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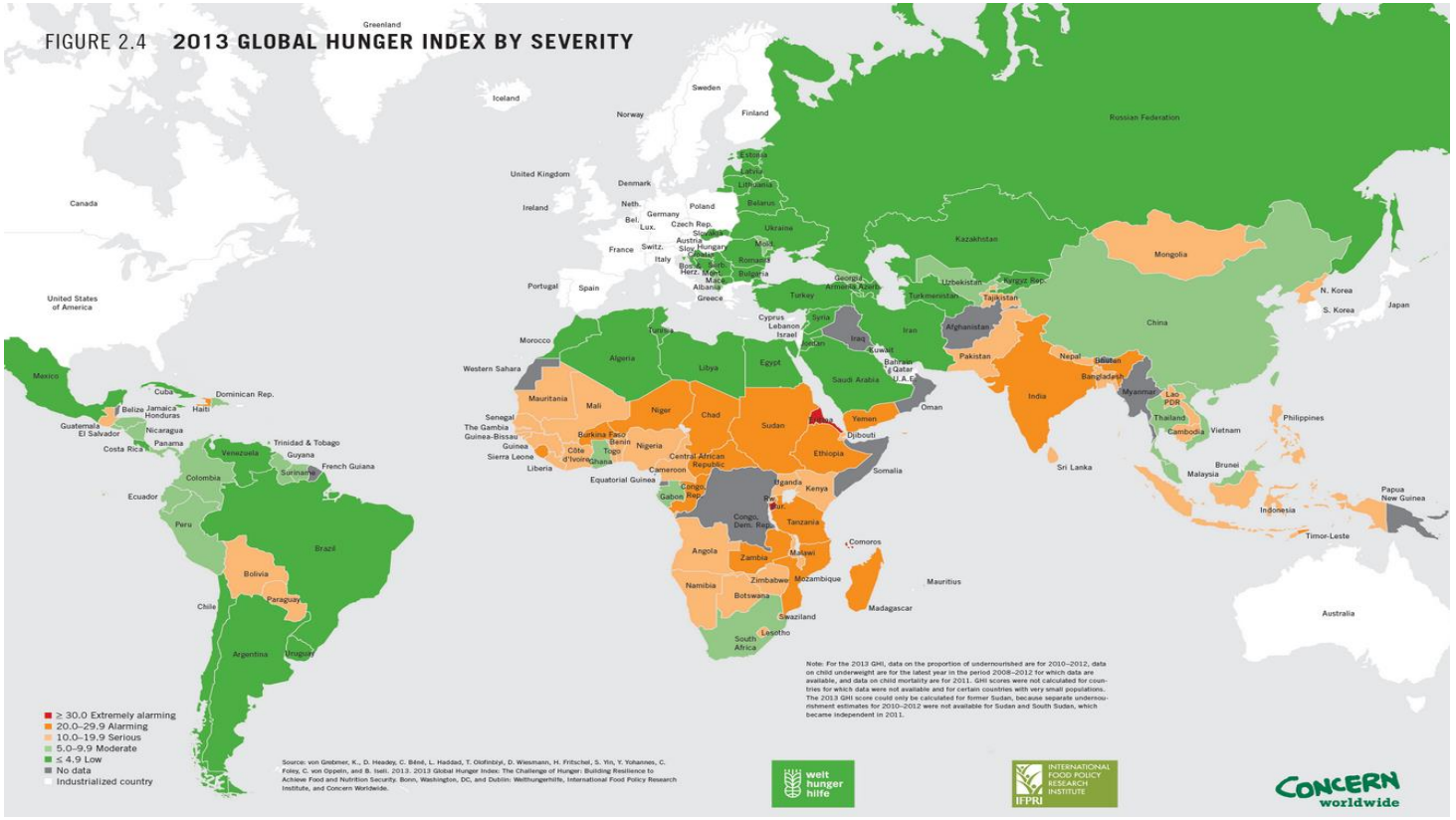
AIEAA conference

Political Reforms and Food Security: Evidence from child mortality

Pieters, H., Curzi, D., Opler, A., and J. Swinnen

Prevalence of hunger

- Vast differences in hunger and food insecurity across countries today



Food security

- Food insecurity is complex and multidimensional issue

- Large literature on the determinants of food security
  - Income
  - Human capital
  - Health environment

- Impact of institutions and political reforms?

