The long term impact of early-life cognitive abilities.

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Early life conditions and human capital development

- To the extent that early cognitive abilities have profound and long-lasting effects on human capital development, the timing of policy intervention is crucial.
- The nature of policy intervention depends on how cognitive abilities, socioeconomic factors and other home environment influences shape human capital development.
- We take a broad view of human capital and investigate the association between early life cognitive abilities and later in life health, cognitive functions and social skills.
- We test the effect of early life conditions on the rate of decline of cognitive functioning and health in old age.

What skills?

A substantial body of research shows that cognitive and non cognitive abilities are important determinants of schooling and socioeconomic success. Almond and Currie (2011).

- **Cognitive skills:** mathematical and literacy ability.

- **Non cognitive skills:** Socio-emotional regulation, time preferences, personality factors (i.e. motivation, discipline, perseverance, sociability, communication etc.).
  - Harder to measure than cognitive skills
  - Greatest impact on non cognitive skills comes during early childhood experiences.

The mechanisms

1. Skills beget skills and capabilities foster future capabilities.
2. Early learning confers value on acquired skills, which leads to self-reinforcing motivation to learn more.
3. Early mastery of a range of cognitive, social, and emotional competencies makes learning at later ages more efficient and therefore easier and more likely to continue.

- **SELF-PRODUCTIVITY:** the capabilities produced at one stage augment the capabilities attained at later stages.
- **DYNAMIC COMPLEMENTARITY**: capabilities produced at one stage of the life cycle raise the productivity of investment at subsequent stage.

Human capital accumulation model

Cunha and Heckman (2008) and Cunha, Heckman and Schennach (2007) estimate a capability production function to understand how the skills of the children evolve in response to:

- The stock of skills children have already accumulated (θ)
- The investment made by their parents (I)
- The stock of skills accumulated by parents (h)

When the child is t years old, the stock of capability is made by:

$$\theta_{t+1} = f(h, \theta_t, I_t)$$

The stock of capabilities at stage t + 1 can be seen as a function of all past investments:

$$\theta_{t+1} = m_t(h, \theta_1, I_1 ... I_t), T = 1, ..., t.$$

Data

- SHARE LIFE (wave 3): *Early life conditions*
- SHARE (wave 2): *Measures of human capital*

