Does Child Market Work Affect Human Capital Accumulation?

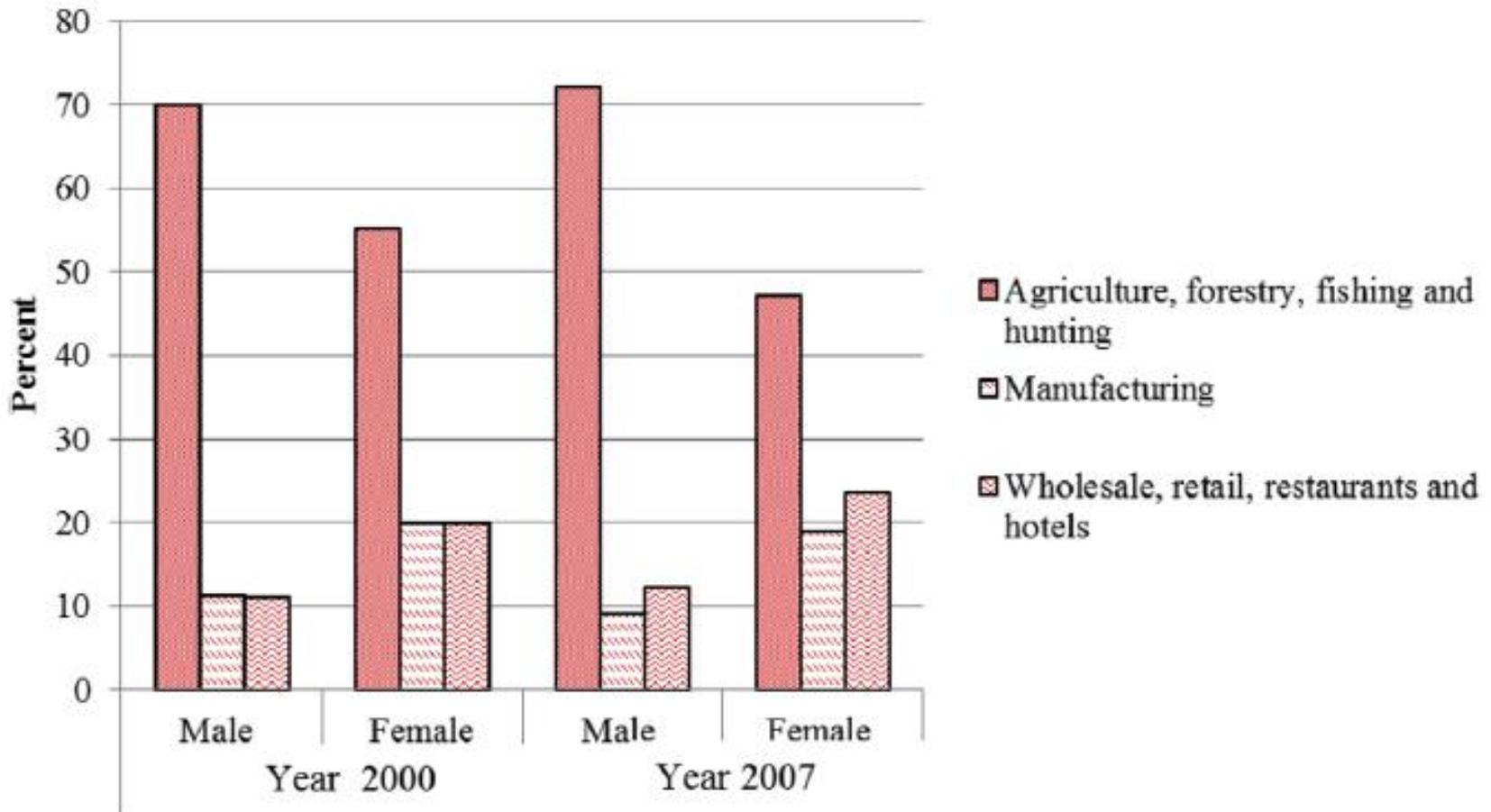Armand A. Sim, Daniel Suryadarma, Asep Suryahadi

