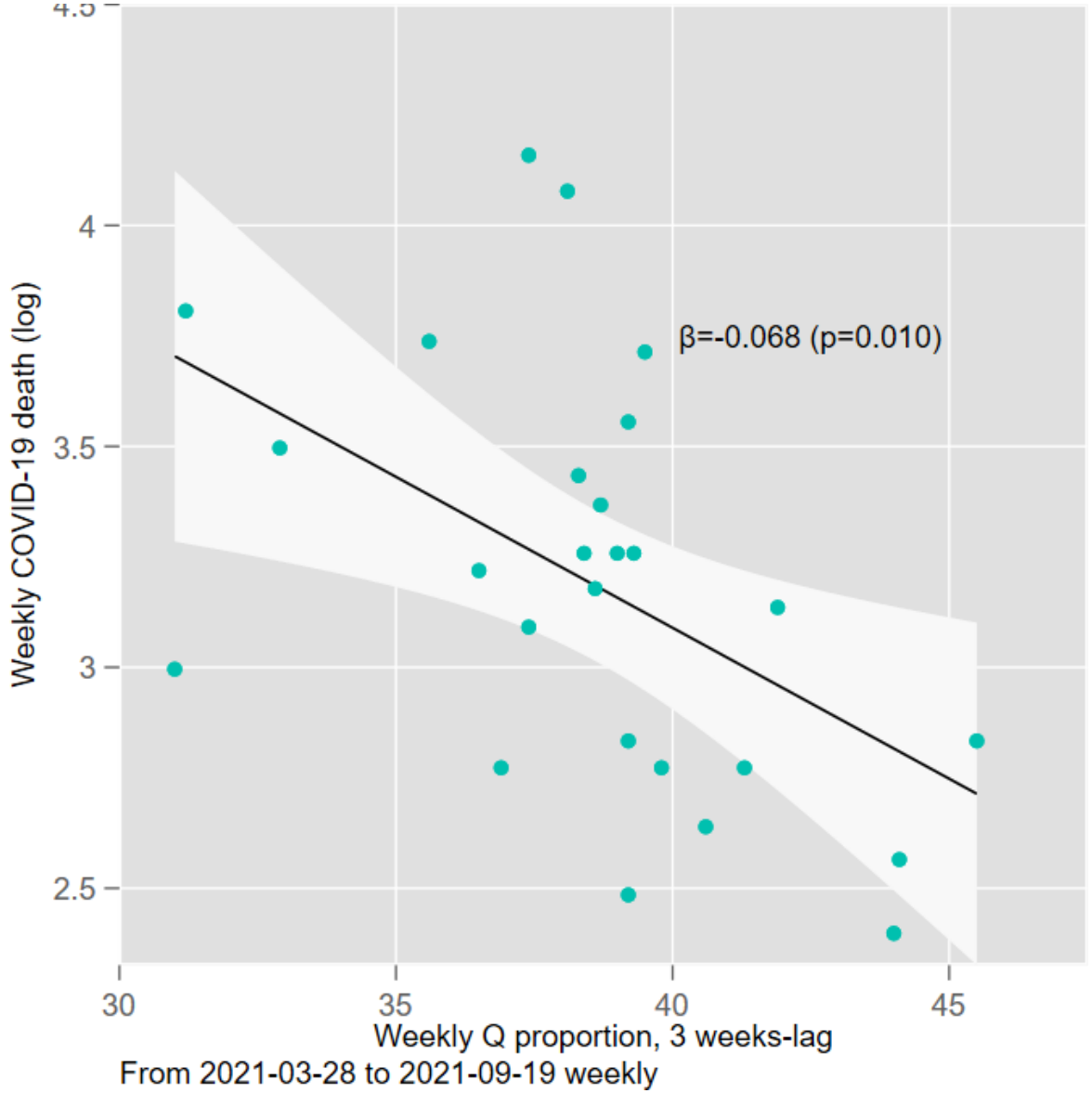
Association between quarantined population proportion among weekly new cases and the 1-week lagged confirmed weekly new cases (log)

from the week of Oct 3-9, 2020
to the week of Sep 12-18, 2021
in Republic of Korea



Source: Oh, Juhwan and Hwang, Seungsik and Long, Khuong Quynh and Kim, Minkyung and Park, Kunhee, and Gostin, Lawrence O. and Subramanian, S. V. and Markuns, Jeffrey F. and Hong, Yun-Chul and Bullen, Chris and Lee, Jong-Koo and McKee, Martin, Real World Evidence of Trace, Test, Isolation, and Quarantine Impact on the COVID-19 Pandemic Response Performance. Available at
SSRN: https://ssrn.com/abstract=3954082 or http://dx.doi.org/10.2139/ssrn.3954082 (Under-review)

Mortality and
Q-proportion



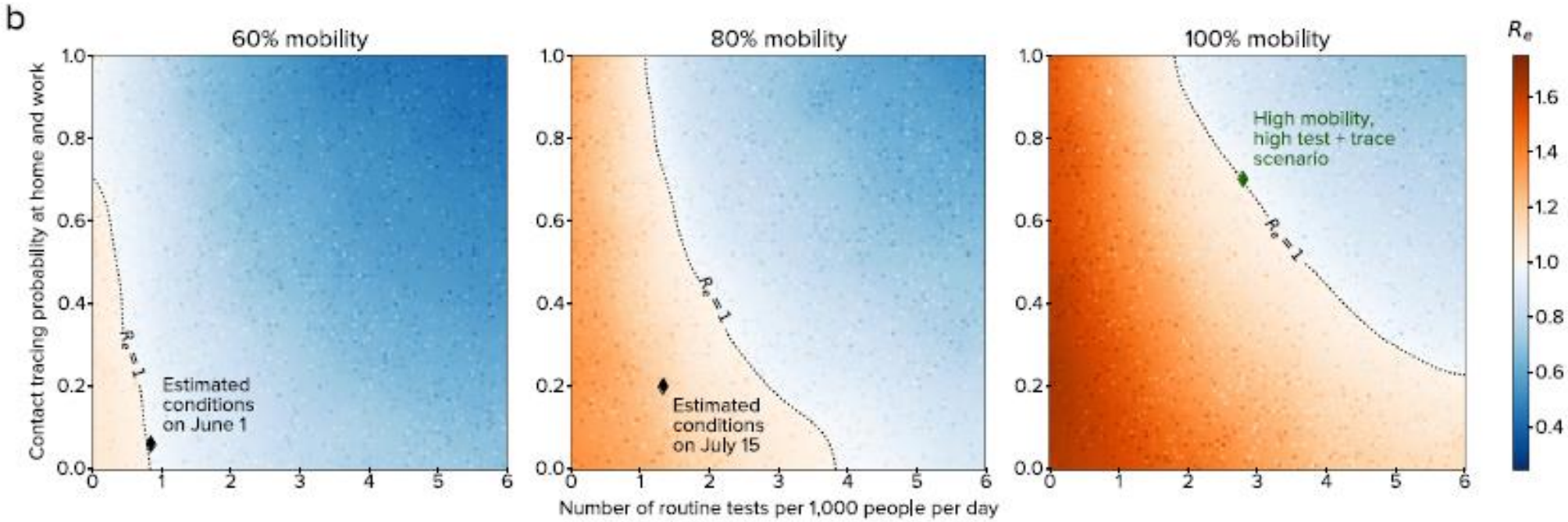


Fig. 4 Impact of testing, tracing, and quarantine. a Relative importance of different aspects of the TTQ strategy for a scenario of high mobility (full return to baseline workplace and community movement patterns), high testing, and high tracing in Seattle. Each dot shows a simulation, with other parameters held constant (at the values indicated by the dashed green lines). Low levels of isolation/quarantine effectiveness or routine testing probability lead to the highest attack rates, although all parameters have a significant impact on epidemic outcomes. **b** Countering the effects of increased mobility via testing, tracing, and quarantine. Current interventions (black diamonds) were estimated to keep $R_e < 1$ for 60% of baseline mobility level (left). Subsequently, increased transmission rates exceeded intervention scale-up, temporarily leading to $R_e > 1$ (center). For a return to full mobility (right), high levels of both testing and tracing are required to maintain epidemic control (green diamond, corresponding to the dashed lines in panel **a**). Dots show individual simulations.

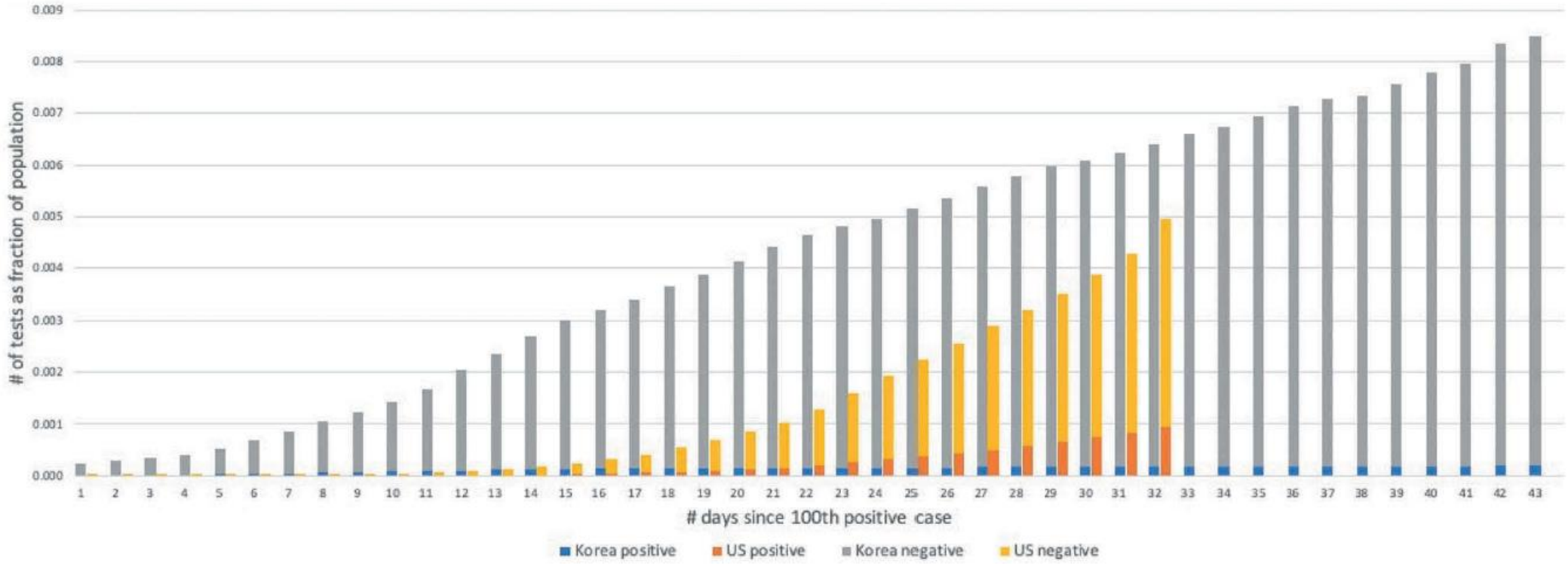
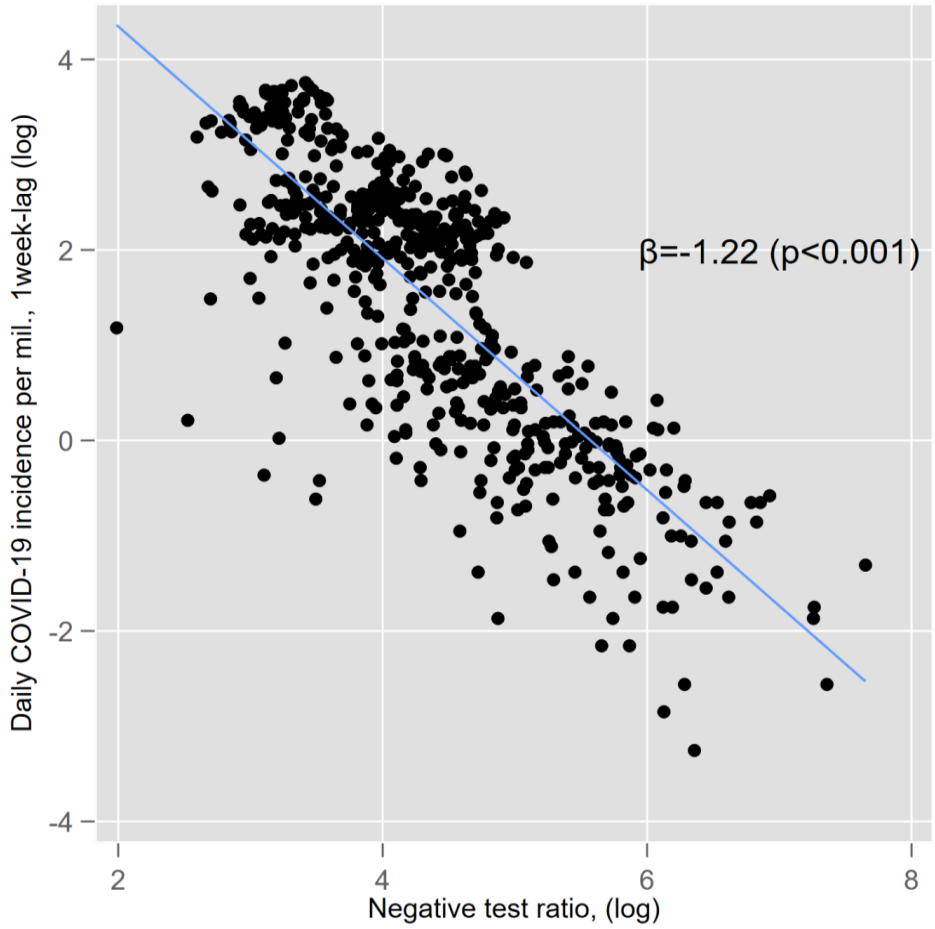


Figure 2. Cumulative Positive and Negative Tests as a Fraction of the Population Since the 100th Case Reported in South Korea and the United States

Sources: Population, total | Data. World Bank Data. https://data.worldbank.org/indicator/sp.pop.totl. Accessed April 5, 2020.. US Historical Data | The COVID Tracking Project. https://covidtracking.com/data/us-daily. Accessed April 5, 2020.



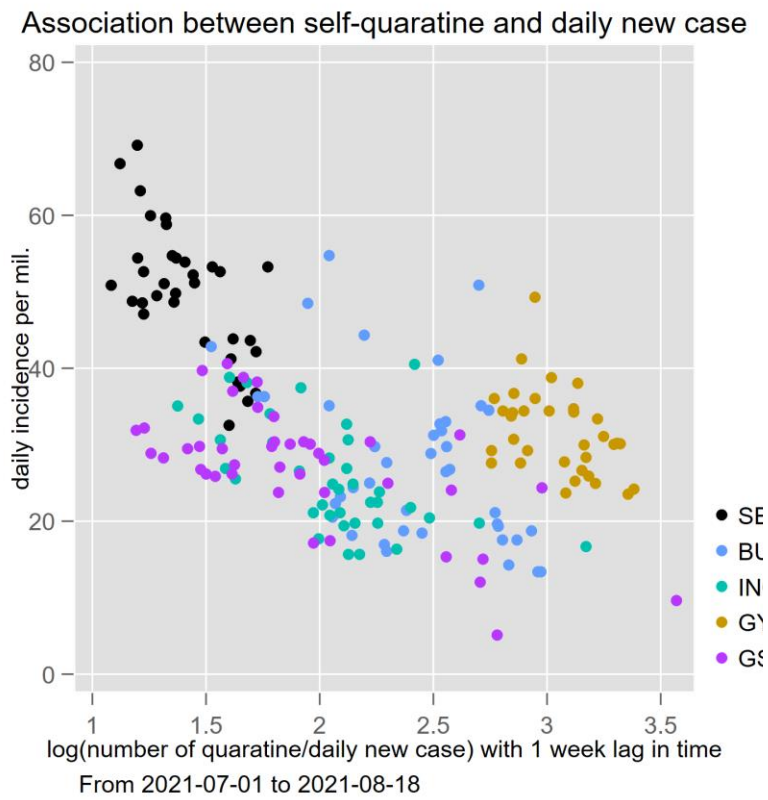
Traced test negative ratio and new incidence in 1 week

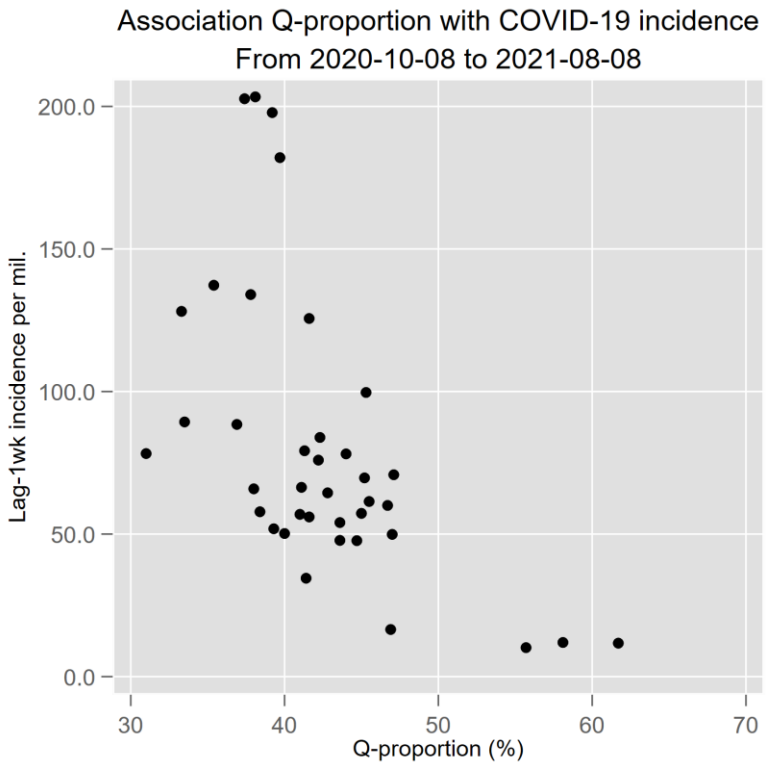
- Source: Oh, Juhwan and Hwang, Seungsik and Long, Khuong Quynh and Kim, Minkyung and Park, Kunhee, and Gostin, Lawrence O. and Subramanian, S. V. and Markuns, Jeffrey F. and Hong, Yun-Chul and Bullen, Chris and Lee, Jong-Koo and McKee, Martin, Real World Evidence of Trace, Test, Isolation, and Quarantine Impact on the COVID-19 Pandemic Response Performance. Available at SSRN: https://ssrn.com/abstract=3954082 or http://dx.doi.org/10.2139/ssrn.3954082 (Under-review)

Traced test negative results ratio

Traced Quarantined population ratio

Quarantined population Proportion



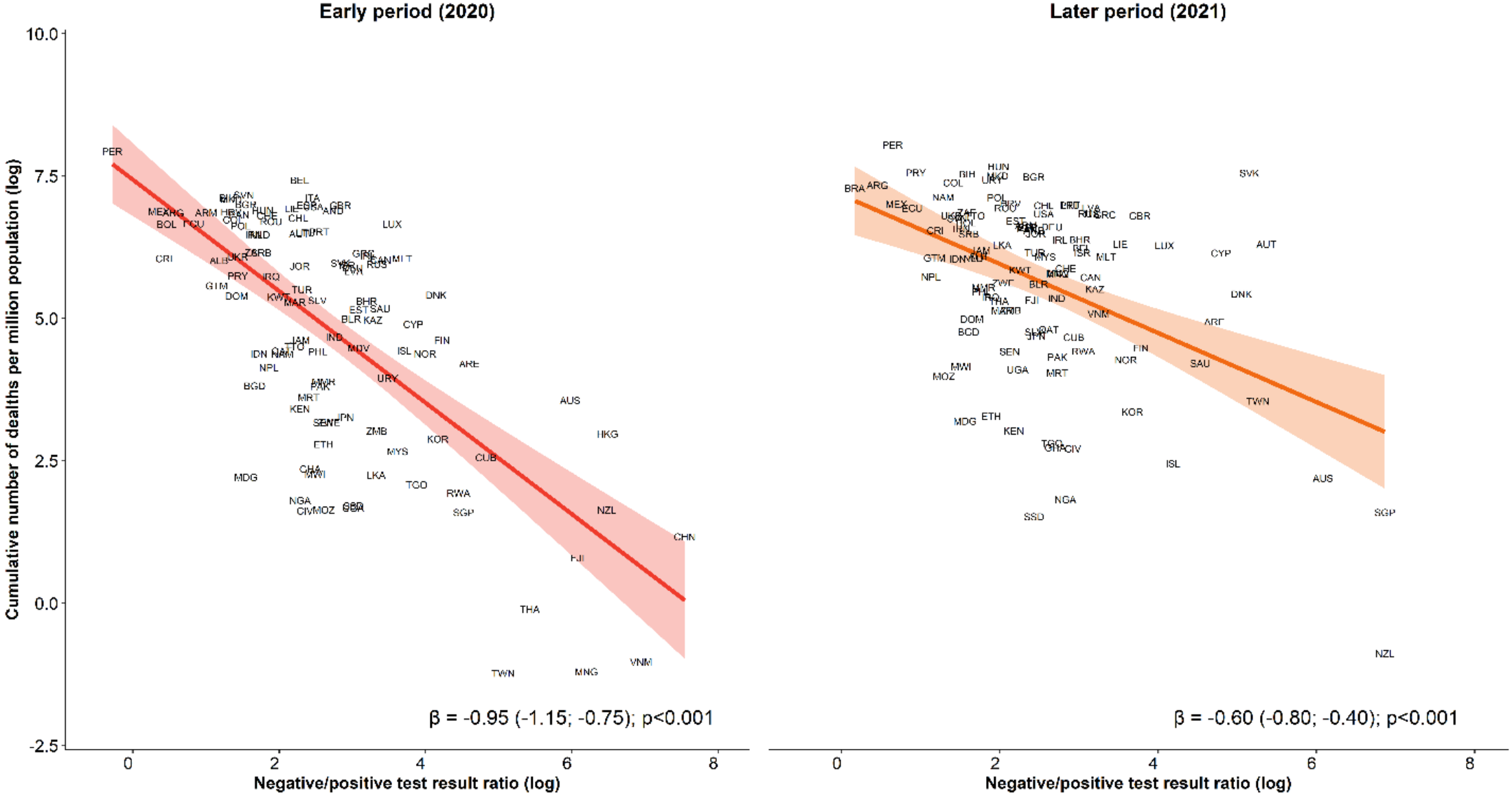


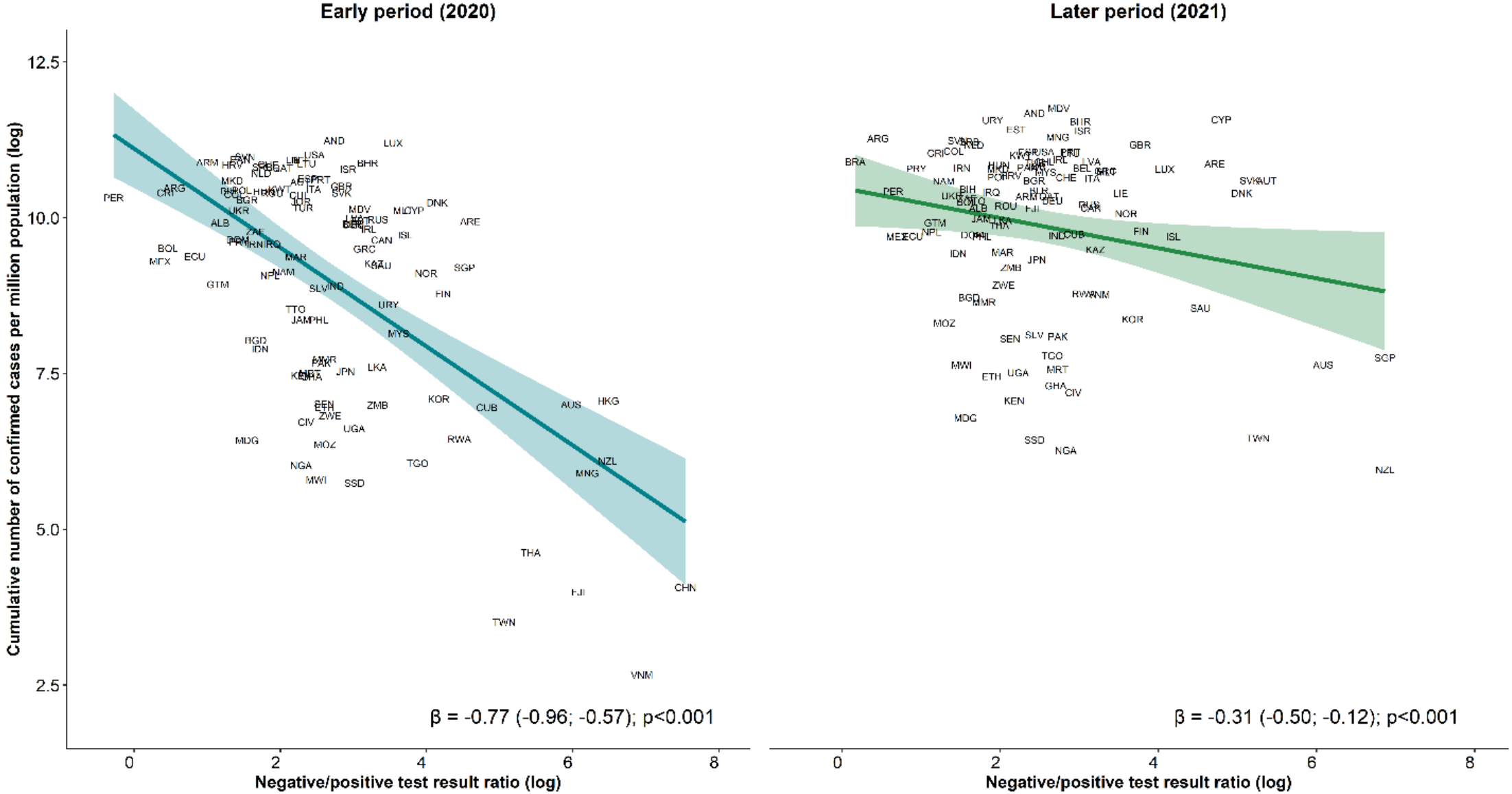
Unit of analysis: national, day

Unit of analysis: provincial, week

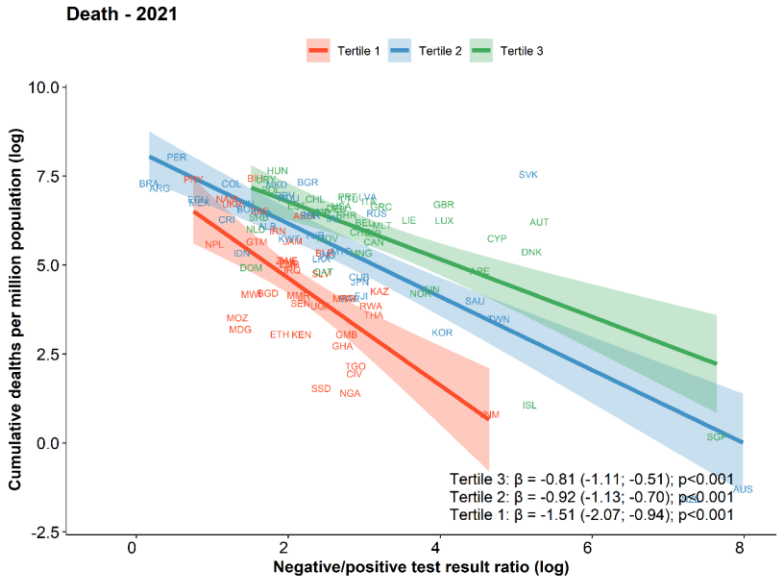
Unit of analysis: national, week

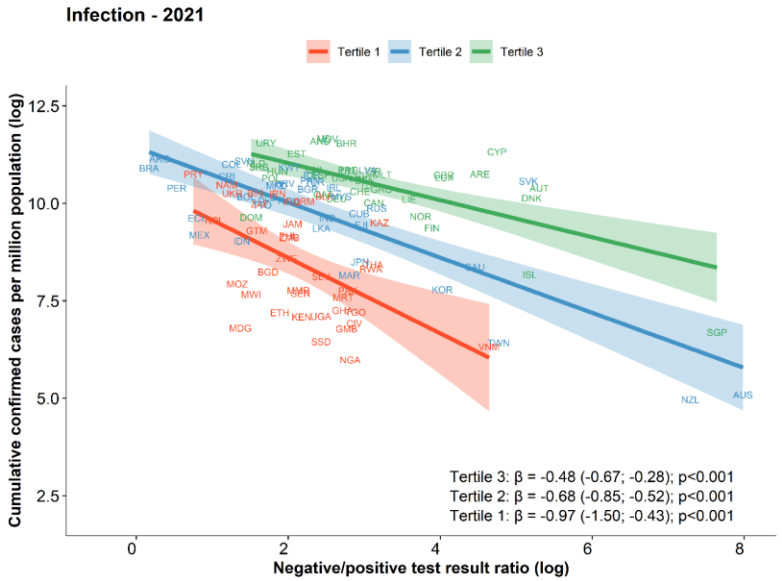
Association between log-transformed 1-week lagged cumulative deaths (A), cases (B) and negative test result ratio (log) of the 111 jurisdictions in 2020 and 2021


Early period (2020)
Later period (2021)
Cumulative number of deaths per million population (log)
Negative/positive test result ratio (log)
10.0
7.5
5.0
2.5
0.0
-2.5
0
2
4
6
8
β = -0.95 (-1.15; -0.75); p<0.001
β = -0.60 (-0.80; -0.40); p<0.001


Early period (2020)
Later period (2021)
Cumulative number of confirmed cases per million population (log)
Negative/positive test result ratio (log)
β = -0.77 (-0.96; -0.57); p<0.001
β = -0.31 (-0.50; -0.12); p<0.001
12.5
10.0
7.5
5.0
2.5
0
2
4
6
8

Global analysis:
National level Negative test ratio and cumulative incidence/mortality
: stratified by vaccination rate tertile





- Source: Oh, Juhwan and Hwang, Seungsik and Long, Khuong Quynh and Kim, Minkyung and Park, Kunhee, and Gostin, Lawrence O. and Subramanian, S. V. and Markuns, Jeffrey F. and Hong, Yun-Chul and Bullen, Chris and Lee, Jong-Koo and McKee, Martin, Real World Evidence of Trace, Test, Isolation, and Quarantine Impact on the COVID-19 Pandemic Response Performance. Available at SSRN: https://ssrn.com/abstract=3954082 or http://dx.doi.org/10.2139/ssrn.3954082 (Under-review)

Trade-off vs Synergy

In health sector: covid vs non-covid

nature medicine

ARTICLES

https://doi.org/10.1038/s41591-022-01750-1

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COVID-19 and resilience of healthcare systems in ten countries

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Declines in health service use during the Coronavirus Disease 2019 (COVID-19) pandemic could have important effects on population health. In this study, we used an interrupted time series design to assess the immediate effect of the pandemic on 31 health services in two low-income (Ethiopia and Haiti), six middle-income (Ghana, Lao People's Democratic Republic, Mexico, Nepal, South Africa and Thailand) and high-income (Chile and South Korea) countries. Despite efforts to maintain health services, disruptions of varying magnitude and duration were found in every country, with no clear patterns by country income group or pandemic intensity. Disruptions in health services often preceded COVID-19 waves. Cancer screenings, TB screening and detection and HIV testing were most affected (26–96% declines). Total outpatient visits declined by 9–40% at national levels and remained lower than predicted by the end of 2020. Maternal health services were disrupted in approximately half of the countries, with declines ranging from 5% to 33%. Child vaccinations were disrupted for shorter periods, but we estimate that catch-up campaigns might not have reached all children missed. By contrast, provision of antiretrovirals for HIV was not affected. By the end of 2020, substantial disruptions remained in half of the countries. Preliminary data for 2021 indicate that disruptions likely persisted. Although a portion of the declines observed might result from decreased needs during lockdowns (from fewer infectious illnesses or injuries), a larger share likely reflects a shortfall of health system resilience. Countries must plan to compensate for missed healthcare during the current pandemic and invest in strategies for better health system resilience for future emergencies.

