THE PERMANENT EFFECTS OF RECESSIONS ON CHILD HEALTH: EVIDENCE FROM PERU

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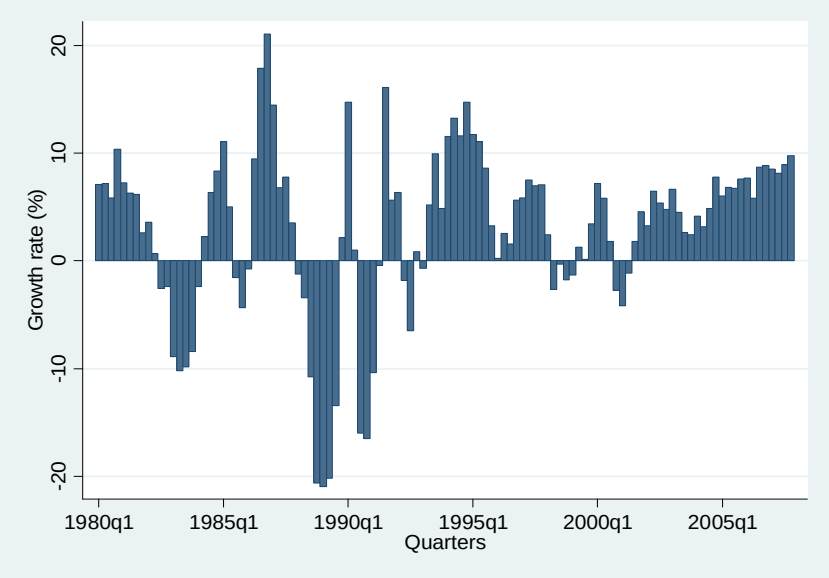
Conceptual setup

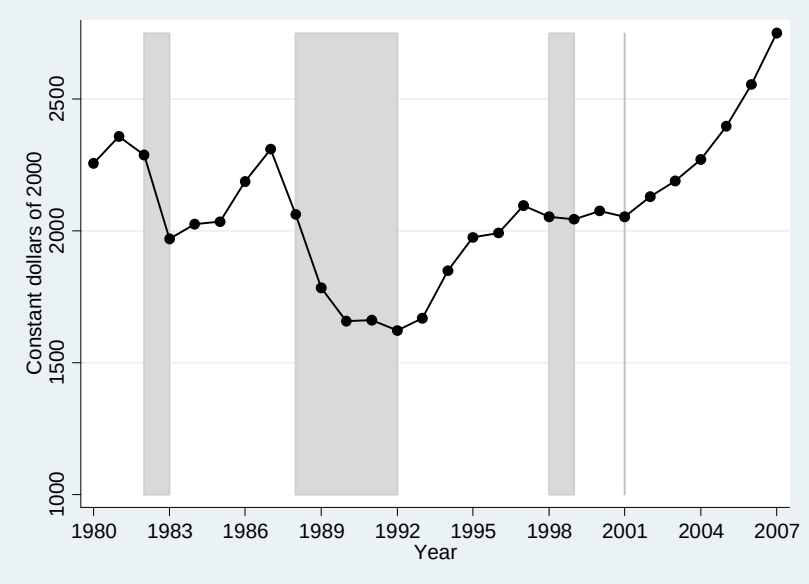
- Macroeconomics shocks are temporary by definition. However, duration and limitations of public and private safety nets may lead to permanent effects, especially to the most vulnerable (poor, uninsured)
  - Infant mortality
  - Child malnutrition
- Fiscal effects also limit the capacity of public safety net to respond accordingly
- In turn, negative shock on human capital also negatively affect the long-run growth path of the economy
- Main goal: learn from previous crises about the potential of the current crisis to negatively affect child health now

Empirical strategy

- Data: All available rounds of the Peruvian DHS
  - Years: 1986, 92, 96, 2000, 2004-05
  - Nationally representative sample of women in reproductive age (15-49)
- We estimate GDP effects on:
  - Infant mortality (all birth history)
  - Child nutrition
  - Maternal mortality (prenatal controls)
- Key identification strategy: Mother´s fixed effects
- Extrapolation issues

The Peruvian crises: 1980-2007





- Four "clear" recessions/ crises since 1980
  1. **1982-83**: combination of domestic, external and climatic shocks
  2. **1988-92**: hyperinflation followed by structural adjustment in 1990
  3. **1998-99**: external factors, less dramatic
  4. **2001**: external and much shorter