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Do democracies matter?

Hypothesis:

Does a regime transition into a democracy (or autocracy) increases (reduces) food security?

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Median voter model

- Median voter model:
  - Median voter determines government policy
  - Electoral competition ➔ public goods provision

- If median voter attaches more value to food insecurity issues compared to elite in autocracy, then democratic transition will increase food security.

More complex issue?

- Democracy might be ‘captured’ or ‘constrained’
  - ***De jure*** does not imply ***de facto*** change in power

  ➔ No impact of democratization on food security

- Elite has incentives to stay in power
  - Care about food security issues

  ➔ No impact of democratization on food security

- Director’s law
  - Democracy may transfer political power to middle class rather than the poor

  ➔ Impact only if middle class favor food security enhancing policies

Empirical evidence

- Food security literature
  - ➢ Smith and Haddad (2000)
- Health literature – infant mortality and life expectancy
  - Positive impact
    - ➢ Besley and Kudamatsu (2006)
      - Positive and robust impact of political reform on life expectancy
      - Use of D-i-D
    - ➢ Kudamatsu (2013)
      - Negative and robust impact of political reforms on infant mortality
      - Use of D-i-D & focus on SSA
  - Negative impact
    - ➢ Ross (2006)
      - No robust correlation between history of democracy and infant and child mortality

Our contributions

- Use of child mortality as food security proxy
- Use of different definitions of political reforms
- In addition to traditional difference-in-difference technique, we use the synthetic control method as robustness check

Preview of the results

- Difference-in-Difference:
  - Political reforms increases food security
  - Confirms findings of other papers like Besley and Kudamatsu (2006) and Kudamatsu (2013)

- Synthetic Control Method:
  - In general, no systematic effect of political reforms on child mortality

Difference-in-Difference method

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Model

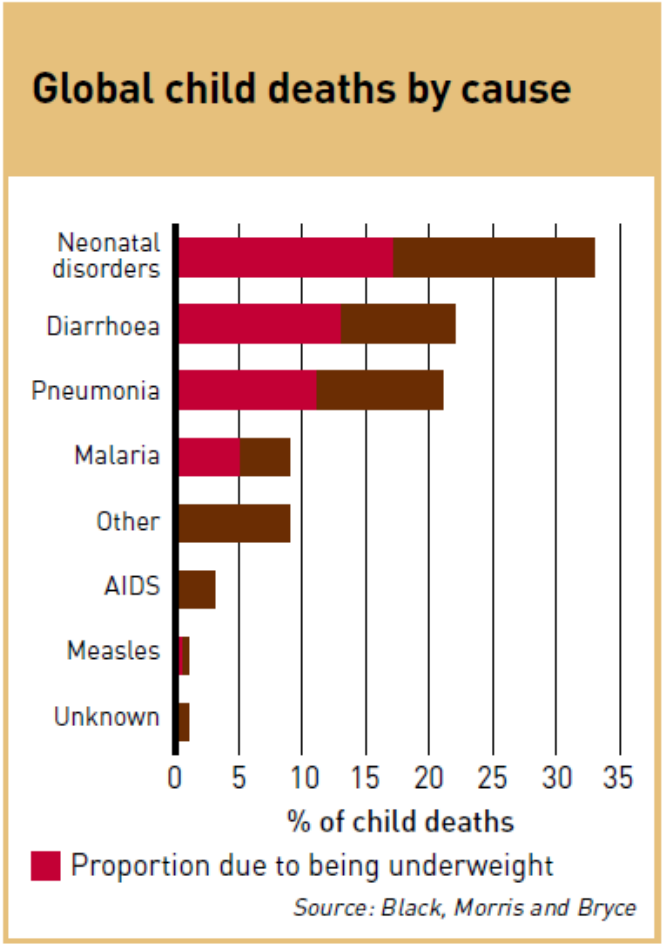
- Estimation of the following regression:

$$Y_{i,t} = \alpha_i + \rho_t + \beta D_{i,t} + \gamma X_{i,t} + \varepsilon_{i,t}$$