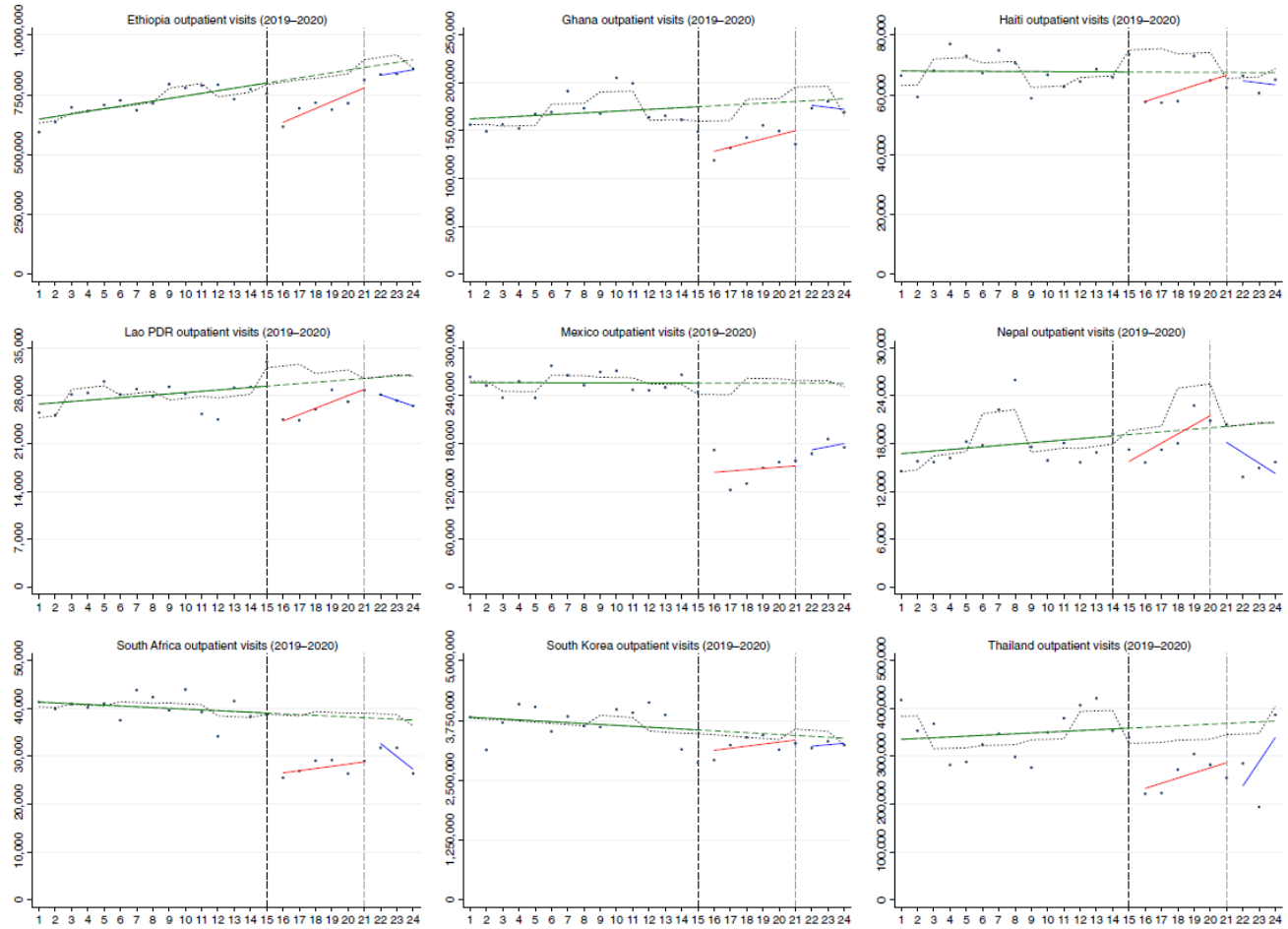

Fig. 1 | Trends in total outpatient visits in nine countries from January 2019 to December 2020. The blue dots are the average monthly number of outpatient visits per sub-national unit (observed). The *x* axes are months 1–24, representing January 2019 to December 2020, except in Nepal where they correspond to 15 January 2019 to 13 January 2021. The *y* axes are the total services provided. The vertical black line shows the beginning of the COVID-19 pandemic, and the vertical gray line shows the beginning of the potential resumption period (last quarter of 2020). The green trend line is the predicted trend based on pre-COVID-19 months. The black dotted trend line is the temporal trend adjusted for seasonality. The red line is the temporal trend in the 6 months after the pandemic was declared (April to September 2020). The blue line is the temporal trend in the last quarter of 2020. Trends extended to June 2021 are available for seven countries in Extended Data Fig. 1. In South Africa, outpatient visits are reported only by hospitals and, thus, represent only a fraction of service provision. In Chile, outpatient visits were not available.

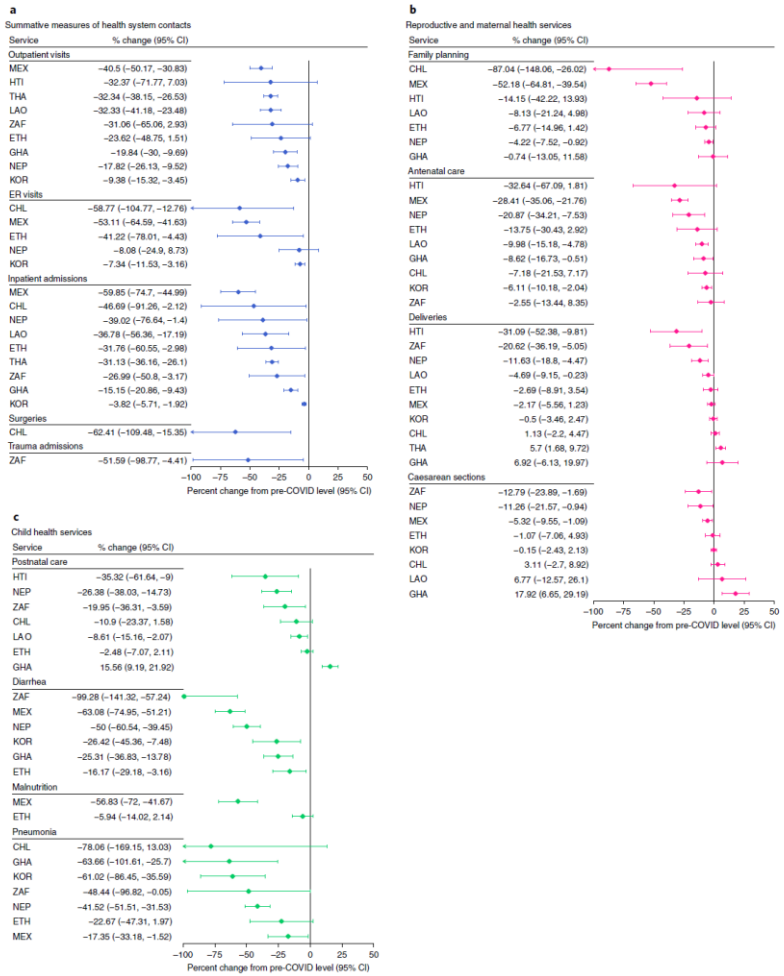

Fig. 2 | Immediate effect of the pandemic on summative measures and reproductive, maternal and child health services. Effect estimates are expressed as the percent change in service level after the declaration of the pandemic compared to the average level pre-COVID-19. The percent change from the average pre-COVID-19 is calculated by dividing the coefficient for the COVID-19 period (β2) from regression models to the monthly average in the 15 months pre-COVID-19. Lower and upper limits of the 95% confidence interval (CI) are also divided by the monthly average pre-COVID-19 to be expressed as percentages. Regression coefficients and CIs are in Supplementary Tables 10–19. Countries are represented with International Organization for Standardization country codes.

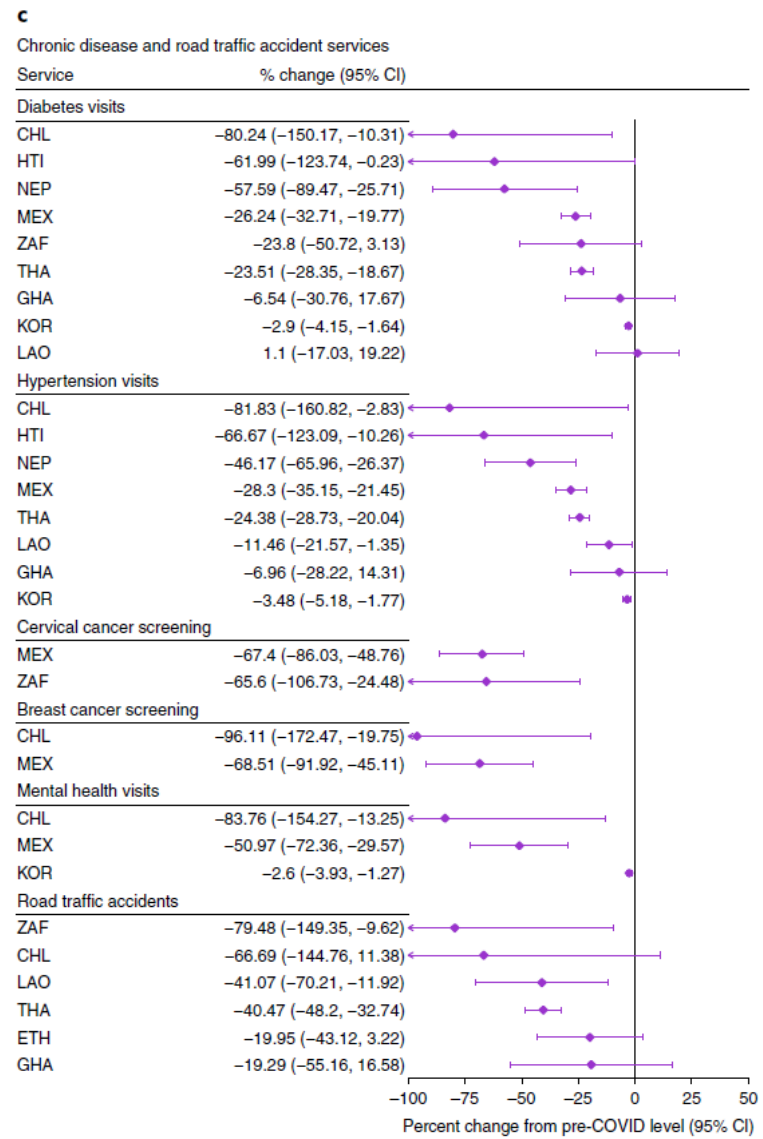

Fig. 3 | Immediate effect of the pandemic on childhood immunizations and services for HIV, TB, malaria, chronic diseases and road traffic accidents. Effect estimates are expressed as the percent change in service level after the declaration of the pandemic compared to the average level pre-COVID-19. The percent change from the average pre-COVID-19 is calculated by dividing the coefficient for the COVID-19 period (β2) from regression models to the monthly average in the 15 months pre-COVID-19. Lower and upper limits of the 95% confidence interval (CI) are also divided by the monthly average pre-COVID-19 to be expressed as percentages. Regression coefficients and CIs are in Supplementary Tables 10–19. Childhood immunizations are for the number of children who received the final dose for the pentavalent vaccine, the pneumococcal conjugate vaccine and the rotavirus vaccine. Measles vaccination is for the number of children who received the first dose in Ethiopia and Nepal, the second dose in Mexico and South Africa and both first and second doses in Ghana. Full vaccination by age 1 is according to the national immunization schedule. Countries are represented with International Organization for Standardization country codes.

Health Policy

Lessons learnt from easing COVID-19 restrictions: an analysis of countries and regions in Asia Pacific and Europe

Emeline Han, Melisa Mei Jin Tan*, Eva Turk, Devi Sridhar, Gabriel M Leung, Kenji Shibuya, Nima Asgari, Juhwan Oh, Alberto L García-Basteiro, Johanna Hanefeld, Alex R Cook, Li Yang Hsu, Yik Ying Teo, David Heymann, Helen Clark, Martin McKee, Helena Legido-Quigley*

The COVID-19 pandemic is an unprecedented global crisis. Many countries have implemented restrictions on population movement to slow the spread of severe acute respiratory syndrome coronavirus 2 and prevent health systems from becoming overwhelmed; some have instituted full or partial lockdowns. However, lockdowns and other extreme restrictions cannot be sustained for the long term in the hope that there will be an effective vaccine or treatment for COVID-19. Governments worldwide now face the common challenge of easing lockdowns and restrictions while balancing various health, social, and economic concerns. To facilitate cross-country learning, this Health Policy paper uses an adapted framework to examine the approaches taken by nine high-income countries and regions that have started to ease COVID-19 restrictions: five in the Asia Pacific region (ie, Hong Kong [Special Administrative Region], Japan, New Zealand, Singapore, and South Korea) and four in Europe (ie, Germany, Norway, Spain, and the UK). This comparative analysis presents important lessons to be learnt from the experiences of these countries and regions. Although the future of the virus is unknown at present, countries should continue to share their experiences, shield populations who are at risk, and suppress transmission to save lives.

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*Joint first authors

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	Overall strategy	Knowledge of infection status	Community engagement	Public-health capacity	Health-system capacity	Measures for border control
Asia Pacific						
Hong Kong	Suppress and lift strategy	Real-time R estimated and reported since February, 2020	1 m physical distancing and mask wearing practised; despite serious mistrust in government, community has shown a high rate of adherence and built their own collective response to the pandemic	Daily PCR-testing capacity being increased from 4500 to >10 000; police supercomputer system used for contact tracing and electronic wristbands paired with mobile phone apps used to monitor people under quarantine	Second-tier isolation beds and community isolation facilities added to public hospitals; safety measures have been effective in protecting health-care workers from infection	Border closed to visitors; all arrivals must submit a health declaration form online, have temperature screening and testing on arrival, and serve a 14-day quarantine
Japan	Trigger-based approach	One indicator is an incidence rate of ≤0·5 cumulative infections per 100 000 people in the past week	2 m physical distancing and mask wearing practised; citizens are encouraged to avoid so-called 3Cs (ie, closed spaces, crowded places, and close contact); adherence aided by existing social etiquette	Daily PCR-testing capacity is low but is being increased from 6000 tests per day in May to more than 22 000 tests per day; manual tracing done and new mobile phone app introduced in June, 2020	Initially, all patients were admitted but, due to low capacity, hospitals now focus on caring for people who are vulnerable or have moderate or severe disease; people with mild disease and people who are asymptomatic supported at home or at lodging facilities	All arrivals are subject to 14-day quarantine, and travellers from selected countries are denied entry or, if allowed for exceptional reasons, subject to testing
New Zealand	Four-level alert system	No publicly specified indicator	So-called social bubble approach allowed gradual expansion of small and exclusive social groups; no physical distancing required at alert level one	Testing capacity being increased; manual and app-based tracing being done	Efforts being made to increase number of ICU beds and number of staff trained to use ICU equipment	Border closed to most visitors; all arrivals are tested and quarantined for 14 days
Singapore	Three-phase plan	No publicly specified indicator	1 m physical distancing and face covering required; government messages have consistently emphasised individual responsibility, although policy changes have generated some initial public confusion	More than 13 000 PCR tests per day done in June, 2020, with plans to increase to 40 000 tests per day; manual and app-based tracing done	ICUs are well under capacity; to reduce pressure on public hospitals, patients with mild symptoms are transferred to private hospitals or community facilities for monitoring	Border closed to most visitors; all arrivals must submit a health declaration form, serve a 14-day Stay Home Notice, and be tested
South Korea	Trigger-based approach, three-level physical distancing scheme	Level one applies if number of daily new cases is <50, level two for 50–100 cases, and level three for >100 cases	2 m physical distancing and mask wearing practised; government has used transparent communication methods to secure public cooperation, including detailed reporting of new cases via websites, mobile phone apps, and text alerts	Mass testing at a rate of 20 000 PCR tests per day, including at drive-through and walk-through stations; records from medical facilities, global positioning system, credit card transaction history, and closed-circuit television used to supplement manual contact tracing	On the basis of a triage system, people with mild disease or who are asymptomatic are monitored at residential treatment centres; people with moderate or severe disease are cared for at government-designated hospitals	All arrivals must submit a health declaration form, install a mobile phone app, have temperature screening, testing, and 14-day quarantine

(Table continues on next page)

Panel: **Comparative framework for COVID-19 lockdown exit strategies**

Knowledge of infection status
- Indicators to monitor the epidemiological situation

Community engagement
- Safe policies for physical distancing and mask wearing
- Precautionary measures in schools and workplaces
- Communication to secure public trust and cooperation
- Protecting vulnerable populations
- Providing socioeconomic support

Public-health capacity
- Testing, tracing, and isolating
- Role of experts

Health-system capacity
- Treatment facilities
- Medical equipment
- Health-care workforce

Measures for border control
- Inbound travel restrictions

viral suppression and avoiding return to a full lockdown.

Fundamentally, this find, test, trace, isolate, and support system needs to be supported by sustained investment in public-health capacity and health-system capacity in terms of facilities, supplies, and workforce. WHO and the

Voices

The Global Response to the COVID-19 Pandemic

Global approaches towards pandemic control range from strict lockdowns to minimal restrictions. We asked experts worldwide about the lessons learned from their countries' response. Their voices converge on the importance of scientifically guided interventions to limit the spread of SARS-CoV-2 and its impact on human health.

John Nkengasong
Africa Centres for Disease Control and Prevention

Africa's Response to COVID-19

The global response to the coronavirus pandemic will be a critical case study in future public health curricula. While some countries were quick to respond, others were not. While some took extreme measures, others were lax. What strategies have we seen as being successful in responding to the pandemic? In Africa, it was **unified leadership.**

The first case of the coronavirus in Africa was confirmed on February 14, 2020, in Egypt and served as the impetus to mobilize leaders of African Union (AU) member states into taking swift action. Just 1 week later, on February 22, H.E. Moussa Faki Mahamat, the chairperson of the African Union Commission, convened an emergency meeting of ministers of health with all 55 member states in attendance. It was from this critical forum that the Africa Joint Continental Strategy for COVID-19 Outbreak was born.

This preemptive coordination by the AU and member states led to the advancement of surveillance, contact-tracing, the rapid scaling up of testing, and case management across the continent. And through the Africa CDC, this key alignment in vision has helped build the capacity of member states to respond to COVID-19 and future pandemics. Leaders understanding the significance of pursuing a harmonized approach from the onset—underpinned by communication, collaboration, coordination, and cooperation—has been vital to the work of the Africa CDC. This unified leadership will continue to be key in our (eventual) ability to lead Africa out of this pandemic, and in our overall quest to establish a new public health order on the continent.

Akiko Iwasaki
Yale University School of Medicine

In the Absence of a National COVID Response

As the death toll skyrockets on a daily basis in the US, we are painfully reminded of the lack of leadership and unified plans to contain the pandemic, leading to a catastrophic explosion of COVID-19. Other countries, such as New Zealand, Germany, and Taiwan, had sensible public health measures put in place swiftly to squash the outbreak and maintain low numbers; early decisive lockdown measures; implementation of surveillance systems; mask use; targeted testing strategies; and the use of information technology. Instead, in the US, we had no national lockdown plans, masks are politicized, testing discouraged for fear of rising numbers, worsening PPE shortages, and growing distrust in science. Despite this chaos, local scientists and public health experts banded together to counter COVID-19. We tested saliva because we ran out of swabs—this ultimately led to Yale's famous SalivaDirect, led by Drs. Grubaugh and Wyllie. We optimized different primers, pooled samples, and multiplexed PCR to save reagents and money. We shifted to studying immune responses in COVID-19 patients in the hope of coming up with a better therapy. While I am immensely proud of the incredible accomplishments by the scientists fighting the virus, we cannot bring back the 280,000 people who died as a result of the lack of national COVID strategy. The painful lesson we learned from all this is that our country needs a president who can provide a concrete and consistent plan for battling the next pandemic, and that this plan must be guided by science.

Cesar Victora
Federal University of Pelotas

COVID-19, Science, and Politics

Brazil is second only to the United States in COVID-19 deaths. As might have been expected, the pandemic is heavily hitting the poor and those with African or indigenous ancestry, who are also the most vulnerable to the economic crisis. Yet, arguably the most striking aspect of the pandemic is how prevention and treatment have been obliterated by politics. President Bolsonaro plays a divisive role in ignoring and contradicting scientific knowledge by promoting hydroxychloroquine, opposing social distancing and face mask use, censoring epidemiological results on high prevalence among indigenous populations, and discontinuing the funding for such studies. Since March, two ministers of health resigned in opposition to the president's positions and the third, an Army official, is now in danger of losing his post. We are now seeing what may be the first ever official antivax campaign by a presidential office. Even though no vaccine is available in Brazil yet, Bolsonaro repeatedly stated that vaccination will not be compulsory, instead of promoting its uptake. He publicly reprimanded his minister for ordering millions of doses of the Sinovac vaccine, a joint venture between Chinese manufacturers and the Instituto Butantan, which is undergoing large-scale phase 3 tests at present, all because Butantan belongs to São Paulo state, whose governor will likely run against Bolsonaro in the next presidential elections. The silver lining in this cloud has been the unity shown by most governors and mayors, strongly supported by the scientific community and the mass media. Concerted opposition to the anti-scientific behaviors of national leaders is what Brazil can show to the rest of the world.

Juhwan Oh
Seoul National University College of Medicine

It Should Be Democracy That Fills the Gaps in the Science

South Korea managed to suppress the COVID-19 outbreak by deploying a comprehensive anti-pandemic arsenal including rapid establishment of disaster management team, swift scale-up in testing capacity by public-private partnership, timely re-allocation of diverse resources, and meticulous contact tracing to prevent asymptomatic community transmission. Highly transparent risk communication culminated in the public's committed cooperation to new behavioral protocols without implementing coercive measures, avoiding the negative economic impact. At the crux of South Korean success lies in the central leadership's rapid, responsible, and humble approach, catalyzed by the golden balance between science and democracy. Imperfect scientific knowledge was overcome by dedicated civic engagement to collectively deal with an uncertain future during a crisis. However, innovative and timely social support, especially for those in more affected industry and business sectors, has yet to be fully secured, which may hamper South Korea's achieving high compliance to the new normal state and may lead to surge in cases. Unnecessarily coercive regulations like lockdowns from Western countries, a tactic never used in the country's early response, could in fact aggravate the situation. The victim-blaming culture promoted by populist approaches, one in which a single patient or community is ostracized for an inevitable outbreak, may disrupt the well-established citizen compliance achieved by persuasive technocrats. Innovations in social support must take place to protect the core principles of South Korea's early successful pandemic strategy.

It Should Be Democracy That Fills the Gaps in the Science

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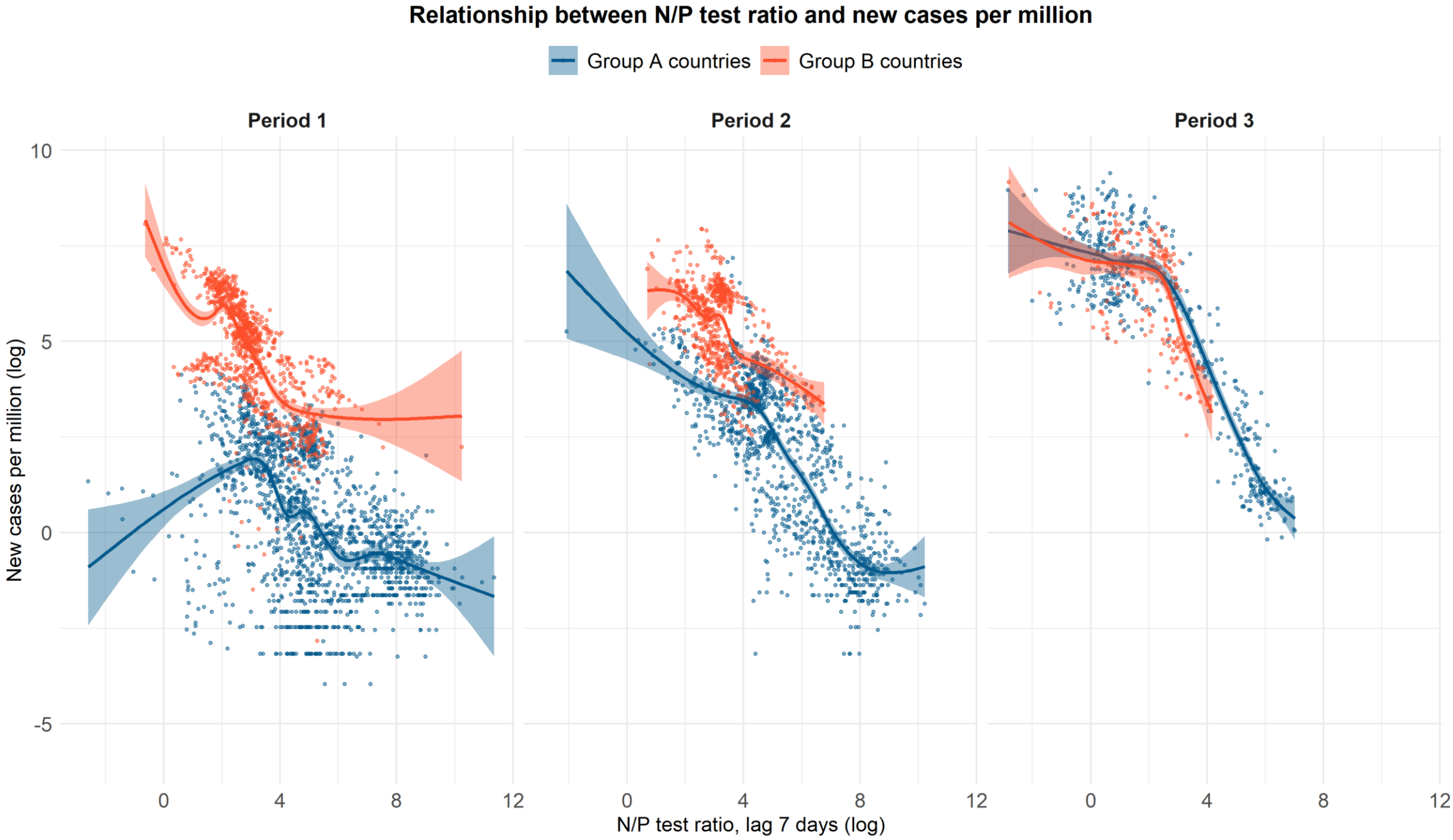
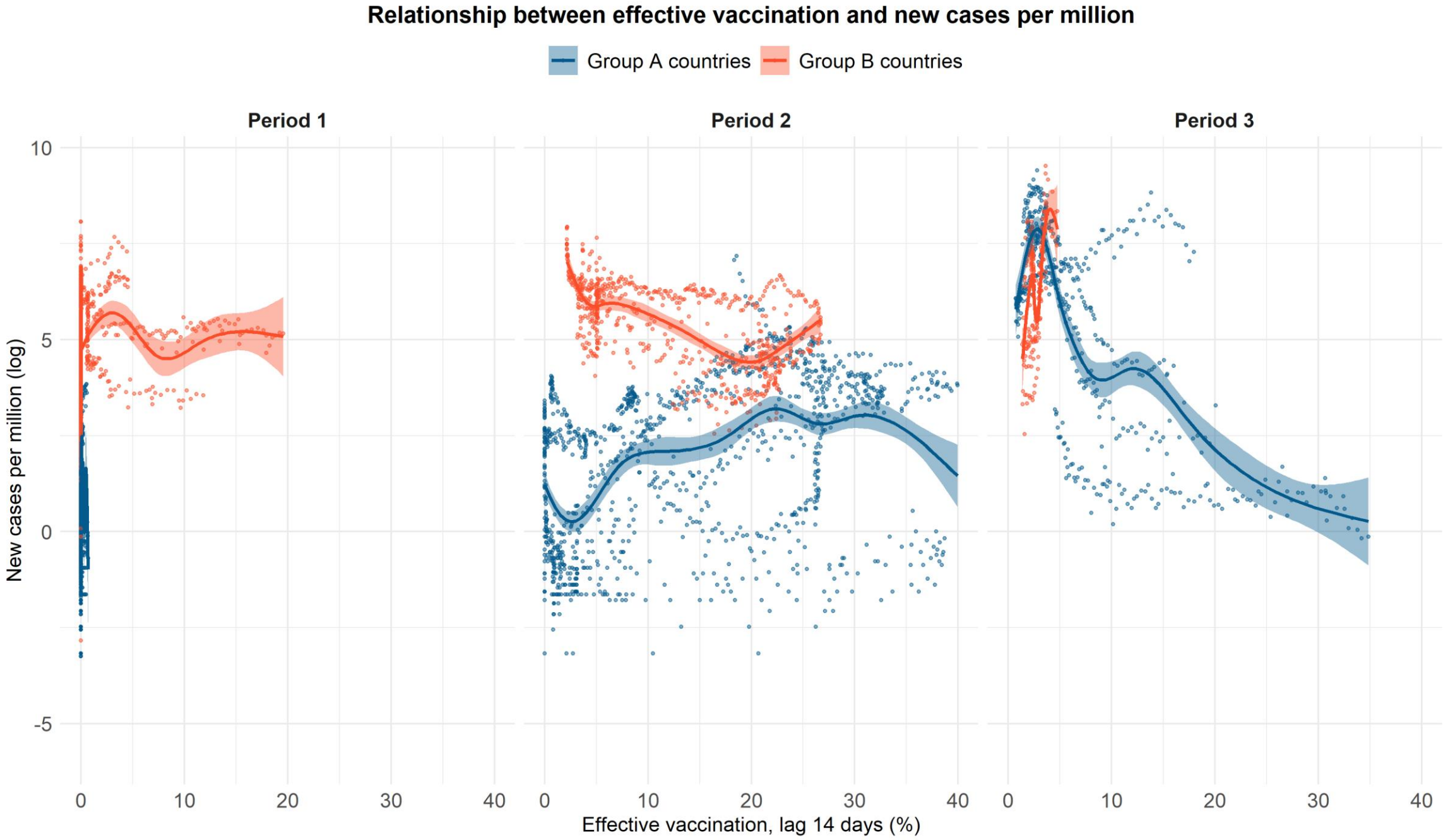
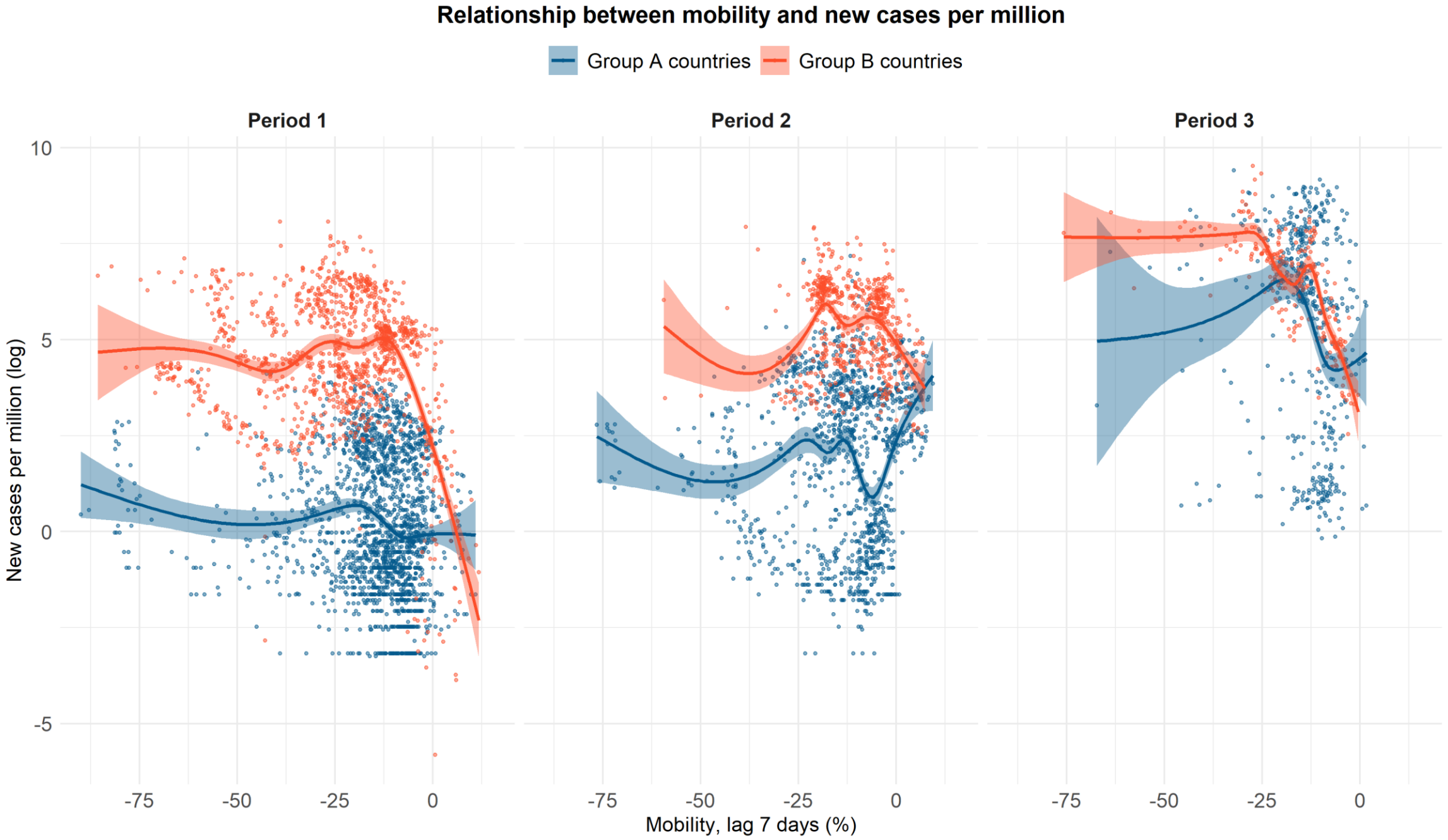
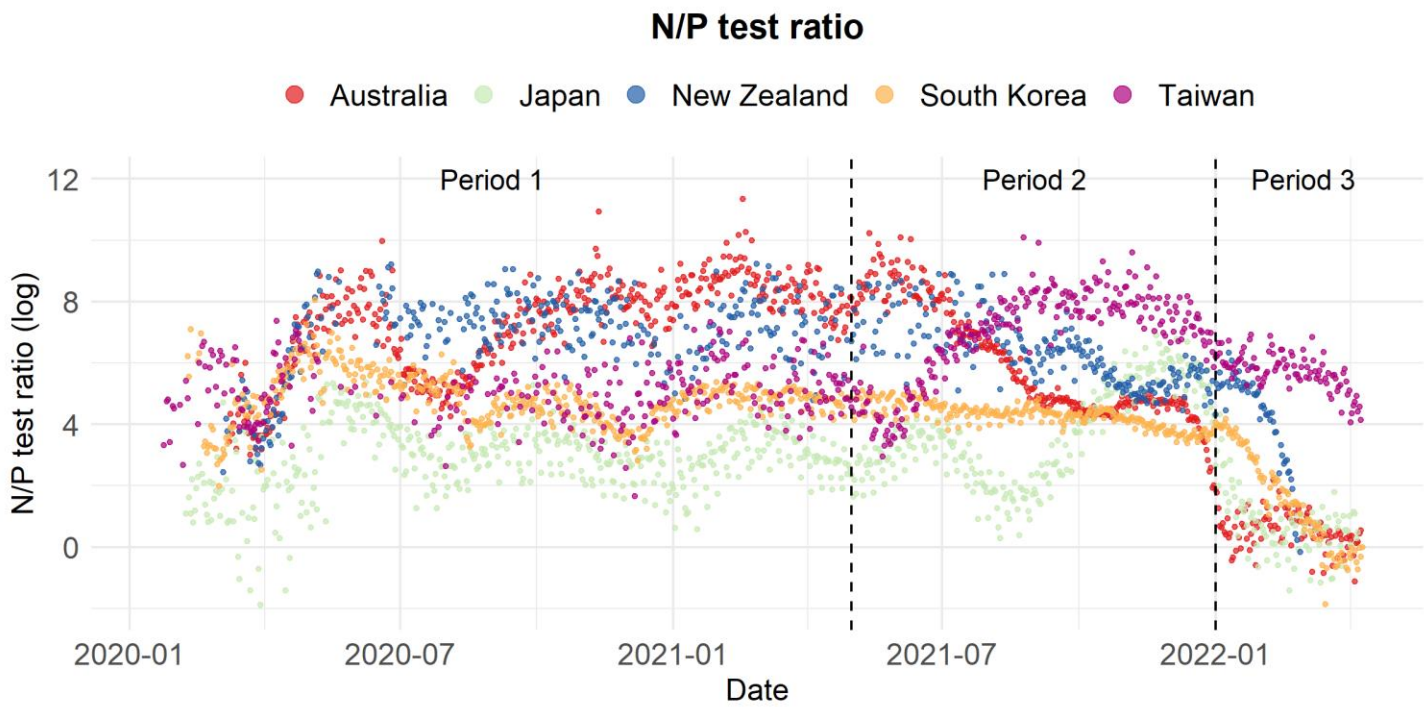
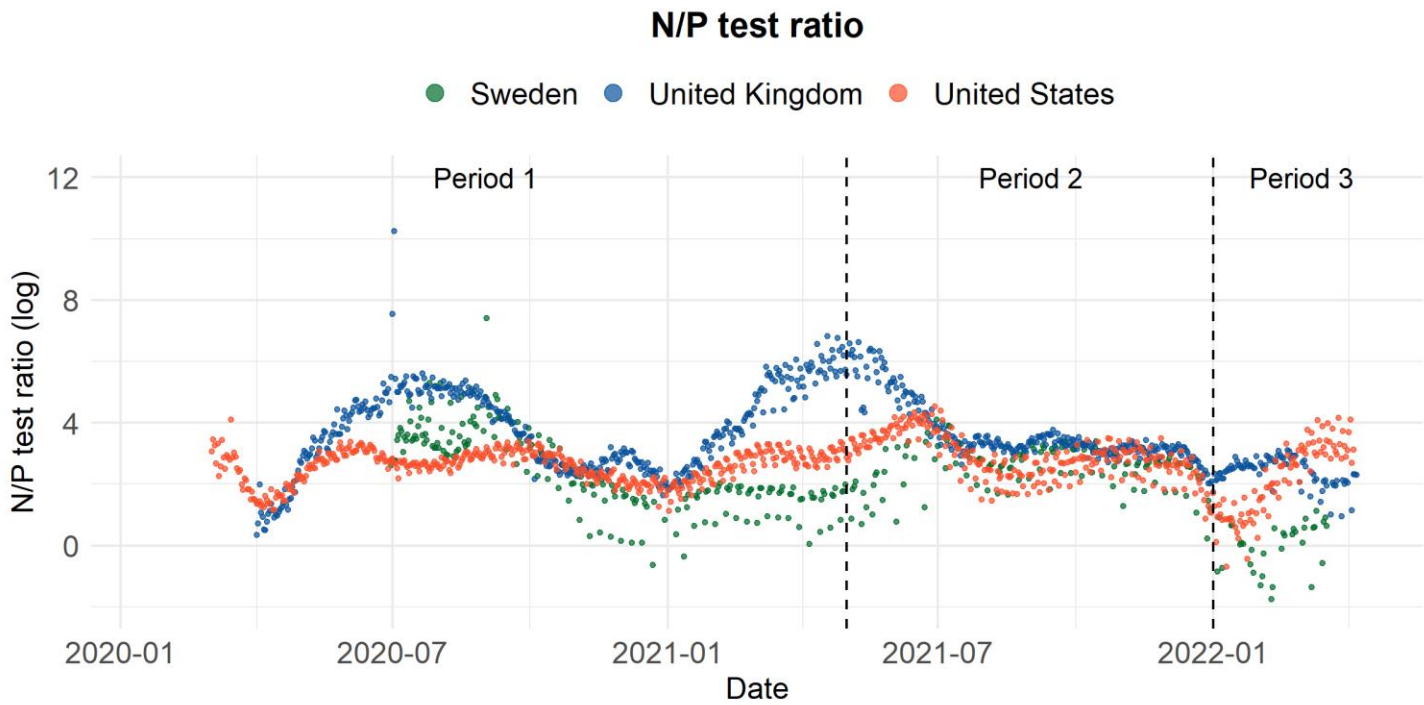
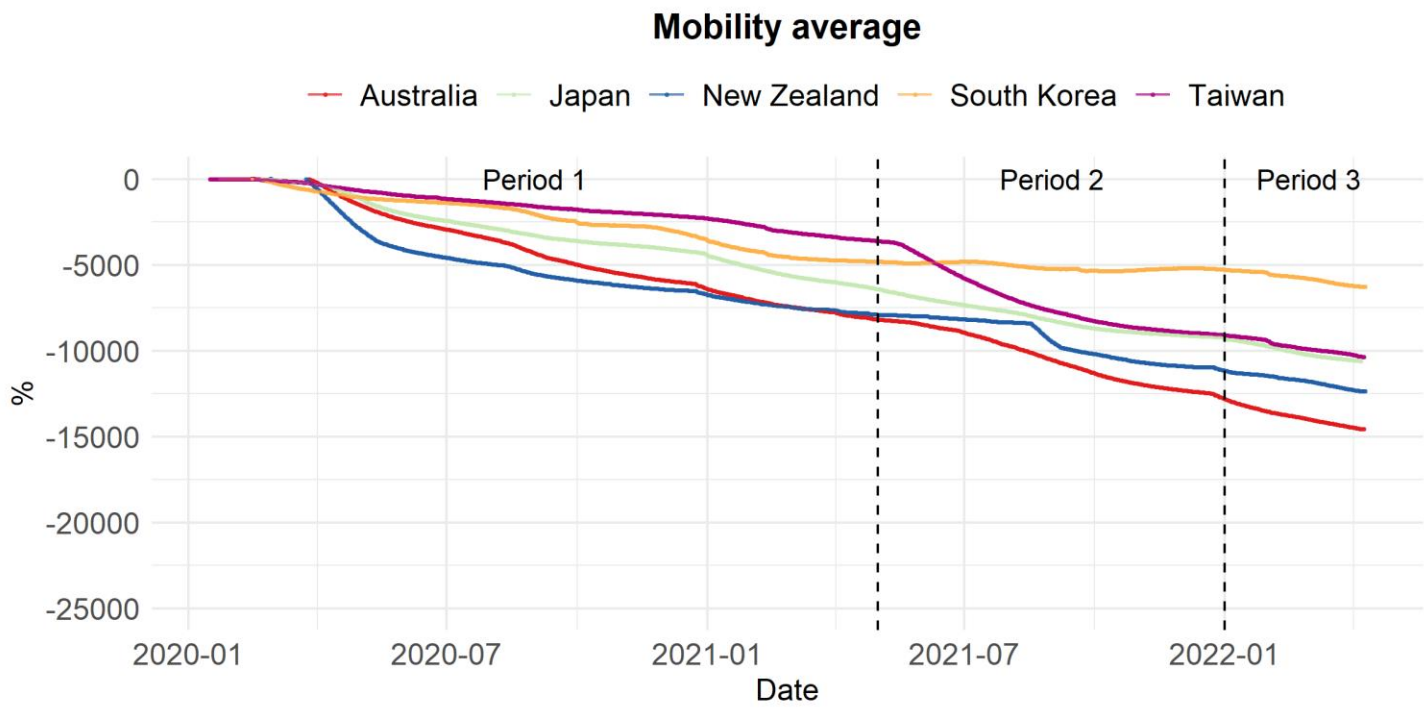

