

Nature or Nurture: Evidence from Indonesia

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Motivation I

Nature or Nurture:
Evidence from
Indonesia

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Research Question

Methodology

Data

Results

Conclusion

- ▶ More educated parents have more educated children.
- ▶ Lower educational attainment result in lower labor market outcomes and socio-economic status later in life.
- ▶ Thus educational persistence facilitates the intergenerational transmission of poverty.
- ▶ If the intergenerational persistence is not determined by inherent factors, there is scope for policy intervention.
- ▶ Rigorous evidence only exists from developed countries:
 - ▶ Genetic endowments drives the intergenerational schooling persistence (Behrman & Rosenzweig, 2002; Plug, 2004; Black et al., 2005; Sacerdote, 2007).

Why Indonesia?

- ▶ High GDP p.c. growth: 4,3% (average 2011-2014).
- ▶ Rising inequality: Gini 0.297 in 1999 and 0.356 in 2010.
- ▶ 11.2% (2015) live in poverty, 40% cluster around national poverty line.
- ▶ 37% of U5 children are stunted, only 68% have access to hygienic toilet facilities.
- ▶ Fourth largest nation on the planet (260 million).

What drives the intergenerational schooling persistence in Indonesia: **Nature or nurture?**

- ▶ **Nature:** Transmission of education is driven by genetic endowments.
- ▶ **Nurture:** Transmission of education is driven by family environmental factors.
- ▶ **Causal effect:** Pure contribution of parental education to the nurture factor.

Estimation strategy I - Comparison of biological and adoptive families

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Nature or nurture?

- ▶ **Adoption as natural experiment** that randomly assigns children to families.

$$S_i^c = \beta_0 + (S_i^f + S_i^m)\beta_1 + X_i\beta_2 + \epsilon_i. \quad (1)$$

- ▶ Estimate for adoptive and biological families and compare.
 - ▶ β_1 for adoptive families is the nurture component.
 - ▶ The difference between β_1 for adoptive and biological families is the nature component.

Estimation strategy II - Comparison of biological and adoptive families

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- ▶ Identifying assumptions:
 - ▶ Adoption process is random = adoptees do not share the same genes with adoptive parents.
 - ▶ Adoptive parents are similar to biological parents = adoptive children grow up in similar environments as biological children.

Adoption practices in Indonesia

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- ▶ Low domestic adoption.
- ▶ Legal framework.
 - ▶ Screening of motives and documentation that adoptive parents will act in best interest of the child (health insurance and education, income statement, references, police record, parent health and psychological check).
 - ▶ Married couple (at least 5 years) between 30 to 55 years old.
 - ▶ No more than one adopted or biological child.
 - ▶ Same religion as child.
 - ▶ Proof of involuntary fertility.
 - ▶ Six month fostering period.
- ▶ Aunt/uncle and niece/nephew share on average 25 percent of genes.

Estimation strategy III - Instrumental variable estimation

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Causal effect of parental education

- ▶ Follow Duflo (2001) IV approach:
 - ▶ Instrument parental education with INPRES school construction program.
 - ▶ Variation through timing and location.
- ▶ Identifying assumptions.
 - ▶ Relevance: Program must increase parental schooling.
 - ▶ Exogeneity: Program must have no other effect on child education than through parental education.

Estimation strategy IV - Instrumental variable estimation

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- ▶ First stage:

$$\begin{aligned} S_{ikm}^f + S_{iln}^m &= \alpha_0 + \sum_{k=1}^K (\text{Birth}_{ik}^f * \text{Intensity}_m) \alpha_{1k} \\ &\quad + \sum_{l=1}^L (\text{Birth}_{il}^m * \text{Intensity}_n) \alpha_{1l} + X_i \delta \\ &\quad + u_k + p_l + v_m + s_n + \epsilon_{ikm} + \epsilon_{iln}. \end{aligned}$$