- Regional variations are not used, as we can only know the location of the women at moment of survey, not at moment of birth

Conceptual framework: Income and substitution effects

- Income effect (IE):
  - Households see their income go down during macroeconomic crisis (unemployment, lower wages)
  - Households are less able to purchase health-improving inputs
- Substitution effect (SE):
  - Lower wages allows family members to dedicate more time to health-promoting activities
- Thus, in principle, net effect is ambiguous
  - Efficiency of public and private safety nets are key
  - Fiscal shock limit ability of public safety net
- Heterogeneous effects
  - Importance of private safety nets (precautionary savings, credit, insurance, diversification) may lead to heterogeneous effects
  - Transaction costs may isolate some households from market fluctuations

Methodology

- We estimate the following model:

$$y_{imt} = \alpha + \beta \cdot g(GDP_{imt}) + f(t) + \theta' x_{imt} + \eta_m + e_{imt} \qquad (1)$$

- y_{imt} : health outcome for child i born to mother m at time t
- *g(GDP)*: log of GDP per capita at moment of birth/ survey
- *f(t)*: time trend

  x_{imt} observable characteristics (child birth order, gender, month of birth, mother´s education)

  η_m mother´s fixed effects

- standard errors are robust to heteroskedacity, clustered at regional level

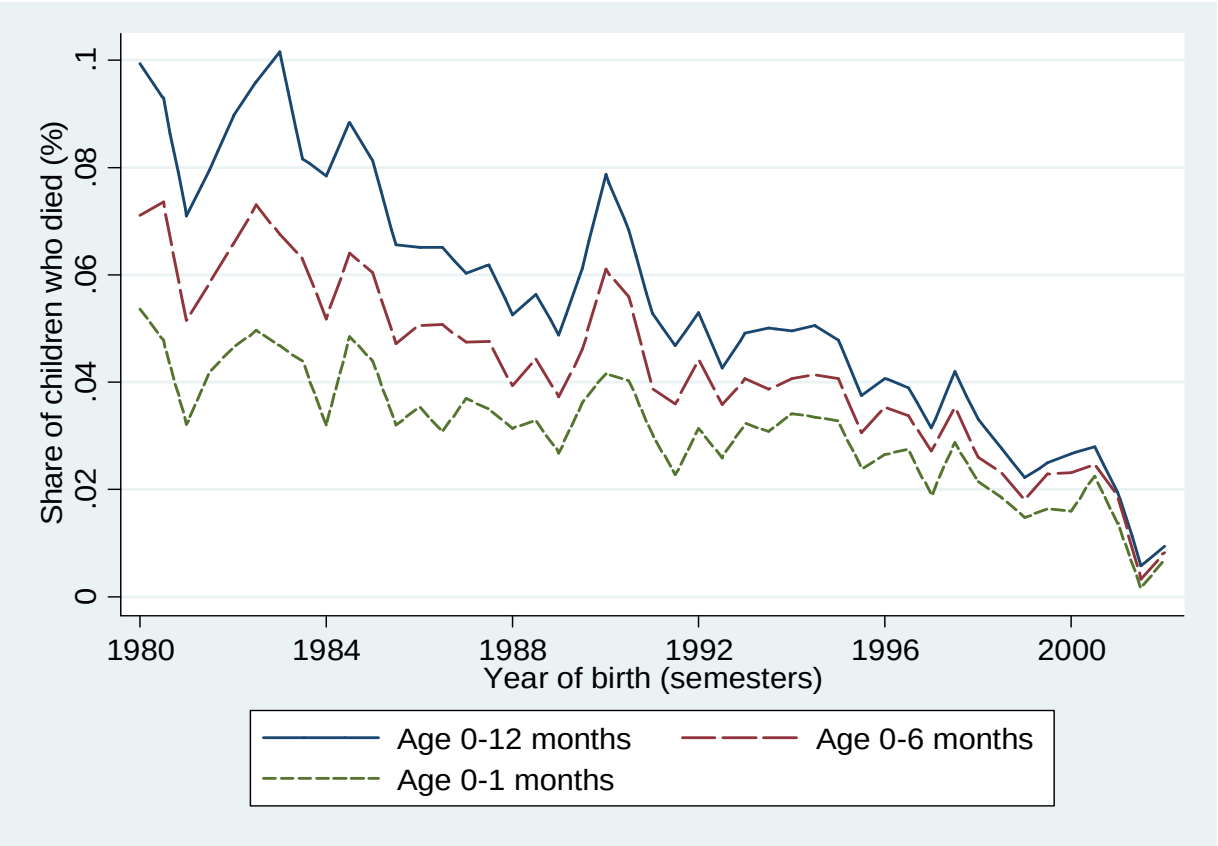
Summary statistics

		Full sample		2+ sample	
Variable	Units	Mean	Std Dev.	Mean	Std Dev.
		Panel A: Infant mortality (N_{Full} = 102,434 and N_{2+} = 82,943)			
Under 12 months	Binary	0.061	0.239	0.070	0.254
0-6 months	Binary	0.047	0.211	0.053	0.224
Under 1 month	Binary	0.035	0.183	0.039	0.194
Mother's age	Years	32.644	7.047	32.880	6.572
Mother's schooling	Years	5.963	4.359	5.407	4.163
Married	Binary	0.949	0.221	0.966	0.181
		Panel B: Child health (N_{Full} = 36,256 and N_{2+} = 16,127)			
Height for age	Z-score	-1.318	1.367	-1.553	1.380
Stunted	Binary	0.304	0.460	0.378	0.485
		Panel C: Prenatal visits (N_{Full} = 29,697 and N_{2+} = 9,542)			