Relationship between N/P test ratio and new cases per million
Group A countries
Group B countries
Period 1
Period 2
Period 3
New cases per million (log)
10
5
0
-5
0
4
8
12
N/P test ratio, lag 7 days (log)

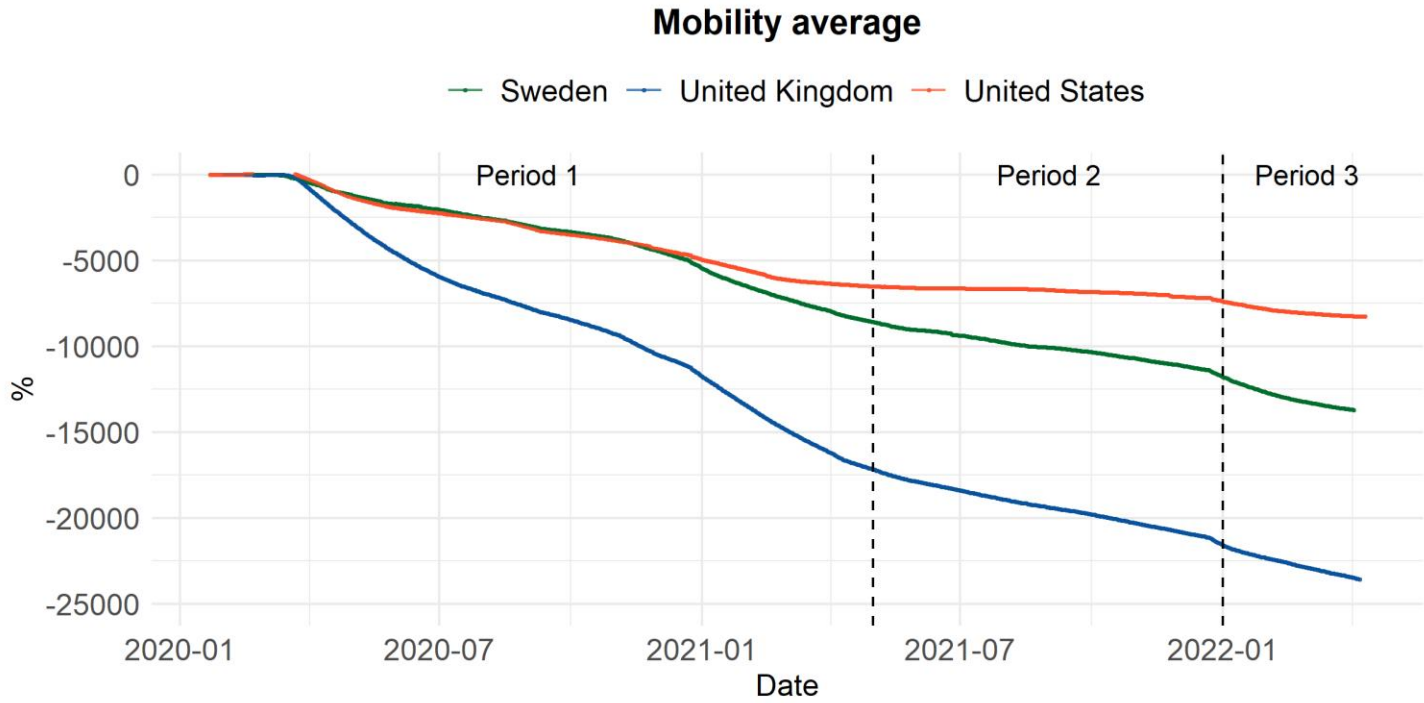

Relationship between effective vaccination and new cases per million
Group A countries
Group B countries
Period 1
Period 2
Period 3
New cases per million (log)
10
5
0
-5
0
10
20
30
40
Effective vaccination, lag 14 days (%)

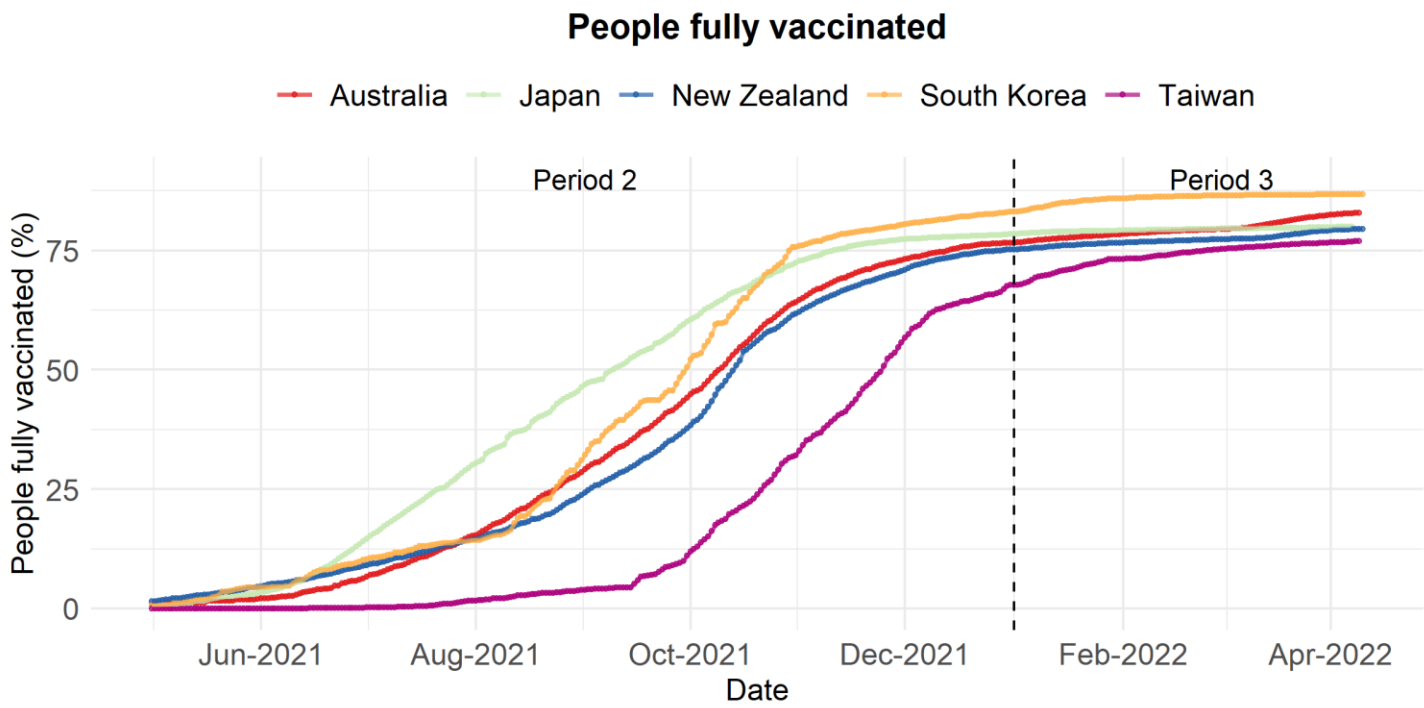

Relationship between mobility and new cases per million
Group A countries
Group B countries
Period 1
Period 2
Period 3
New cases per million (log)
10
5
0
-5
-75
-50
-25
0
Mobility, lag 7 days (%)

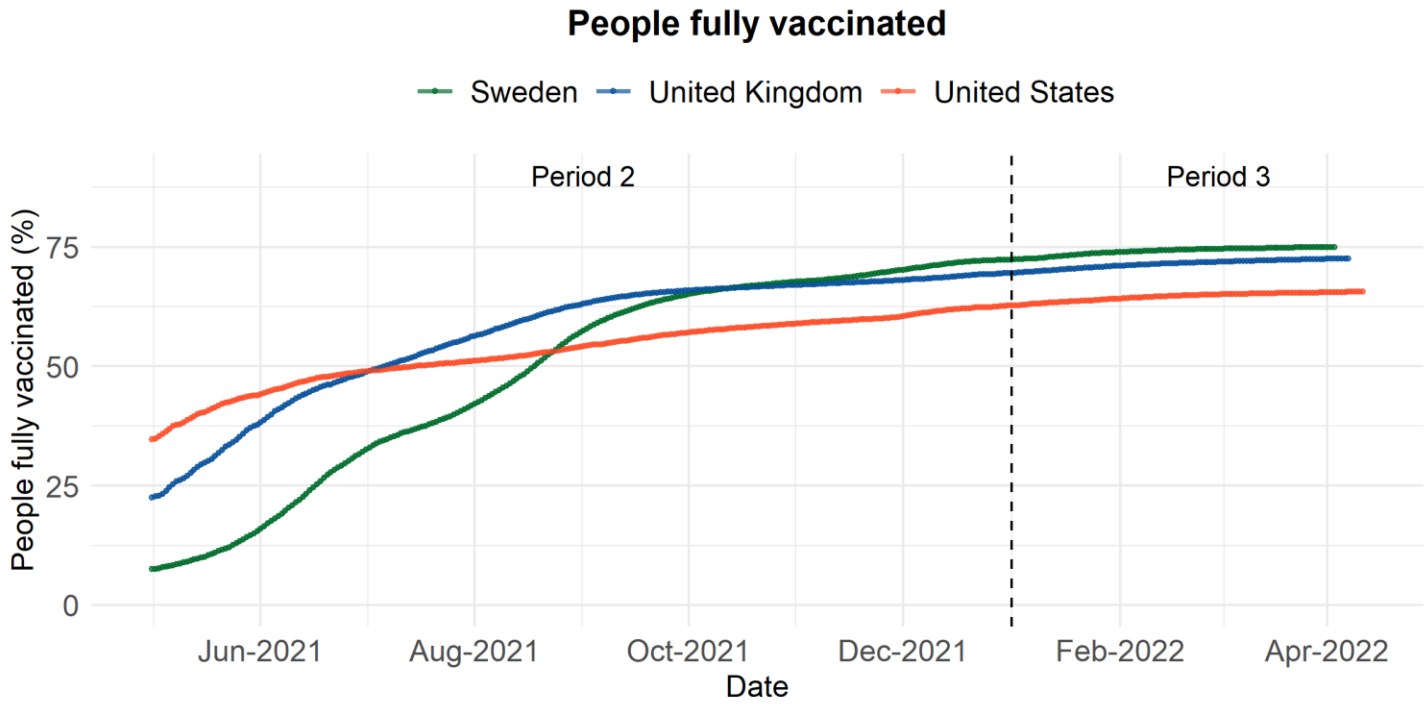

N/P test ratio
Australia
Japan
New Zealand
South Korea
Taiwan
Period 1
Period 2
Period 3
12
8
4
0
N/P test ratio (log)
2020-01
2020-07
2021-01
2021-07
2022-01
Date

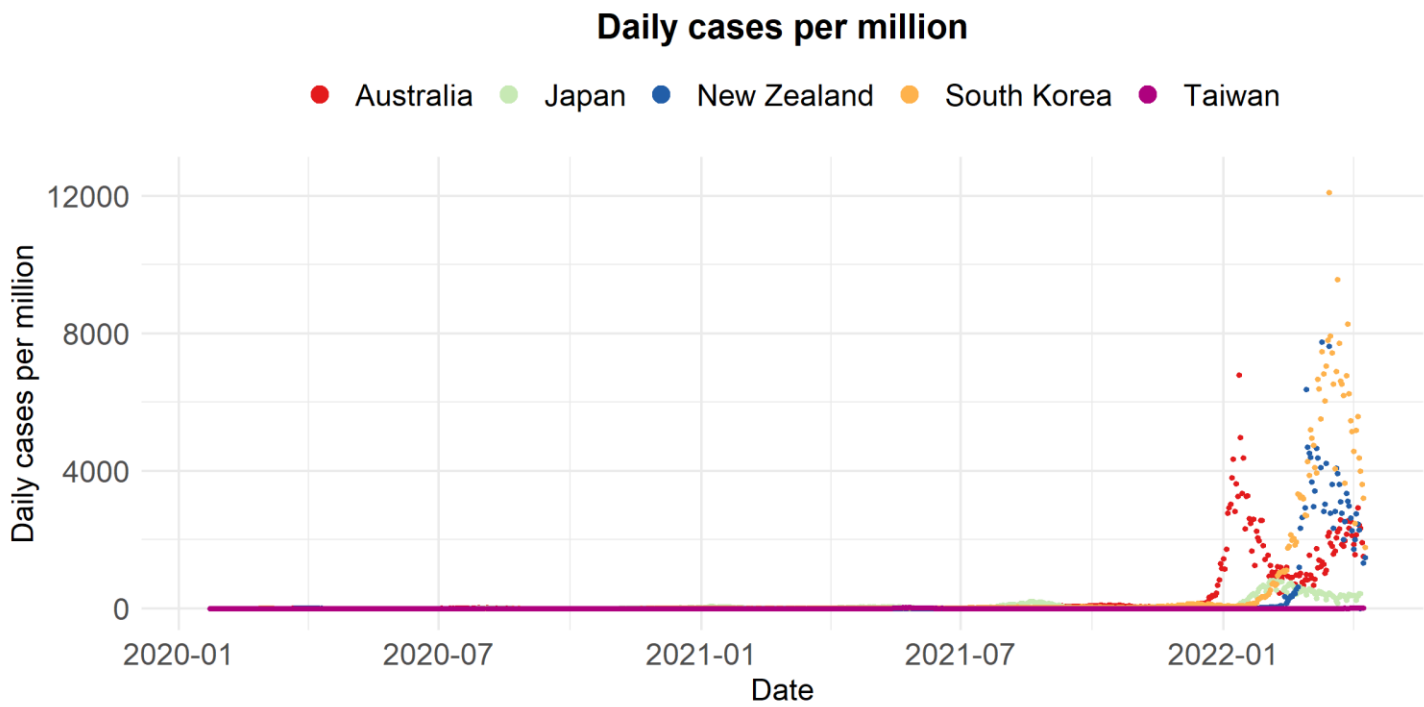

N/P test ratio
Sweden
United Kingdom
United States
Period 1
Period 2
Period 3
12
8
4
0
N/P test ratio (log)
2020-01
2020-07
2021-01
2021-07
2022-01
Date

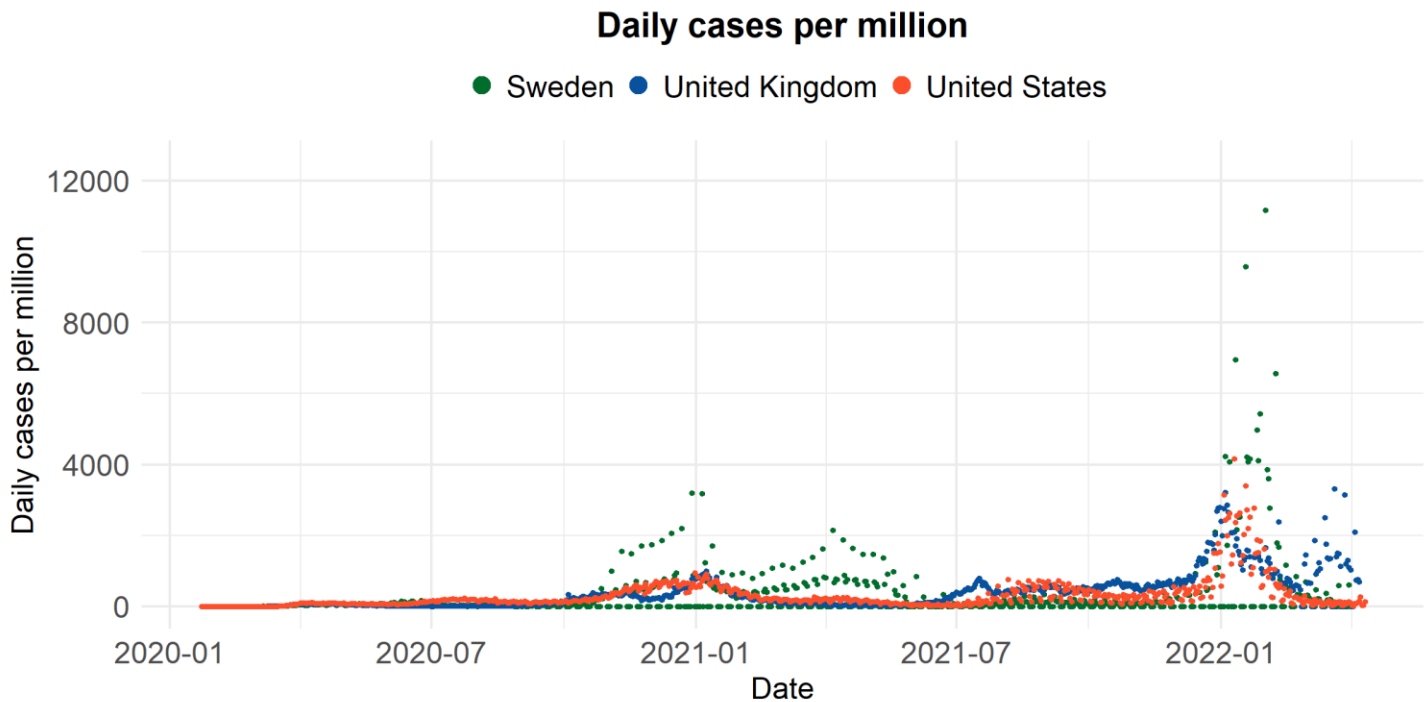

Mobility average
Australia
Japan
New Zealand
South Korea
Taiwan
Period 1
Period 2
Period 3
0
-5000
-10000
-15000
-20000
-25000
%
2020-01
2020-07
2021-01
2021-07
2022-01
Date


Mobility average
Sweden
United Kingdom
United States
Period 1
Period 2
Period 3
0
-5000
-10000
-15000
-20000
-25000
%
2020-01
2020-07
2021-01
2021-07
2022-01
Date


People fully vaccinated
Australia
Japan
New Zealand
South Korea
Taiwan
Period 2
Period 3
People fully vaccinated (%)
0
25
50
75
Jun-2021
Aug-2021
Oct-2021
Dec-2021
Feb-2022
Apr-2022
Date


People fully vaccinated
Sweden
United Kingdom
United States
Period 2
Period 3
People fully vaccinated (%)
0
25
50
75
Jun-2021
Aug-2021
Oct-2021
Dec-2021
Feb-2022
Apr-2022
Date


Daily cases per million
Australia
Japan
New Zealand
South Korea
Taiwan
12000
8000
4000
0
Daily cases per million
2020-01
2020-07
2021-01
2021-07
2022-01
Date

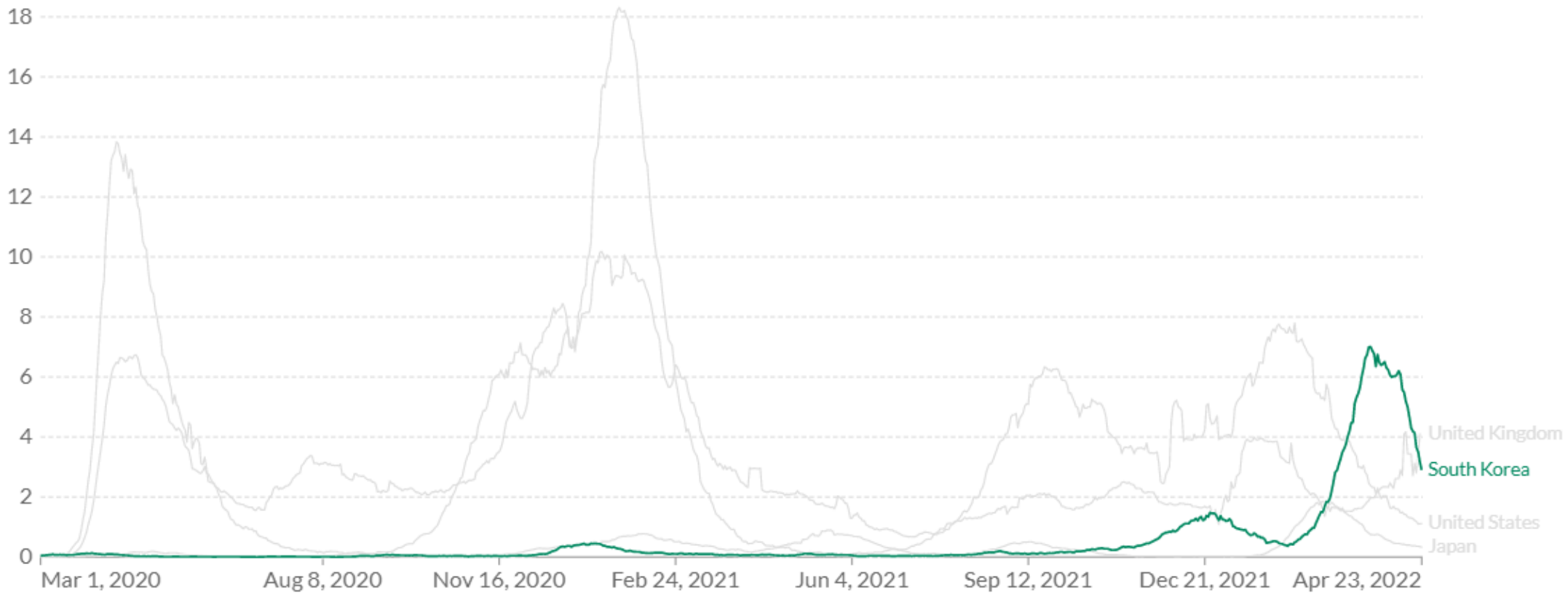

Daily cases per million
Sweden
United Kingdom
United States
12000
8000
4000
0
Daily cases per million
2020-01
2020-07
2021-01
2021-07
2022-01
Date

Daily new confirmed COVID-19 deaths per million people

7-day rolling average. Due to varying protocols and challenges in the attribution of the cause of death, the number of confirmed deaths may not accurately represent the true number of deaths caused by COVID-19.

Our World in Data

LINEAR LOG



Source: Johns Hopkins University CSSE COVID-19 Data

Feb 18, 2020 — Apr 23, 2022

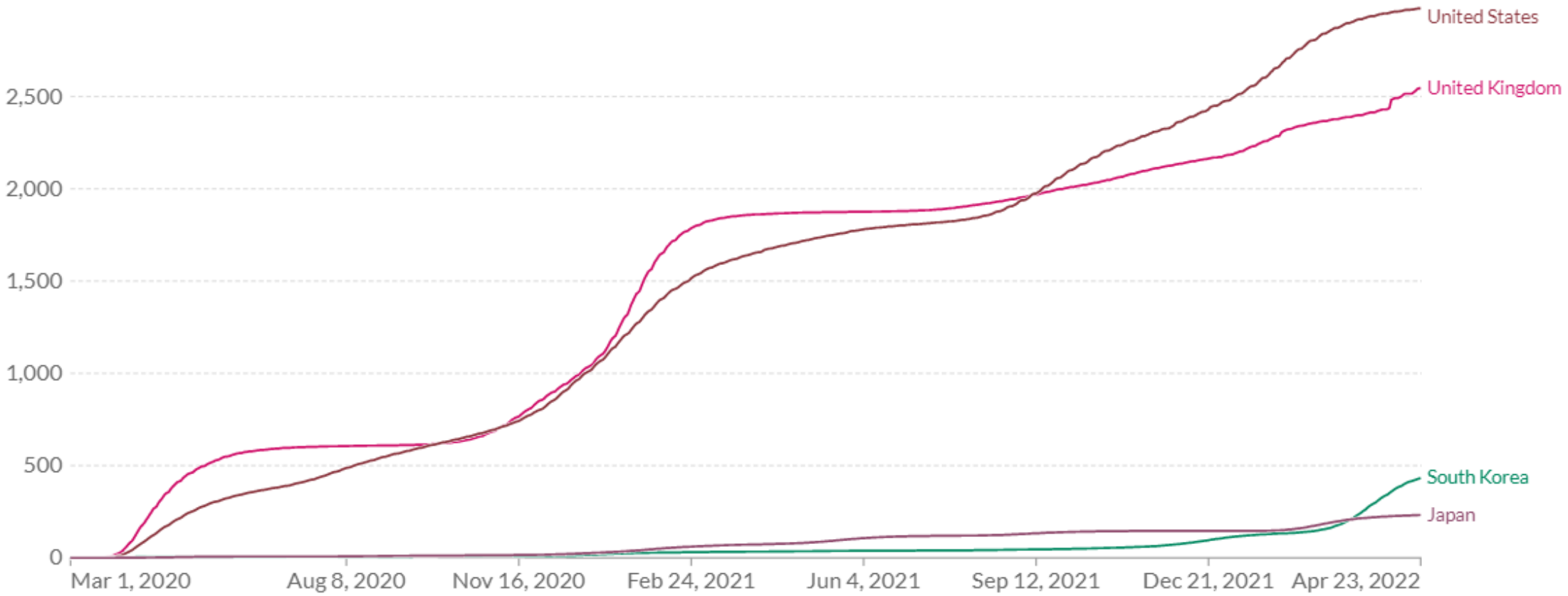
CHART | MAP | TABLE | SOURCES | DOWNLOAD

Cumulative confirmed COVID-19 deaths per million people

Due to varying protocols and challenges in the attribution of the cause of death, the number of confirmed deaths may not accurately represent the true number of deaths caused by COVID-19.