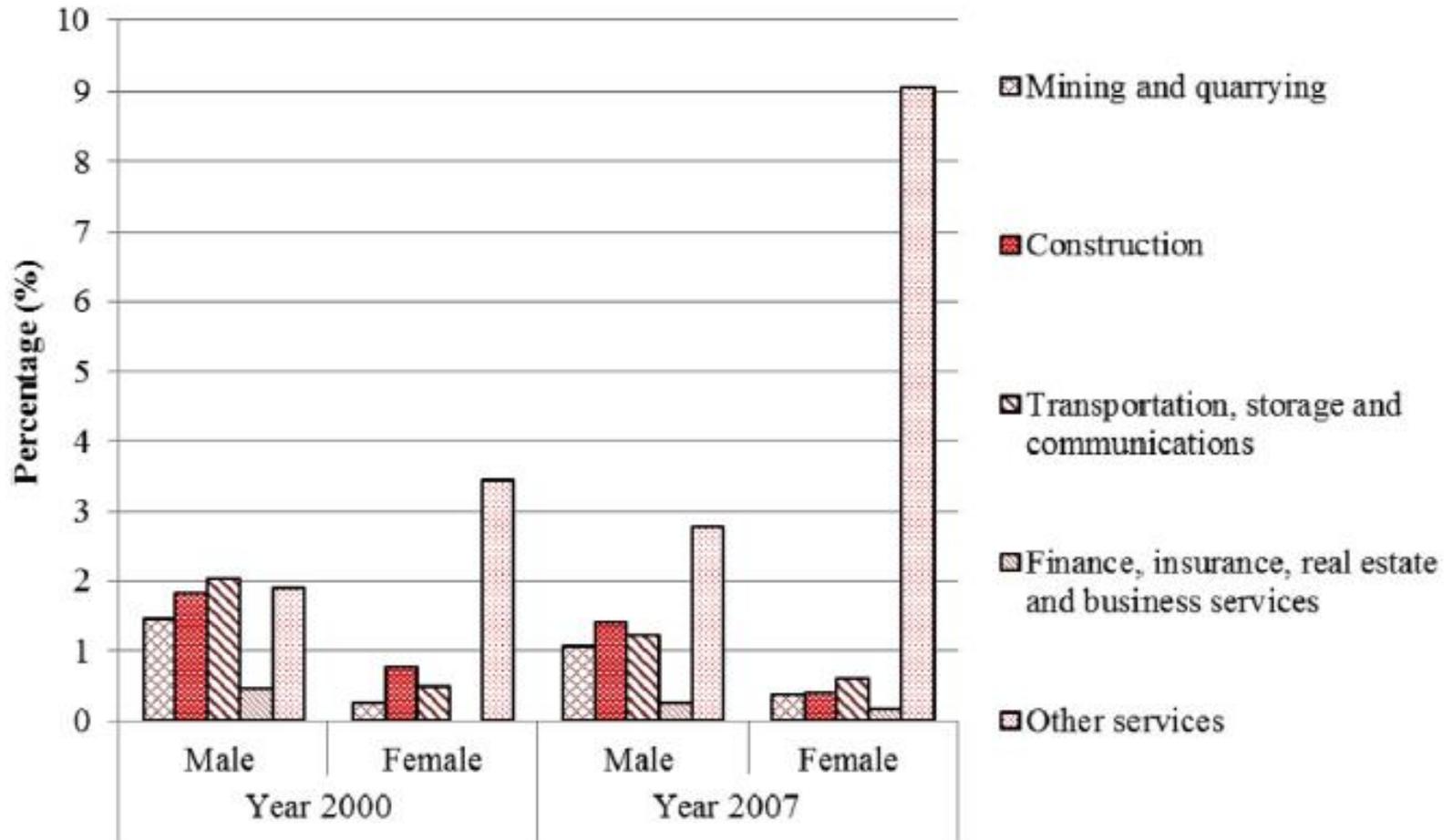In 2012, 168 million (11%) children globally worked.