Had prenatal care	Binary	0.692	0.461	0.560	0.496
Visits	Number	4.063	3.884	2.827	3.486
Had 4+ visits	Binary	0.499	0.500	0.338	0.473

Variation across siblings in the exposure to recessions at birth

	Proportion of siblings born during a recession (by survey)					
Born during	1986	1992	1996	2000	2004+	All surveys
a recession	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Infant mortality sample						
Yes	0.398	0.493	0.595	0.516	0.176	0.485
	(1,911)	(9,387)	(15,388)	(13,283)	(6,526)	(46,495)
No	0.122	0.345	0.408	0.416	0.133	0.382
	(866)	(7,058)	(15,449)	(11,748)	(1,327)	(36,448)
Panel B: Child health sample						
Yes		0.980	0.340	0.234	0.189	0.344
		(810)	(5,214)	(3,579)	(673)	(10,276)
No		0.738	0.030	0.034	0.000	0.397
		(3,031)	(1,828)	(865)	(127)	(5,851)
Panel C: Prenatal visits sample						
Yes		0.966	0.507			0.603
		(1,045)	(3,923)			(4,968)
No		0.594	0.047			0.345
		(2,487)	(2,087)			(4,574)

Infant mortality



- Paxson and Schady (2005)
  - constructed a time series of IMR
  - focused on the 1988-92 crisis and use 1988-2000 DHS
  - Estimate: crisis "generated" 17,000 additional deaths
  - Limitation: selection problems due to income (income and desired fertility) and substitution (lower wages)
- We extended their analysis by including the 2004+ DHS and all crises
  - Mother fixed effects
  - Separate time trend from GDP effect
  - Clustered errors

Results infant mortality

	Full sample (1)	2+ sample (2)	Mother FE (3)
	Panel A: Linear trend		
Ln (GDP)	-0.018	-0.018	-0.027
	[0.008]**	[0.009]**	[0.010]***
	Panel B: Quadratic trend		
Ln (GDP)	-0.028	-0.028	-0.022
	[0.010]***	[0.011]**	[0.012]*
	Panel C: Cubic trend		
Ln (GDP)	-0.028	-0.028	-0.021
	[0.010]***	[0.011]**	[0.012]*
Observations	102,434	82,943	82,943
Number of mothers			29,341

Note: Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. Regressions include child's birth order, gender, separate dummies for the child's month of birth and the mother's educational level. Mother's age and her marital status are calculated for the child's year of birth. The 2+ sample refers to mothers with two or more live births.

