The Annual Proceedings of

The Wealth and Well-Being of Nations

2019-2020

Volume XII: Human Capital and the Wealth and Well-Being of Nations

James J. Heckman

Diep Phan, Editor

The Miller Upton Program at Beloit College

The Wealth and Well-Being of Nations was established to honor Miller Upton, Beloit College's sixth president. This annual forum provides our students and the wider community the opportunity to engage with some of the leading intellectual figures of our time. The forum is complemented by a suite of programs that enhance student and faculty engagement in the ideas and institutions that lay at the foundation of free and prosperous societies.

Senior Seminar on The Wealth and Well-Being of Nations:

Each year, seniors in the Department of Economics participate in a semester-long course that is built around the ideas and influence of that year's Upton Scholar. By the time the Upton Scholar arrives in October, students will have read several of his or her books and research by other scholars that has been influenced by these writings. This advanced preparation provides students the rare opportunity to engage with a leading intellectual figure on a substantive and scholarly level.

Endowed Student Internship Awards:

A portion of the Miller Upton Memorial Endowments supports exceptional students pursuing high-impact internship experiences. Students are encouraged to pursue internships with for-profit firms and non-profit research organizations dedicated to advancing the wealth and well-being of nations.

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The department has initiated a research colloquium that gives students the opportunity to read and discuss seminal articles aimed at deepening their understanding of the market process. Students also develop original analysis that applies economic ideas to novel contexts. Colloquium participants receive close mentoring as they craft an article with the eventual goal of publication in a newspaper, magazine, or academic journal. The themes of the research colloquium and annual forum are supported with a speaker series featuring the next generation of scholars working on questions central to our understanding of the nature and causes of wealth and well-being.

Annual Proceedings of The Wealth and Well-Being of Nations:

The keynote address presented by the Upton Scholar is an important contribution to the public discourse on the nature and causes of wealth and well-being. Further, the annual forum includes presentations by noted scholars who expand upon or challenge the work of the Upton Scholar. These presentations are assembled in the *Annual Proceedings of the Wealth and Well-Being of Nations*, which serves as an important intellectual resource for students, alumni, and leaders within higher education.

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Volume XII

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The Annual Proceedings of the Wealth and Well-Being of Nations, 2019-2020.

Printed in the United States of America

ISBN 978-0-578-80488-0

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Introduction

Diep Phan[1]

Introduction

As the Elbert Neese Professor of Economics, it is my honor to introduce the twelfth Annual Proceedings of the Wealth and Well-Being of Nations, a collection of papers based on the talks at the 2019 Miller Upton Forum on Human Capital and the Wealth and Well-Being of Nations, featuring Professor and Nobel Laureate James Heckman. Two papers by Beloit economics students who attended the economic senior seminar in fall 2019 are also included.

It is not an overstatement that the economic discipline is obsessed with answering the question "what promotes economic prosperity?" In its more than two hundred years history, the discipline has gone through a long list of factors that are associated with long-run economic growth, such as physical capital, human capital, technical progress, institutions, markets and trade, liberal ideas, and so on. While most economists agree that all of these factors play some role, they debate fiercely which one is the ultimate driver. Many of the previous Miller Upton Forums focused on the institutional foundations that support long-run economic growth, such as social institutions and the rule of law (2008 Inaugural Forum featuring Nobel Laureate Douglass North), property rights (2009 Forum), entrepreneurship (2010 Forum), self-governance (2011 Forum), institutional change (2012 Forum), and economic freedom (2013 Forum). In her keynote essay in the Annual Proceedings, the 9th Upton Scholar Deirdre Nansen McCloskey championed the role of liberal ideas, and convincingly argued that we became rich thanks to "bourgeois virtues," not capital or institutions or exploitation.

In this volume, we turn our attention to one of the most critical determinants of the wealth and well-being of nations: human capital. Human capital includes both health and education and training which produce skills. As an input into

1 Diep Phan is the Elbert H. Neese, Jr. Professor of Economics at Beloit College.

production of goods and services and a driver of economic growth, human capital is a means to an end. At the same time, it is also an end in itself, since health and education are both essential components of human development.