85 million working in hazardous conditions (ILO-IPEC, 2013)

In 2007, 2.7 million Indonesian children 5-14 years old were working
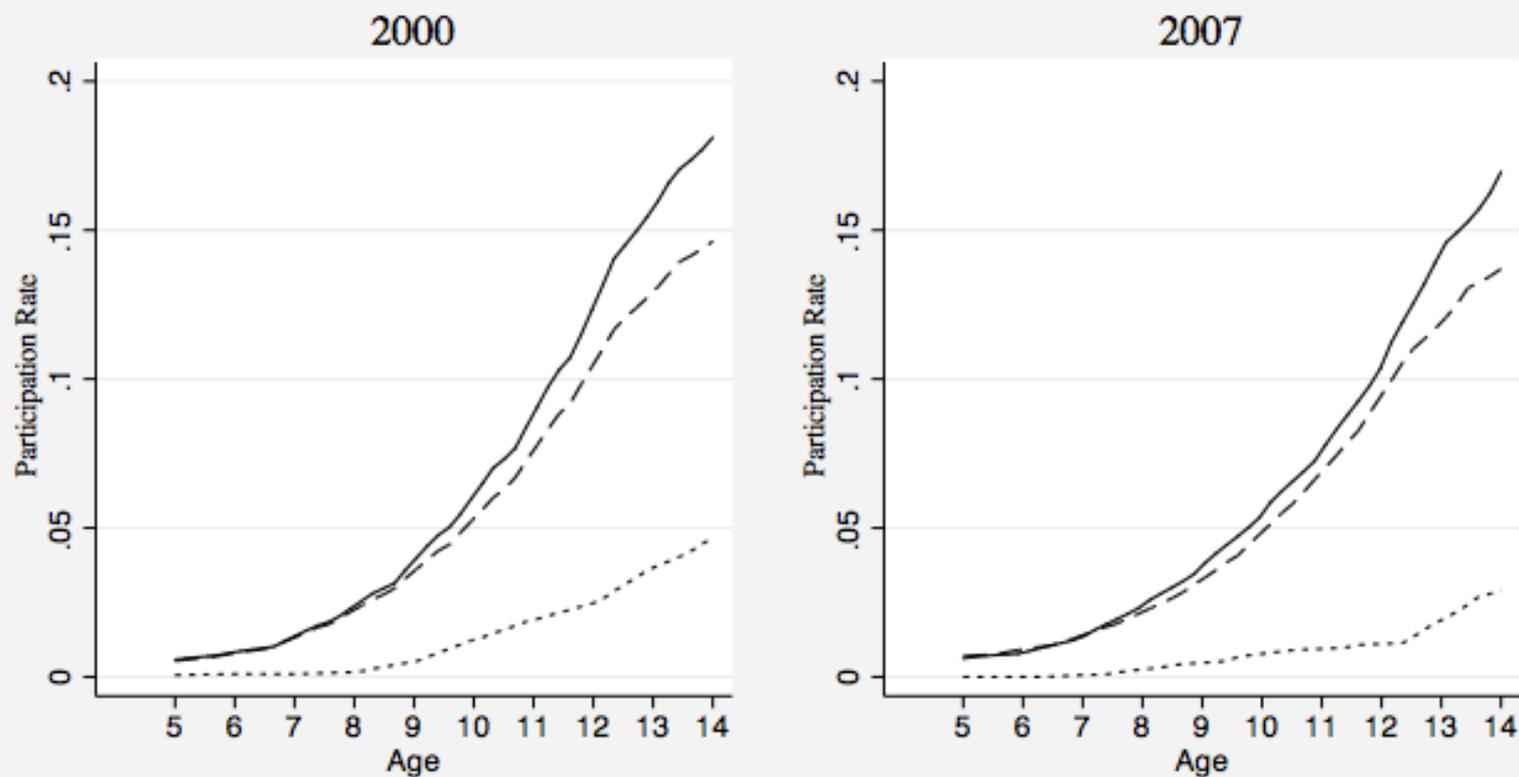
A sizeable proportion working in hazardous occupations

Child market work correlated positively with age. But most work done inside the household.