Our World in Data

LINEAR | LOG



Source: Johns Hopkins University CSSE COVID-19 Data

Feb 13, 2020 — Apr 23, 2022


Way to secure development in the era of recurrent pandemic possibility

Health and Wealth as a synergic relationship

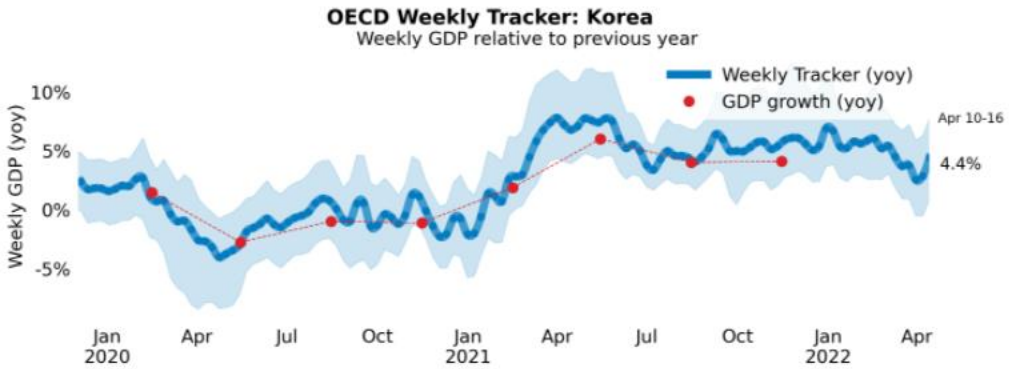
Securing Health and Development could go together

(not trade-off but synergic)

Especially effective when TTIQ applied for both goals rather than lockdown dominance

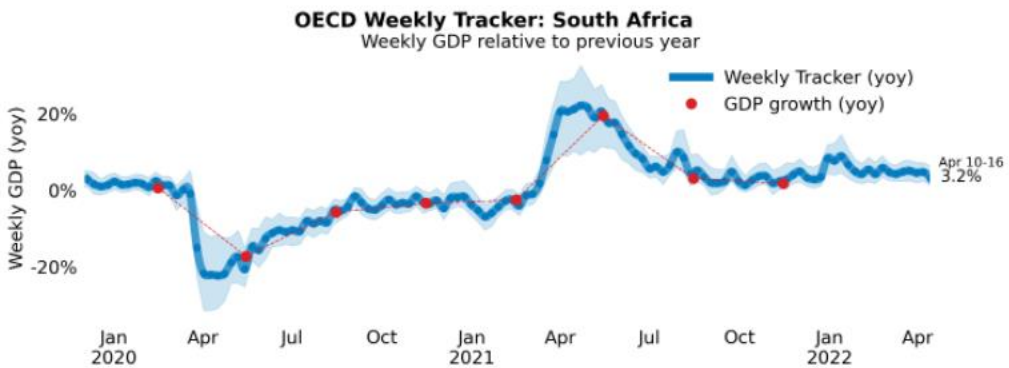
Prioritizing wealth did not necessarily reach better economic outcomes

Korea



Note: The Weekly Tracker provides an estimate of weekly GDP based on Google Trends search data and machine learning.
Source: OECD Weekly Tracker (Woloszko, 2020), https://www.oecd.org/economy/weekly-tracker-of-gdp-growth;
OECD Quarterly National Accounts.

South Africa



Note: The Weekly Tracker provides an estimate of weekly GDP based on Google Trends search data and machine learning.
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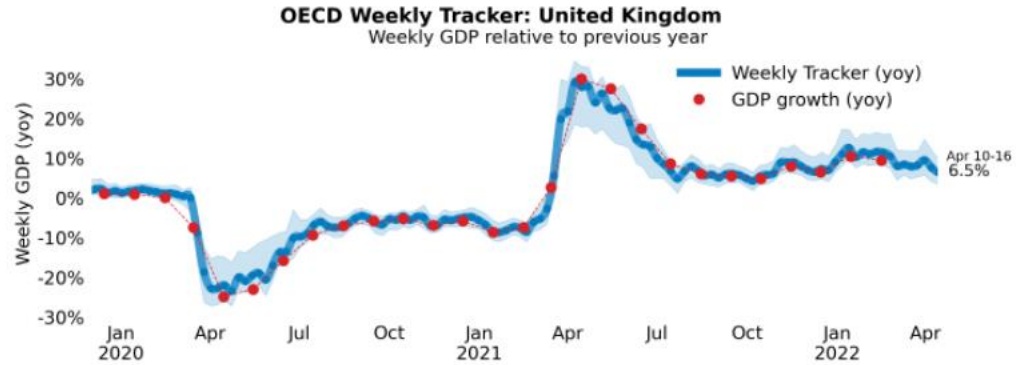
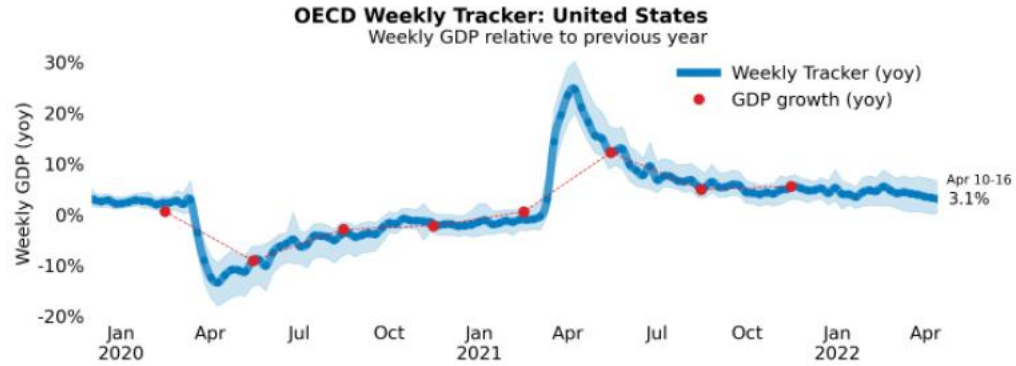


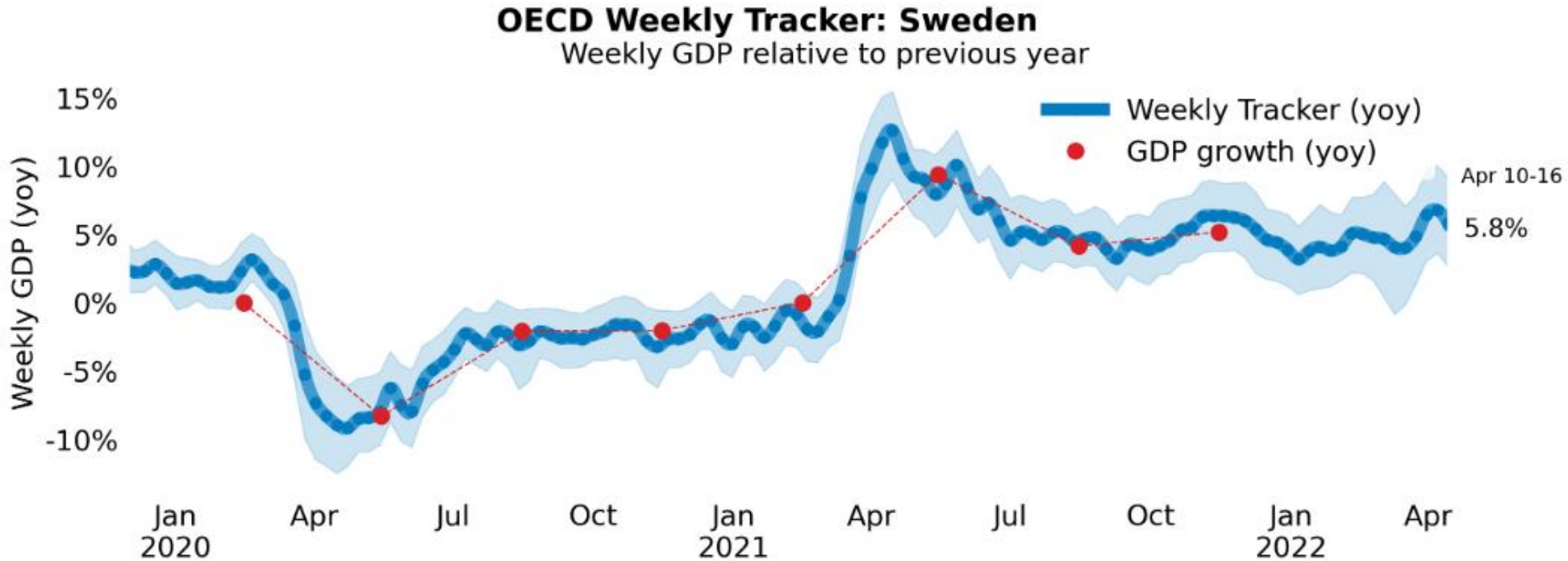
Note: The Weekly Tracker provides an estimate of weekly GDP based on Google Trends search data and machine learning.
Source: OECD Weekly Tracker (Woloszko, 2020), https://www.oecd.org/economy/weekly-tracker-of-gdp-growth;
Office for National Statistics (ONS).

United States



Note: The Weekly Tracker provides an estimate of weekly GDP based on Google Trends search data and machine learning.
Source: OECD Weekly Tracker (Woloszko, 2020), https://www.oecd.org/economy/weekly-tracker-of-gdp-growth;
OECD Quarterly National Accounts.

Select a country: Sweden

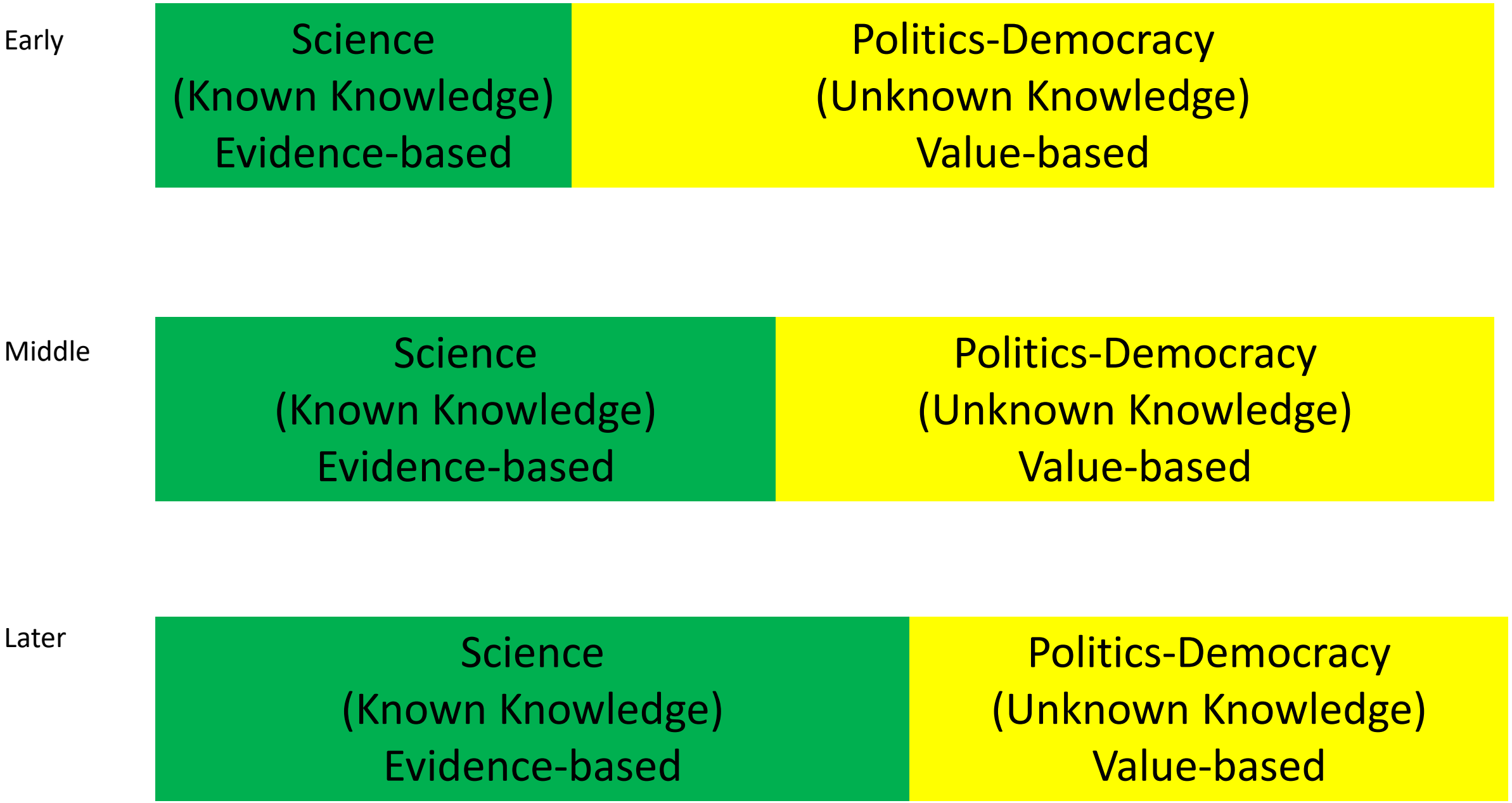


Note: The Weekly Tracker provides an estimate of weekly GDP based on Google Trends search data and machine learning.
Source: OECD Weekly Tracker (Woloszko, 2020), https://www.oecd.org/economy/weekly-tracker-of-gdp-growth;
OECD Quarterly National Accounts.

Better pandemic response for both safe and sustainable development could go by:

- Politics with evidence when there are well triangulated scientific evidence and/or with democracy especially when there are not well-established knowledge yet.
- Pandemic response capacity building plan in the social development strategy
- Socioeconomically supported population plan to make response effective and to secure people's life/livelihood simultaneously from the pandemic and/or any side-effect driven by response itself

Ideal response in the coming next pandemic



Test-Trace-Isolation-Quarantine

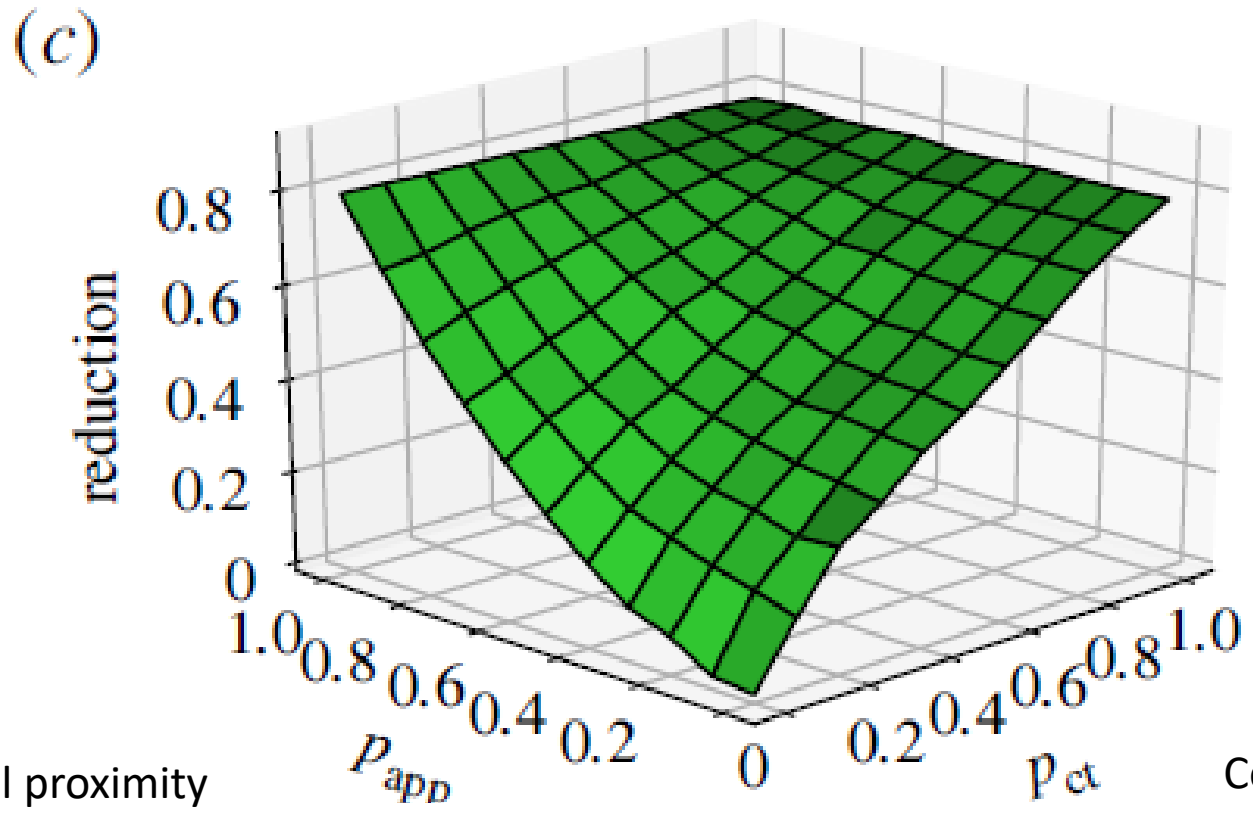
Barrier (Facemask)

or dilution (Ventilation)

Confusing policies in Physical Distancing

Medicine: Drug of Choice

Vaccine



Digital proximity app adoption rate

Contact tracing completeness

Manual Contact Tracing

Digital proximity app based tracing

: Parallel effect but under-utilized potential

Functionally Digital Vaccine

Source: Barrat A, Cattuto C, Kivelä M, Lehmann S, Saramäki J. 2021 Effect of manual and digital contact tracing on COVID-19 outbreaks: a study on empirical contact data. J. R. Soc. Interface 18: 20201000. https://doi.org/10.1098/rsif.2020.1000

Smarter Test-Trace-Isolation-Quarantine

Medicine: Drug of Choice

Barrier (Facemask) or dilution (Ventilation)

Faster & More Effective Vaccine development & application

Physical Distancing

한국개발정책학회
춘계학술포럼
(2022.4.29)

Discussion

Smart pandemic response

to secure development with safety and sustainability together

Juwhan Oh

Sanghoon Ahn

Senior Fellow

Korea Development Institute

Background: *Productivity*

KDI

"Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker."

Paul Krugman

The Age of Diminishing Expectations (1994)

Transport Policy 100 (2021) 89–97

Contents lists available at ScienceDirect

Transport Policy

journal homepage: http://www.elsevier.com/locate/tranpol

Invited Research Paper

Impacts of transportation and industrial complexes on establishment-level productivity growth in Korea☆

Hyungtai Kim [a], Sanghoon Ahn [b], Gudmundur F. Ulfarsson [c,*]

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[b] Center for International Development (CID), Korea Development Institute (KDI), 263 Namsejong-ro, Bangok-dong, Sejong-si, 30149, South Korea

[c] Faculty of Civil and Environmental Engineering, University of Iceland, Hjardarhagi 2-6, IS-107, Reykjavik, Iceland

ARTICLE INFO

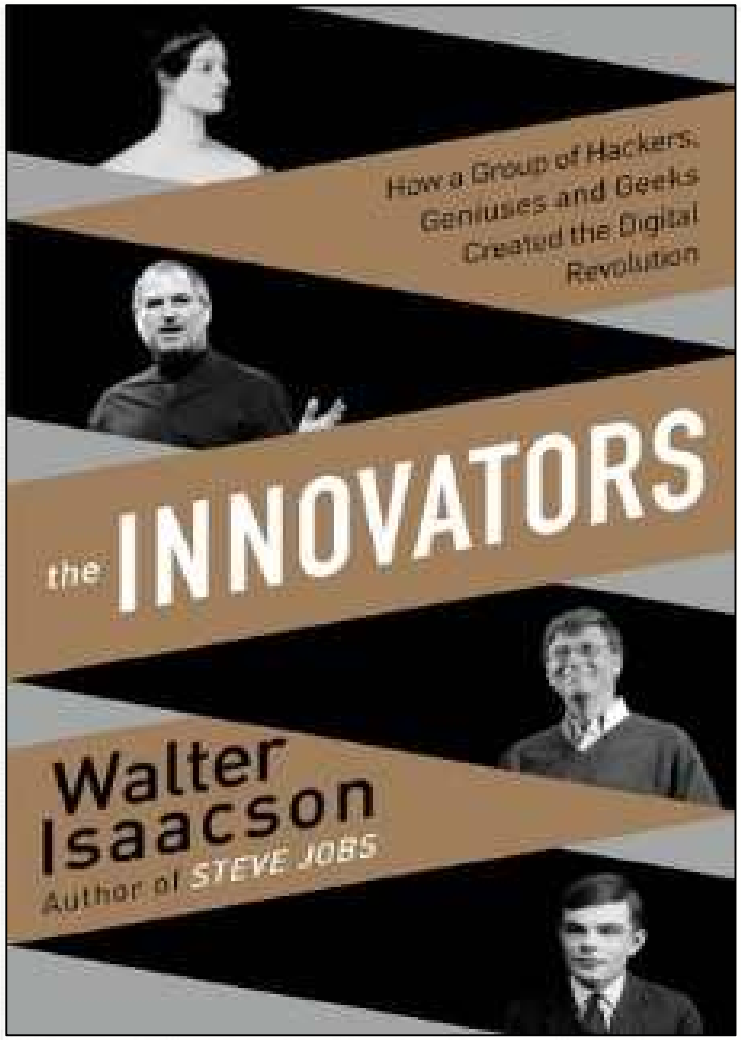
Keywords:
Transportation
Location
Manufacturing
Productivity
Industrial complex

ABSTRACT

This study examines how transportation and industrial complexes influence the productivity of manufacturing establishments. The study achieves this by combining and analyzing microdata and industrial location data for manufacturing establishments in Korea, from 2007 through 2014. The study estimates economic effects in a more precise manner than earlier work and suggests policy implications based on various land use and location characteristics, such as accessibility to expressways, road ratio, average land price, and employee density.

Other things being the same, a shorter linear distance to the nearest expressway interchange was overall linked with higher establishment productivity growth but when focusing on technology level, this effect was not found for the high-technology industry. Also, the annual productivity growth rate of establishments located within industrial complexes was generally higher than that of establishments outside. The productivity growth enhancing effect of industrial complexes was observed in low and medium-technology industries, but not in high-

Background: *The Innovators*



Walter Isaacson,

The Innovators:

How a Group of Inventors,

Hackers, Geniuses,

and Geeks Created

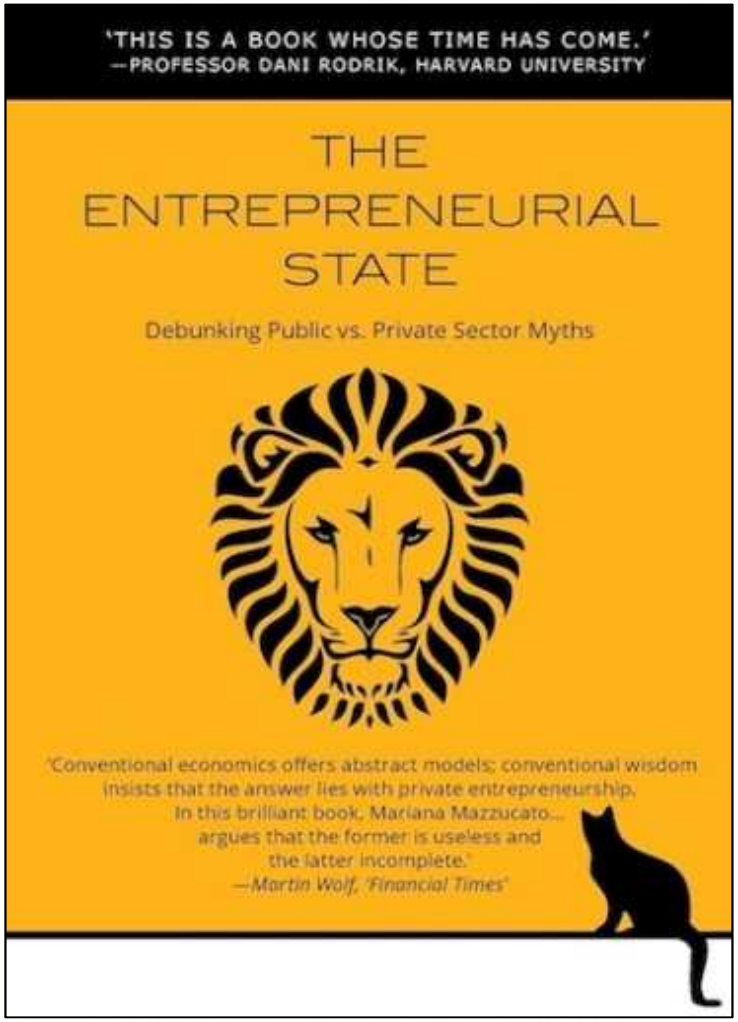
the Digital Revolution, 2014.

Background: *The Innovators*

KDI

"But the main lesson to draw from the birth of computers is that innovation is usually a group effort, involving collaboration between visionaries and engineers, and that creativity comes from drawing on many sources."

Background: *The Entrepreneurial State*



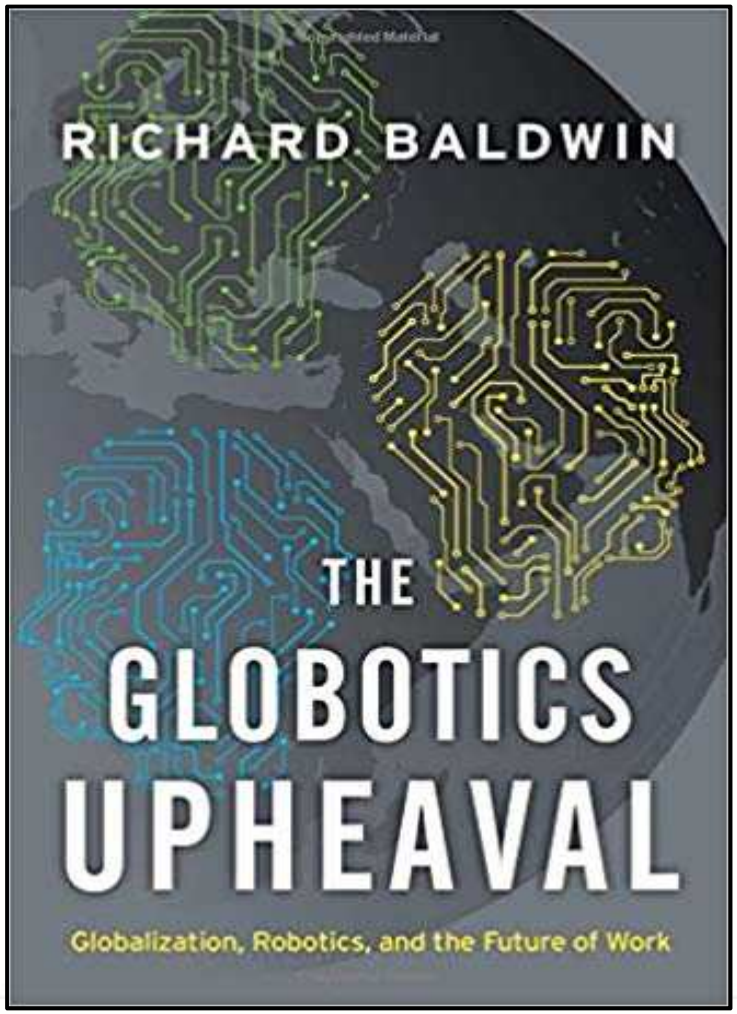
Mariana Mazzucato,

The Entrepreneurial State: Debunking Public vs. Private Sector Myths, 2013.

Background: *The Entrepreneurial State*

"Creating a symbiotic (more mutualistic) public-private innovation ecosystem thus requires new methods, metrics and indicators to evaluate public investments and their results. Without the right tools for evaluating investments, governments have a hard time knowing when they are merely operating in existing spaces and when they are making things happen that would not have happened otherwise."

Background: *Globotics Upheaval*



Richard Baldwin,

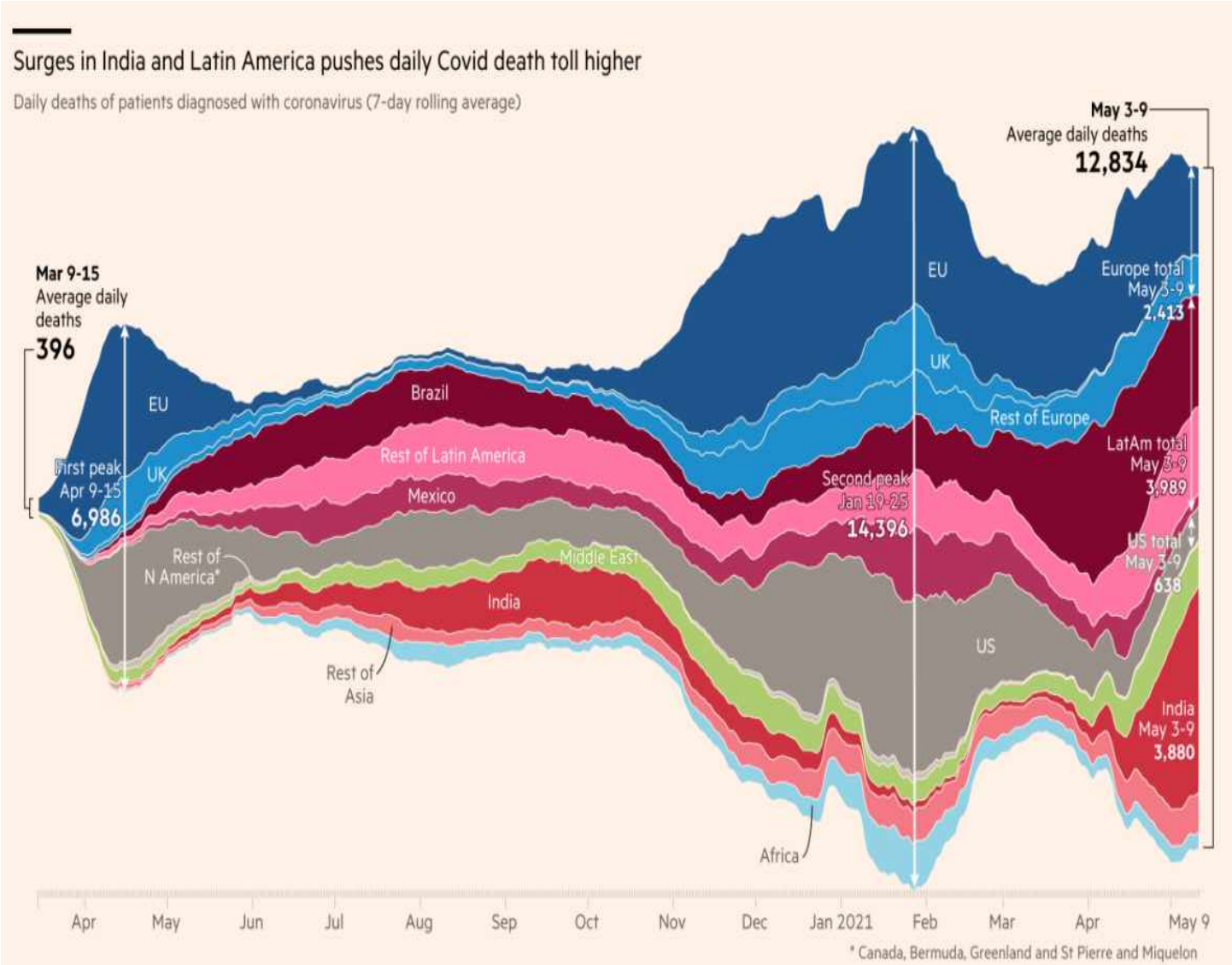
The Globotics Upheaval: Globalization, Robotics, and the Future of Work, 2019.

Background: *Globotics Upheaval*

KDI

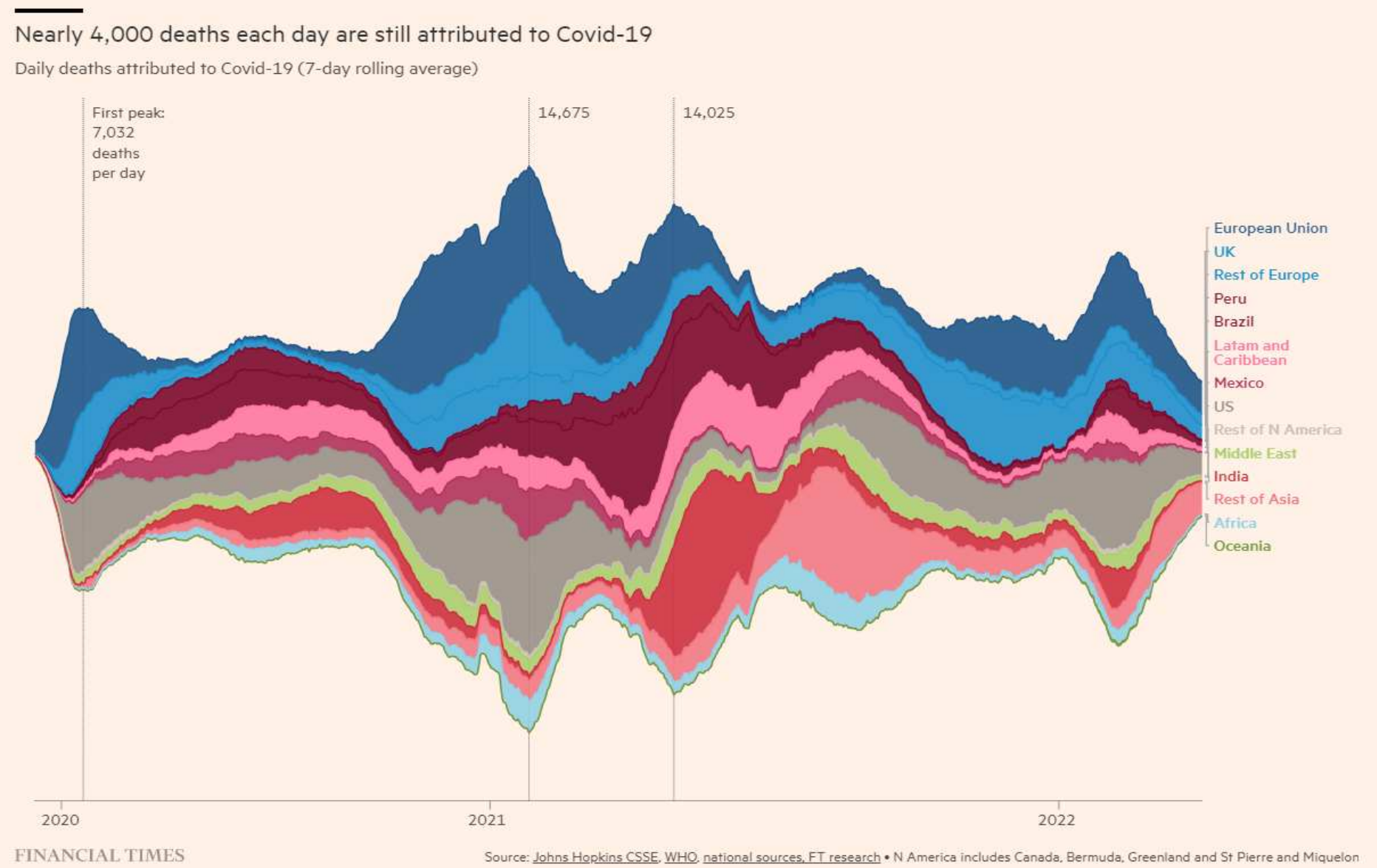
Digital technology is allowing talented foreigners to telecommute into our workplaces and compete for service and professional jobs. Computing power is dissolving humans' monopoly on thinking, enabling AI-trained computers to compete for many of the same white-collar jobs. The combination of globalization and robotics is creating the globotics upheaval, and it threatens the very foundations of the liberal welfare-state.