For the twelfth Miller Upton Forum in fall 2019, Beloit College had the honor of welcoming Professor and Nobel Laureate James Heckman as the Upton Scholar. James J. Heckman is the Henry Schultz Distinguished Service Professor of Economics at the University of Chicago, a Nobel Memorial Prize winner in economics and an expert in the economics of human development. He founded the Center for the Economics of Human Development at the University of Chicago. Through this center, he has conducted groundbreaking work with a consortium of economists, developmental psychologists, sociologists, statisticians and neuroscientists showing that quality early childhood development heavily influences health, economic and social outcomes for individuals and society at large. In the early 1990s, his pioneering research on the outcomes of people who obtained the GED certificate received national attention. His findings, which found great deficiencies in the alleged value of the degree, spurred debates across the country on the merits of obtaining the certificate.

Professor Heckman is currently editor of the Journal of Political Economy. He is also a member of the National Academy of Sciences, the Econometric Society, the Society of Labor Economics and the American Statistical Association, and a fellow of the American Academy of Art and Sciences. Professor Heckman has published over 300 articles and several books. Some of his most recent books include *Giving Kids a Fair Chance: A Strategy that Works*, and *Inequality in America: What Role for Human Capital Policy?*

On October 25th 2019, at the twelfth Miller Upton Forum at Beloit College, Professor James Heckman delivered the June and Edgar Martin Memorial Lecture titled *"Promoting Skills."* The first essay in this volume draws from this lecture. In it, Heckman emphasizes the critical role of skills in alleviating poverty and inequality and promoting social and economic mobility. In the first section of the essay, Heckman sets the context by pointing out that the problem of social and economic immobility is pervasive in many countries including developed Western nations. This is true even in countries known for having low inequality (as measured by the Gini coefficient) thanks to their progressive and redistributional tax and transfer policies. Heckman is critical of such tax and transfer policies, arguing that they cannot address the root cause of poverty and inequality. He instead advocates for the development of skills among the disadvantaged popula-

tion, because "by building skills, not only can long term poverty be eliminated, but economic and social mobility can be promoted, thus creating equity without any tradeoff in economic efficiency. Moreover, enhancing skills will also enhance people's dignity, agency, and the ability to engage in the larger society."

In the second section of the essay, Heckman argues that the persistence of poverty and inequality and differences in children's outcomes are caused more by differences in family structure and environments, and less by differences in access to high-quality schooling. He emphasized the need to move beyond education and promote social inclusion and mobility by addressing skills gap resulting from family difference. He rejects the popular idea that the observed racial inequality in education, employment, income and wealth in the US is largely driven by racial discrimination and injustice, though he did not deny the existence of racial discrimination and injustice. He makes the case that that it's the racial differences in skills that explain the differential outcomes, drawing our attention to what can really help reduce racial inequality: to reduce the racial skills gap driven by differences in family structures and environments.

In the third and last section of his essay, through presenting an abundance of empirical evidence from more recent studies, Heckman rejects the hypothesis that the academic achievement or skills gaps cannot be eliminated because they result from genetic differences. He then presents further evidence on the benefits of early childhood investments, giving a series of examples of successful early childhood programs that have been shown to promote skills and improve later life outcomes for the children who participated in such programs.

In addition to the keynote essay by Professor James Heckman, there are eight other essays in this Annual Proceedings, and they are divided into two sections. One section is a collection of five essays about human capital development in the United States. The other is a collection of three essays about human capital development in several Asian countries, in particular Indonesia, India, and China.

The 2019 Miller Upton Forum was special because it had not only one but two very prominent economists in the field of human capital. In addition to the Upton Scholar--Professor James Heckman--we were fortunate to have the participation of Professor Carolyn Heinrich '89, one of Beloit College Economics Department's most distinguished alumni. Professor Heinrich is the Patricia and Rodes Hart Professor of Public Policy, Education and Economics at Vanderbilt University and the Chair of the Department of Leadership, Policy and Organizations in the Peabody College of Education and Human Development. She has

served many leadership roles in the public policy and management field, including: President of the Association for Public Policy Analysis and Management in 2016-17, President of the Public Management Research Association from 2011-2013, editor of the Journal of Public Administration and Theory from 2005-2008, and director of the Center for Health and Social Policy at the Lyndon B. Johnson (LBJ) School of Public Affairs. She is a prolific researcher, having published six books and numerous articles in prestigious journals such as the American Economic Review, Review of Economics and Statistics, Journal of Human Resources, World Development, Journal of Policy Analysis and Management, and many others. Her upcoming book *Equity and Quality in Digital Learning* contributes critical insights and tools needed for educators and policy makers to deliver on the promise of digital learning in American schools.