- $Y_{i,t}$: child mortality (per 1,000 live births)
- $D_{i,t}$: indicator variable for being “democratic”
- $X_{i,t}$: vector including country level controls
  - GDP per capita, conflict, food supply, percentage of rural population, primary female education, ODA as a percentage of GDP
- α_i: country-fixed effect
- ρ_t: time-fixed effect
- $\varepsilon_{i,t}$: error-term clustered at country-level

Child Mortality

- Per 1,000 live births
- Data availability
- More than 50 percent of child deaths are related to undernutrition



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Results

Dependent variable	Under-five Mortality Rate				
Variables	(1)	(2)	(3)	(4)	(5)
Democratization index	-14.57***	-15.58***	3.965	-24.65***	3.694
	(4.808)	(4.393)	(8.352)	(4.699)	(16.38)
Log GDP per capita	-167.1***	-154.1***	-173.4***	-270.3***	-203.9***
	(50.48)	(54.83)	(61.47)	(57.24)	(74.20)
Log GDP per capita squared	11.35***	10.62***	10.38***	17.00***	12.51***
	(3.127)	(3.361)	(3.695)	(3.464)	(4.492)
Conflict dummy = 1 if > 1000 battle-realted deaths	2.481	-0.748	3.044	7.590**	4.997
	(2.910)	(3.342)	(2.853)	(3.399)	(4.157)
Percentage of females with primary education	-0.101	-0.282	-0.589	-0.471*	-0.560
	(0.307)	(0.321)	(0.454)	(0.276)	(0.481)
Log Food supply per capita	-78.91***	-85.72***	-57.83**	-48.66***	-58.59**
	(17.37)	(18.41)	(21.93)	(17.06)	(25.69)
Percentage of rural population	77.14	29.87	49.45	17.69	18.96
	(51.48)	(48.65)	(70.32)	(47.79)	(66.84)
ODA as a percentage of GDP	-0.287	-0.321	0.296	-0.00204	0.373
	(0.214)	(0.208)	(0.284)	(0.245)	(0.306)
Treatment	Democracy & Autocracy	Democracy	Autocracy	Permanent democracy	Permanent Autocracy
Observations	3213	2840	1765	2430	1458
Number of countries	82	76	55	64	41

* p<0.10, ** p<0.05, *** p<0.01

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Robustness checks

- Different definition of political reforms
  - Papaioannou and Siourounis (2008)
  - Acemoglu et al. (2014)
- Use of infant mortality as dependent variable
- Analysis of the timing of the effect: no anticipation effect

➔ Still significant and robust

Synthetic Control Method

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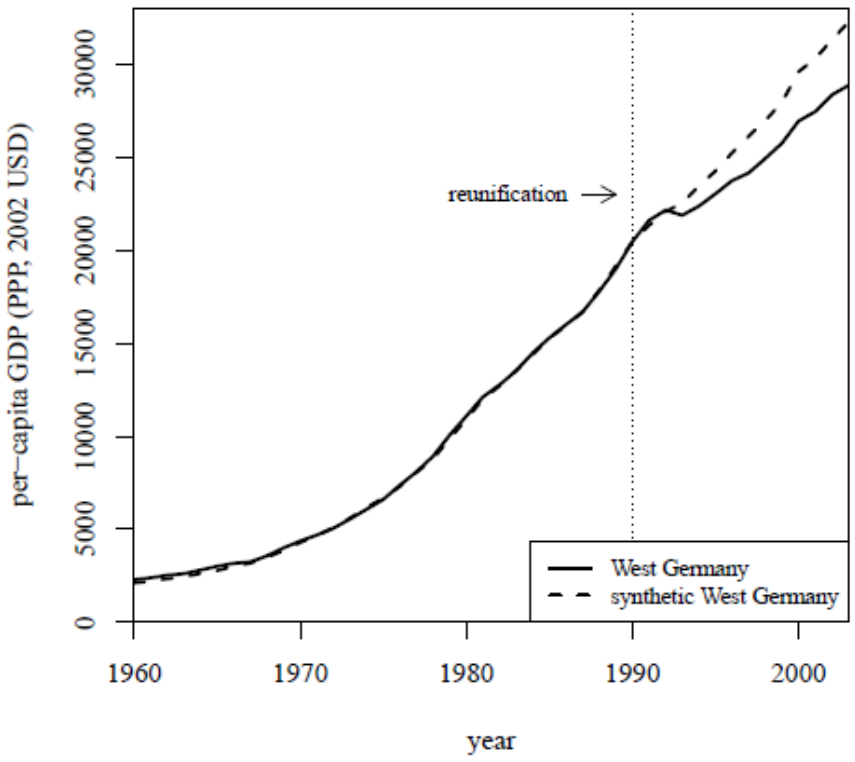
Model