The human cost of the COVID-19 pandemic has continued to mount



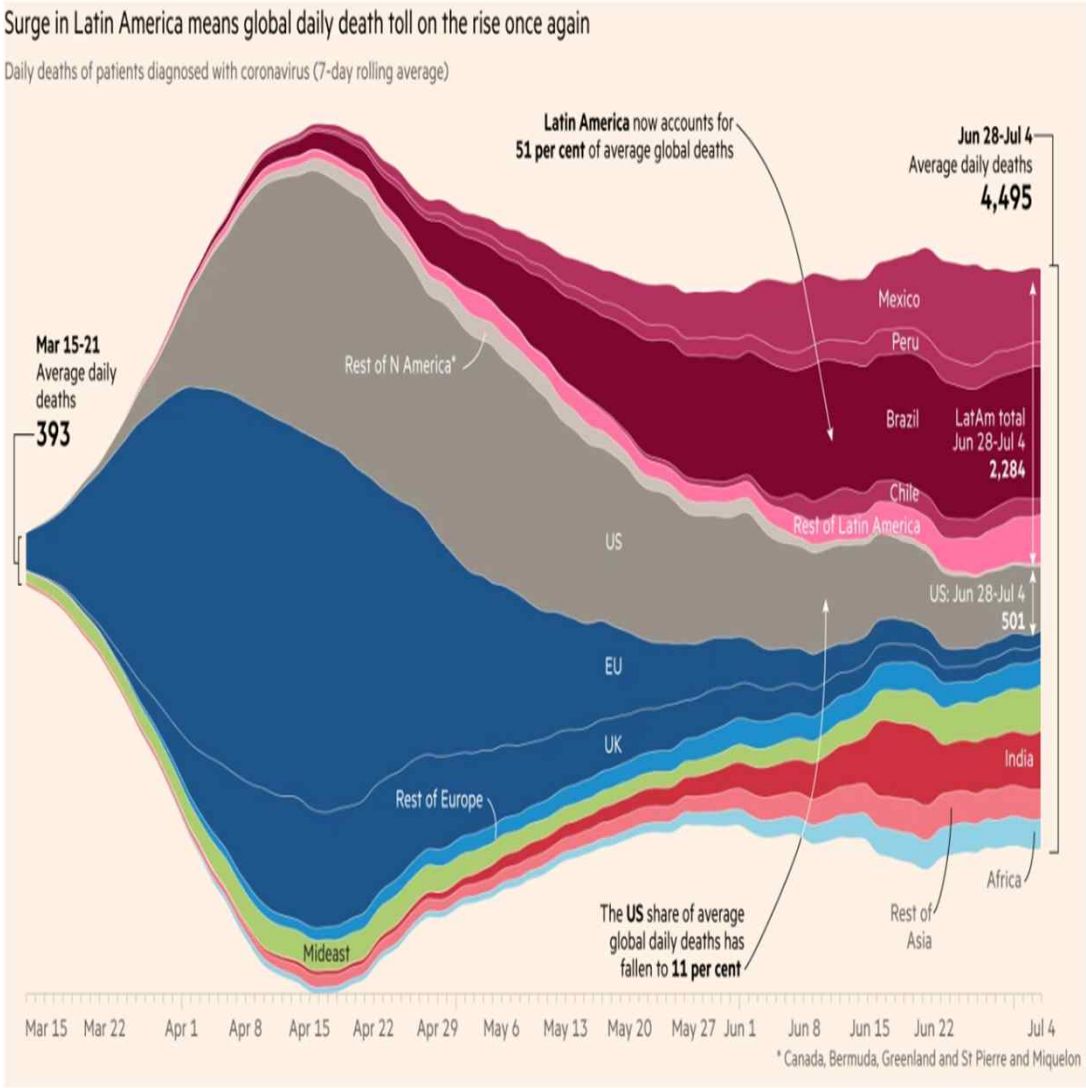
Source: FT analysis of ECDC (European Centre for Disease Prevention and Control) and Covid Tracking Project Data

The human cost of the COVID-19 pandemic has continued to mount



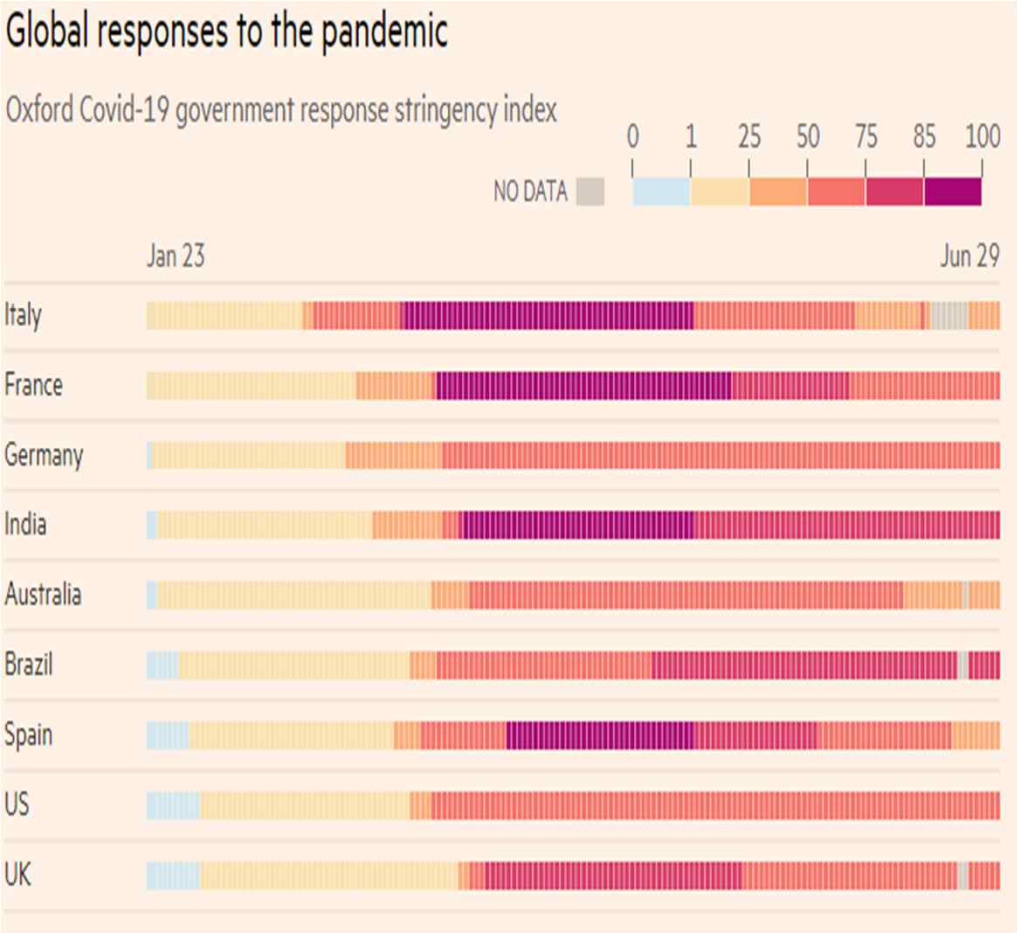
Source: FT analysis of ECDC (European Centre for Disease Prevention and Control) and Covid Tracking Project Data

The human cost of the COVID-19 pandemic has continued to mount



Source: FT analysis of ECDC (European Centre for Disease Prevention and Control) and Covid Tracking Project Data. Requoted from Financial Times, "Coronavirus tracked: the latest figures as countries start to reopen", accessed 6 July 2020, https://www.ft.com/content/a26fbf7e-48f8-11ea-aeb3-955839e06441.

Governments responded to the pandemic by implementing containment measures with varying degrees of restriction



Source: FT analysis of ECDC (European Centre for Disease Prevention and Control) and Covid Tracking Project Data. Requoted from Financial Times, "Coronavirus tracked: the latest figures as countries start to reopen", accessed 6 July 2020, https://www.ft.com/content/a26fbf7e-48f8-11ea-aeb3-955839e06441.

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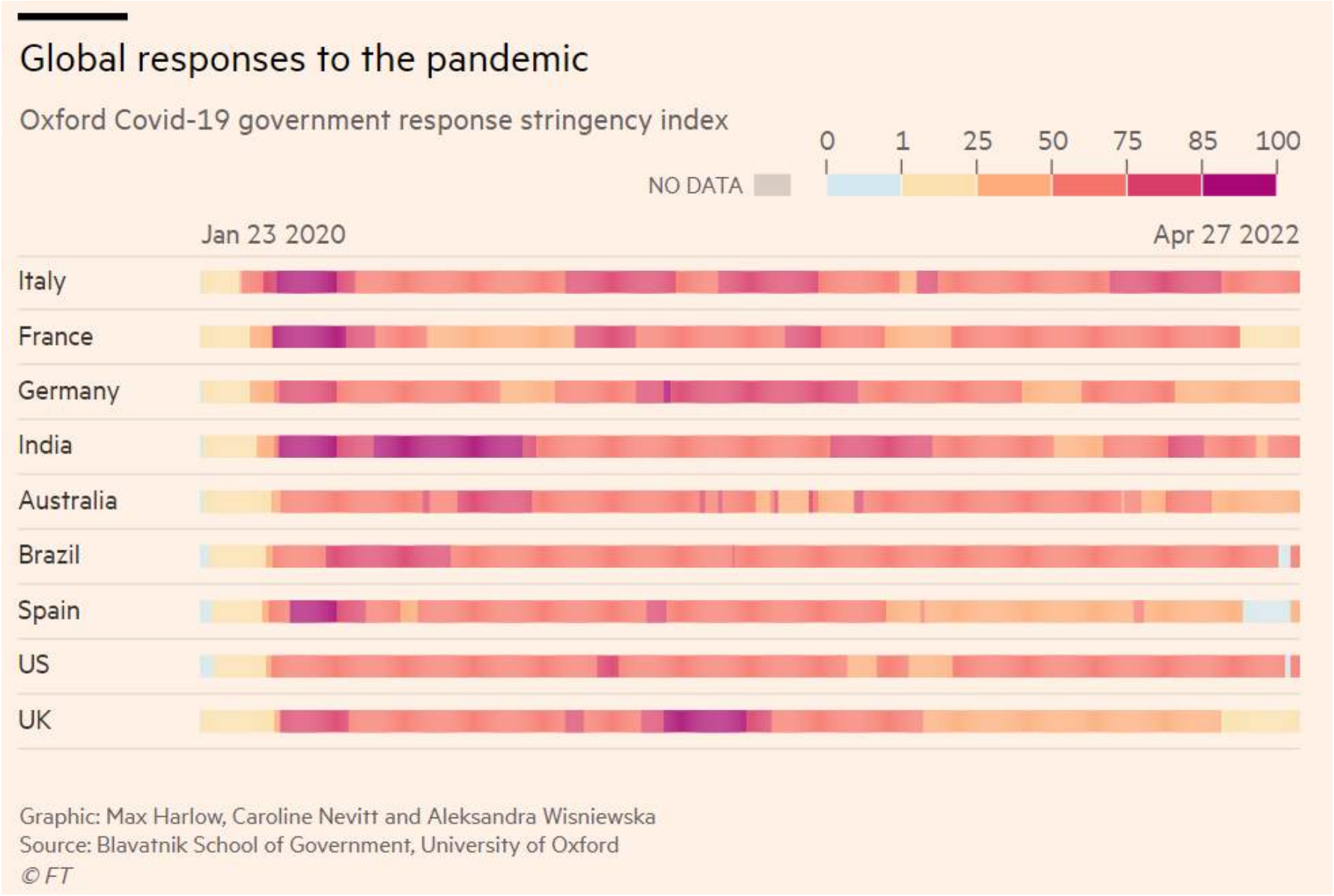
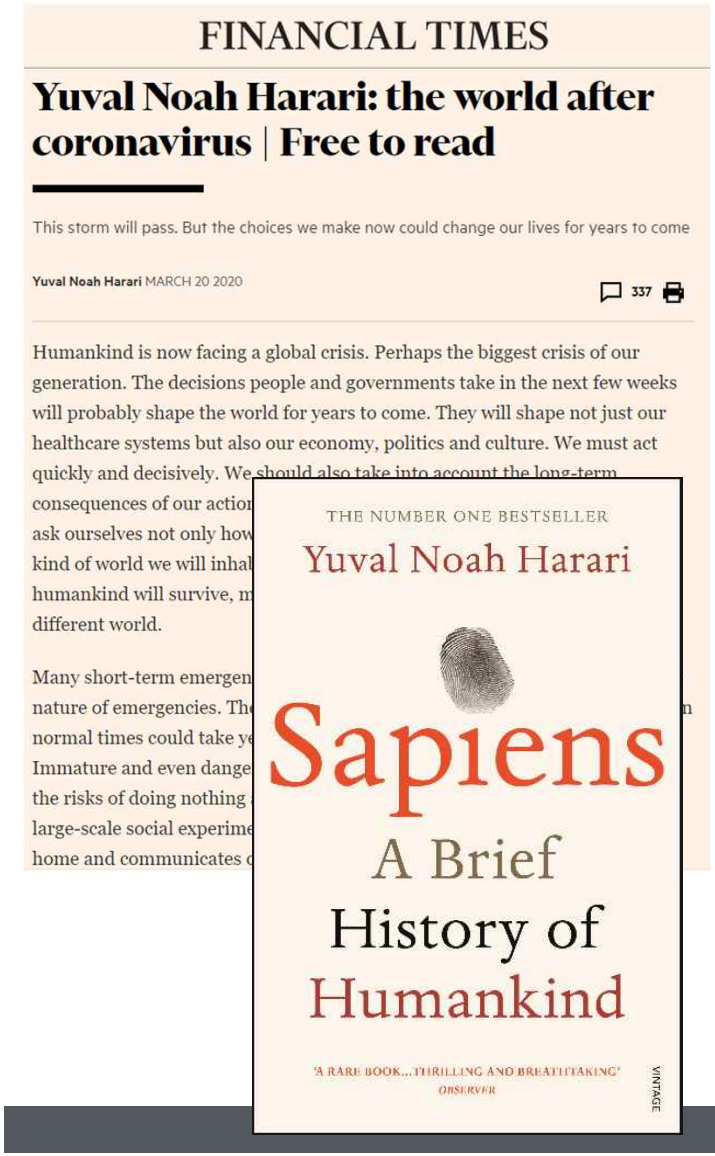


	Overall strategy	Knowledge of infection status	Community engagement	Public-health capacity	Health-system capacity	Measures for border control
Asia Pacific						
Hong Kong	Suppress and lift strategy	Real-time R estimated and reported since February, 2020	1 m physical distancing and mask wearing practised; despite serious mistrust in government, community has shown a high rate of adherence and built their own collective response to the pandemic	Daily PCR-testing capacity being increased from 4500 to >10 000; police supercomputer system used for contact tracing and electronic wristbands paired with mobile phone apps used to monitor people under quarantine	Second-tier isolation beds and community isolation facilities added to public hospitals; safety measures have been effective in protecting health-care workers from infection	Border closed to visitors; all arrivals must submit a health declaration form online, have temperature screening and testing on arrival, and serve a 14-day quarantine
Japan	Trigger-based approach	One indicator is an incidence rate of ≤0·5 cumulative infections per 100 000 people in the past week	2 m physical distancing and mask wearing practised; citizens are encouraged to avoid so-called 3Cs (ie, closed spaces, crowded places, and close contact); adherence aided by existing social etiquette	Daily PCR-testing capacity is low but is being increased from 6000 tests per day in May to more than 22 000 tests per day; manual tracing done and new mobile phone app introduced in June, 2020	Initially, all patients were admitted but, due to low capacity, hospitals now focus on caring for people who are vulnerable or have moderate or severe disease; people with mild disease and people who are asymptomatic supported at home or at lodging facilities	All arrivals are subject to 14-day quarantine, and travellers from selected countries are denied entry or, if allowed for exceptional reasons, subject to testing
New Zealand	Four-level alert system	No publicly specified indicator	So-called social bubble approach allowed gradual expansion of small and exclusive social groups; no physical distancing required at alert level one	Testing capacity being increased; manual and app-based tracing being done	Efforts being made to increase number of ICU beds and number of staff trained to use ICU equipment	Border closed to most visitors; all arrivals are tested and quarantined for 14 days
Singapore	Three-phase plan	No publicly specified indicator	1 m physical distancing and face covering required; government messages have consistently emphasised individual responsibility, although policy changes have generated some initial public confusion	More than 13 000 PCR tests per day done in June, 2020, with plans to increase to 40 000 tests per day; manual and app-based tracing done	ICUs are well under capacity; to reduce pressure on public hospitals, patients with mild symptoms are transferred to private hospitals or community facilities for monitoring	Border closed to most visitors; all arrivals must submit a health declaration form, serve a 14-day Stay Home Notice, and be tested
South Korea	Trigger-based approach, three-level physical distancing scheme	Level one applies if number of daily new cases is <50, level two for 50–100 cases, and level three for >100 cases	2 m physical distancing and mask wearing practised; government has used transparent communication methods to secure public cooperation, including detailed reporting of new cases via websites, mobile phone apps, and text alerts	Mass testing at a rate of 20 000 PCR tests per day, including at drive-through and walk-through stations; records from medical facilities, global positioning system, credit card transaction history, and closed-circuit television used to supplement manual contact tracing	On the basis of a triage system, people with mild disease or who are asymptomatic are monitored at residential treatment centres; people with moderate or severe disease are cared for at government-designated hospitals	All arrivals must submit a health declaration form, install a mobile phone app, have temperature screening, testing, and 14-day quarantine

(Table continues on next page)

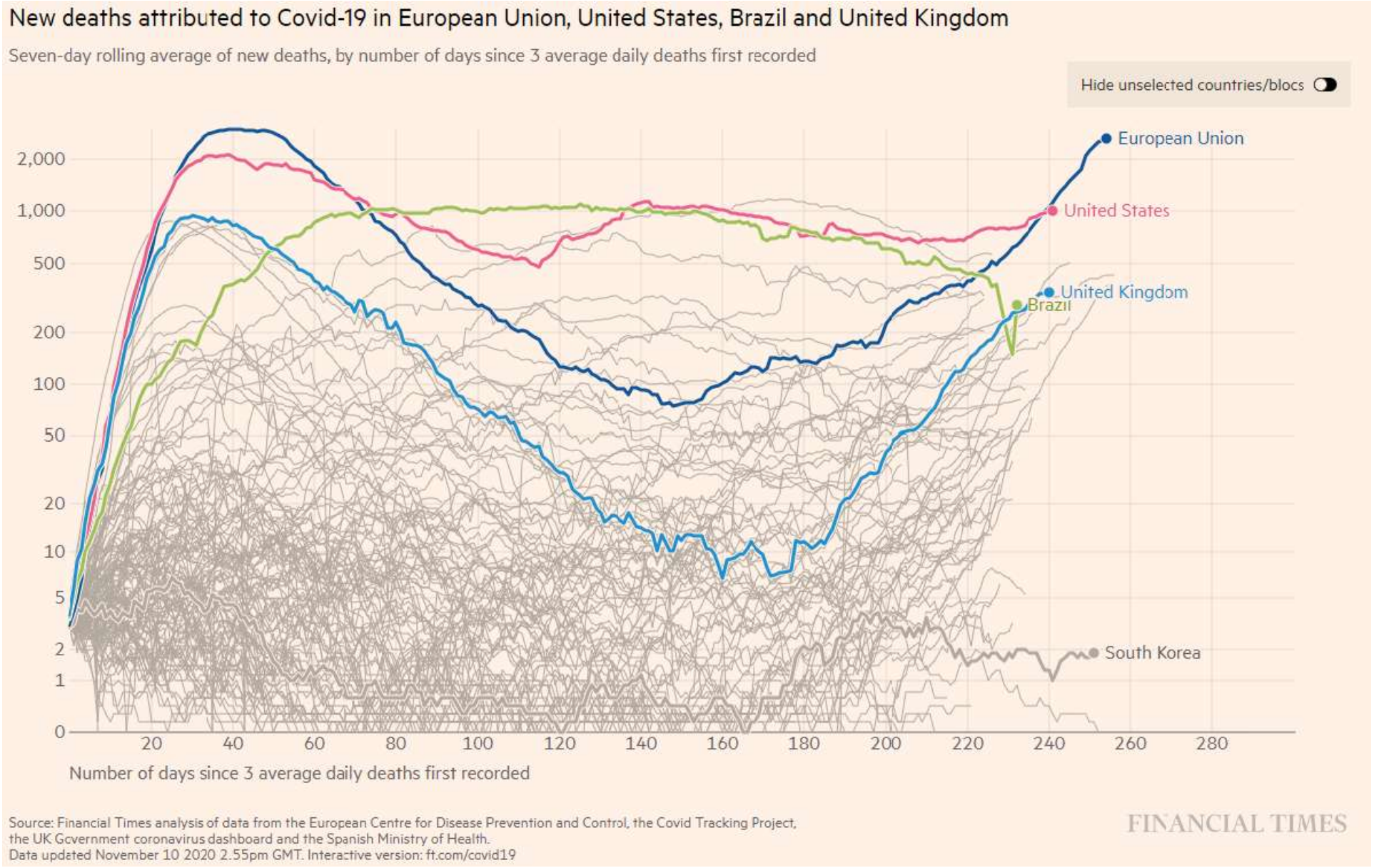
Global crisis can be solved effectively only by global cooperation



"Both the epidemic itself and the resulting economic crisis are global problems. They can be solved effectively only by global co-operation. First and foremost, in order to defeat the virus we need to share information globally. That's the big advantage of humans over viruses … ***When the UK government hesitates between several policies, it can get advice from the Koreans who have already faced a similar dilemma a month ago. But for this to happen, we need a spirit of global co-operation and trust.*** *"*

Harari, Yuval N (2020). "Yuval Noah Harari: the world after coronavirus". 20 Mar 2020. Financial Times.

The human cost of the COVID-19 pandemic has continued to mount

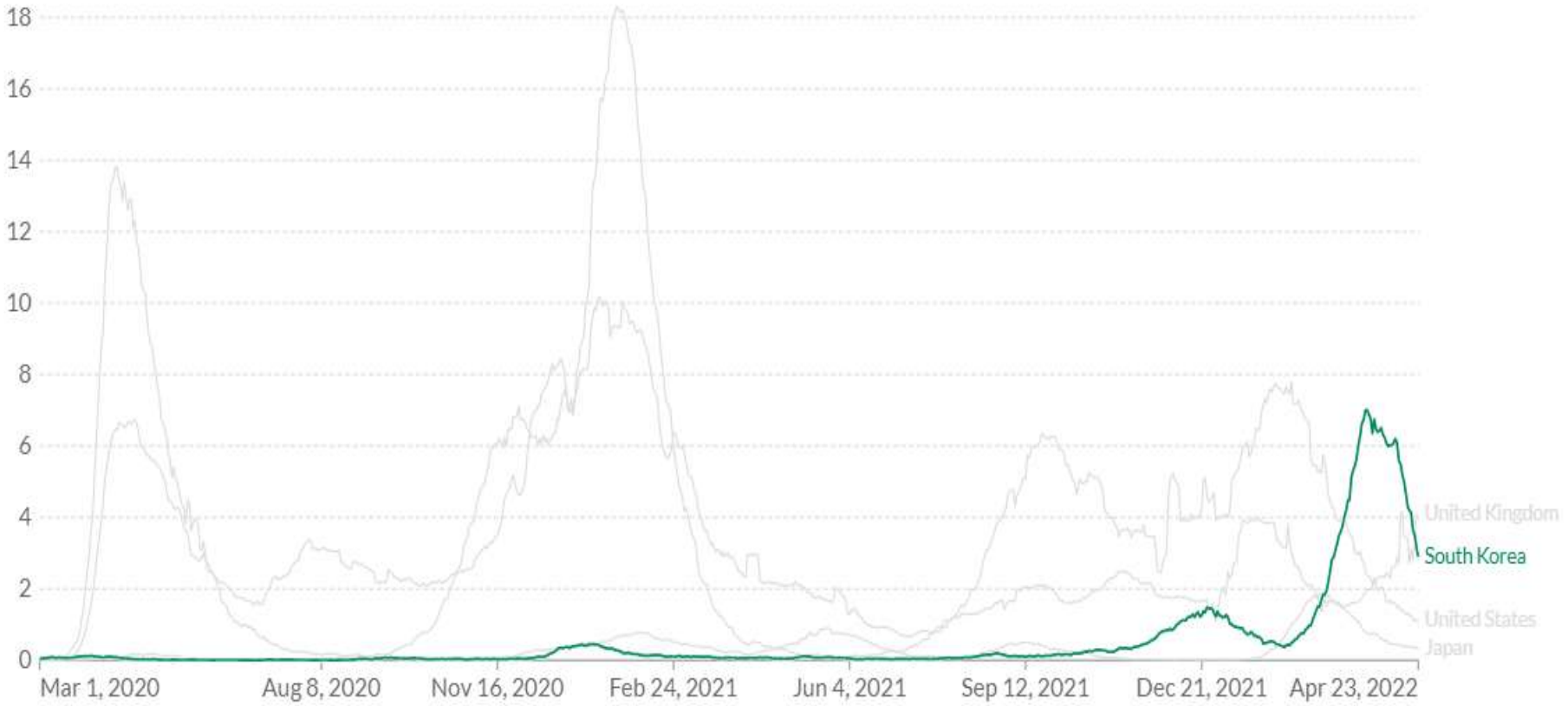


Daily new confirmed COVID-19 deaths per million people

7-day rolling average. Due to varying protocols and challenges in the attribution of the cause of death, the number of confirmed deaths may not accurately represent the true number of deaths caused by COVID-19.

Our World in Data

LINEAR LOG

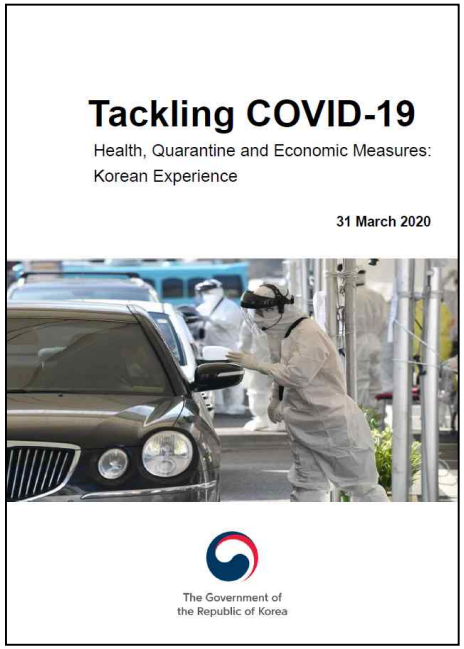


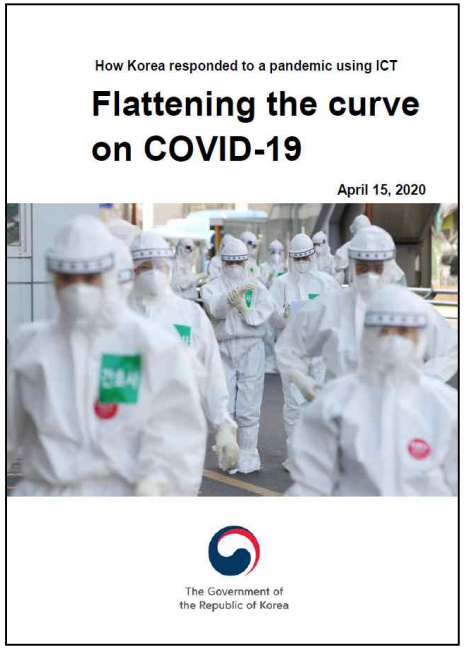
Source: Johns Hopkins University CSSE COVID-19 Data

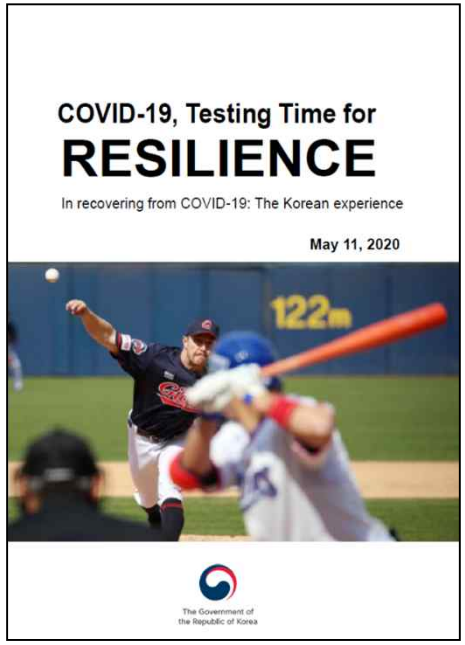
Feb 18, 2020 — Apr 23, 2022

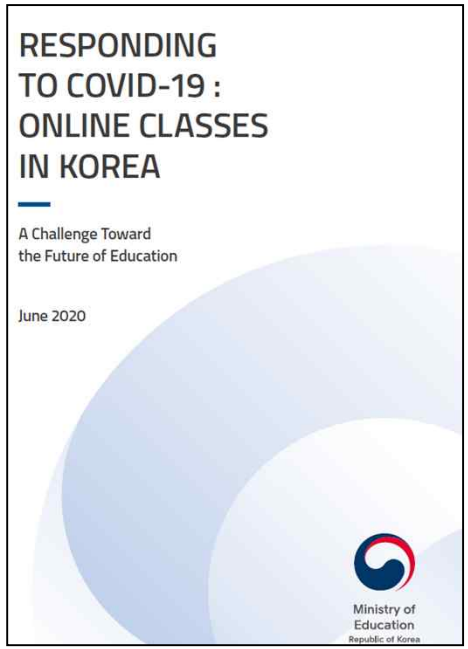
CHART | MAP | TABLE | SOURCES | DOWNLOAD

Sharing Korea's Experiences and Lessons Learned with International Community









Sharing Korea's Experiences and Lessons Learned with International Community

A checkpoint at Incheon International Airport, South Korea, March 2020
Xinhua / eyevine / Redux

Source: Foreign Affairs. "South Korea Offers a Lesson in Best Practices." 10 Apr 2020.

Kerala has reported three deaths and more than 370 confirmed cases

Source: BBC News. "Coronavirus: How India's Kerala state 'flattened the curve'." 16 Apr 2020.

Brigham and Women's Hospital is using a testing booth for coronavirus patients. (WBZ-TV)

Source: CBS Boston. "Coronavirus Testing Booth At Brigham And Women's Hospital Helps Conserve Protective Gear." 1 Apr 2020.

보건의료 분야 PMC 사례 분석

SOON CHUN HYANG UNIV. HOSPITAL

CASE 1. 이라크 중환자 전문의료서비스 역량강화사업 진행중

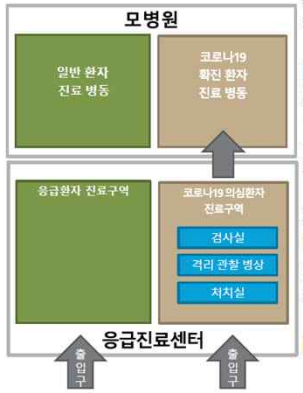
이라크 수도 바그다드, 메디컬 시티 내 중환자 전문의료센터 건립 및 의료진 역량강화
KOICA 단일 사업 최대규모(3,600만불)

구 분	사업 범위
건축	중환자 전문센터(70병상, 약 6,900m2) 건립
기자재 지원	중환자실, 수술실 등 관련 기자재 공급
국내 초청연수	중환자 다학제 전담 진료팀 초청연수 고위관리자 (5명 / 2주) 의사 (5명/12주/5회), 간호사(7명, 4주, 10회), 약사(2명/3주/4회), 영상의료기사, 영양사, 행정, 임상병리사, 의무기록사, 시설관리자, 의공기사
전문가 파견	마스터 플랜 수립, 현지 컨설팅 및 교육훈련, 건축 및 설계 전문가 파견
사업관리	설시협의, 평가 및 예비비

감염병 진료센터 시설 개선

응급환자진료구역 분리 : 감염의심환자와 일반환자

- 대상 : 감염병센터
  = 중증센터 (상급종합병원+권역응급센터)
  + 지역센터 (300병상 이상 지역응급센터)
- 감염.비감염 진료구역 및 동선 분리
- 격리진료구역 설치
  - 격리병상 : 병원당 3병상 = 600병상 확보
- 소요예산: 약 300억원
  - 격리병상 : 200개소*3병상*20백만원 (병상당단가)
  - 병원당 시설 개보수 약 1억원



시사점 - 병상 및 장비 확보 방안

사실 – 3천5백 병상 추가 확보
병동을 준중환자실로 전환가능하도록 시설 – 숫자 필요
회복기 중환자 수용 – 중환자실 입원기간 : 우리나라 21일, 외국 13일
장, 회복실 등 중환자실로 활용 – 숫자 필요
병상 이하 종합병원 중환자실 : 인력지원을 통한 진료기능 강화 – 1,636병상

사실 인력 지원 - 중환자의학회
환자진료 지원팀" 구성 지원 : 중환자진료인력이 부족한 종합병원 지원
팀 : 의사 10명, 간호사 156명 – 환자 20명 담당
0개 팀 운영 지원
자 진료 간호인력 확보 방안

흡기 등 장비 – 8월말까지 확복
- 인공호흡기 3,692대, 체외순환기 135대
- 인공호흡기 0000대, 체외순환기 000대
품 소요량 (추계 필요)

오에 따른 모의 훈련 시행 필요

Source: Experts from Soonchunhyang University Seoul Hospital. 2 Jul 2020. PowerPoint Presentation

Source: Experts from Seoul National University College of Medicine. 19 Jun 2020. PowerPoint Presentation.