- A 10% decrease in GDP leads to a 2.7 per thousand in the IMR
- Estimated coefficients imply an elasticity of mortality for the whole period between -0.30 to -0.39
- Friedman and Schady (2009) find that the equivalent figure for Africa is between -0.32 and -0.58

Heterogeneity in infant mortality effects

Categories	Ln (GDP)	t-statistic
Panel A: By recession		
1982-1983	-0.0368	-2.84
1988-1992	-0.0381	-2.92
1998-1999	-0.0389	-3.07
2001	-0.0385	-3.03
Panel B: By mother's education		
No education	-0.0671	-2.54
Primary	-0.0173	-1.26
Secondary†	-0.0082	-0.51
Panel C: By gender of the child		
Boys	-0.0304	-2.12
Girls	-0.0238	-1.82

- Table presents results with mother FE and linear time trend
- Effects do not vary across crisis events or gender, but by mother's education
- A 10% decrease in GDP leads to
  - a 6.7 per thousand in the IMR, for children born to low-educated women
  - No effect for children of more educated women
- Potential contribution to health inequalities

Results child nutrition

	Full sample	2+ sample	Mother FE
	(1)	(2)	(3)
	Panel A: Effect on height-for-age		
Ln (GDP)	-0.355	-0.372	0.326
	[0.079]***	[0.109]***	[0.187]*
	Panel B: Effect on stunting		
Ln (GDP)	0.074	0.121	-0.036
	[0.027]***	[0.038]***	[0.072]
Observations	36,256	16,127	16,127
Number of mothers			7,676

- Proper signs only in specification with mother FE
- Implied elasticities:

HAZ z-score:	0.21
stunting	-0.10

Results antenatal care

	Full sample	2+ sample	Mother FE
	(1)	(2)	(3)
	Panel A: Effect on the probability of a visit		
Ln (GDP)	0.308	0.141	0.052
	[0.033]***	[0.040]***	[0.032]
	Panel B: Effect on the number of visits		
Ln (GDP)	3.224	1.302	0.794
	[[0.241]***	[0.268]***	[0.199]***
	Panel C: Effect on the probability to have 4 or more visits		
Ln (GDP)	0.383	0.149	0.106
	[0.031]***	[0.038]***	[0.034]***
Observations	29,515	9,481	9,481
Number of mothers			4,574