- “Synthetic control” developed by Abadie and Gardeazabal (2003); Abadie et al. (2013)
  - Weighted average of all untreated countries
  - Based on pre-treatment values of variables
  - Minimizes the sum of squared differences of the observables

Model

Evaluation of the treatment effect by comparing the trend in the outcome variable between the synthetic control and treated country.

Figure 2: Trends in Per-Capita GDP: West Germany vs. Synthetic West Germany



Source: Abadie et al. (2012)

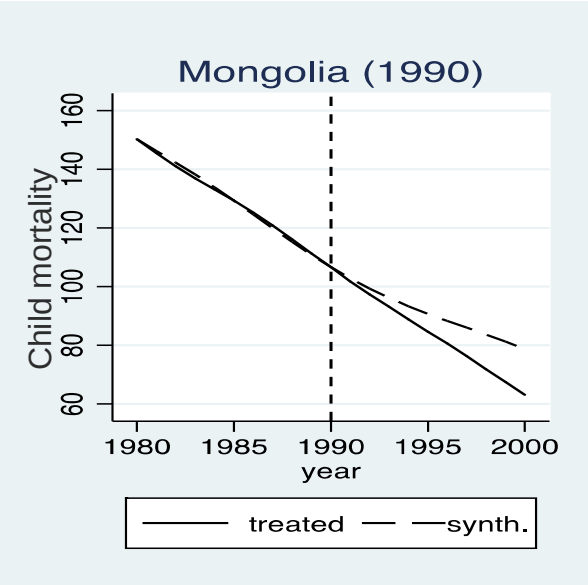
Model

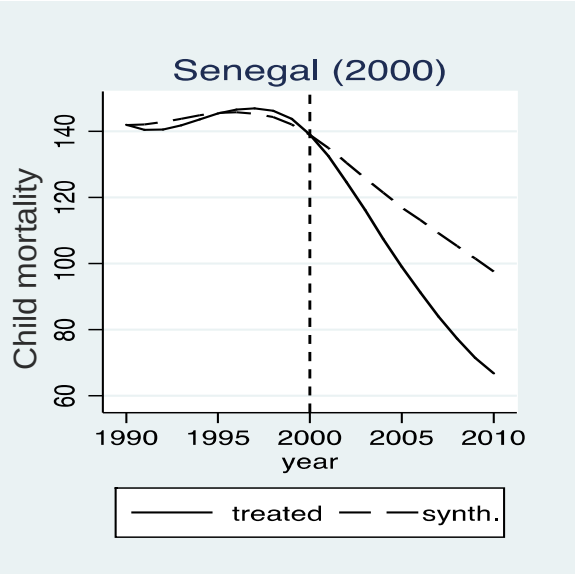
- Comparison with Diff-in-Diff
  - The counterfactual fits, by construction, better the pre-treatment period between treated country and counterfactual
  - Controls for unobserved time variant heterogeneity
  - Both internal (good common support) and external (generalization) valid results

