Genetic Influences on Human Capital Development

Philip Monagan*
University of Chicago

October 2026

Job Market Paper

Click here for the latest version.

Abstract

This paper explores the channels and mechanisms by which a child's genetic endowment influences the processes of human capital development during adolescence; I investigate the interplay between genes, parental investment, and the environment, and how they shape skill formation and ultimately educational attainment. Using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), I estimate how differences in genetic predisposition for educational attainment causally influence years of schooling, college attendance, and earnings, and how the causal effects are mediated through parental investment and the environment. A one-standard-deviation increase in a child's polygenic score is associated with a 0.66 year increase in completed years of schooling; when I account for gene-environment correlation by controlling for parental education and household income, the increase is attenuated to 0.42 years; I find this estimate is robust to a specification leveraging strictly random within-family variation. Applying the same controls, the same increase in polygenic score causes four-year college completion to increase by 7.8 percentage points and projected present-discounted lifetime earnings to increase by 9.3 percent; this finding is again robust to the use of strictly exogenous within-family variation: the analogous estimates are 6.8 percentage points and 10.8 percent. Next, I decompose the endowment-education relationship, and its attenuation, by analyzing the reduced-form relationships between the endowment, skill accumulation, and parental investment, and how they change across different stages of adolescence. However, this analysis of parental choices is not policy invariant; further, the reduced-form coefficient obscures the degree to which the investment response represents a change in total parental investment or a within-family sibling reallocation. To deepen understanding of parental choices, disentangle the margins of investment response, and tease out policy implications, I develop a two-child model of parental investment as an optimal resource allocation problem, and jointly estimate the dynamic structural model of skill production and household choice using the Simulated Method of Moments. Finally, I use the structural parameter estimates to evaluate the counterfactual welfare effects of different policy interventions.

*Email: pmonagan@uchicago.edu. I thank my dissertation committee, James Heckman (chair), Kevin Thom and Joseph Hotz, for their guidance and feedback. I am grateful to Zach Weingarten, Francesco Agostinelli, Leandro Carvalho, Marina Palma, Dan Benjamin and Weilong Zhang for conversations that shaped this work, and to participants in the Public/Labor Advising Group and the CEHD Intergenerational Seminar Series for their comments. The Carolina Population Center at the University of North Carolina at Chapel Hill provided access to the Add Health data.