Heinrich is an embodiment of what a successful "product" of Beloit College looks like: a critical and interdisciplinary thinker. In her essay titled ***"Investing in Human Capital across the Life Cycle to Increase Equity and Improve Outcomes,"*** she summarizes the three "buckets" of research projects that she has been pursuing, applying a highly interdisciplinary approach and rigorous methodological tools acquired through her studies at Beloit College and the University of Chicago (under Professor Heckman's mentorship).

1. Early childhood education: getting children off to a "right start" through early intervention and supports, especially for the most vulnerable.
2. K-12 education: maximizing children's potential through the K-12 education system, with attention to historically disadvantaged student populations and ameliorating persistent inequities in access to quality learning opportunities.
3. Post-secondary education: supporting children's transition to healthy, productive adults who will effectively nurture the next generation.

In summarizing her first area of research on early childhood education, Heinrich highlights the "two-generation" strategies that aim to invest early in young children's education and well-being, while simultaneously helping their parents through family support services (e.g., to improve parenting practices) and education and training. She is currently leading a research project investigating the health and educational development of vulnerable children in Tennessee. The research project engages policymakers and program administrators throughout the state in a qualitative research effort that aims to identify the specific ways to remove barriers

to participation in public welfare programs, so children and families in low-resource households are better served.

Regarding the second area of Heinrich's research on K-12 education, her work on the effect of online and digital education is pioneering and yields results parallel to Heckman's research on General Educational Development (GED) program. In Heckman's 1993 analysis with Cameron, they found that GED's recipients were no more successful than high school dropouts in terms of their college and labor market outcomes, after controlling for differences in their ability (Cameron and Heckman 1993). In Heinrich's research on online instruction in high school, she found that, compared to students who graduated high schools completely through in-person courses, students who took online classes to make up for failed in-person courses had worse outcomes in college attendance and persistence and in the labor market. In other words, both the work of Heckman and Cameron and the work of Heinrich confirm that there is "no cheap substitute for schooling."

Heinrich's third area of research on postsecondary education is no less impressive. In her essay, she summarizes her participation in a large research-practice partnership—the Tennessee Postsecondary Evaluation and Analysis Research lab (TN-PEARL)—which engages in policy research on higher education and workforce development in the state of Tennessee. The partnership is comprehensive and covers ten on-going projects, covering many topics such as how to help first generation students overcome the many challenges that they face in higher education, or how to ensure a smooth transition and to minimize credit loss for students transferring from two-year community colleges to four-year colleges.

The work of Heckman and Heinrich and many other scholars clearly confirms the high return to education, especially early childhood education. Then why don't we see society invest more in early childhood education? In fact, this is the very question posed by Andrew Davis in his essay ***"The 200 Billion Dollar Bill Lying on the Sidewalk."***

Davis is an alumnus of the college, from the class of 1979. He is unique among all the speakers at the 2019 Miller Upton Forum. Unlike other speakers who are in academia, Davis is a businessman who has turned an academic idea into a business. He is a firm believer in the Miller Upton Forum's founding principles—those of a liberal society characterized by political freedom, the rule of law, and the promotion of peace and prosperity through voluntary exchange of goods, services, and ideas. With an entrepreneurial mindset, he brought to fruition an idea proposed by Milton Friedman: the use of equity funding, instead of the

more popular debt funding, to finance education. After spending many years in the financial industry, in 2011 Davis founded the innovative company Education Equity Inc. which provides students with equity funding opportunities and helps them meet the critical challenge of rising cost of post-secondary education.