Results

- Negative relation between child mortality and political reforms:
  - 8 countries
    - Guatemala (1986); Mexico (1994); Cape Verde (1991); Senegal (2000); Philippines (1986); Nepal (1990); Bangladesh (1991); Mongolia (1990); Honduras (1980)
  - 4 countries survive the placebo test
    - Guatemala, Mexico, Senegal and Philippines
- No impact between child mortality and political reforms
  - 17 countries
    - Dominican Republic (1978); Bolivia (1982); El Salvador (1982); Brazil (1985); Pakistan (1988); Chile (1989); Panama (1989); Paraguay (1989); Nicaragua (1990);); Guyana (1992); Central African Republic (1993); Djibouti (1999); Indonesia (1999); Nicaragua (1999); Madagascar (1991); Benin (1991)
- No good counterfactual for 8 countries
  - Uruguay (1985); Korea (1987); Zambia (1991); Mali (1992); Mozambique (1994); Malawi (1994); Ghana (1996); Nigeria (1999)

Results





	Treated	Synthetic
war	0	0.17
ln(gdp)	7.7	7.9
% rural pop	0.5	0.6
population growth	0.03	0.02
female education	15.3	9.2
u5mr (T_0 - 10)	150.2	150.2
u5mr (T_0 - 5)	129.3	129.3
u5mr (T_0)	106.6	106.6
u5mr (T_0 + 5)	84.6	90.7
u5mr (T_0 + 10)	63.1	78.6
RMSPE	0.8	

	Treated	Synthetic
war	0	0.07
ln(gdp)	7.1	7.2
% rural pop	0.7	0.7
population growth	0.03	0.03
female education	14.4	11.0
u5mr (T_0 - 10)	142	141.9
u5mr (T_0 - 5)	145.4	145.6
u5mr (T_0)	139.0	138.9
u5mr (T_0 + 5)	99.0	117.0
u5mr (T_0 + 10)	66.8	97.6
RMSPE	1.4	