Figure 3. Child Market Work in 2000 and 2007, by Type of Work

Note: Lines are polynomial fit

For about two hours per day; more if outside household

Market Work Hours, by Gender and Type, 2000 and 2007
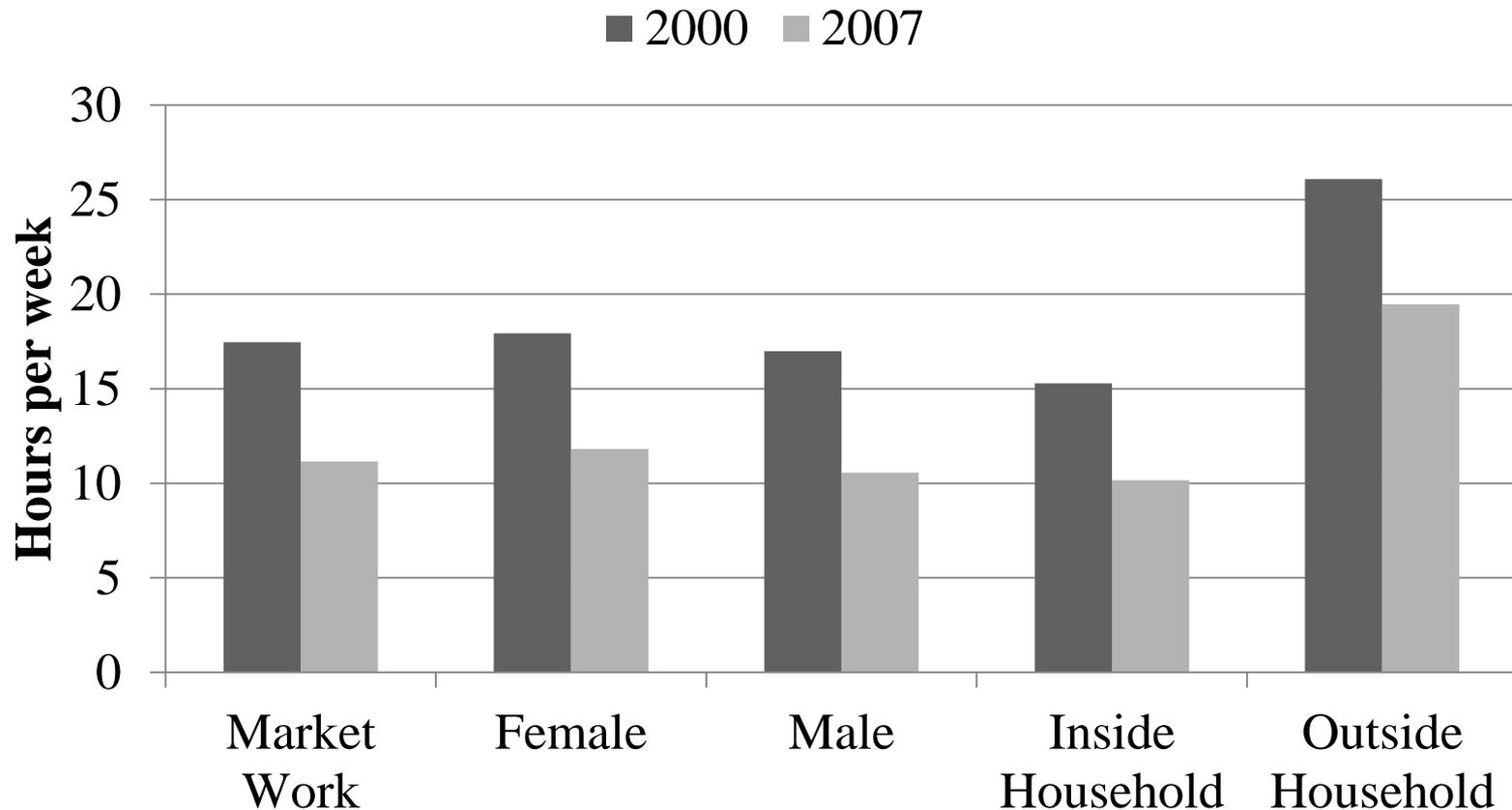
Child market work is closely linked to poverty