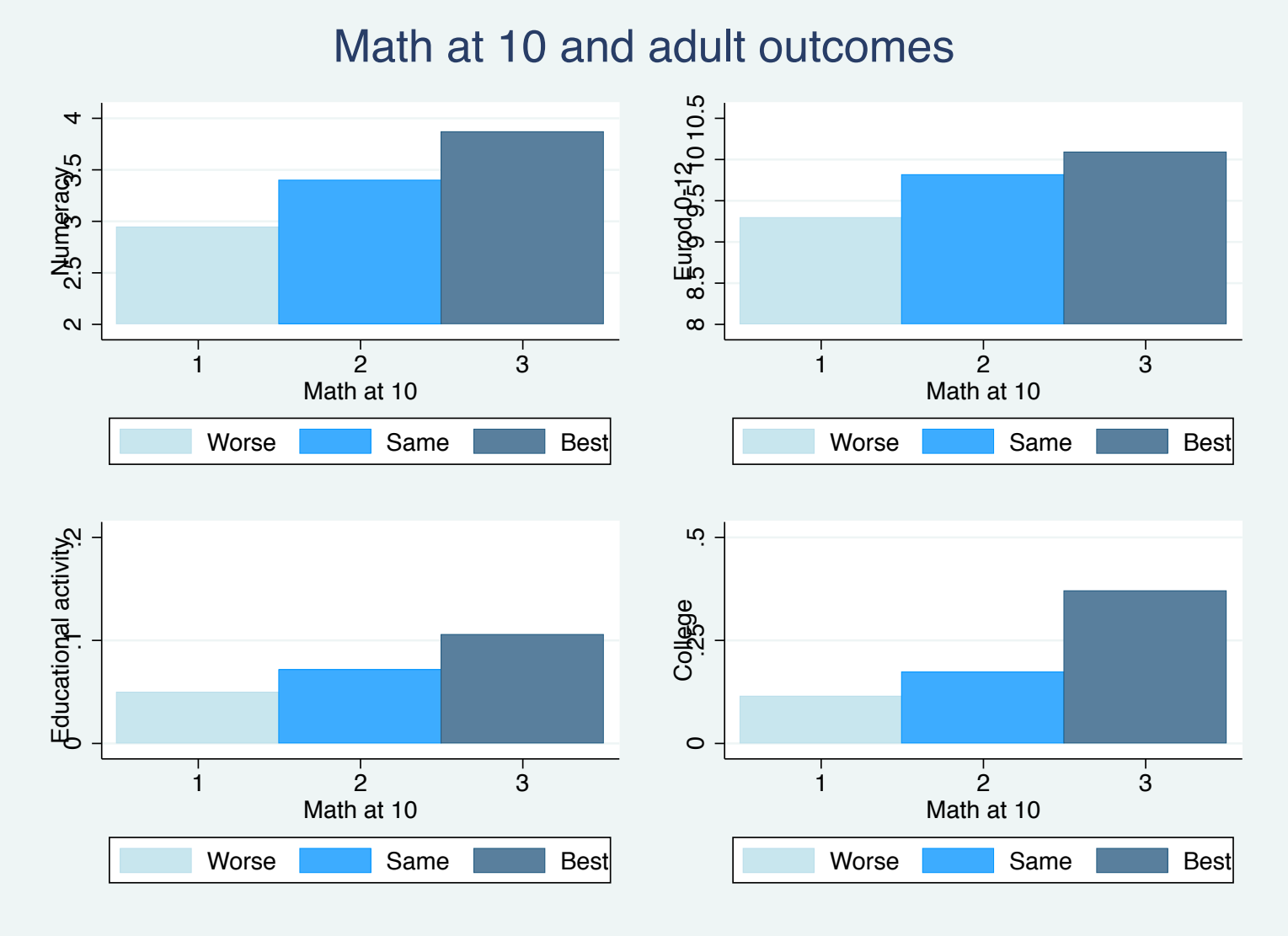
Early life conditions

- **Cognitive abilities at age 10:** math and language ranking position in the class when aged 10.
- **Proxy for Socio-economic status:** whether living in a bad accommodation and whether father had a blue collar job.
- **Health status of parents:** risky behaviours and mental health status.
- **Cognitive milieu:** few books at home, whether born in rural area and number of siblings.

Measures of human capital

- **Health outcomes:** Bad self reported health, having at least 2 ADL, having at least 2 chronic diseases, mental distress.
- **Cognitive outcomes:** Numeracy, memory, orientation and college degree.
- **Social outcomes:** Political, religious, sport, volunteering and educational activities.

Descriptive evidence



The effect of early conditions

	Panel A: Health outcomes			
	Bad health	*At least 2 ADL*	*At least 2 Chronic*	*Depressed*
Lang better, age 10	−0.038***	0.000	−0.008	0.025***
	(0.006)	(0.004)	(0.008)	(0.007)
Math better, age 10	−0.038***	−0.006	−0.003	−0.053***
	(0.006)	(0.004)	(0.008)	(0.007)
Bad health, age 10	0.179***	0.019***	0.072***	0.077***
	(0.006)	(0.004)	(0.007)	(0.006)
R-squared	0.137	0.039	0.096	0.066
N	21387	21358	21346	21133
	Panel B: Cognitive outcomes			
	Numeracy	*Memory*	*Orientation*	*College degree*
Lang better, age 10	0.039***	0.735***	−0.002	0.113***
	(0.007)	(0.048)	(0.002)	(0.006)
Math better, age 10	0.180***	0.394***	0.006**	0.122***
	(0.007)	(0.048)	(0.002)	(0.006)
Bad health, age 10	−0.030***	0.001	0.001	−0.014*
	(0.007)	(0.046)	(0.002)	(0.006)
R-squared	0.168	0.235	0.015	0.182
N	21313	21256	21346	21340

The effect of early conditions on social outcomes

	Political activities	*Religious activities*	*Sport activities*	*Volunteering activities*	*Educational activities*
Lang better, age 10	0.012^{***}	0.029^{***}	0.017^{**}	0.021^{***}	0.033^{***}
	(0.004)	(0.005)	(0.006)	(0.005)	(0.004)
Math better, age 10	0.024^{***}	0.003	0.034^{***}	0.029^{***}	0.011^{*}
	(0.003)	(0.005)	(0.006)	(0.005)	(0.004)
Bad health, age 10	0.003	0.010^{*}	-0.021^{***}	−0.003	−0.004
	(0.003)	(0.005)	(0.006)	(0.005)	(0.004)
R-squared	0.021	0.048	0.104	0.082	0.063
N	21325	21325	21325	21325	21325

Notes: Other controls include a full set of age group and country dummies and other early conditions measured at age 10. These early life conditions are: number of siblings, a dummy for living in a bad accommodation, a dummy for having few books in the household, whether father blue collar, a dummy for parents with mental health problem, whether parents were smokers or drinkers and whether born rural area.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Conclusions

- Strong and statistically significant effect of early cognitive abilities on later cognitive outcomes.
- Early cognitive abilities affect later social skills.
- Milder effect on health status later in life, which appears to be strongly related to health condition early in life.

Plan for future work

- Estimating the effect of early cognitive ability on human capital depreciation.
- Allowing for correlation between unobservable factors affecting the various measures of human capital.
- Explore more in depth the complementarity (and substitutability) between cognitive abilities and other early life conditions.

Thank you!

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