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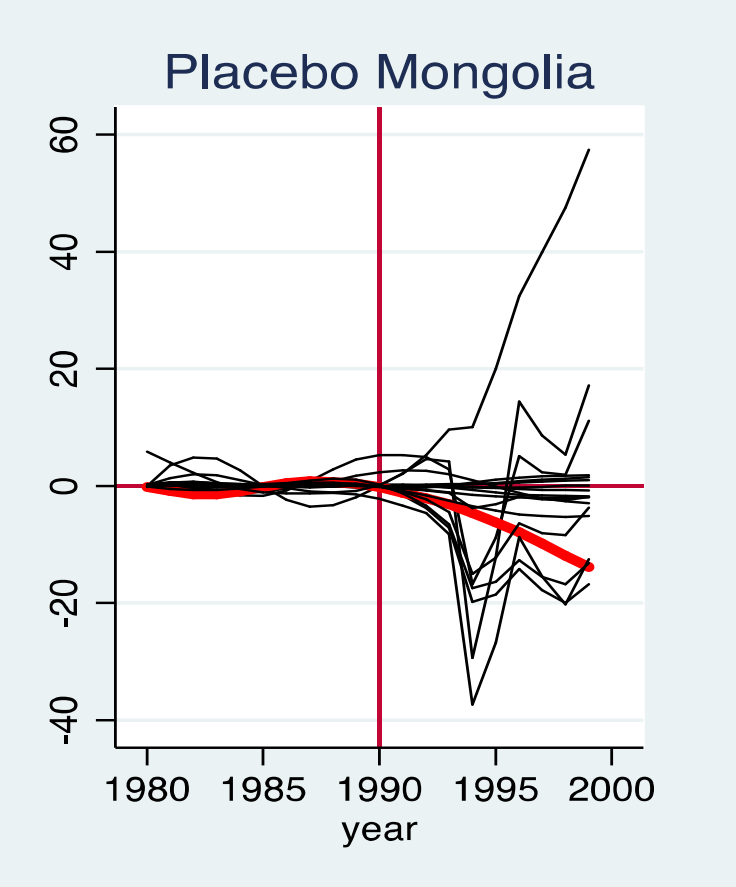
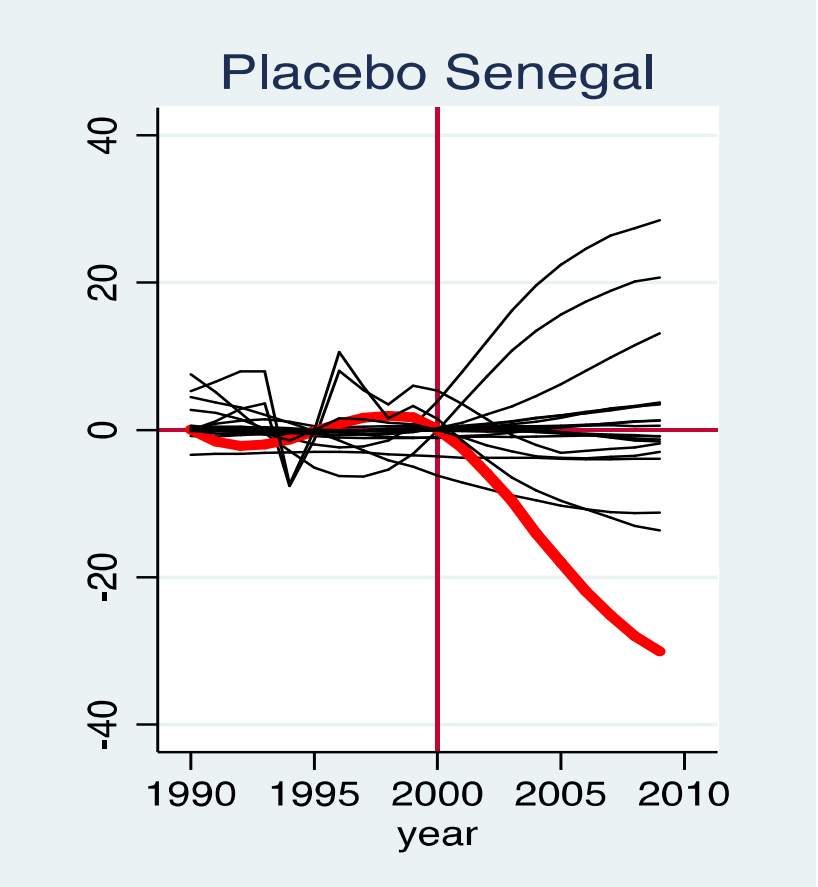
Placebo test





Conclusion

- Impact of political reforms on child mortality
  - Diff-in-Diff:
    - Negative impact of political reform on child mortality
    - Impact is not symmetric
  - SCM
    - No systematic impact of political reforms on child mortality
    - Significant effect for 4 countries
- Explained by:
  - Better counterfactual

Thanks!

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Results

Dependent variable Variables	Under-five Mortality Rate (1)
Pretreatment period = 1 if T-4 < t < T and 0 otherwhise	-1.870
	(3.226)
Treatment period 0 = 1 if T-1 < t < T+3 and 0 otherwhise	-5.318
	(4.023)
Treatment period 1 = 1 if T+2 < t < T+7 and 0 otherwhise	-11.26**
	(4.984)
Treatment period 2 = 1 if T+6 < t and 0 otherwhise	-19.12***
	(6.209)
Log GDP per capita	-279.0***
	(59.59)
Log GDP per capita squared	17.52***
	(3.627)
Conflict dummy = 1 if > 1000 battle-realted deaths	9.317**
	(3.594)
Percentage of females with primary education	-0.471
	(0.297)
Log Food supply per capita	-49.41***
	(18.38)
Percentage of rural population	24.45
	(50.71)
ODA as a percentage of GDP	-0.122
	(0.270)
Constant	6566.9***
	(713.8)
Time fixed effects	Yes
Country fixed effects	Yes
Region trend effects	Yes
Observations	2430
Number of countries	64