Figure 1. *Market work participation rate of 10- to 14-year-olds, by gender 1986–2007. Source: Authors' calculation from Sakernas 1986–2007.*

Child market work is inefficient if it adversely affects future earning ability (Baland & Robinson, 2000)

This paper examines the effect of child market work on human capital accumulation
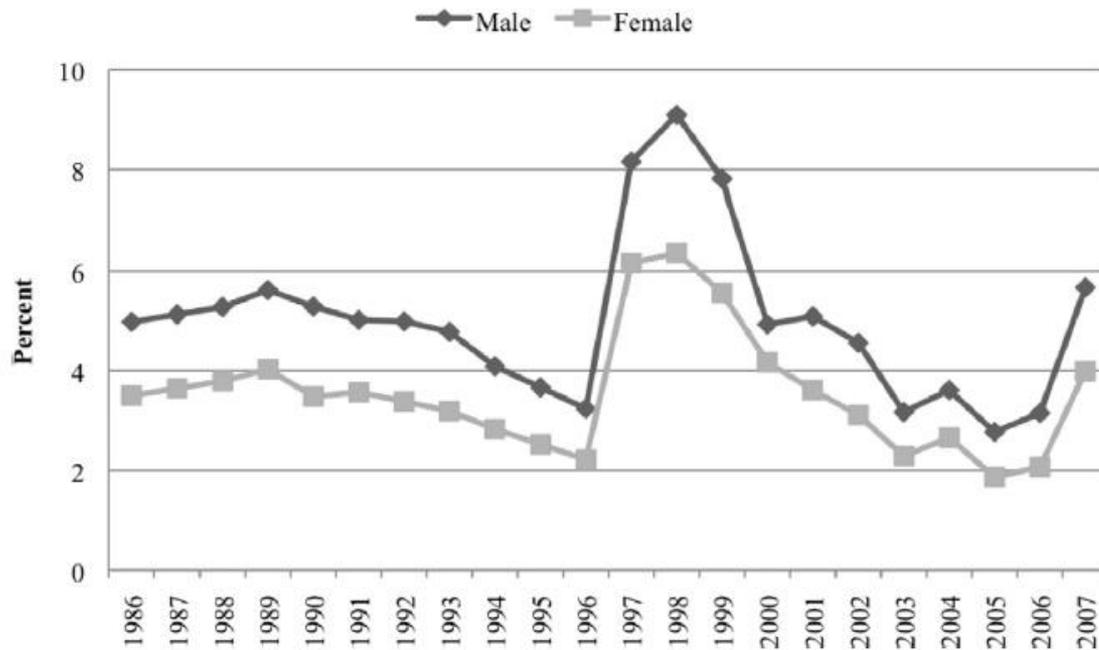
- Not many studies could examine medium-term effects on accumulation of human capital.
- "Market work" – economic goods/services. Note: could be unpaid.
  - Our definition: any market work in past month.
- Child: <15 years old
- Data:
  - Indonesia Family Life Survey 2000 & 2007
  - 83% of Indonesian population
  - 7,200 households in 1993; 13,000 in 2007.
  - Low attrition: 5% per wave; 88% original households were interviewed in all subsequent waves up to 2007.
  - Focus on the Child Labor Module in 2000 (given to 5-14 years old), then follow them in 2007.