- ▶ Second stage:

$$\begin{aligned} S_{iklmn}^C &= \beta_0 + (S_{ikm}^f + S_{iln}^m) \beta_1 + X_i \gamma \\ &\quad + \mu_k + \pi_l + \omega_m + \rho_n + \vartheta_{iklmn} \end{aligned} \quad (2)$$

Data I - Indonesian Family Life Survey

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- ▶ Panel survey including individual, household and community level data.
- ▶ IFLS 1 (1993): Parent and household characteristics.
- ▶ IFLS 4 (2007): Child characteristics.
- ▶ Sample selection:
 - ▶ Censored child education: Eliminate children younger than 23 in 2007.
 - ▶ Not for all observations are region of birth data available.
 - ▶ Parents born before 1945 were eliminated in IV estimation.
- ▶ Educational attainment: Years of schooling and proceeding to secondary school.

Data II - Descriptive statistics

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	Adoption sample		IV sample	
	(1) Biological	(2) Adopted	(3) Non-reform prone	(4) Reform prone
<i>Child characteristics</i>				
Rural area	0.40	0.41	0.50	0.58
Gender (Male=1)	0.51	0.52	0.47	0.52
Age in 2007	29.64	30.42	26.14	24.93
Years of schooling	11.33	9.63	11.35	10.01
Proceeded to secondary school	0.85	0.69	0.85	0.78
<i>Father characteristics</i>				
Age in 2007	60.51	57.43	54.98	49.34
Years of schooling	7.51	6.57	7.34	5.72
Proceeded to secondary school	0.44	0.26	0.42	0.26
<i>Mother characteristics</i>				
Age in 2007	54.93	52.56	51.05	43.07
Years of schooling	6.10	5.82	6.11	4.64
Proceeded to secondary school	0.30	0.28	0.30	0.12
<i>Sum of father and mother characteristics</i>				
Years of schooling	13.61	12.40	13.45	10.36
Proceeded to secondary school	0.75	0.54	0.72	0.38
Observations	4594	96	1096	340

OLS results I - Years of schooling

► Biological families:

	Full sample		Parent's years of education <12	
	(1) Years of schooling β / SE	(2) Years of schooling β / SE	(3) Years of schooling β / SE	(4) Years of schooling β / SE
Parents' years of schooling	0.277*** (0.007)	0.274*** (0.007)	0.291*** (0.009)	0.287*** (0.009)
Observations	4594	4594	4224	4224
R^2	0.344	0.357	0.280	0.296

► Adopted families:

	Full sample		Parent's years of education <12	
	(1) Years of schooling β / SE	(2) Years of schooling β / SE	(3) Years of schooling β / SE	(4) Years of schooling β / SE
Parents' years of schooling	0.229*** (0.051)	0.220*** (0.055)	0.335*** (0.072)	0.304*** (0.078)
Observations	96	96	89	89
R^2	0.338	0.476	0.356	0.500

OLS results II - Proceeding to secondary school

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	Biological children		Adopted children	
	Full sample	Parent edu <12	Full sample	Parent edu <12
	(1)	(2)	(3)	(4)
	Secondary school	Secondary school	Secondary school	Secondary school
	β / SE	β / SE	β / SE	β / SE
Parents proceeded to secondary school	0.103*** (0.005)	0.104*** (0.005)	0.161*** (0.045)	0.184*** (0.053)
Observations	7533	6893	133	122
R^2	0.107	0.097	0.225	0.217

IV results I - Years of schooling

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	Full sample		Parent's edu <12	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
Years of schooling	Years of schooling	Years of schooling	Years of schooling	Years of schooling
	β / SE	β / SE	β / SE	β / SE
Parents' years of schooling	0.294*** (0.012)	0.285*** (0.048)	0.316*** (0.014)	0.308*** (0.049)
Observations	1436	1436	1357	1357
R^2	0.341	0.593	0.305	0.580
F-test (first stage)	/	4.12	/	4.95