In his essay (the third paper in this volume), Andrew Davis converged the ideas of two Nobel Laureates in economics: Milton Friedman and James Heckman. In Milton Friedman's seminal book "Capitalism as Freedom," while extolling the virtues of free markets, Friedman also acknowledges the important role of the government in providing essential public goods, including education and particularly early childhood education. Several decades later, Heckman's work has given concrete empirical evidence for the private and social benefits of investing in early childhood education, reinforcing Friedman's earlier writing. Tying these two economists' ideas together, and using his business-oriented mind, Davis provides a back-of-the-envelope calculation and suggests that, by not investing in early childhood education, the United States is forgoing a tremendous investment opportunity:

> *There are 20 million people under the age of 5 in the US today. To spend $10,000 on each one of them per year for high-quality early childhood learning would cost $200 billion per year. If this investment was funded with 30-year bonds that currently earn 2%, the debt service would be about one-billion dollars a year. If Heckman's lowest-end estimates of return were cut in half, the taxpayers who back-stop such a funding and their government that provides it will not only be whole, but ahead … With Professor Heckman's guidance and Friedman's thumbs up we will earn 5% or more on this investment. What are we waiting for?*

The fourth paper in this Annual Proceedings is titled ***"Credit Constraints through Childhood and Educational Attainment,"*** and written by Peter Nencka, another alumnus of Beloit College Economics Department, from the class of 2011. He is currently an Assistant Professor of Economics at Miami University. In his essay, Nencka reviews the literature on the impact of credit constraints on human capital investment. He concludes that "there is consensus within economics and related fields that credit constraints throughout childhood exist and impact future human capital investment decisions." He then proposes that researchers investigate this topic to identify optimal set of policies and programs that might alleviate these constraints.

The ultimate goal of the Upton Program is to serve and engage students, in

particular to encourage them to ask big questions about the wealth and wellbeing of nations. So, it is my great pleasure to introduce a student paper that was a product of the fall 2019 economic senior seminar, by Olivia Brimacombe (from the United Kingdom) and Jiho Wu (from South Korea) who are now alumni. In their paper titled ***"To Study or to Work: Labor Market Effects on High School Graduation Rate,"*** Brimacombe and Wu analyze how US high school graduation rates at the state level are affected by conditions in the states' labor market and the economy, and by other factors such as state's educational expenditure and legislature control. Their empirical analysis reveals that higher household income, GDP growth rate, and youth unemployment rate keep high school students in school. The most interesting result is that higher minimum wage does not induce students to leave school, directly contradicting the conventional view that an unintended consequence of the minimum wage policy is to cause students to drop out of high school.

The last paper in this section by Dr. Dipesh Navsaria takes us away from economics and examines early childhood skill development from the perspective of a pediatrician and a public health specialist. Dr. Dipesh Navsaria is Associate Professor of Pediatrics at the University of Wisconsin School of Medicine and Public Health. A pediatrician working in the public interest, Navsaria blends the roles of physician, occasional children's librarian, educator, public health professional and child health advocate. Navsaria can be considered a celebrity in the city of Beloit. He has delivered talks at Beloit several times and is known by many in the early childhood circle in Beloit. It is not an exaggeration to claim that he seeded the idea of a Miller Upton Forum on human capital, in particular, early childhood education. I first got to know him from a talk which he delivered a few years ago at the Eclipse Center in Beloit. I was very impressed by the huge attendance at the talk, which made me realize how enthusiastic the Beloit community is when it comes to early childhood education. It was then that the idea of having a Miller Upton Forum on early childhood education came to my mind.

In ***"Finding the Profit in Peekaboo: Moving Towards Relational Health as a Goal,"*** Navsaria confirms the importance of examining the financial return on investment in early childhood education, while also drawing our attention to less quantifiable concepts such as trust, curiosity, and enquiry, all of which form the foundation of healthy relationships that promote children's wellbeing. He argues that "the promotion, protection and growth of these relationships should be the central point of any work that engages early childhood, and, indeed, should be core to societal progress."

The remaining three essays in the 12th Annual Proceedings look beyond the United States and study human capital development issues in countries such as Indonesia, India, and China. Shatanjaya Dasgupta is currently Assistant Professor of Economics at Providence College and was a member in the Economics Department at Beloit College from 2014 to 2019. In her paper co-authored with Edward Kosack and titled ***"Patterns of Human Capital Formation Among Indonesian Migrants,"*** they examine educational attainment of individuals under the transmigration program in Indonesia by comparing transmigrants to other people who migrated outside this program by age of arrival. The study finds no effect of transmigration on educational outcomes of children. There is also no difference in this effect by the sex of the migrant. The authors conjecture that the absence of differential effects of the transmigration program on children's educational outcomes could be due to the low returns on education in the Outer Islands because of lack of opportunities to work other than the agricultural sector.