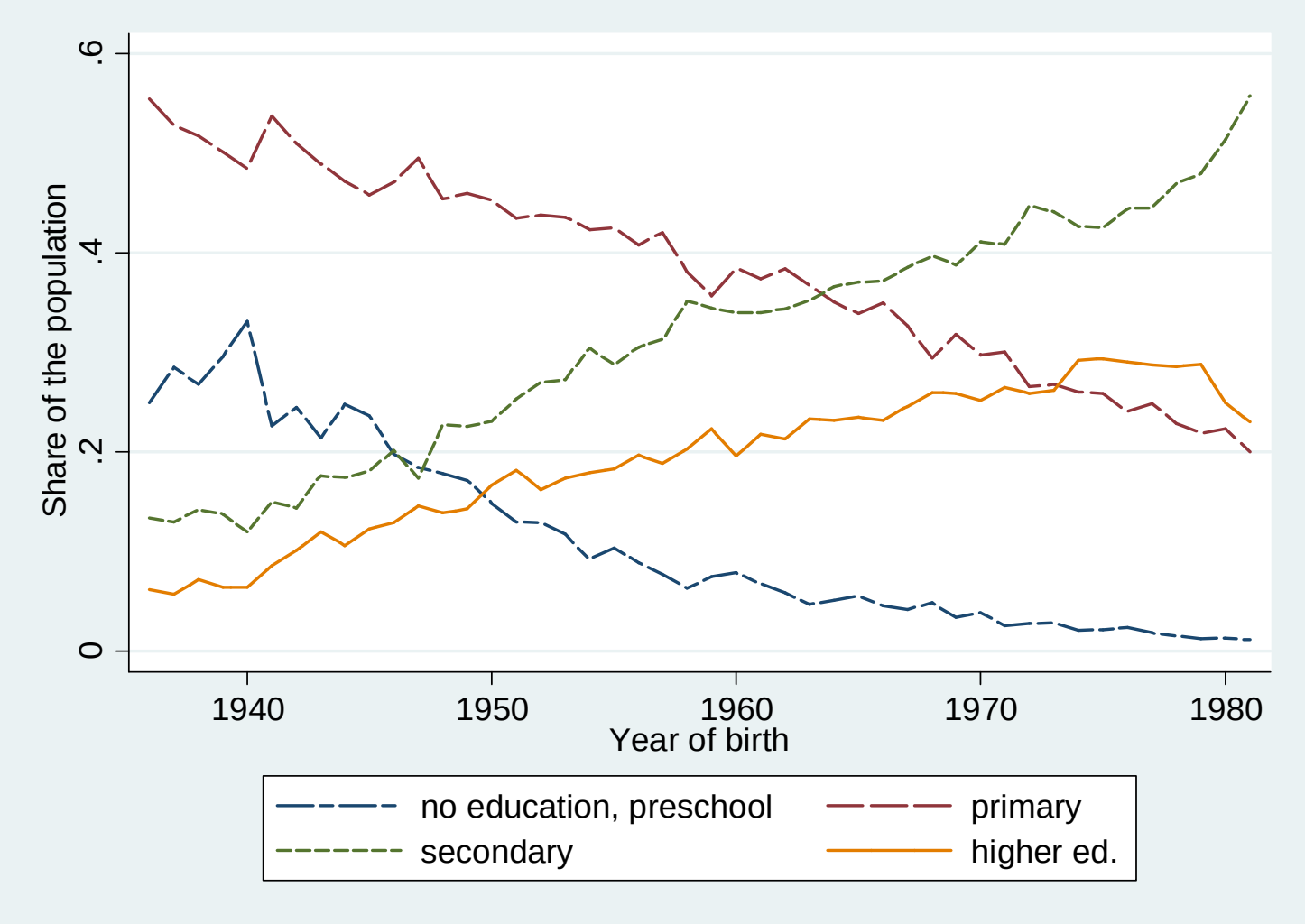
Summary

- We explore the effect of past crises on health related outcomes of mothers and children
  - This paper compares outcomes between children born to the same mother as way to obtain estimates that are closer to the “causal“ effect of the crisis
- Our results show that past macroeconomic crises increased infant mortality, child malnutrition and reduce the prevalence of antenatal care
  - That is, macroeconomic shocks have important permanent effects (affecting human capital of children of today, the adults of tomorrow)
  - Effects are higher for children born to low-educated women
- Finally, we discussed how these results could help us estimate the effect of the current crisis on the achievement of the MDGs in Peru

Lessons for the current crisis?

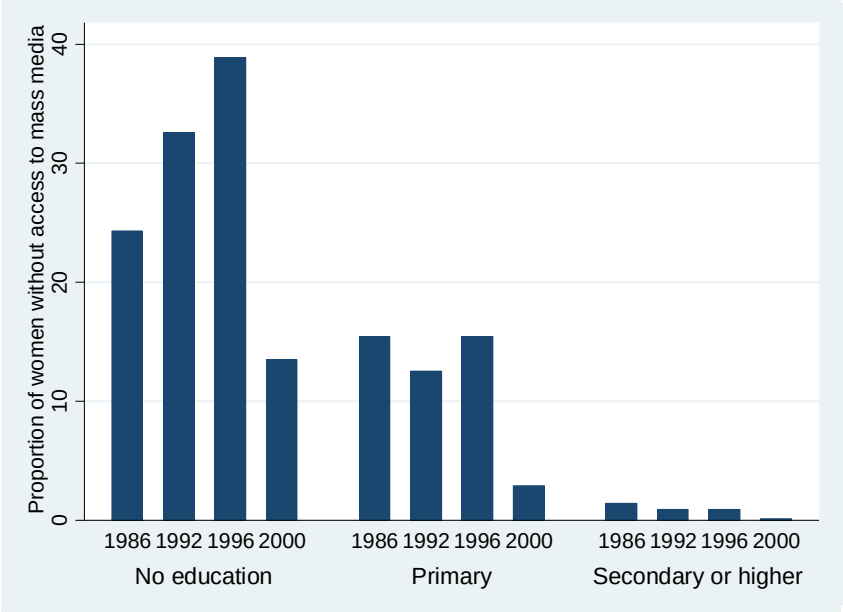
- We hope effects of the current crisis are smaller
  - Younger cohorts are more educated
  - Improved health information for women of all levels of education
  - Increased fiscal resources may help sustain or improve public safety net
  - Improved technologies to protect mother-child (CCT – Juntos, SIS)

Level of education by cohorts



Access to health information, by level of education

(a) Lack of access to mass media



(b) Access to vaccination for children