IFLS has rich information on individuals

- Better measures of human capital
- Mathematics and cognitive skills (IFLS EK1)
  - 7-14 year-olds.
  - 5 numeracy and 12 shape matching problems.
  - Identical problems in 2000 and 2007. Test takers in 2000 asked to retake in 2007.
  - Since tests are identical and individuals are the same, any changes in performance measure actual skills growth over seven years.
- Lung capacity
  - Peak flow meter – expiratory flow rate in liters/minute.
  - Measures pulmonary function (Lebowitz, 1991) and respiratory health (Rojas-Martinez et al, 2007; Schwartz, 1989).
  - Depends on gender, age, height.
  - Children living in environment with higher air pollution experience smaller lung capacity growth (He et al, 10).

EK13.   49 - 23 = . . .

    a. 25

    b. 26

    c. 27

EK14.   267 + 112 - 189 = . . .

    a. 180

    b. 188

    c. 190

EK15.   (8 + 9)*3 = . . .

    a. 34

    b. 45

    c. 51

EK16.   56/84 = . . .

    a. 4/7

    b. 2/3

    c. 3/4

    d. 5/6

EK17.   1/3 - 1/6 = . . .

    a. 2/3

    b. 1/3

    c. 1/6

    d. 1/9
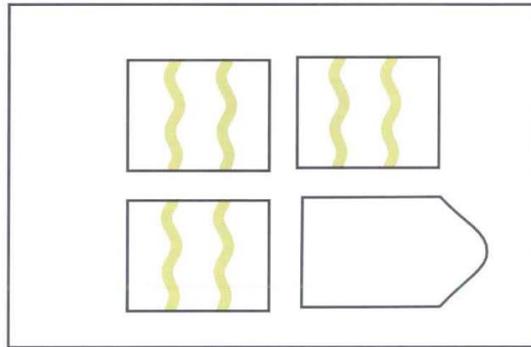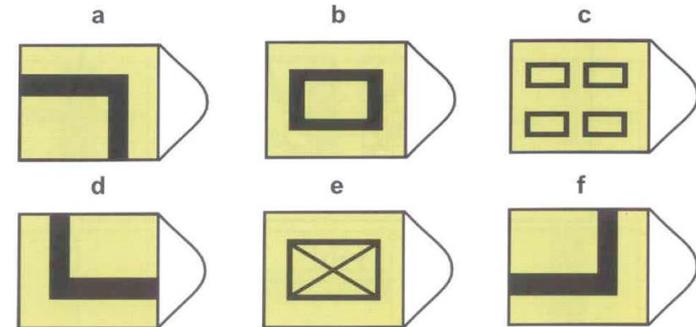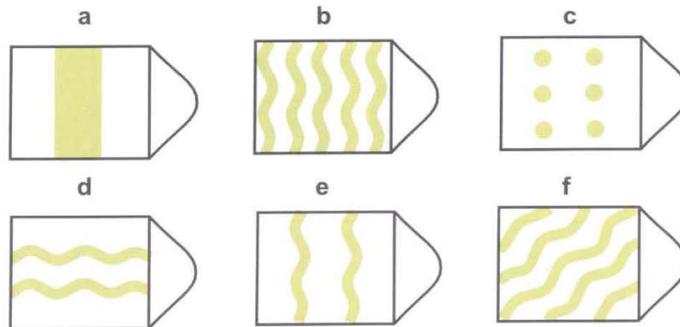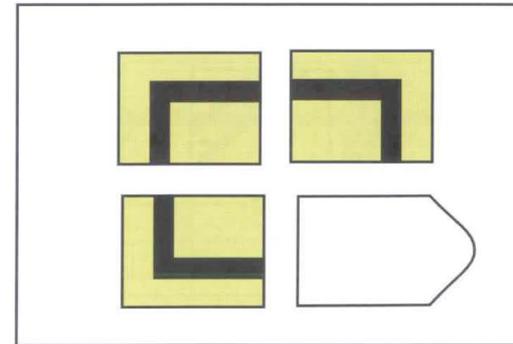
Model and Identification Strategy

$$\frac{Y_{ijk,2007}}{\sigma_{2000}} = f\left(W_{ijk,2000}, \frac{Y_{ijk,2000}}{\sigma_{2000}}, X_{ijk}, P_{ijk}, D_k, \varepsilon_{ijk}\right)$$

- Main problem: child market work is endogenous.