Notes:
Standard errors clustered at country levels are reported in parentheses
* p<0.10, ** p<0.05, *** p<0.01

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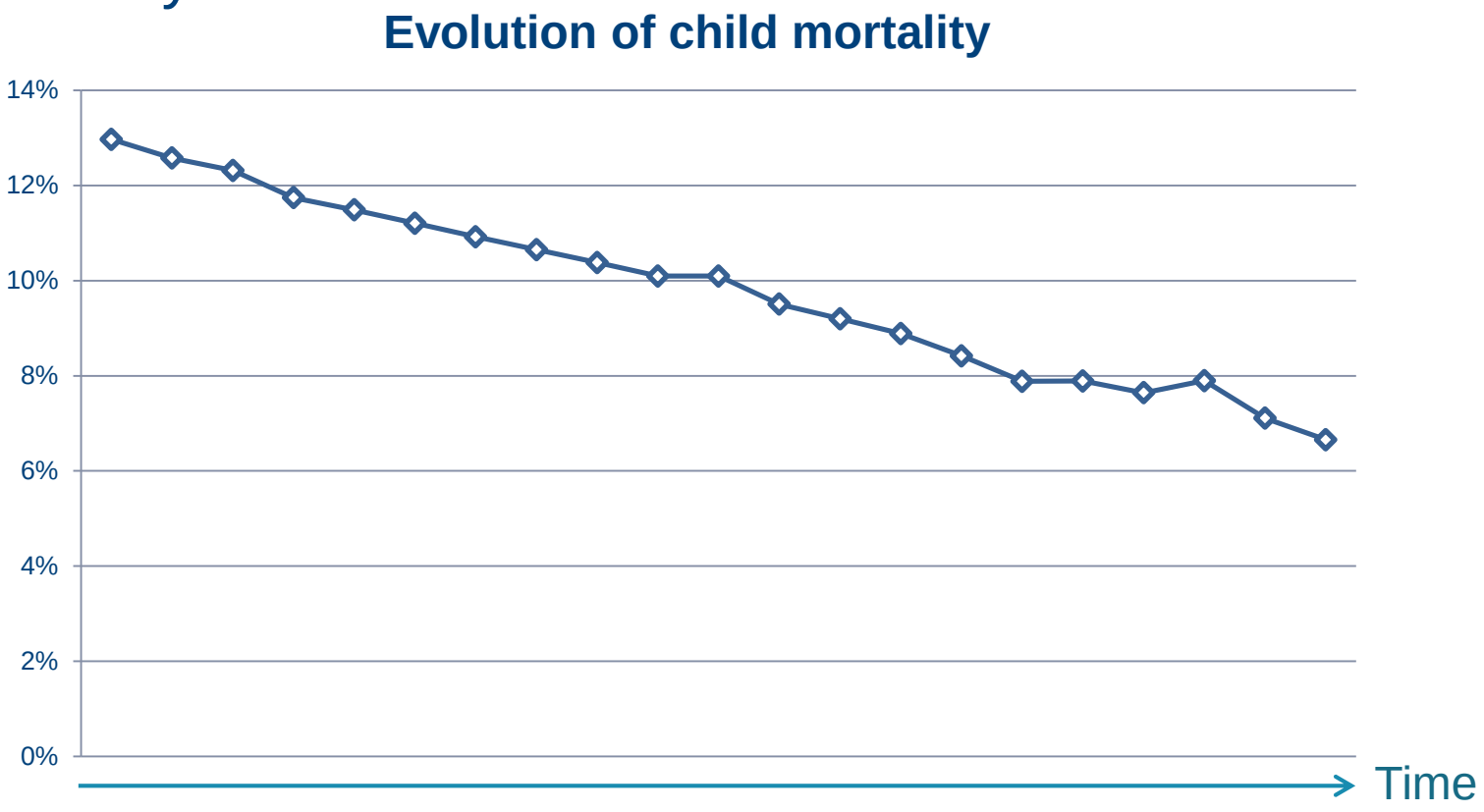
Child mortality rates

- Average child mortality of treated is 115
- Average child mortality of control is 75

Preview of the results

- Can you define the year of transition from autocracy to democracy?