IV results II - Proceeding to secondary school

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	Full sample		Parent's edu <12		Parent's edu <9	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Secondary school	Secondary school	Secondary school	Secondary school	Secondary school	Secondary school	Secondary school
	β / SE	β / SE	β / SE	β / SE	β / SE	β / SE
Parents proceeded to secondary school	0.100*** (0.006)	0.217*** (0.035)	0.101*** (0.006)	0.208*** (0.036)	0.107*** (0.021)	0.272*** (0.099)
Observations	3337	3337	3115	3115	1948	1948
R^2	0.093	0.228	0.087	0.253	0.038	0.335
F-test (first stage)	/	3.89	/	4.24	/	9.10

OLS results III - Outlook using IFLS5 (2014)

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	Years of schooling		Secondary school	
	Biological	Adopted	Biological	Adopted
Parents years of schooling	0.293*** (0.004)	0.244*** (0.032)		
Gender child (Male=1)	0.026 (0.028)	0.015 (0.195)	-0.007** (0.003)	0.031 (0.025)
Age child	0.005 (0.024)	0.292* (0.160)	-0.005* (0.003)	0.027 (0.021)
Age squared child	-0.001*** (0.000)	-0.005** (0.002)	-0.000 (0.000)	-0.000* (0.000)
Age parent 1	-0.001 (0.019)	-0.035 (0.108)	0.002 (0.002)	-0.019 (0.014)
Age squared parent 1	-0.000 (0.000)	0.001 (0.001)	-0.000** (0.000)	0.000 (0.000)
Age parent 2	0.027** (0.012)	-0.046 (0.058)	0.003** (0.002)	-0.001 (0.008)
Age squared parent 2	0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)	-0.000 (0.000)
Rural area (when child)	0.892*** (0.060)	1.237*** (0.433)	0.129*** (0.007)	0.233*** (0.054)
Parent proceeded to secondary school			0.163*** (0.005)	0.159*** (0.039)
Observations	13001	281	13001	281
R ²	0.369	0.357	0.165	0.227

Conclusions

- ▶ Intergenerational schooling persistence fairly low.
- ▶ No evidence that genetic endowments matter.
- ▶ Nurturing and family environmental factors matter.
- ▶ Large part of nurture component is driven by parental education.
- ▶ Hypothesis: Additional year of parental education has positive effects on nurture in Indonesia where education levels are low compared to advanced countries.
- ▶ Scope for policy intervention exists.

Thank you for your attention.

Estimation strategy V - Pooling parents' education

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- ▶ Assumption:
 - ▶ The effect of mother's and father's education on their child's education is identical.
- ▶ Advantage:
 - ▶ Controls for assortative mating.
 - ▶ Avoid multicollinearity.
 - ▶ More precise estimates.
 - ▶ Oreopoulos et al. (2006): Instruments for fathers and mothers are too highly correlated to be included separately.

Adoption practices in Indonesia II

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- ▶ Threats to non-exogenous adoption placement?
 - ▶ Family size: No, similar in underlying sample.
 - ▶ Sorting by religion: No, 87% (2010) of Indonesians are Muslim.
 - ▶ Orphanages: Potentially yes.
 - ▶ Parents may choose child at orphanage/learn about child's background.
 - ▶ 56% of children in orphanages have still both parents alive and biological parents have to provide consent to adoption.
 - ▶ Children in urgent situations is given adoption preference → if all children come from disadvantaged backgrounds process can be viewed random again.

Violations to identifying assumptions I

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4 concerns:

1. Sample selection → adoptive parents differ from biological parents.
2. Non-random adoption process → upwards bias.
3. Late adoption → downwards bias.
4. Sample size too small.

Violations to identifying assumptions II

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4 concerns:

1. IV results present LATE \rightarrow upward bias.
2. Weak instruments \rightarrow upward bias.
 - ▶ To check LATE/weak instruments restrict sample to less educated people.
3. Errors-in-variables \rightarrow downward bias on OLS estimate.
4. Endogeneity of instrument.