- Solution: use provincial legislated minimum wage as instrument

  – Positive effect on child labor if minimum wages reduces adult unemployment (Basu, 2000). Effect could multiply if child workers are substitutes with adult workers.

  – Negative effect of child labor if minimum wages have no effect on adult unemployment -> increase welfare (Goldin, 1979; Ray, 2000).

For those interested …

$$W_{ijkp,2000} = g(MW_p, X_{ijkp}, P_{ijkp}, D_{kp}, \upsilon_{ijkp}) \quad (2)$$

$$\frac{Y_{ijkp,2007}}{\sigma_{2000}} = f\left(\hat{W}_{ijkp,2000}, \frac{Y_{ijkp,2000}}{\sigma_{2000}}, X_{ijkp}, P_{ijkp}, D_{kp}, \varepsilon_{ijkp}\right) \quad (3)$$

- For child workers:
  - Minimum wage in the province and year they started working
- For non-child workers:
  - Imputed year of started working based on birth year
- Exclusion restrictions: minimum wages are set based on a bundle of consumption items; then determined by province-specific tripartite negotiations

Table 2. *Relevance of instrument*

	Child labor (=1)			
	(1)	(2)	(3)	(4)
Provincial monthly legislated minimum wage (hundred thousand Rupiah)	0.128***	0.264***	0.353***	0.379***
	(0.049)	(0.070)	(0.056)	(0.052)
Male (=1)		−0.004	−0.003	−0.002
		(0.012)	(0.013)	(0.013)
Age in 2007		0.044	0.048***	0.049***
		(0.005)	(0.004)	(0.003)
Mother's schooling in 2000 (years)		−0.008***	−0.008***	−0.008***
		(0.002)	(0.001)	(0.001)
Father's employment status (=1)		−0.015	−0.028	−0.036
		(0.067)	(0.059)	(0.067)
Mother's employment status (=1)		(−0.012)	(−0.002)	(0.004)
		(0.068)	(0.062)	(0.069)
District GDP per capita in 1996 (in 1993 Rupiah)		−0.014	−0.012	−0.010
		(0.005)	(0.007)	(0.006)
District adult unemployment rate			−0.837**	−0.777
			(0.368)	(0.355)
District population			−0.000	−0.000
			(0.000)	(0.000)
Share of villages in the district with market			0.052	0.169
			(0.108)	(0.114)
Share of villages in the district with year-round roads				0.137
				(0.125)
Share of villages in the district with banks				−0.140
				(0.058)
Number of primary and secondary schools in the district (thousand)				0.021
				(0.056)
Constant	−0.056***	−0.982**	−1.093***	−1.283***
	(0.069)	(0.163)	(0.129)	(0.149)
Number of observations	2,794	2,794	2,794	2,794
Adjusted R-squared	0.010	0.086	0.107	0.110

Notes: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$; estimated using OLS; standard errors are clustered at the province level; the provincial minimum wage depends on the year that a child worker began working or a non-child worker is predicted to have begun working.

Estimation Results

Child market work negatively affects mathematics and lung capacity growth

- No effect on schooling

- No effect on cognitive skills

- Effect on mathematics is -0.372 SD
  - Equivalent to three years of schooling

- Effect on lung capacity is -0.384 SD

- OLS underestimates the negative effects of child market work.

- No gender or location differences.

- In conclusion: child market work does affect long-term earning ability.

Take home messages

Policymakers still need to address child market work

1. Proportion of child market work in Indonesia is relatively small, but absolute number remains large.

2. Child market work has large detrimental effects on human capital accumulation.

   – This means child labor is a trade-off between current income and long-term / lifetime income.

3. These effects are observed even when 80% of the child workers are working for the family business, and 20% work outside the family.

The effect of child market work on the child's human capital is ambiguous

- Displaces schooling
- Physically demanding
- Lack of sleep, study, play
- Exposure to hazard
- But working brings income
  - Food, healthcare, schooling, books
- Basu (1999); Edmonds (2008): many studies find zero or positive effects of child labor.