The Way Forward: Solutions for the Post COVID-19 Era

◆ Focus on key policy areas in which Korea has competitive advantage and relevant experiences

✓ National Crisis Management Policy

- Policy framework and effective interventions for crisis management; resilience, responsiveness, effectiveness, communication, collaboration, and control
- Policy responses to COVID-19 and lessons learned; governance, communication, public health care, ICT and education, economic recovery

✓ ICT Infrastructure and ICT-based Services

- Supporting ICT infrastructure development for better public services of e-government, education, health and medical treatment.
- Package Program: Infrastructure, devices, capacity building of service providers, ICT-based services and solutions (e-learning, banking, and others)

◆ New types of cooperation to tackle the challenges in the era of pandemic

- Additional short-term consultations and policy dialogues on the challenges faced by partner countries through online platforms
- Introduction of a fast-track procedure for urgent issues in tackling COVID-19 impacts including economic recessions

* The status quo requires that all ODA projects be submitted to relevant authorities for review two years prior to implementation year

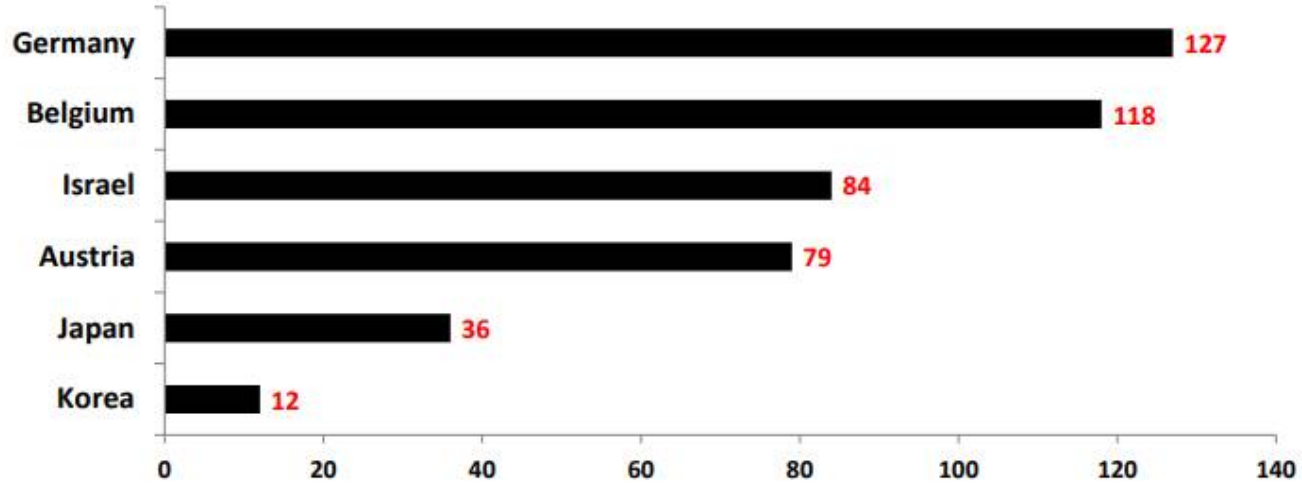
KDI
Korea's Leading Think Tank

Appendix. Evolution of Korea's Health Financing

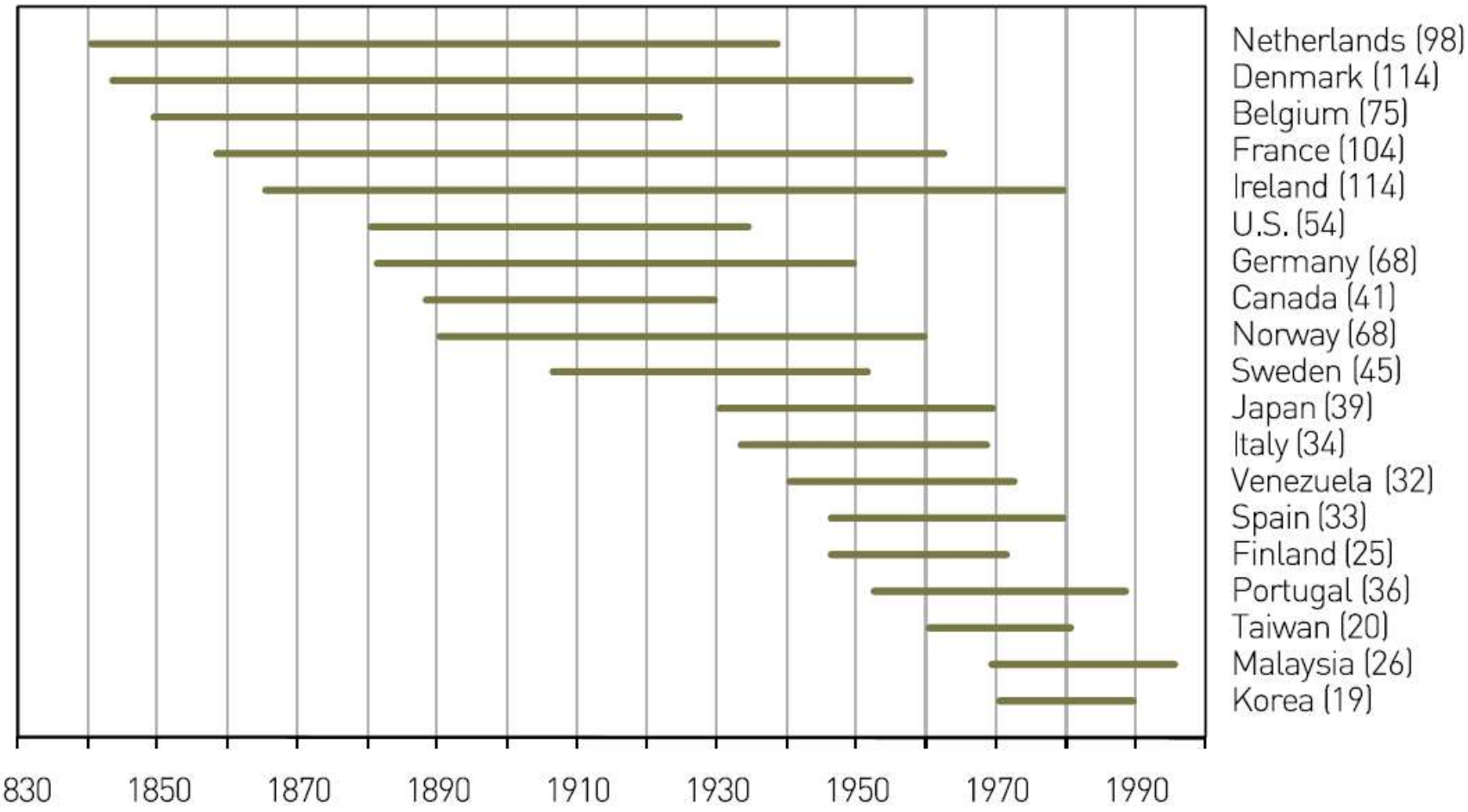
Rapid expansion of health insurance coverage (3/3)

- In 1989, Korea could declare the establishment of a nationwide health insurance system only 12 years after its first introduction in 1977.
  - One key factor for such a globally unprecedented, record-breaking achievement was thanks to the *compressed* industrialization.

<Number of years taken to achieve universal health insurance system>



Industrialization : How Long Did it Take?



Note: The numbers in parentheses indicate the length of the industrialization period in years.
Source: Jungho Yoo (1997).

An Exploration of Technology Diffusion (Comin & Hobijn)

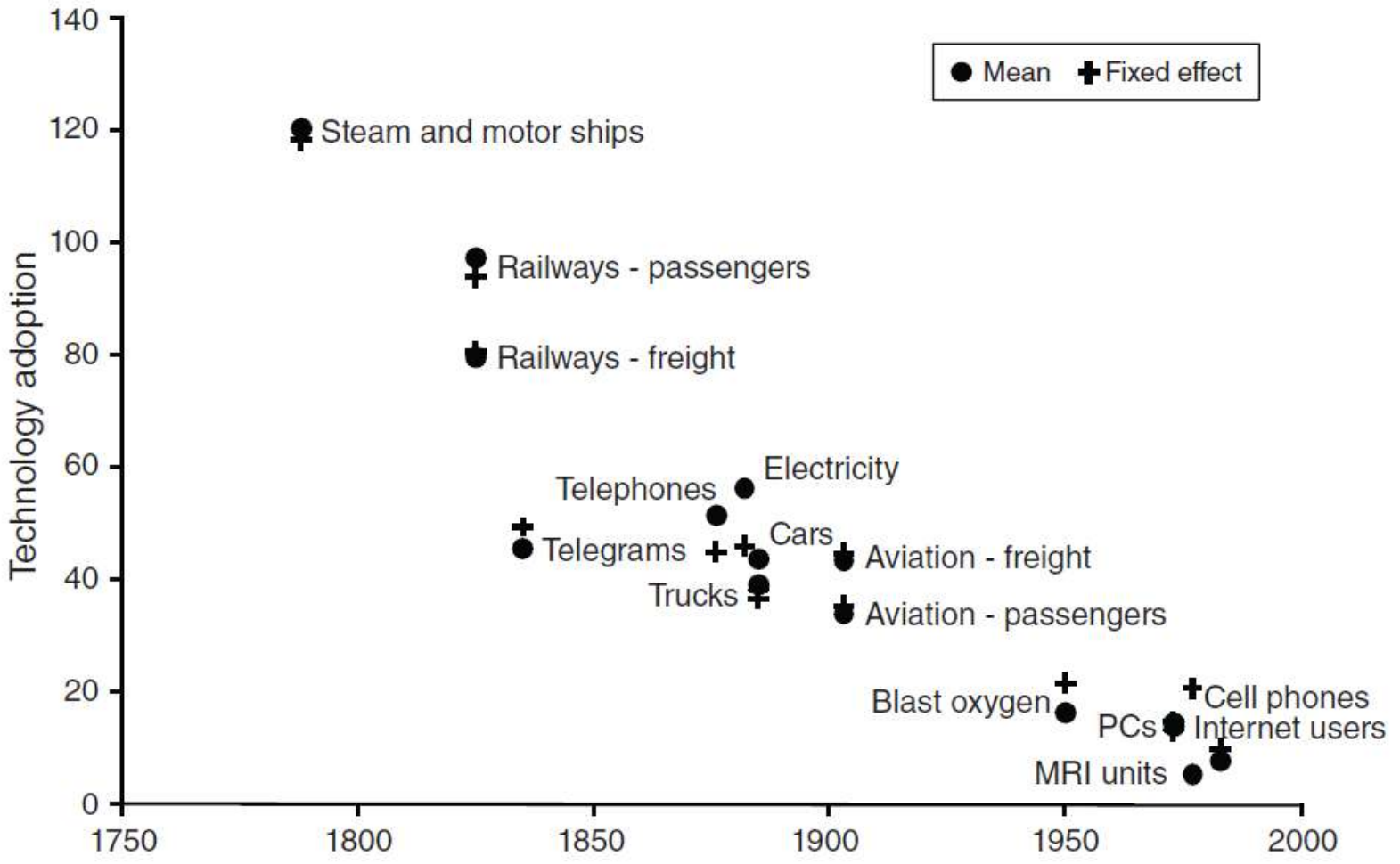
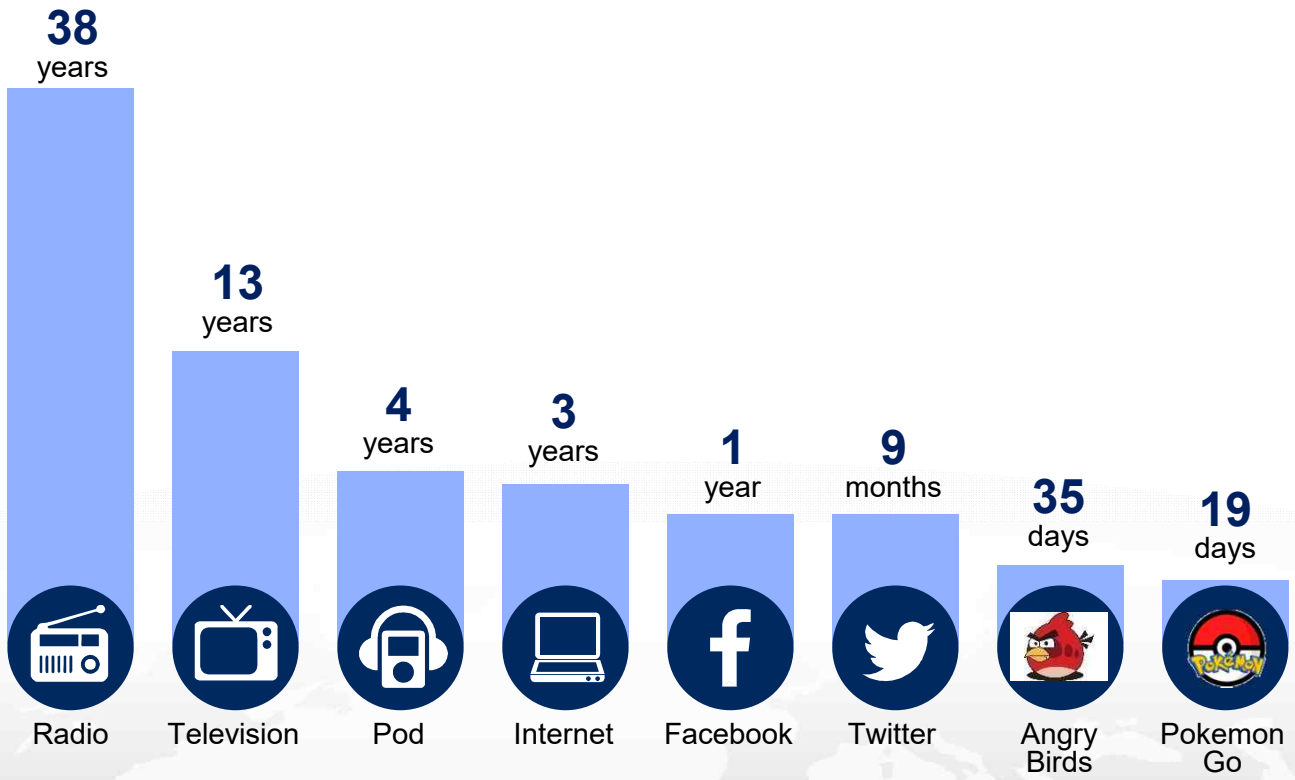


FIGURE 5. TECHNOLOGY ADOPTION LAGS DECREASE FOR LATER INVENTIONS

Acceleration of Diffusion

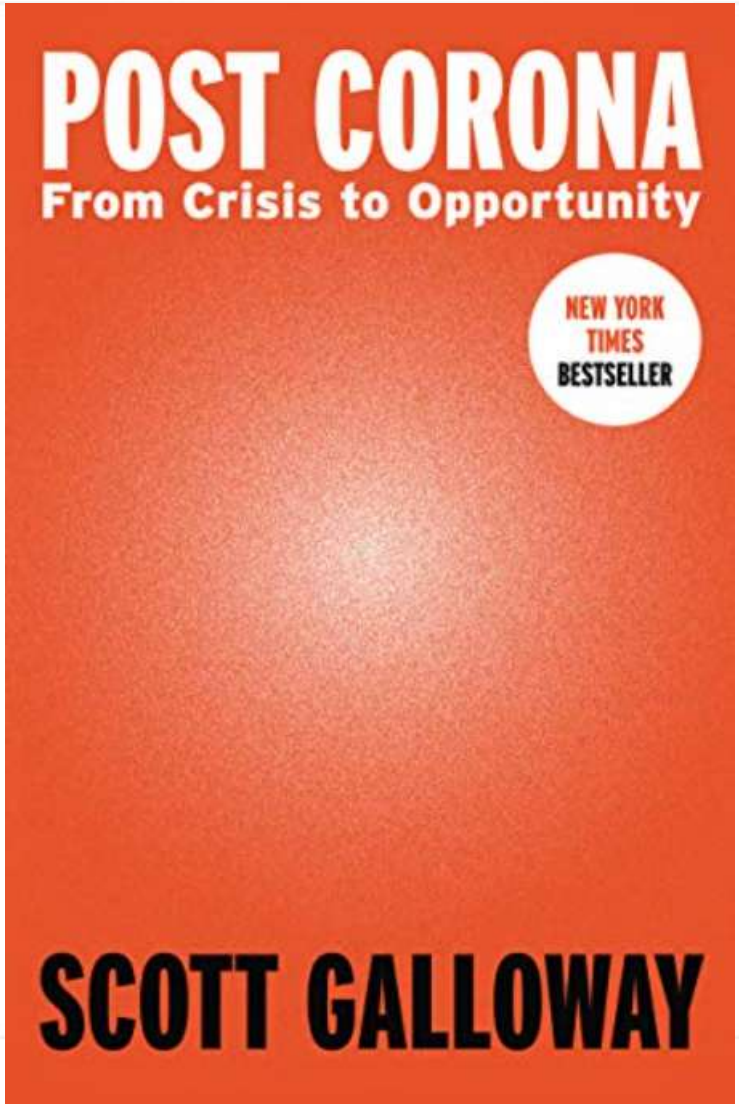
Adoption of new technologies is also accelerating

Time to reach 50 million users



SOURCE: Press reports; McKinsey Global Institute analysis

Background: *Post Corona*



Scott Gallaway,

Post Corona:

From Crisis to Opportunity,

2020.

Background: *Post Corona*

"Pandemics, wars, depressions—these shocks are painful, but the times that follow are often among the most productive in human history. The generations that endure and observe the pain are best prepared for the fight."

Thank You

「개발금융협력의 이해」

한국개발정책학회 추계 학술포럼

정혁
서울대학교 국제대학원

4월29일, 2022년

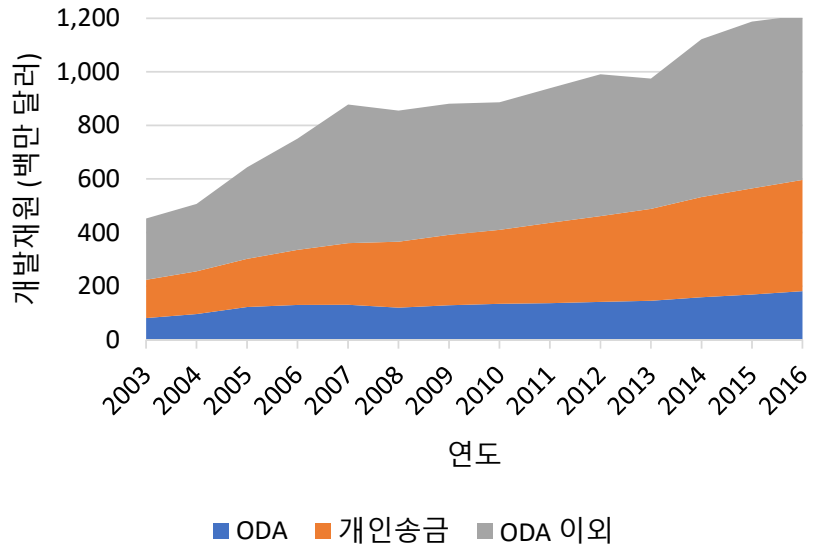
개발금융 개념과 기능

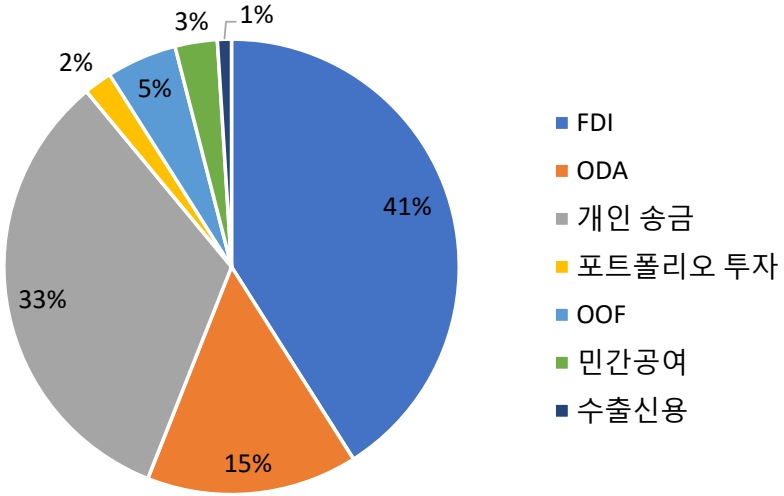
개발금융 개념 본질

- 효과적 개발 달성을 위한 모든 금융수단, 금융정책 및 제도 전반
- 핵심 내용
  - '개발 임팩트'와 '위험관리' 간 최적 균형 모색(임팩트와 재무적 지속가능성 동시 만족)
  - 투자 지원
- 개도국 개발 자체를 특수 현상으로 보지 않고 일반적 금융 원리 적용하여 개발효과성 증진
  - 다만 개별 개도국 고유의 제약조건과 상이한 사회경제적 여건에 맞춘 다양한 최적 균형을 모색
  - 이것이 **ODA** 혹은 시장과 상업금융이 실패하는 곳에 개발금융이 진출할 수 있는 이유
- 개발금융의 특성/장점
  - 유연성
  - 확장성

국제사회 개발금융 인식 변화 추세

- *Financing for Development* Conferences
  - Monterrey(2002): 0.7% 권고, 민간재원 동원 필요(investment climate 개선 → WB "Doing Business") ⟹ "민간부문 개발(PSD)"이 개발협력 코어 컨셉으로 부상
  - Addis Ababa(2015): 개발재원 규모 확장 강변, 민간부문 개발을 위한 민간자본 투자 중요성 부각, ODA는 촉매 역할, 민간자본과 ODA를 연결하는 개발금융 역할 재조명





민간자본 투자 개발재원 동원 채널

- 세 가지 채널
  1. 상업금융, FDI
  2. ODA 시행기관 개발금융: (i) 시장재원 조달, (ii) 양허성 ODA, (iii) 공공기관, 준 공공기관, 금융기관, (iv) KfW, AFD [정혁(2013, 2015)]
  3. DFI: (i) 정부재정, 시장재원 (ii) 시장 기준 투자 (iii) 민간부문 직접 투자 (iv) 16개 DAC 공여국 17개 양자 DFI, MDB DFI(IFC;중국, BRICS 적극 참여) (v) 아태 지역 공여국(한국, 일본, 호주, 뉴질랜드) DFI 부재
- DFI의 이원성
  - 원조기관과 공통 위임령(mandate): 개도국 개발 임팩트 [대상(민간부문)과 수단(민간 금융투자)의 차이]
  - 상업금융과 공통점: 재무적으로 지속가능한 민간 투자재원 동원
  - DFI의 '유연성'(ODA 제약으로부터의 자유)과 '확장성'(ODA와 민간자본 양쪽 모두 접근 가능)의 이유
- 기존 17개 DFI 매우 다양한 거버넌스와 운영체계

현존 DFI 현황 (1)

	기관	국가	지역	금융 수단	직원 수	2020 신규투자 금액 (백만 달러)	총 투자금액 (2020 연말 기준, 백만 달러)	소유권 구조	국가 이익 구속성 여부
1	DFC	USA	G	L, G, I	300+	6,800*	35,242	U.S. government	Yes
2	FinDev	Canada	AF, LA	E, L, F	64	107	348	Canadian export credit agency Export Development Canada(EDC)	No
3	BIO	Belgium	AS, AF, LA, MENA	E, L, Q-E	72	220	1,200	Belgian government	No
4	CDC	UK	AF, SA	E, L, G, Q-E	474	1,546	8,959	UK government	No
5	COFIDES	Spain	G, LA	E, L, Q-E	80	109	2,011	Spanish government (54%), Spanish banks (45%), and CAF (1%)	Yes
6	DEG	Germany	G	E, L, Q-E	650	1,580	9,620	German development bank KfW	No
7	FINNFUND	FInland	G	E, L, Q-E	83	191	1,152	Finnish government (93%), Finnvera, and Confederation of Finnish Industries (7%)	Yes
8	FMO	Netherlands	G	E, L, G, Q-E	609	1,232	9,360	Dutch government (51%) and commercial banks, trade unions, and others (49%)	No
9	IFU	Denmark	G	E, L, G, Q-E	92	239	1,176	Danish government	Yes

자료: EDFI, Member Profiles를 참고하여 저자 작성. Key 지역: G = Global, AF = Africa, AS = Asia, LA = Latin America, MENA = Middle East and North Africa

금융수단: E = Equity, L = Loans, G = Guarantees, I = Insurance, Q-E = Quasi-equity *2021 회계연도 완료 기준

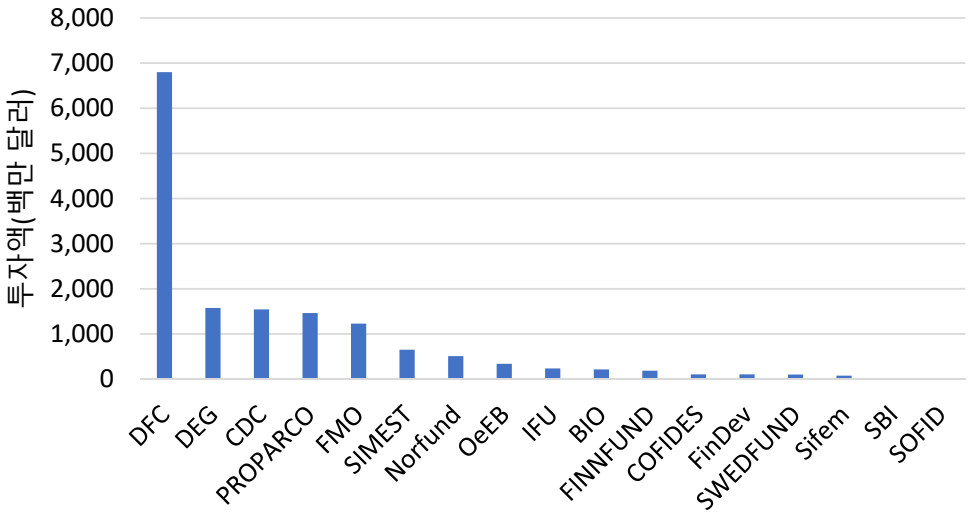
현존 DFI 현황 (2)

	기관	국가	지역	금융 수단	직원 수	2020 신규투자 금액 (백만 달러)	총 투자금액 (2020 연말 기준, 백만 달러)	소유권 구조	국가 이익 구속성 여부
10	Norfund	Norway	AF, LA, AS	E, L, G, Q-E	96	513	3,065	Norwegian government	No
11	OeEB	Austria	G	E, L, G, Q-E	66	342	1,625	Austrian export credit agency Oesterreichische Kontrollbank AG	No
12	PROPARCO	France	G	E, L, Q-E	404	1466	7,951	French development agency AFD (74%), Public and private shareholders(26%)	No
13	SBI	Belgium	AS, LA, AF	E, L, Q-E	4	22	55	Belgian government (63%) and private financial institutions (37%)	Yes
14	Sifem	Switzerland	G	E, L, Q-E	29	79	831	Swiss government	Yes
15	SIMEST	Italy	G	E, L, Q-E	171	655	1,873	Italian national promotional bank CDP	Yes
16	SOFID	Portugal	AF, LA, MENA	L, G	18	0	12.5	Portuguese government (60%) and four Portuguese banks (40%)	Yes
17	SWEDFUND	Sweden	G	E, L, G, Q-E	46	106.4	704	Swedish government	No

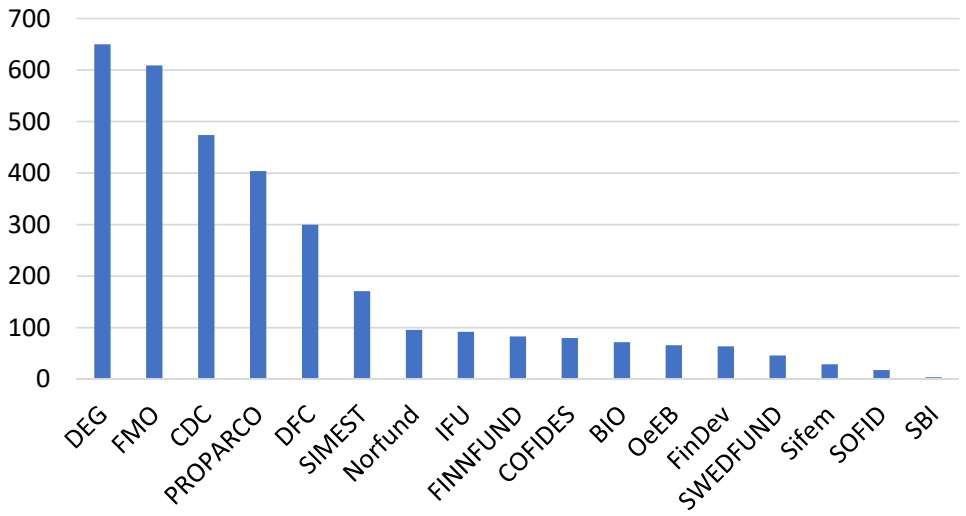
자료: EDFI, Member Profiles를 참고하여 저자 작성. Key 지역: G = Global, AF = Africa, AS = Asia, LA = Latin America, MENA = Middle East and North Africa
금융수단: E = Equity, L = Loans, G = Guarantees, I = Insurance, Q-E = Quasi-equity, *2021 회계연도 완료 기준

DFI 규모 분포(2020년 기준)

A. 신규투자 액수



B. 직원 수



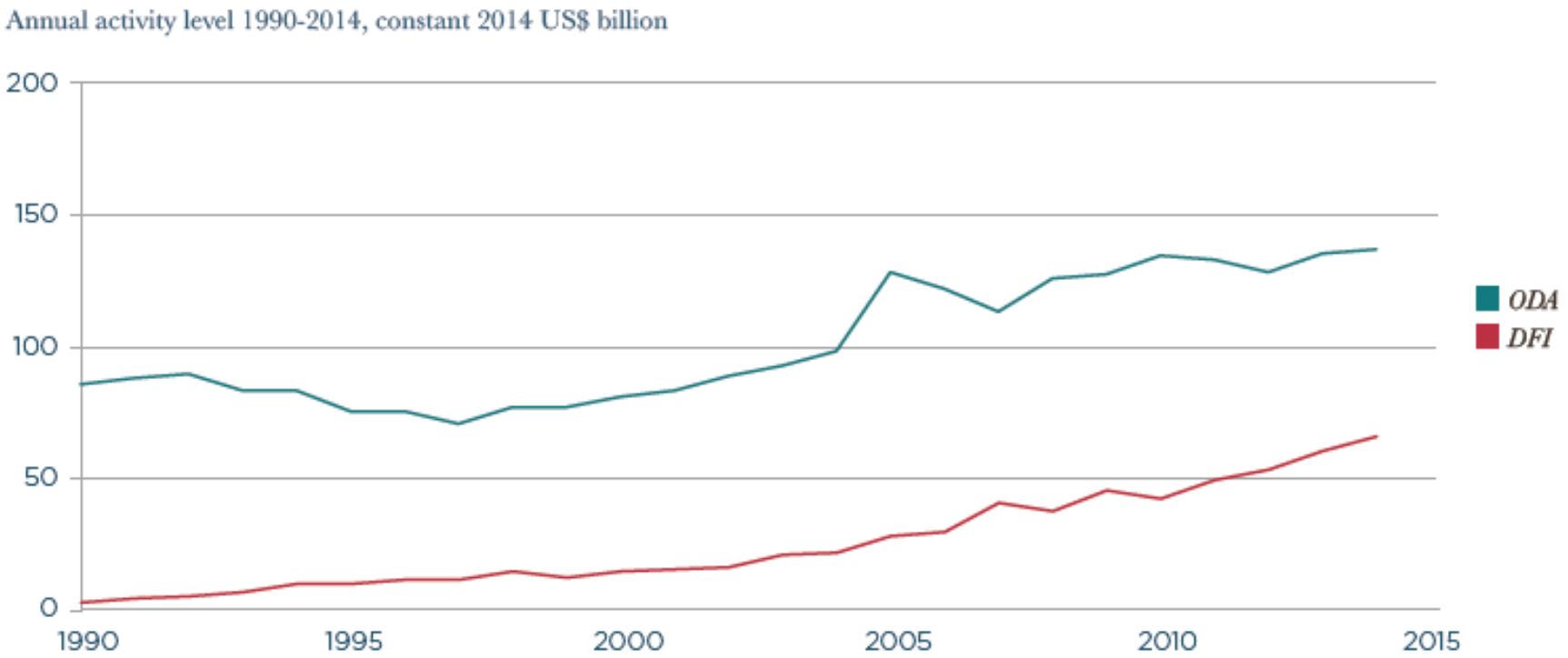
정부소유 거버넌스와 국익 구속성

	정부지분 **100%**	정부기관(국책은행, **ECA**) **100%** 투자 자회사	정부/정부기관 + 민간지분(은행, 산업)
국익 구속성	DFC(USA) IFU(Denmark) Sifem(Switzerland)	SIMEST(Italy CDP)	COFIDES(Spain) FINFUND(Finland) SBI(Belgium) SOFID(Portugal)
국익 비구속성	BIO(Belgium) CDC(UK) Norfund(Norway) SWEDFUND(Sweden)	DEG(Germany KfW) FinDev(Canada EDC) OeEB(Austria OeKB)	FMO(Netherlands) PROPARCO(France)

개발금융의 부가성(ADDITIONALITY) 원칙

- 개발금융 부가성 원칙: "Crowd-in" NOT "Crowd-out"
  - ODA 구축 지양: 혼합금융
  - 상업금융 구축 지양: 시장 기준 가격책정(market-benchmarking guidelines)
    1. 부가성 및 혼합금융 사용의 근거 제시(Additionality/Rationale Using Blended Concessional Finance) 원칙
    2. 재원 유입 및 양허성 최소화(Crowding-in and Minimum Concessionality) 원칙
    3. 상업적 지속가능성(Commercial Sustainability) 원칙
    4. 시장 강화(Reinforcing Markets) 원칙
    5. 고수준 지향(Promoting High Standards) 원칙