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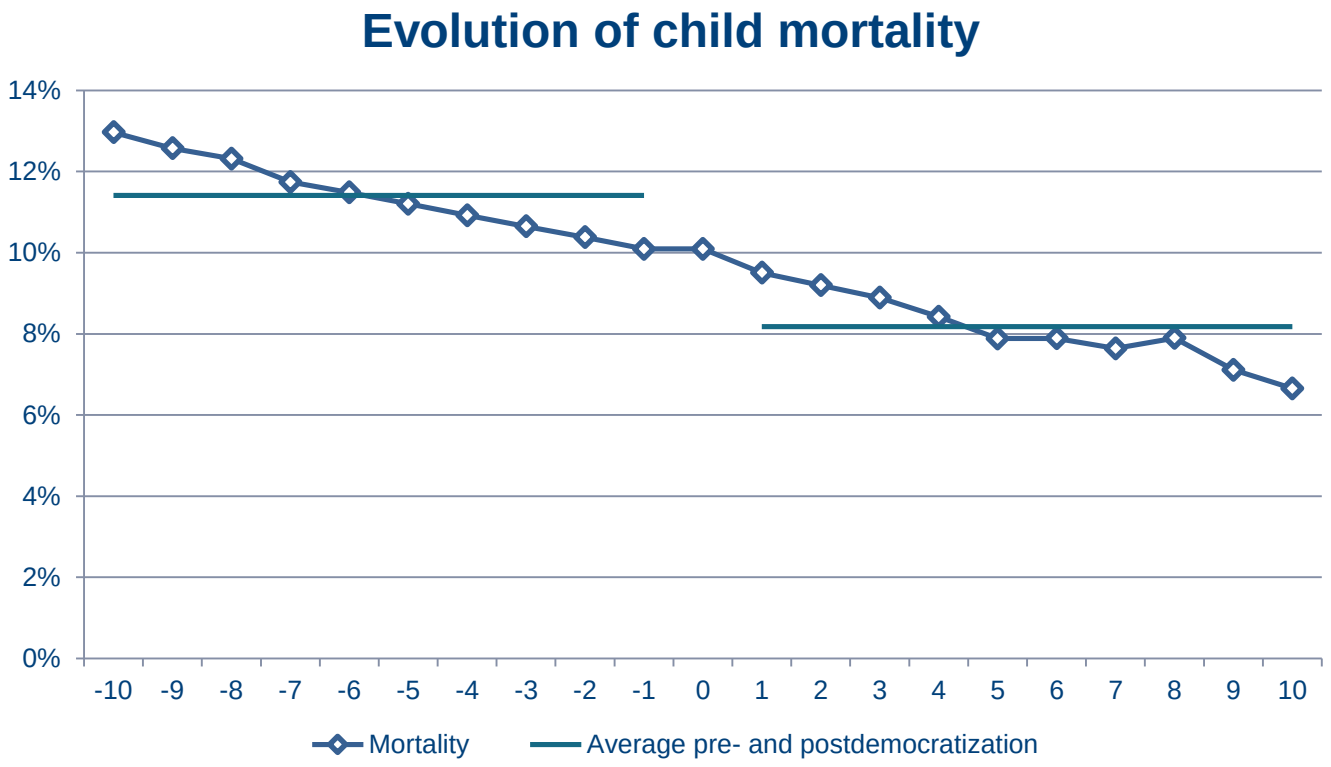
Preview of the results

- Comparison of the average pre- and post-democratization period might have led to other conclusions



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Political reform indicator

- Based on Pearson and Tabellini (2008)
  - Polity2 index
    - Data from Marshall and Jaggers (2007)
    - Score from -10 to +10 with higher values associated better democracies
  - A country is classified as “democratic”

$$D = 1 \text{ if } Polity2 > 0$$

- Use of dummy variable
  - Reduction measurement error which created spurious movements

- The switch must hold for at least 4 years or 10 years