Variables	Full sample			Children not working in 2000			Children working in 2000			Mean difference significant at 5 %
	Mean	Std. dev.	N	Mean	Std. dev.	N	Mean	Std. dev.	N	
Human capital outcomes										
Mathematics score in 2000 (min = 0, max = 5)	3.08	1.34	2,794	3.07	1.35	2,438	3.10	1.26	356	No
Mathematics score in 2007 (min = 0, max = 5)	3.13	1.34	2,794	3.14	1.35	2,438	3.07	1.27	356	No
Cognitive Score in 2000 (min = 0, max = 12)	8.38	2.89	2,794	8.39	2.89	2,438	8.31	2.87	356	No
Cognitive Score in 2007 (min = 0, max = 12)	9.74	2.39	2,794	9.74	2.38	2,438	9.74	2.48	356	No
Lung Capacity in 2000 (l/min)	223.24	63.03	2,794	220.39	61.93	2,438	242.72	67.04	356	Yes
Lung Capacity in 2007 (l/min)	337.13	98.19	2,794	337.15	97.60	2,438	336.95	102.34	356	No
Schooling in 2000 (years)	4.74	1.94	2,794	4.67	1.95	2,438	5.22	1.83	356	Yes
Schooling in 2007 (years)	9.92	2.89	2,794	9.97	2.84	2,438	9.57	3.17	356	Yes
Child labor status (=1)	0.13	0.33	2,794	NA	NA	2,438	1.00	1.00	356	
Work for wage outside family (=1)	0.11	0.31	2,794	NA	NA	2,438	0.21	0.41	356	
Work in family business (=1)	0.03	0.16	2,794	NA	NA	2,438	0.86	0.35	356	
Male (=1)	0.50	0.50	2,794	0.50	0.50	2,438	0.49	0.50	356	No
Age in 2007	18.79	1.86	2,794	18.65	1.84	2,438	19.74	1.72	356	Yes
School attendance in 2000	0.94	0.23	2,764	0.96	0.20	2,414	0.84	0.36	350	Yes
Mother's schooling in 2000 (years)	5.61	4.09	2,794	5.81	4.13	2,438	4.26	3.54	356	Yes
Father's employment status (=1)	0.87	0.25	2,794	0.88	0.25	2,438	0.86	0.24	356	No
Mother's employment status (=1)	0.89	0.23	2,794	0.89	0.23	2,438	0.87	0.22	356	No
Per capita monthly household expenditure in 2000 (hundreds of thousand rupiahs)	2.47	2.31	2,788	2.45	2.22	2,432	2.58	2.85	356	Yes
District GDP per capita in 1996 in 1993 Rupiah (millions)	2.25	2.71	2,794	2.31	2.80	2,438	1.89	1.92	356	Yes
District adult unemployment rate	0.07	0.05	2,794	0.07	0.05	2,438	0.06	0.04	356	Yes
District population (thousand)	938.36	664.94	2,794	942.89	671.67	2,438	907.34	616.91	356	No
Proportion of villages in the district with:										
A market building	0.25	0.18	2,794	0.25	0.18	2,438	0.25	0.16	356	No
Year-round roads	0.96	0.07	2,794	0.97	0.07	2,438	0.96	0.08	356	No
Bank	0.26	0.25	2,794	0.27	0.25	2,438	0.24	0.24	356	No
Public health center	0.20	0.19	2,794	0.20	0.20	2,438	0.18	0.17	356	Yes
A primary and secondary school	0.91	0.55	2,794	0.91	0.56	2,438	0.92	0.50	356	No
Instrument										
Provincial monthly legislated minimum wage (hundreds of thousand rupiahs)	1.43	0.26	2,794	1.42	0.23	2,438	1.50	0.41	356	Yes

Note: Mean difference is calculated from a *t*-test or a chi-squared test for binary variables, where Ho is equality of means.