DFI VS. ODA 규모 성장

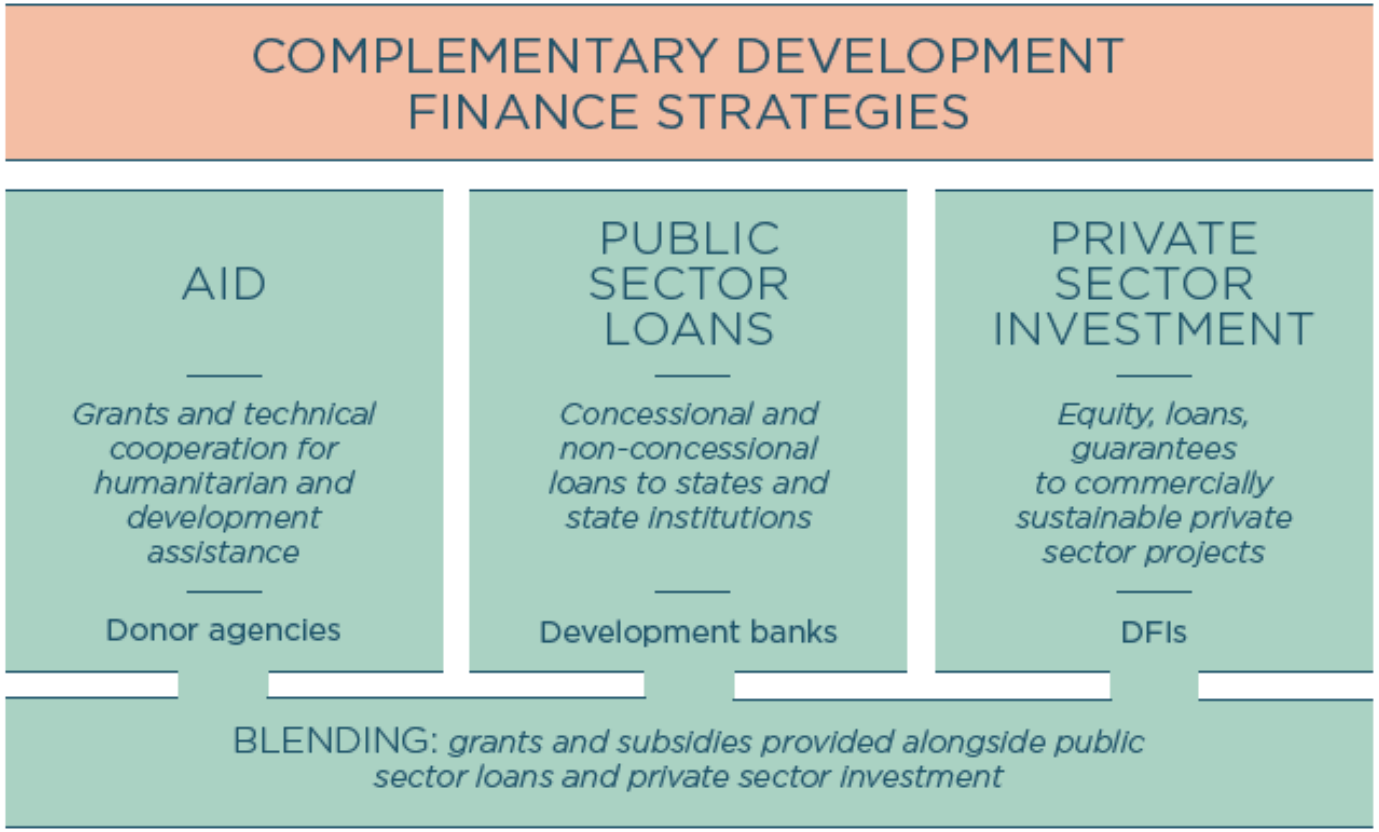


1990-2014 기간 연평균 성장률
- ODA: 2%
- DFI: 5%

* 최근 DFI 성장률 10%

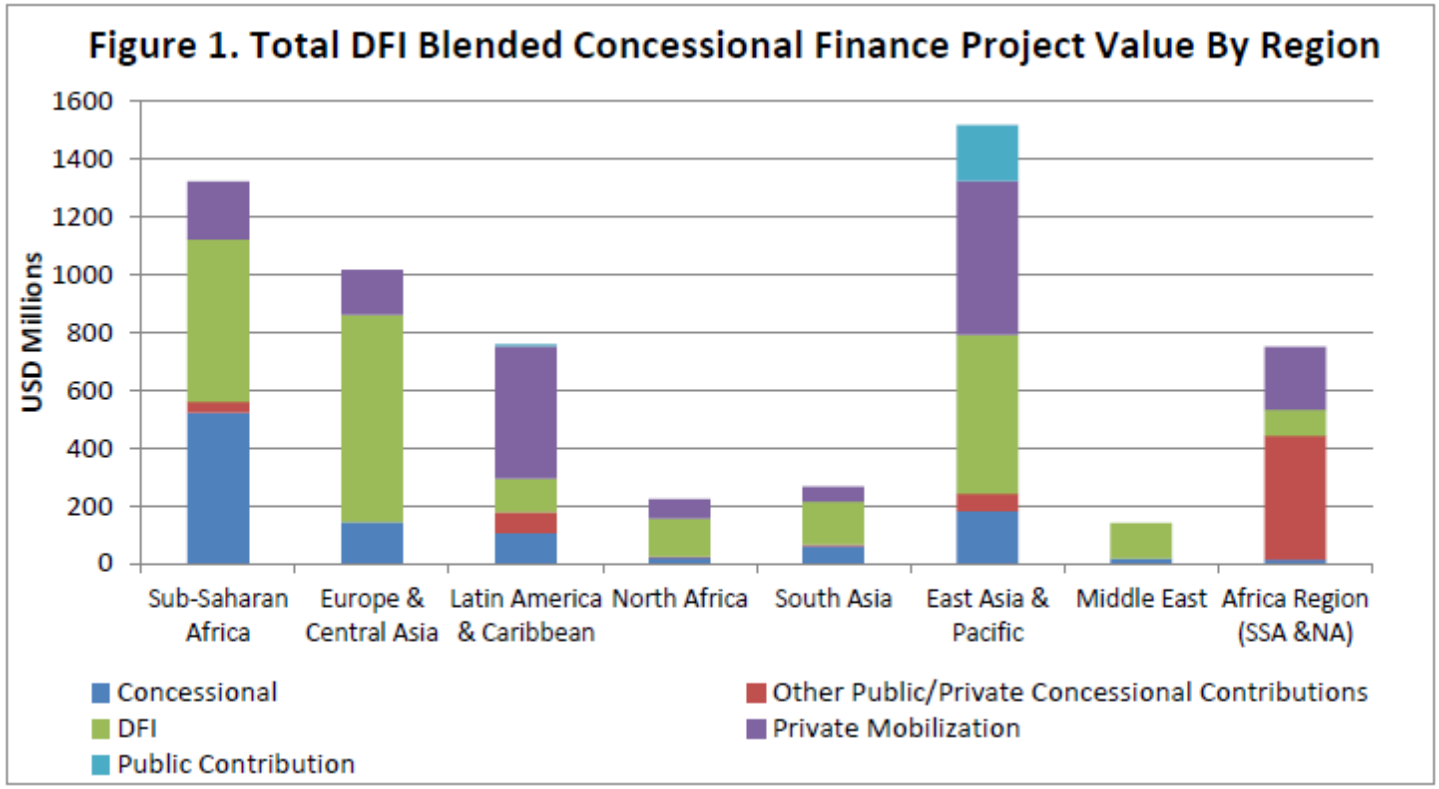
출처: EDFI(2016) Flagship Report 2016, Figure 3.

개발금융의 기존 개발재원 보완성



출처: EDFI(2016) Flagship Report 2016, Figure 2.

DFI 개발금융 개발재원 동원 촉매 역할



출처: IFC(2019), Figure 1.

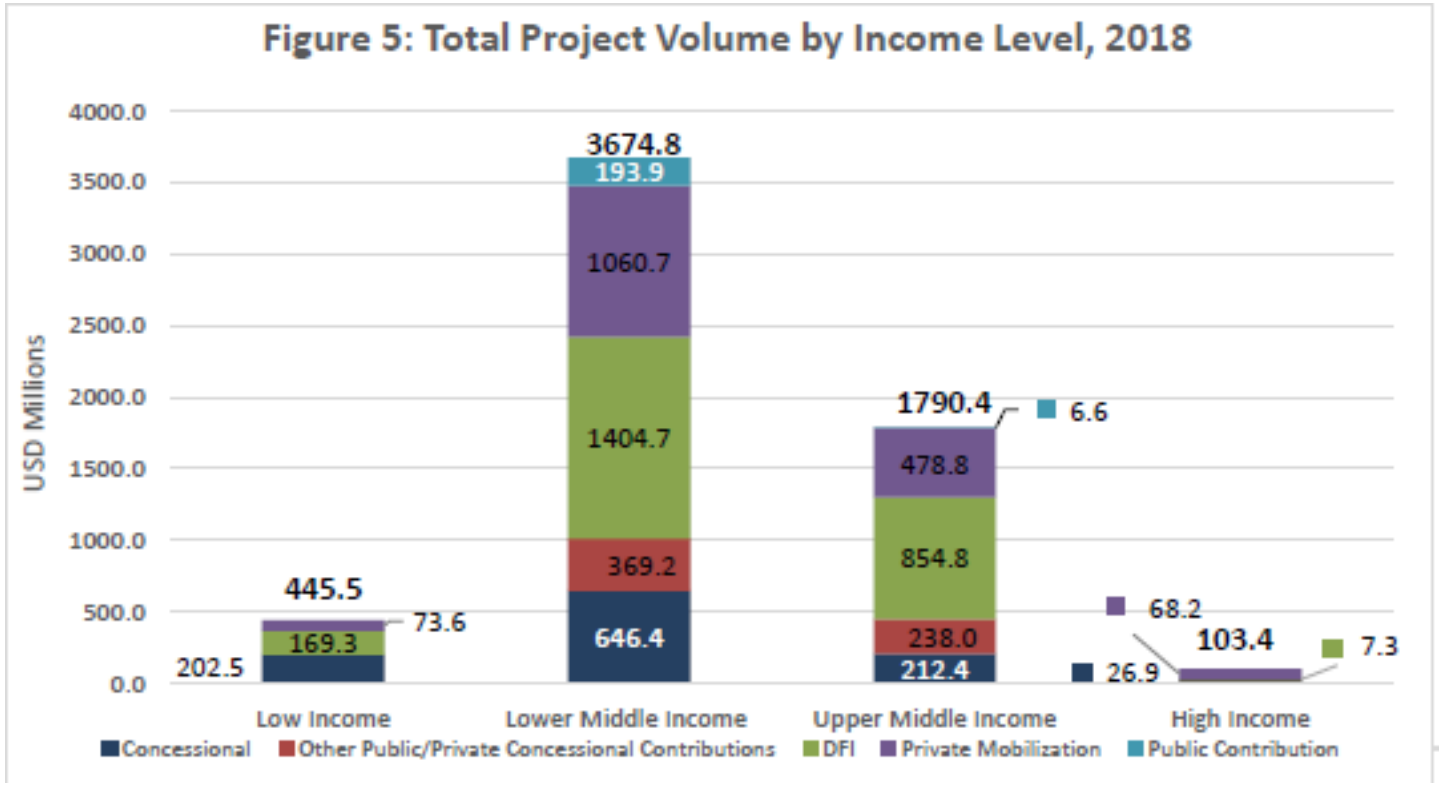
- 양허성 자금과 민간자본 모두 추가 동원

- 동아시아•태평양 지역 비중 가장 큼(민간자본 동원 규모가 양허성 자금 동원 규모보다 큼)

- 중남미 역시 민간자본 동원 규모가 양허성 자금 동원 규모보다 큼 (DFI 자체 재원 규모는 작음)

- SSA 지역은 민간자본보다 양허성 자금 동원 규모가 더 큼

DFI 개발금융 개발재원 소득 그룹 분포



- LMIC > UMIC > LIC > HIC

- LMIC:
  (ODA + 민간자본) > DFI 자체 재원

출처: IFC(2019), Figure 1.

개발금융을 통한 개발효과성 증진

- 성장의 빈곤퇴치 효과
  - Bourguignon and Morrison(2002)
  - Dollar and Kray(2002)
  - Datt and Ravallion(1992)
- 민간부문 고용창출 효과: 9/10 일자리 창출(WDR 2013)
- 금융 접근성 확장을 통한 성장, 분배 개선, 빈곤 감소 효과
  - Greenwood and Jovanovic(1990), Jeong and Townsend(2008)
  - King and Levine(1993)과 Beck, Levine, and Loyaza(2000)
  - Jeong and Townsend(2007)

개발금융을 통한 SDG 달성

- 직접 연관
  1. Goal 8(양질의 일자리와 경제성장)
  2. Goal 1(빈곤 완전퇴치)
  3. Goal 10(불평등 감소)
  4. Goal 12(지속가능한 소비와 생산)
- 사업 구성 관련
  1. Goal 9(산업, 혁신, 인프라)
  2. Goal 11(지속가능 도시 및 지역개발)
  3. Goal 6(청정 식수 및 위생)
  4. Goal 7(구매가능 청정 에너지)
  5. Goal 13(기후 대응)
  6. Goal 5(양성 평등)

개발금융의 ODA 레버리지 증가 효과

- ODA 시행기관이 정부재정이 아닌 시장재원으로 ODA 자금 조달 시 주어진 정부 일반예산 단위 당 ODA 지출 비율, 즉 "ODA 레버리지"가 증가
  - AFD(4~5)), KfW(5~6) 활발 [정혁(2013, 2015)]
    * KfW 이자저감 융자 ODA 레버리지: 20
  - 현행 EDPF ODA 레버리지: 1.07, 이차보전율 문제 [정혁(2019)]
- DFI 개발금융의 ODA 레버리지는 거버넌스에 따라 다름
  - 정부재정 100% 경우 ODA 레버리지 효과 없음
  - 민간지분이 있으면 그 만큼 ODA 레버리지 효과
  - 정부기관 자회사 경우 모기관의 시장재원 조달 여부에 따라 ODA 레버리지 효과 달라짐

개발금융의 대외경제•외교 전략 활용 기능

- 미국 DFC 탄생 배경:
  - 2018년 BUILD Act(중국 일대일로 견제 목적)
  - 인도-태평양 전략 팀이 DFC 일부
  - 최근 EAGLE Act 스트레치: 고소득국으로 확장 시도 중
- 영국 BREXIT과 더불어 개발협력 전략 전환: "Global Influence"!
  - 2020년 DFID(Department for International Development) → FCDO(Foreign, Commonwealth, and Development Office)
  - 2022년 CDC(Commonwealth Development Corporation) → BII(British International Investment): 개발금융 대상 지역을 구 영연방 아프리카와 남아시아에서 전 세계로 확장
- 개발금융의 대외경제-외교 전략 활용 기능 존재하나 성공 가능성은 DFI 독립성 보장 여부에 달려있음
  - DFI 거버넌스 중요성: accountable to whom?

개별 사업 특성

CDC 지역별 투자 구성

지역	2000-2015					2016-2020				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
아프리카	337	43	18,162	50	54	388	52	10,730	56	28
아시아	362	47	13,392	37	37	286	38	6,885	36	24
중동	27	3	1,570	4	58	56	8	1,439	7	26
중남미	32	4	85	0	3	3	0	181	1	60
전세계	8	1	2,332	6	291	9	1	30	0	3
유럽 및 중앙아시아	8	1	62	0	8	2	0	0	0	0
오세아니아	4	1	709	2	177	0	0	0	0	0
합계	778	100	36,312	100		744	100	19,264	100	

자료: **CDC, Our Investments, 2021**을 참고하여 저자 작성

CDC 금융수단별 투자 구성

금융수단	2000-2015					2016-2020				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
투자펀드	737	95	36,312	n.a.	49	646	87	19,264	100	30
대출	16	2	n.a.	n.a.	n.a.	54	7	n.a.	n.a.	n.a.
지분투자	20	3	n.a.	n.a.	n.a.	41	6	n.a.	n.a.	n.a.
대출 및 지분투자	5	1	n.a.	n.a.	n.a.	3	0	n.a.	n.a.	n.a.
합계	778	100	n.a.	n.a.	n.a.	744	100	n.a.	n.a.	n.a.

CDC 분야별 투자 구성

분야	2000-2015					2016-2020				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업 규모 (백만 USD)	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업 규모 (백만 USD)
사업 및 서비스	77	10	3,451	10	45	47	6	4,203	22	89
금융	160	21	4,018	11	25	144	19	3,044	16	21
산업, 광업, 건설	155	20	9,115	25	59	83	11	2,587	13	31
농수산업	99	13	1,760	5	18	91	12	2,033	11	22
통신	75	10	2,573	7	34	109	15	1,949	10	18
도시개발	43	6	8,217	23	191	78	10	1,764	9	23
에너지	54	7	1,581	4	29	77	10	1,533	8	20
보건	45	6	2,347	6	52	70	9	1,387	7	20
기타	15	2	838	2	56	16	2	300	2	19
교육	22	3	814	2	37	18	2	298	2	17
교통, 물류	12	2	215	1	18	6	1	77	0	13
다부문	11	1	463	1	42	2	0	65	0	33
위생	6	1	831	2	138	2	0	15	0	8
관광	3	0	65	0	22	1	0	10	0	10
환경보호	1	0	25	0	25	0	0	0	0	0
합계	778	100	36,312	100		744	100	19,264	100	

정혁, 개발금융협력의 이해

CDC 특정 범주 투자 구성

특정 범주	2000-2015		2016-2020	
	사업 건수	건수 비중 (%)	사업 건수	건수 비중 (%)
양성평등	6	4.9	9	5.2
중소기업	44	36.1	40	23.1
수원국 기업 연관	45	36.9	47	27.2
공여국 기업 연관	1	0.82	0	0
경제협력 외교	0	0	0	0
기후변화 대응	23	18.9	76	43.9

FMO 지역별 투자 구성

지역	2000-2015					2016-2021				
	사업 건수	건수비중 (%)	액수 (백만USD)	액수비중 (%)	단위사업 규모 (백만USD)	사업 건수	건수비중 (%)	액수 (백만USD)	액수비중 (%)	단위사업 규모 (백만USD)
아프리카	113	35	1,655	39	15	166	30	1,923	28	12
아시아	87	27	1,118	27	13	139	25	1,446	21	10
중남미	58	18	723	17	12	84	15	1,127	16	13
중동	14	4	170	4	12	55	10	867	12	16
전세계	14	4	160	4	11	51	9	860	12	17
유럽 및 중앙아시아	35	11	382	9	11	55	10	723	10	13
합계	321	100	4,207	100	-	550	100	6,946	100	-

자료: **FMO, Investment World Map, 2021**을 참고하여 저자 작성

FMO 금융수단별 투자 구성

금융 수단	2000-2015					2016-2021				
	사업 건수	건수비중 (%)	액수 (백만USD)	액수비중 (%)	단위사업 규모 (백만USD)	사업 건수	건수비중 (%)	액수 (백만USD)	액수비중 (%)	단위사업규모 (백만USD)
대출	169	53	2,450	58	14	241	44	2,924	42	12
보증	55	17	660	16	12	132	24	1,981	29	15
기술지원	26	8	271	6	10	88	16	1,097	16	12
투자펀드	26	8	264	6	10	55	10	578	8	11
지분투자	7	2	117	3	17	34	6	366	5	11
기타	37	12	405	10	11	0	0	0	0	0
대출, 지분투자	1	0	40	1	40	0	0	0	0	0
합계	321	100	4,207	100	-	550	100	6,946	100	-

정혁, 개발금융협력의 이해

FMO 분야별 투자 구성

분야	2000-2015					2016-2021				
	사업 건수	건수비중 (%)	액수 (백만USD)	액수비중 (%)	단위사업규모 (백만USD)	사업 건수	건수비중 (%)	액수 (백만USD)	액수비중 (%)	단위사업규모 (백만USD)
금융	111	35	1,422	34	13	184	33	2,225	32	12
에너지	60	19	849	20	14	132	24	2,077	30	16
농수산업	31	10	393	9	13	40	7	903	13	23
위생	21	7	249	6	12	49	9	379	5	8
교통·물류	13	4	426	10	33	19	3	225	3	12
환경보호	9	3	88	2	10	11	2	186	3	17
재건	6	2	57	1	9	20	4	179	3	9
교육	5	2	10	0	2	22	4	177	3	8
위기대응	6	2	49	1	8	10	2	170	2	17
통신	9	3	122	3	14	15	3	122	2	8
보건	9	3	159	4	18	14	3	112	2	8
산업, 광업, 건설	6	2	78	2	13	11	2	66	1	6
재난대비	0	0	0	0	0	7	1	60	1	9
사업 및 서비스	10	3	79	2	8	5	1	46	1	9
기타 사회 인프라	3	1	42	1	14	11	2	19	0	2
식량원조	8	2	76	2	9	0	0	0	0	0
중소기업	5	2	50	1	10	0	0	0	0	0
다부문	6	2	46	1	8	0	0	0	0	0
도시개발	2	1	10	0	5	0	0	0	0	0
관광	1	0	2	0	2	0	0	0	0	0
합계	321	100	4,207	100	-	550	100	6,946	100	-

FMO 특정 범주 투자 구성

특정 범주	2000-2015					2016-2021				
	사업 건수	건수비중 (%)	액수 (백만USD)	액수비중 (%)	단위사업 규모 (백만USD)	사업 건수	건수비중 (%)	액수 (백만USD)	액수비중 (%)	단위사업 규모 (백만USD)
양성평등	60	19	808	19	13	67	12	584	8	9
중소기업	160	50	2,122	50	13	227	41	3,199	46	14
수원국 기업 연관	172	54	2,234	53	13	203	37	2,711	39	13
공여국 기업 연관	12	4	69	2	6	3	1	4	0	1
경제협력 외교	1	0	3	0	3	1	0	5	0	5
기후변화 대응	52	16	901	21	17	57	10	619	9	11

DFC 지역별 투자 구성

지역	2000-2015					2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위사업 규모 (백만USD)	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위사업 규모 (백만USD)
중남미	74	20	3,180	24	43	121	23	7,357	34	61
아프리카	100	26	2,746	20	27	159	30	5,865	27	37
아시아	84	22	1,781	13	21	122	23	3,392	16	28
중동	58	15	4,199	31	72	42	8	2,426	11	58
전세계	15	4	640	5	43	42	8	1,837	8	44
유럽 및 중앙아시아	47	12	952	7	20	37	7	867	4	23
합계	378	100	13,498	100		523	100	21,744	100	

자료: DFC, All Active Projects, 2Q 2021을 참고하여 저자 작성

DFC 금융수단별 투자 구성

금융수단	2000-2015					2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위사업 규모 (백만USD)	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위사업 규모 (백만USD)
대출	269	71	10,594	78	39	426	81	15,748	72	37
보험	81	21	1,912	14	24	54	10	3,957	18	73
투자펀드	17	4	831	6	49	32	6	2,019	9	63
기타	11	3	160	1	15	5	1	15	0	3
기술지원	0	0	0	0	0	6	1	5	0	1
합계	378	100	13,498	100		523	100	21,744	100	

DFC 분야별 투자 구성

분야	2000-2015					2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위사업규모 (백만USD)	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위사업규모 (백만USD)
금융	232	61	5,834	43	25	307	59	9,708	45	32
에너지	58	15	5,187	38	89	97	19	6,561	30	68
보건	9	2	303	2	34	25	5	1,230	6	49
산업, 광업, 건설	4	1	223	2	56	13	2	1,114	5	86
교통, 물류	3	1	8	0	3	12	2	1,112	5	93
환경보호	1	0	32	0	32	8	2	524	2	66
도시개발	19	5	414	3	22	13	2	414	2	32
통신	3	1	472	3	157	5	1	360	2	72
교육	14	4	141	1	10	7	1	310	1	44
농수산업	14	4	190	1	14	16	3	211	1	13
사업 및 서비스	5	1	76	1	15	8	2	111	1	14
다부문	3	1	205	2	68	3	1	52	0	17
기타	11	3	160	1	15	5	1	15	0	3
재건	0	0	0	0	0	1	0	10	0	10
위생	2	1	254	2	127	2	0	6	0	3
재난대비	0	0	0	0	0	1	0	3	0	3
합계	378	100	13,498	100		523	100	21,744	100	

DFC 특정 범주 투자 구성

특정 범주	2000-2015					2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위사업규모 (백만USD)	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만USD)
양성평등	19	5	606	4	32	113	22	4,038	19	36
중소기업	90	24	3,551	26	39	217	41	8,627	40	40
수원국 기업 연관	182	48	6,176	46	34	345	66	14,625	67	42
공여국 기업 연관	148	39	5,378	40	36	231	44	9,460	44	41
경제협력 외교	35	9	897	7	26	91	17	3,485	16	38
기후변화 대응	46	12	3,282	24	71	91	17	2,620	12	29

DEG 지역별 투자 구성

지역	2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위 사업규모 (백만USD)
중남미	128	33	2,651	33	21
아시아	130	33	2,483	31	19
아프리카	63	16	1,411	18	22
유럽 및 중앙아시아	29	7	598	7	21
전세계	19	5	498	6	26
중동	20	5	383	5	19
합계	389	100	8,025	100	-

자료: **DEG, Investment Database, 2021**을 참고하여 저자 작성.

DEG 금융수단별 투자 구성

금융수단	2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위 사업규모 (백만USD)
대출	240	62	5,366	67	22
투자펀드	104	27	2,111	26	20
지분투자	43	11	533	7	12
기술지원	2	1	16	0	8
합계	389	100	8,025	100	-

DEG 분야별 투자 구성

분야	2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위 사업규모 (백만USD)
금융	229	59	4,734	59	21
에너지	48	12	1,030	13	21
농수산업	26	7	544	7	21
산업, 광업, 건설	21	5	415	5	20
교통, 물류	13	3	428	5	33
사업 및 서비스	22	6	282	4	13
위생	4	1	131	2	33
보건	6	2	82	1	14
통신	1	0	50	1	50
도시개발	9	2	111	1	12
다부문	3	1	91	1	30
대출 조정	4	1	88	1	22
환경보호	3	1	40	1	13
합계	389	100	8,025	100	-

DEC 특정 범주 투자 구성

특정 범주	2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만USD)	액수 비중 (%)	단위 사업규모 (백만USD)
양성평등	23	6	475	6	21
중소기업	182	47	3,625	45	20
수원국 기업 연관	309	79	6,324	79	20
공여국 기업 연관	49	13	1,205	15	25
경제협력 외교	0	0	0	0	0
기후변화 대응	210	54	4,594	57	22

PROPARCO 지역별 투자 구성

지역	2000-2015					2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
아프리카	56	39	1,242	37	22	149	40	2,824	38	19
중남미	32	23	958	28	30	69	19	1,855	25	27
아시아	19	13	369	11	19	65	18	1,056	14	16
중동	25	18	627	19	25	49	13	1,048	14	21
전세계	7	5	142	4	20	26	7	517	7	20
유럽 및 중앙아시아	1	1	19	1	19	12	3	224	3	19
프랑스령	2	1	14	0	7	0	0	0	0	0
합계	142	100	3,371	100		370	100	7,524	100	

자료: **Proparco, Our Projects Around the World, 2021**을 참고하여 저자 작성.

PROPARCO 금융수단별 투자 구성

금융수단	2000-2015					2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
대출	88	62	2,739	81	31	207	56	5,522	73	27
지분투자	24	17	254	8	11	95	26	1,230	16	13
대출, 지분투자	14	10	207	6	15	18	5	343	5	19
보증	3	2	39	1	13	28	8	304	4	11
지분투자, 기술지원	12	8	82	2	7	11	3	101	1	9
기술지원	0	0	0	0	0	9	2	24	0	3
대출, 기술지원	1	1	49	1	49	0	0	0	0	0
차관	0	0	0	0	0	2	1	0	0	0
합계	142	100	3,371	100		370	100	7,524	100	

정혁, 개발금융협력의 이해

PROPARCO 분야별 투자 구성

분야	2000-2015					2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업 규모 (백만 USD)	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
금융	55	39	1,172	35	21	184	50	3,501	47	19
에너지	33	23	1,019	30	31	52	14	1,306	17	25
도시개발	4	3	68	2	17	54	15	1,050	14	19
농수산업	23	16	428	13	19	32	9	792	11	25
보건	5	4	98	3	20	18	5	408	5	23
다부문	3	2	101	3	34	20	5	282	4	14
교육	3	2	56	2	19	4	1	91	1	23
교통, 물류	1	1	22	1	22	1	0	52	1	52
중소기업	4	3	30	1	7	2	1	32	0	16
사업 및 서비스	3	2	31	1	10	2	1	10	0	5
산업, 광업, 건설	5	4	173	5	35	0	0	0	0	0
위생	2	1	151	4	75	1	0	0	0	0
통신	1	1	21	1	21	0	0	0	0	0
합계	142	100	3,371	100		370	100	7,524	100	

PROPARCO 특정 범주 투자 구성

특정 범주	2000-2015					2016-2021				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업 규모 (백만 USD)	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업 규모 (백만 USD)
양성평등	4	3	33	1	8	113	31	2,361	31	21
중소기업	52	37	943	28	18	80	22	1,022	14	13
수원국 기업 연관	116	82	2,579	77	22	44	12	711	9	16
공여국 기업 연관	13	9	255	8	20	2	1	68	1	34
경제협력 외교	0	0	0	0	0	0	0	0	0	0
기후변화 대응	19	13	459	14	24	53	14	1,285	17	24

FINDEV 지역별 투자 구성

지역	2018-2021				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
중남미	13	57	162	51	12
아프리카	9	39	134	42	15
전세계	1	4	20	6	20
합계	23	100	316	100	14

NO Asia!

자료: **FinDev, Our Portfolio, 2021**을 참고하여 저자 작성.

FINDEV 금융수단별 투자 구성

금융수단	2018-2021				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
대출	14	61	194	62	14
투자펀드	6	26	78	25	13
지분투자	3	13	44	14	15
합계	23	100	316	100	14

FINDEV 분야별 투자 구성

분야	2018-2021				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
금융	15	65	191	60	13
농수산업	5	22	73	23	15
에너지	2	9	40	13	20
사업 및 서비스	1	4	13	4	13
합계	23	100	316	100	14

FINDEV 특정 범주 투자 구성

특정 범주	2018-2021				
	사업 건수	건수 비중 (%)	액수 (백만 USD)	액수 비중 (%)	단위사업규모 (백만 USD)
양성평등	23	100	316	100	14
중소기업	11	48	152	48	14
수원국 기업 연관	22	96	303	96	14
공여국 기업 연관	1	4	1	0	1
경제협력 외교	0	0	0	0	0
기후변화 대응	12	52	167	53	14

정혁, 개발금융협력의 이해

DFI 설립 추진 방안과 활용 방안

개발금융기관 설계 기본 구성 요소

- 구성 요소
  1. 목적과 비전 설정
     1) 개발 임팩트
     2) 협력국과 한국의 상생발전
     3) 개발재원 창출: 재정적 지속가능성, 위험관리
  2. 시행체계 설계
     1) 거버넌스
     2) 금융수단 운용
        - 재원조달
        - 투자지출
- 시행체계 설계 기본 관점
  1. 효과성: 목적/비전의 명목적 달성이 아닌 실질적 달성
  2. 합목적성: 시행체계와 목적/비전 간 합치

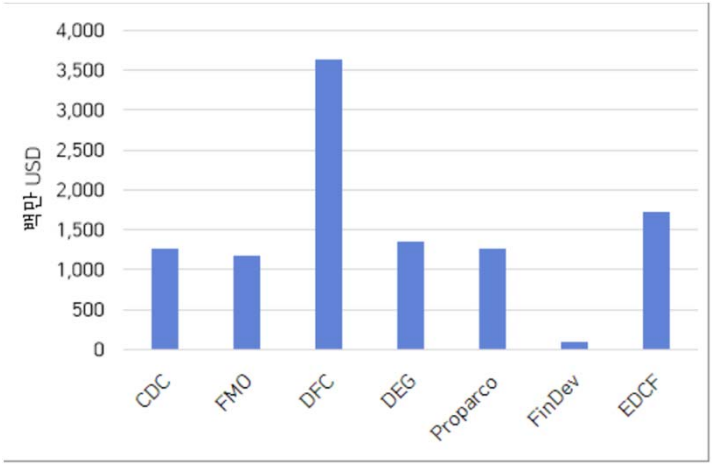
재정 거버넌스와 국익 구속성

	정부지분 100%	정부기관(국책은행, ECA) 100% 투자 자회사	정부/정부기관 + 민간지분(은행, 산업)
국익 구속성	DFC(USA) IFU(Denmark) Sifem(Switzerland)	SIMEST(Italy CDP)	COFIDES(Spain) FINFUND(Finland) SBI(Belgium) SOFID(Portugal)
국익 비구속성	BIO(Belgium) CDC(UK) Norfund(Norway) SWEDFUND(Sweden)	DEG(Germany KfW) FinDev(Canada EDC) OeEB(Austria OeKB)	FMO(Netherlands) PROPARCO(France)

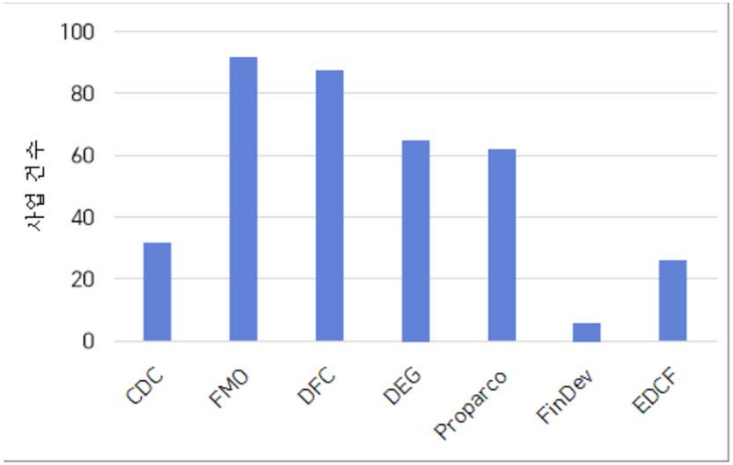
1. 재정 거버넌스는 역사적 배경과 정부재정 여력 및 금융구조에 따라 다름
2. 국익 구속성은 재정 거버넌스와 연계된 패턴이 없음
3. 즉, DFI 거버넌스는 국가별 여건에 따른 선택사항

기존 DFI와 EDCF 금융협력 규모 양상 비교

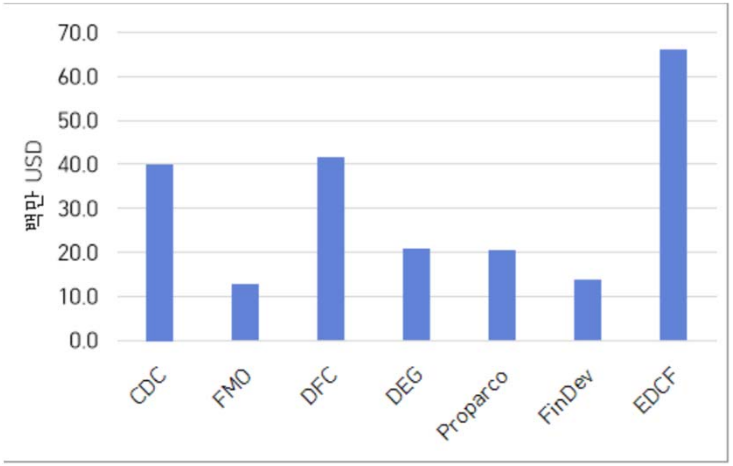
A. 연평균 승인액 총 규모



B. 연평균 승인 사업건수



C. 연평균 승인 사업 단위규모



- EDCF 금융협력은 양허성 차관 대단위 사업 소수 시행
- DFI는 준상업성 투자/대출 중소규모 개발사업 다수 시행

기존 DFI와 EDCF 금융협력 분야 양상 비교

분야	FMO	DFC	DEG	Proparco	FinDev	평균	EDCF
금융 서비스	32.0	44.7	59.3	46.5	60.3	48.6	0.04
에너지	29.9	30.2	12.9	17.4	12.6	20.6	12.0
농수산업	13.0	1.0	6.8	10.5	23.0	10.9	4.6
위생·수자원·보건	7.1	5.7	2.7	5.4	-	5.2	20.9
교통·물류	3.2	5.1	5.4	0.7	-	3.6	35.8
환경보호 및 재건	5.3	2.5	-	-	-	3.9	-
교육	2.5	1.4	-	1.2	-	1.7	6.5
통신	1.8	1.7	0.6	-	-	1.4	8.3
산업·광업·건설	1.0	5.1	5.2	-	-	3.8	0.9
재난대비 ·위기대응	3.3	-	-	-	-	3.3	-
사업 및 서비스	0.7	0.5	3.5	0.6	4.1	1.9	-
다부문	-	0.2	1.1	3.7	-	1.7	8.3
도시개발	-	1.9	1.4	14.0	-	5.8	-
대출조정	-	-	1.1	-	-	1.1	-
기타 사회 인프라	0.3	0.1	-	-	-	0.2	2.7

- **EDCF:** 대규모 인프라 위주 집중
- **DFI:** 금융부문 집중, 분야 다변화

정혁, 개발금융협력의 이해

기존 DFI와 EDCF 금융협력 채널 및 목적 양상 비교

범주	CDC	FMO	DFC	DEG	Proparco	FinDev	평균	EDCF
양성평등 금융	1.5	12.2	21.6	5.9	30.5	100	28.6	0
기후변화 대응 금융	17.2	10.4	17.4	54	14.3	51.7	27.5	2.5
중소기업 금융	5.8	41.3	41.5	46.8	21.6	47.4	34.1	n.a.
수원국 기업 지원	13	36.9	65.9	79.5	11.9	94.8	50.3	n.a.
공여국 기업 지원	1.5	0.5	44.2	12.6	0.5	4.3	10.6	82.8

- **EDCF: gender finance, climate finance** 거의 없음
- **DFI: Impact finance, SME,** 수원국 기업 지원

개발금융의 대외경제•외교 전략 활용 기능

- 미국 DFC 탄생 배경:
  - 2018년 BUILD Act(중국 일대일로 견제 목적)
  - 인도-태평양 전략 팀이 DFC 일부
  - 최근 EAGLE Act 스트레치: 고소득국으로 확장 시도 중
- 영국 BREXIT과 더불어 개발협력 전략 전환: "Global Influence"!
  - 2020년 DFID(Department for International Development) → FCDO(Foreign, Commonwealth, and Development Office)
  - 2022년 CDC(Commonwealth Development Corporation) → BII(British International Investment): 개발금융 대상 지역을 구 영연방 아프리카와 남아시아에서 전 세계로 확장
- 개발금융의 대외경제-외교 전략 활용 기능 존재하나 성공 가능성은 DFI 독립성 보장 여부에 달려있음
  - DFI 거버넌스 중요성: accountable to whom?