This volume features another student paper that was also a product of the economic senior seminar in fall 2019. Using Young Lives survey data,[2] Shivangi Ambardar (from India) and Xinrui Bai (from China) investigate factors associated with English and math test scores of 9,328 students aged between 12-18 in 2011 in Andhra Pradesh, India, focusing on the intersection of gender and caste. Their empirical examination yields several interesting and policy-relevant findings: social factors are more important than economics factors in explaining test scores; discriminatory effects of gender and caste are stronger in rural than in urban areas; gender disparity is actually worse among high-caste families; female and rural students in India especially need parental support to succeed because they face many negative stereotypes.

In the last paper by Dr. Jingjing Lou, Associate Professor of Education and Youth Studies at Beloit College, we again turn our attention away from economics and enter the field of international and comparative education. In her essay titled ***"Suzhi, Relevance and the New Curriculum"*** Lou summarized the findings from her semester-long ethnographic study in a rural middle school in Northwest China. She questions the relevance of the new quality-oriented curriculum for rural students, and "raises concerns about the urban-centered curriculum and how the rural community's absence in the picture has led to rural students' increasing disengagement in schooling and even dropout." She pushes for a discussion of

2 See https://www.younglives.org.uk/

how formal schooling can better serve rural children and youth.

Acknowledgments and Thanks

I wish to thank all the speakers who delivered talks at the Upton Forum and contributed papers to this volume. I especially thank Professor Heckman for his stellar keynote address and his amazing interaction with Beloit College students. Even in their wildest dreams, my students could not imagine that one day they would directly discuss their senior theses with a Nobel Laureate, who would "grill" them with hard questions while providing them with valuable comments and suggestions. I thank all students in the fall 2019 economic senior seminar. Their excellent participation in the senior seminar and the Upton Forum made the forum the enriching experience that it is designed to be.

I wish also to extend my thanks to all those who made the Upton Forum possible, in particular the alumni, donors, and former colleagues who helped raised funds and created the Upton Forum. I would like to especially thank Ms. Jennifer Kodl for all her excellent work in organizing the forum and editing the Annual Proceedings in all twelve years that the program has been in existence. And finally, I would like to thank my colleagues and students at Beloit College and members of the local community, because their participation in the forum is critical to its continuing success.

On the topic of expressing thanks, below I would like to quote Shivangi Ambardar, a contributor to this volume and a student who attended the fall 2019 economic senior seminar and Upton Forum. She has succinctly expressed the meaningful impact that the Upon Program makes in the college experiences of herself and other Beloit students:

> " … I looked forward to the day when I would be in a room with a Nobel Laureate … I vividly remember going back to my dorm, calling my mother to tell her that the best day of my undergraduate career could come soon … The Upton Forum at Beloit College has given me an exposure that I will cherish forever … I was immensely inspired by his [James Heckman] depth of knowledge and the impact he has made in the field of Education Economics … My success would not be possible without the opportunities, love and care brought to me by the Economics Department at Beloit College."

Promoting Skills

James J. Heckman[1, 2]

1. Universal Problems: Poverty, Inequality, and Economic and Social Immobility

Societies everywhere face the problems of poverty, inequality, and economic and social immobility. The severity of these problems differs by country. Governments everywhere, including those in the United States (U.S.), are enacting policies to alleviate them. Historically the U.S. has utilized a strategy of redistributional taxes and income transfers, and a strategy of promoting education by spending on public schools and trying to boost test scores. While such redistributional policies reduce income and consumption disparities, they have failed to significantly reduce and prevent the underlying structural causes of poverty and inequality. Many studies suggest that a major underlying structural issue is the skills gap – or the differences in skills among various groups in the population. By adopting a comprehensive approach to skill development, the U.S. can begin to implement effective policies that address structural poverty and inequality. But to do so, policy makers must understand what skills are needed, when they should be developed, how they are best formed, how they are best measured, and whom these policies should target.