DFI 대외전략 활용 방안

- 개발재원 동원 확장을 통한 한국의 개발협력 임팩트 증진
- 한국의 아시아 지역 개발금융 비교우위(hidden risk 거래비용) 활용한 기존 양자 및 MDB DFI와 금융협력 협조를 통해 한국의 국제금융 발전 및 영향력 확대 기회
- "DFI Family" network 참여를 통한 국제금융 및 경제협력 등 국제사회 정책 다이얼로그에 참여, e.g., G7 DFI's는 국제금융협력 소통 채널
  - "The 2X Challenge: Financing for Women" 이니셔티브
  - IFC, AfDB, EBRD, EIB와 함께 Covid-19 팬데믹 이후 아프리카의 지속가능한 성장과 회복을 위해 5년 동안 아프리카 민간부문에 800억 달러 지원
- 외교안보 전략과 직접 연계하는 DFC 사례는 경계할 필요 있으나 '선진공여국' 그리고 '다자금융기관'과의 대외협력관계 공조의 채널로 적절히 활용할 경우 DFI는 중요한 대외전략 도구
- 다자국제금융기관들과의 파트너십 강화: WB(Korea Trust Fund 효과성 제고), IFC, ADB, EIB, EBRD(체제국 전환)
- 비 ODA 개발협력 수단인 개발금융은 효과적 남북협력 수단이 될 수 있음

한국의 개발금융협력 시행 여건 검토(1)

- 개발사업 금융협력 역량 축적: 수은 EDCF(1987년), EDPF(2018년)
- 시장재원 조달 역량
  1. 외화채권 발행 역량을 갖추고 있는 기관: 수은, 산은 모두 국가신용등급 AA

     * 타 DFI 신용등급: KfW 및 FMO AAA, AFD AA

     * 아시아 주요 외화 채권발행 금융기관 신용 등급: 일본 JICA 및 JBIC A+, 중국 CBD AA-, China EXIM A+
  2. 2020년 기준 수은 외화채권 발행 규모 56조 원으로 국내 최대, 전체의 32.2%(산은 22.7%, 하나은행 10.8%, 국민은행 8.6%)
  3. 낮은 조달금리: 2022년 1월 기준 3년물 1.301%, 5년물 1.693%, 10년물 2.179%(미국채 금리 대비 스프레드 각 25bp, 30bp, 50bp)
  4. 수은 외화채권 발행통화 다변화(20여 개 이상)

한국의 개발금융협력 시행 여건 검토(2)

5. 추가 채권 발행 여력 고려 요인

1) 한국수출입은행법 23조: 수은의 차입 잔액 한도는 기준금액 (납입자본금+적립금)의 30배(2021년 말 기준 수은의 기준금액은 15.3조 원. 법적 차입 한도 459조 원)

2) BIS 자기자본 최소 비율: '위험가중치 조정 자산' 대비 10.5% = CAR 8% + '자본보전 완충자본(Capital Conservation Buffer)' 비율 2.5%

3) 2021년 말 기준 수은의 BIS 비율은 15.72%

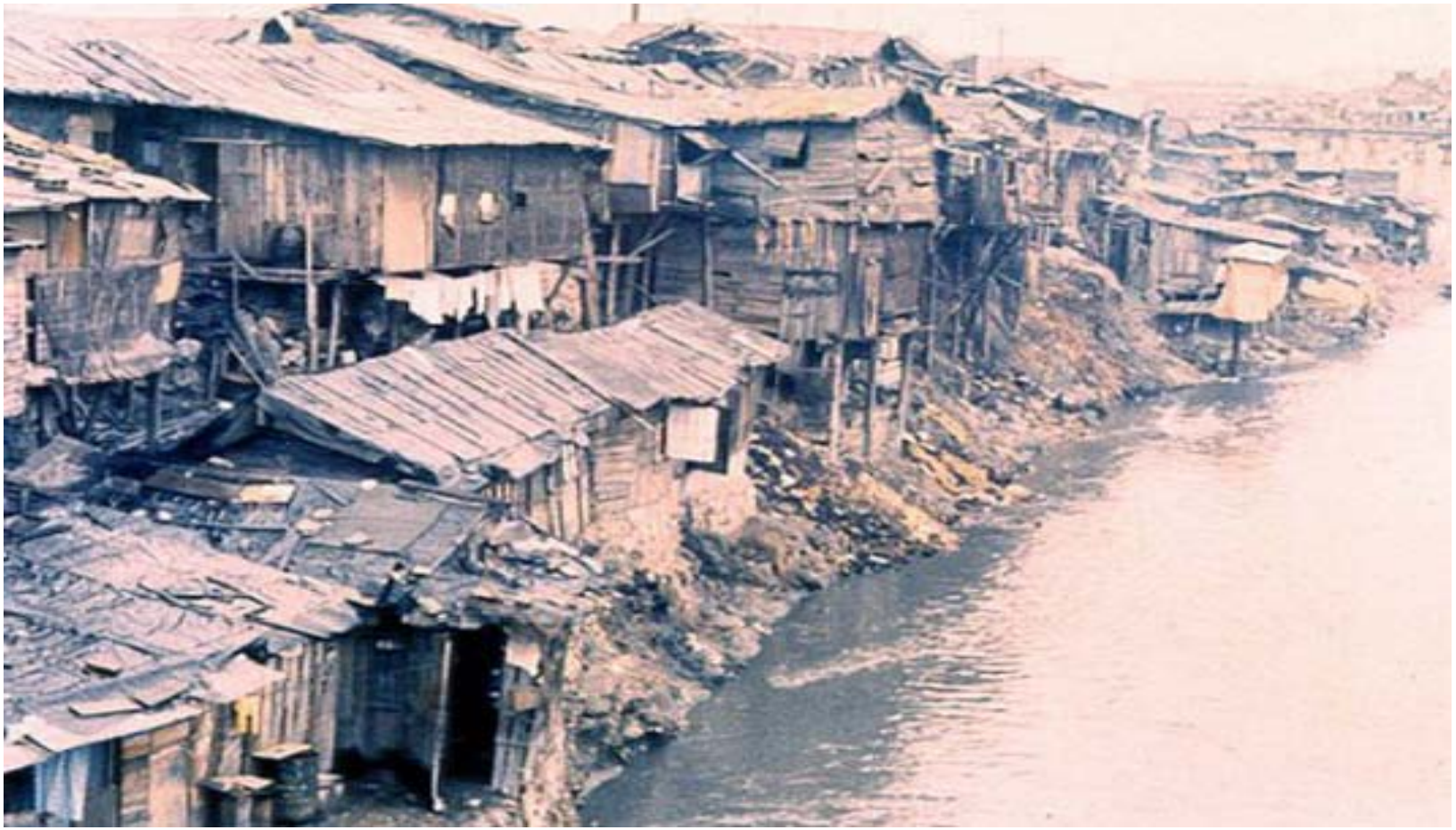
4) DFI 설립을 지원할 추가 외화채권 발행을 통한 시장재원 조달 여력

- 시나리오 1: 현 자본금 유지하며 BIS 비율을 10.5%로 낮춤 → 58.4조 원(487억 달러). 이는 SDG 기간 EDCF 사업 연평균 총 승인액의 28년치 규모.
- 시나리오 2: 외국은행 의견 서베이 자료 수은 총 외화채권 발행 규모 800억 달러. 현 발행 규모 500억 달러 고려 시 추가 발행 가능 규모는 300억 달러. EDCF 연평균 규모 총 승인액의 17년치 규모
- 시나리오 3: 수은 자기자본 2조 원 추가하면서 BIS 비율 15% 수준으로 유지 시 추가 재원 조달 규모는 169억 달러. EDCF 연평균 총 승인 규모 10년치 규모. (산은, 한은 투자 유치)

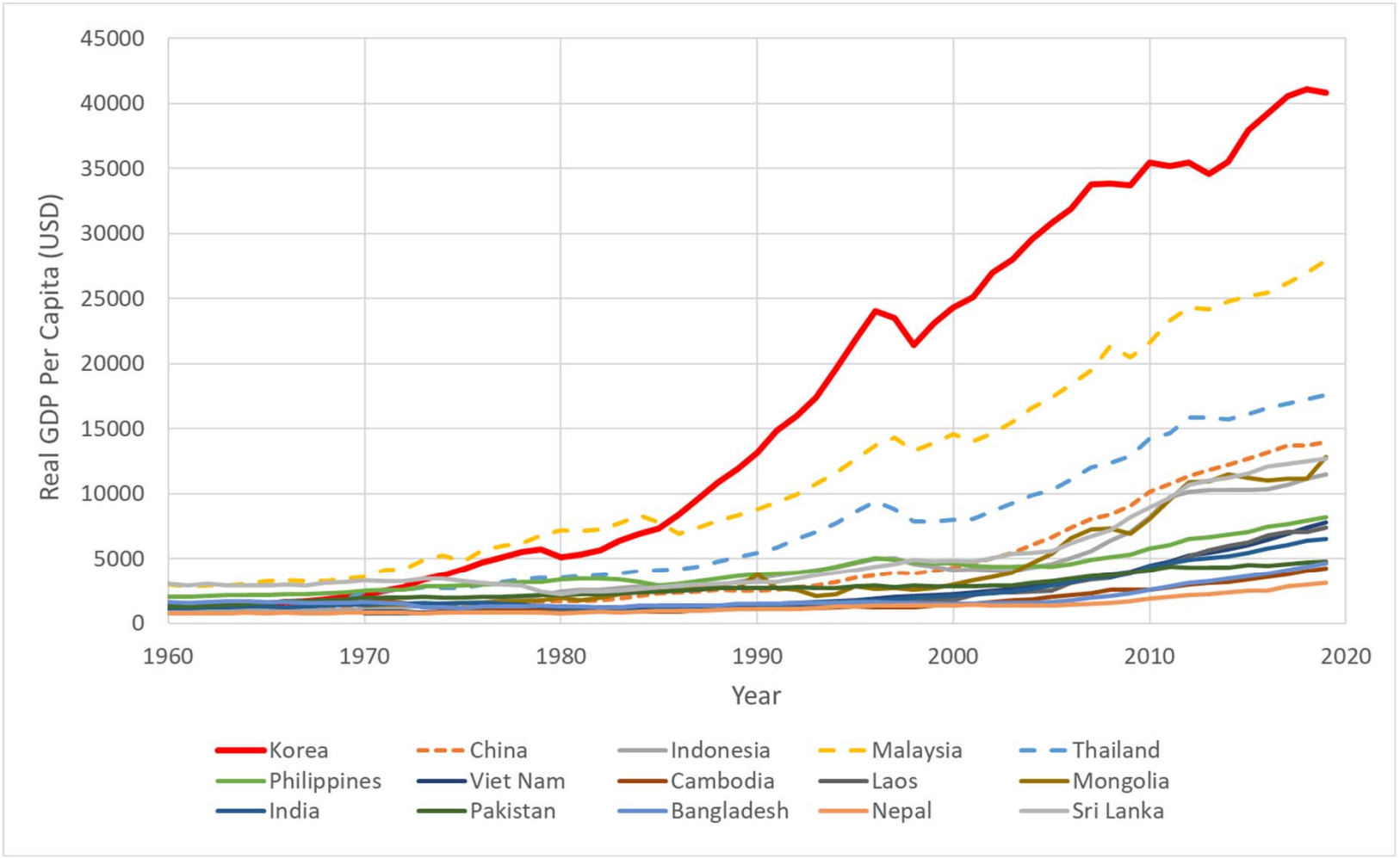
지속가능한 발전의 원동력:
개방적 자생력과 생산성 기반 성장

한국의 현재 (청계천)

한국의 그 때 그 시절 (1950년대 같은 지역)

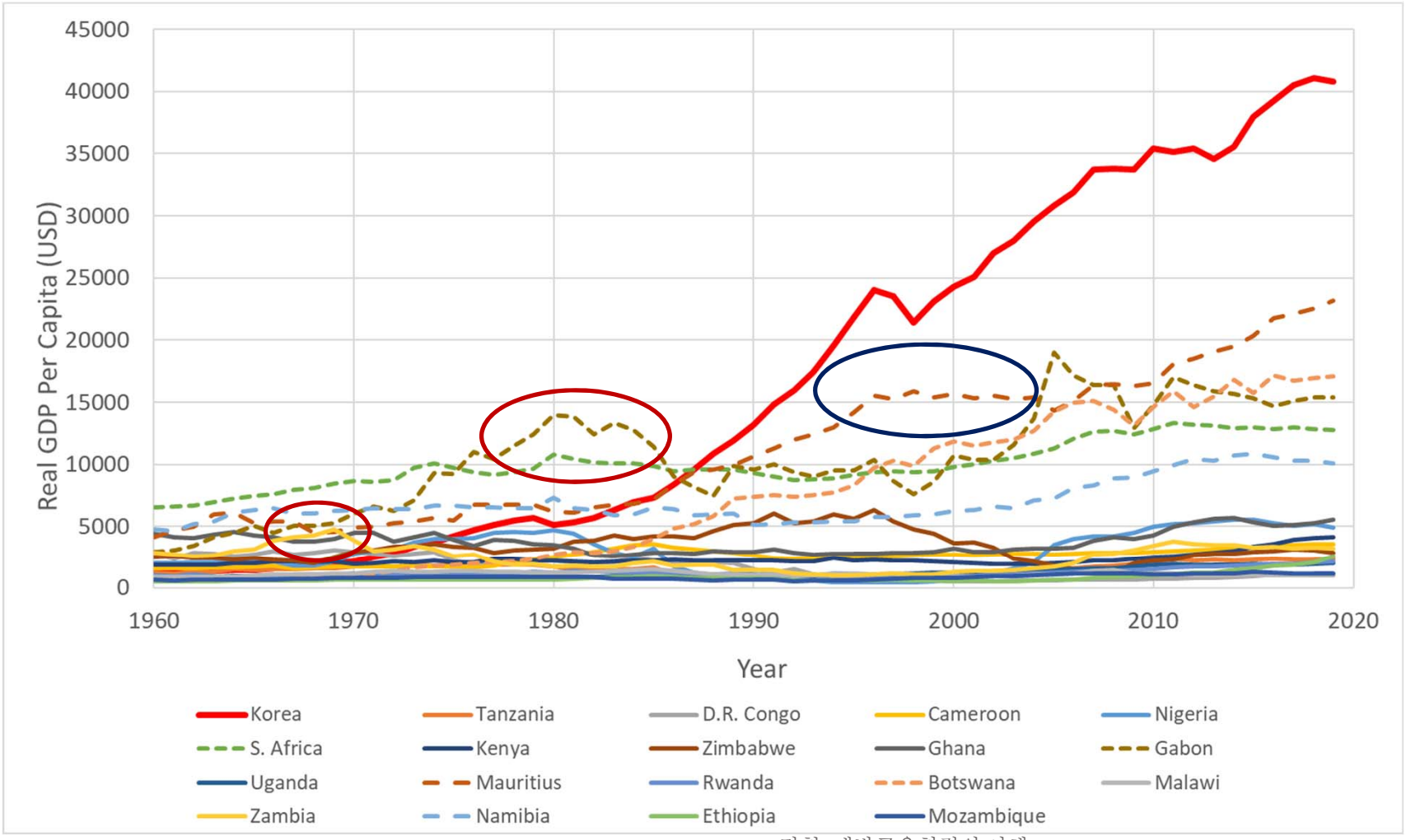


한국의 성장 양상: 아시아 비교



Speed!
일인당 실질 **GDP**
연평균 **6%** 성장

한국의 성장 양상: 아프리카 비교



Sustainability!
일인당 실질 **GDP**
연평균 6%
60년 성장!

"6p-6d Growth"
전 세계 유일한
성장 성과!

정혁, 개발금융협력의 이해

한국경제 성장 동력 전환

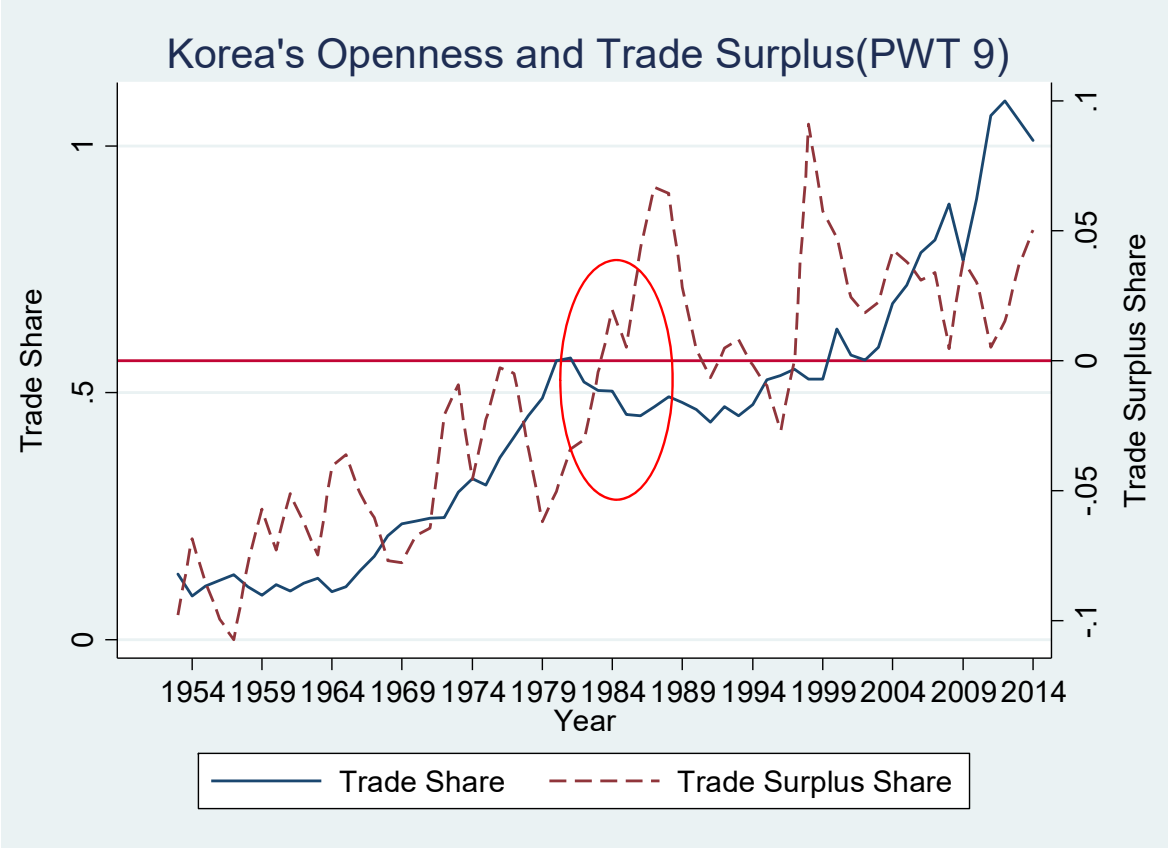
Period	Actual	WAP	LFP	AL	HC	K/Y
1960-2014	5.9	0.5	0.5	**1.9**	1.5	1.3
1960-1970	5.0	-0.1	1.2	0.8	**2.2**	1.0
1970-1980	7.4	1.3	-0.3	1.2	1.9	**3.0**
1980-1990	8.6	1.1	1.1	**3.7**	1.7	0.8
1990-2000	6.0	0.3	0.2	**2.3**	1.2	1.9
2000-2010	3.9	0.1	0.2	**2.2**	0.8	0.5
2010-2014	2.5	0.1	0.8	0.5	**0.9**	0.3

주요 성장 동력의 단계적 진화
1단계: 노동과 인적자본 증대(60년대)
2단계: 물적자본 심화(70년대)
3단계: 생산성 증대(80년대 이후 30년)

- 한국경제 성장의 가장 중요한 전환은 80년대 생산성 기반 성장 경제로의 전환!

WAP: 생산가능인구 비중 증가 효과, **LFP:** 노동참여율 증가 효과, **AL:** 총생산성 증가 효과,
HC: 인적자본 증가 효과, **K/Y:** 물적자본 심화 효과

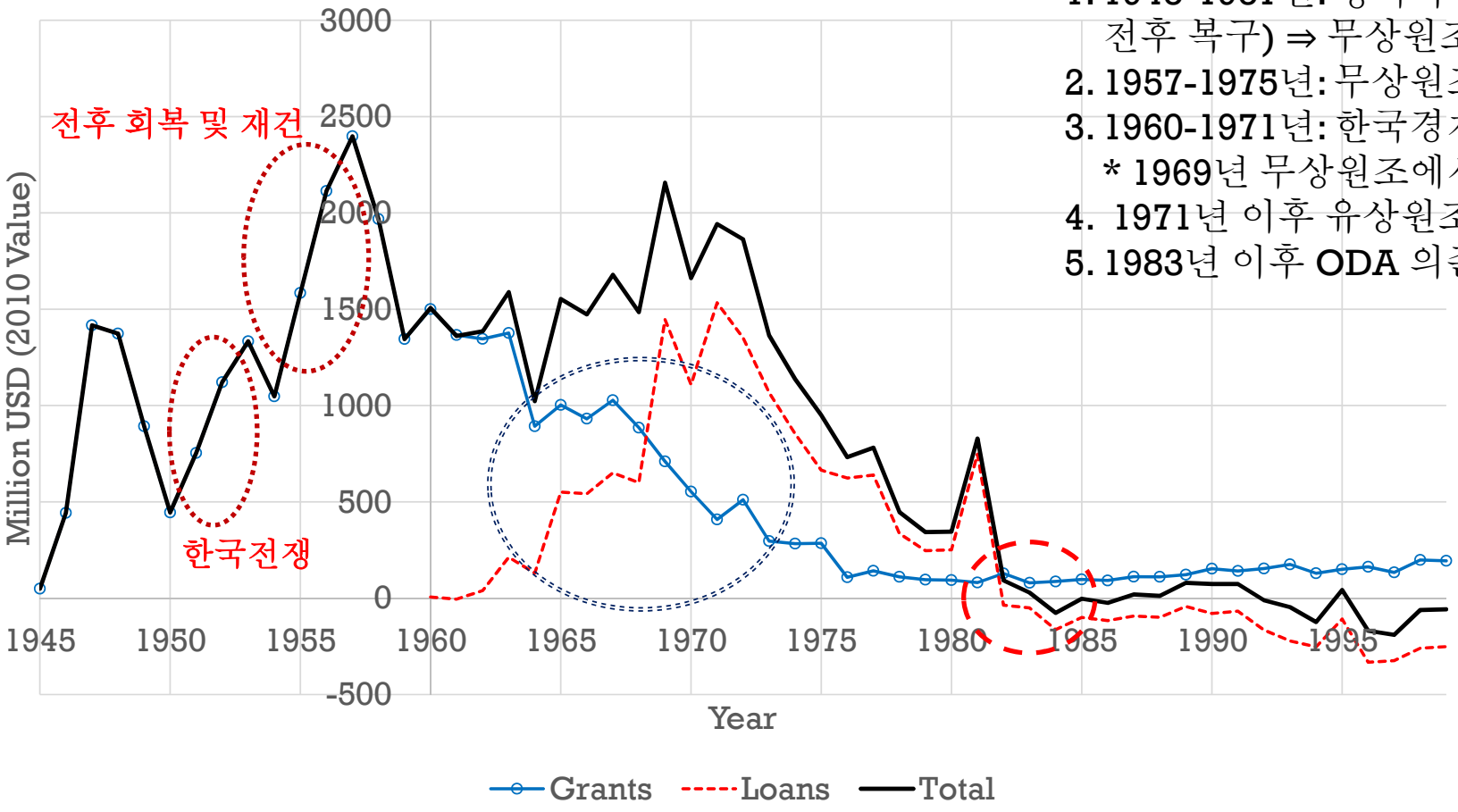
개방성 확대와 무역 구조전환



1960-2014 기간, 국제무역 개방성 척도 (GDP 대비 총 무역 비중) 11%에서 104%로 지속적 증가.

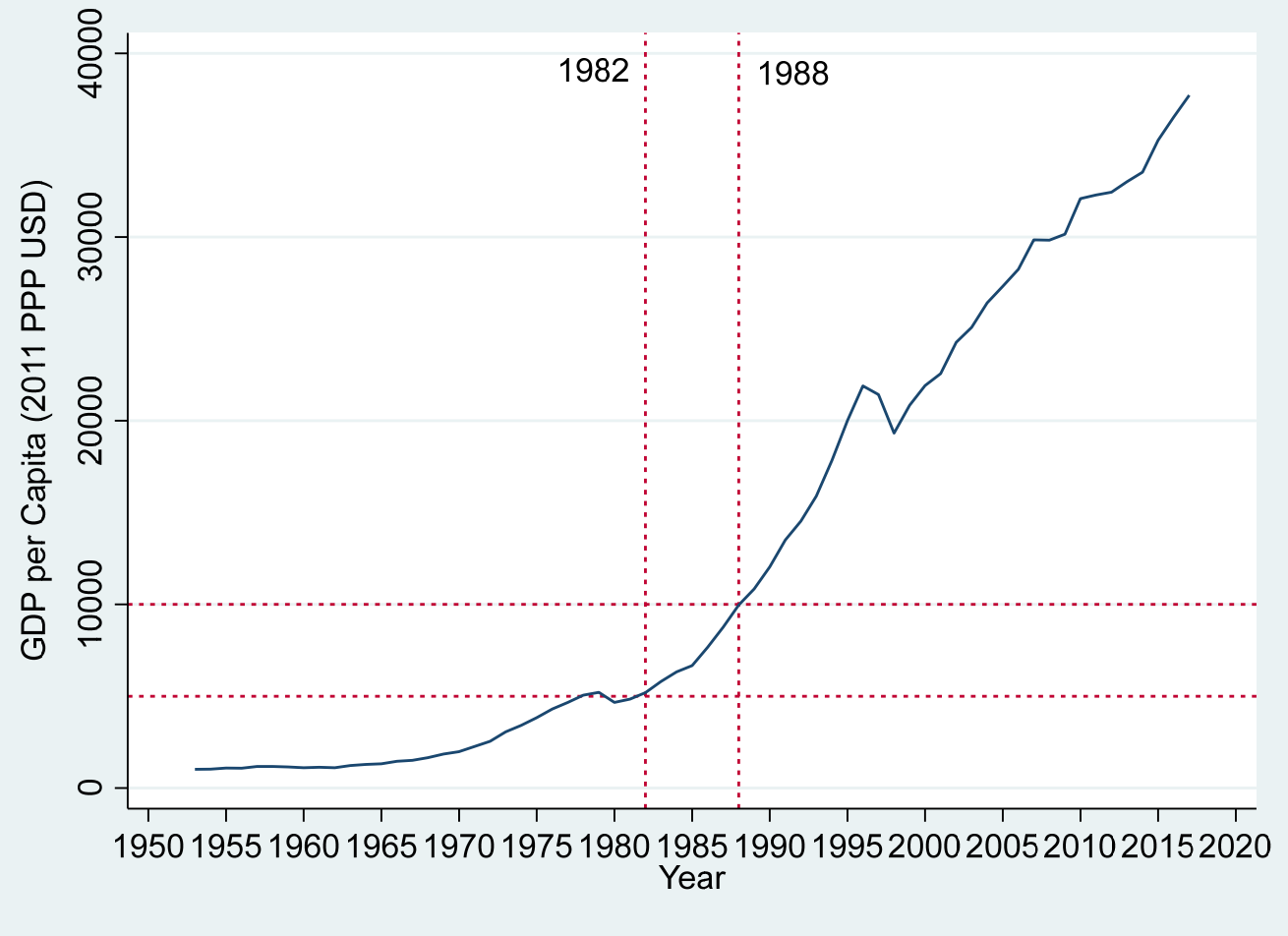
개방 초기 무역 적자가 발생했으나 개방 확대를 지속하면서 무역 적자 지속적 감소 및 1980년대 중반부터 무역수지 흑자국으로 무역 구조전환.

한국의 ODA 구조전환



1. 1945-1957년: 정치적 혼돈 시기(해방, 한국전쟁과 전후 복구) ⇒ 무상원조 집중 및 증가 시기(12년)
2. 1957-1975년: 무상원조 지속적 감소
3. 1960-1971년: 한국경제 도약 시기 ⇒ 유상원조 증가
   * 1969년 무상원조에서 유상원조 수원국으로 전환
4. 1971년 이후 유상원조와 무상원조 모두 감소 추세
5. 1983년 이후 ODA 의존 탈피

생산성 기반 성장 전환과 중진국 함정 탈출



1. 한국의 중진국 함정 탈출은 투입 증대 기반 성장에서 생산성 기반 성장 모형으로 성장동력 기제 전환으로 인해 가능했음
⇒ **"생산성 기반 성장" 성장동력 구조전환**

2. 생산성 기반 성장동력 전환의 배경
(i) 지속적 개방성 확대와 무역수지 흑자 전환
(ii) ODA 의존 탈피
⇒ **무역구조 및 ODA 활용 구조 전환을 통한 "개방적 자생력" 축적**

한국의 개발협력 방향성 제언

한국의 개발협력 방향성

- 한국 개발협력의 강점
  1. 성공한 개발 경험이 현 시대에 체화된 유일한 공여국
  2. 제국주의 역사 레거시가 없는 신뢰에 기초한 협력 가능성
  3. 한국 스스로 일방적이 아닌 상생발전의 유인이 강함
- 한국 개발협력의 방향성
  1. 개도국의 실질적 개발효과성에 초점을 맞추는 상생발전 추구
     - 개방적 자생력을 갖출 수 있는 사회경제 구조로 전환에 도움을 주는 개발협력
     - 생산성 기반 성장 경제로의 전환에 도움을 주는 개발협력
  2. 개발협력 이후 지속적 협력 관계 구축을 바라보는 개발협력 구도 구축
  3. 상생발전의 범위를 개도국과 선진국 모두를 포함하는 글로벌 관점 지향
  4. 최근 한국경제 생산성 성장 급락의 위기 돌파 전략으로서 개발협력: 개발금융을 수단으로 민간부문 간 협력을 촉진하여 한국의 80년대 "모방적 생산성" 경제로 전환한 한국경제를 미래 "창의적 생산성" 경제로 재전환하는 계기로 삼음

[끝]