Typically, when people think about skills, they think about education, scores on achievement tests, or "Intelligence Quotients" (IQs). Recent research informs us that there are many different types of skills and that they can all be fostered. They are not solely genetically determined. Modern understanding of how to foster skills continues to develop as studies delve deeper into the process of human

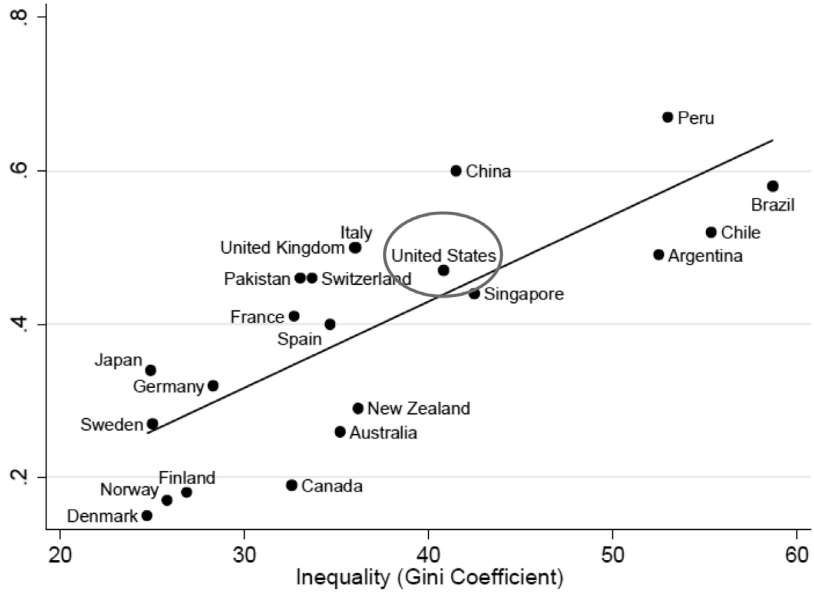
1 James J. Heckman, the 2019 Miller Upton Scholar, is the Henry Schultz Distinguished Service Professor of Economics and Director of the Center for the Economics of Human Development at the University of Chicago. He works to understand the origins of inequality, social mobility, the formation of skills, and regulation in labor markets. He also devises and applies empirical strategies to address these questions.

2 Edited by Diep Phan (Neese Chair and Associate Professor of Economics at Beloit College) with the assistance of Gabrielle Watson (student at Beloit College, Political Science major).

skill formation. Despite growing levels of understanding, many policymakers and concerned citizens fail to realize the connection between skill development and other social problems. Many contemporary social problems are skills-based.

Alan Krueger (2012) summarized the nature of income inequality and intergenerational immobility in the "Gatsby Curve" shown in Figure 1. In this figure, the horizontal axis depicts the Gini coefficient, a measure of inequality in family income after taxes and transfers, for various countries. The vertical axis shows the intergenerational elasticity (IGE), defined as the relationship between a child's income when they become an adult and the child's family income at the same age. It is the beta coefficient (β) in the equation at the heading of the figure. The lower β, the less dependent is the child's income on their family income, and the higher the level of intergenerational immobility. The graph shows that there is a relationship between income inequality and intergenerational immobility, as countries with high Gini coefficients also tend to have high β coefficients. Family inequality and social mobility are strongly related.

Figure 1: Intergenerational Mobility and Inequality
(Child Income) $=a+\beta$IGE(Family Income) + Other Factors



Source: Krueger, 2012

It is not surprising that in very unequal places such as Peru, Brazil, Chile or Argentina, income inequality is higher, and so is intergenerational immobility. Meanwhile, in very equal places such as Finland, Norway, and Demark, both income inequality and intergenerational immobility are low.

The traditional approach to remedying poverty and inequality has been a version of "alms to the poor," or redistribution of income and wealth from the rich to the poor through the tax and transfer system. Contemporary political discourse is dominated by this concept. Focusing too heavily on a pure redistributional strategy proves ineffective in resolving persistent poverty and inequality. For instance, many people in the U.S. glorify the Scandinavian welfare state, and they believe that economic mobility across generations is higher in Scandinavian countries thanks to their more generous social welfare states, which include progressive taxes and benefits, better schools, universal healthcare, free childcare, and free college at uniform quality levels across the country. Americans have implemented portions of the welfare state. The transfer programs launched by President Lyndon B. Johnson's War on Poverty (1964), known as the Great Society program, managed to reduce not only income inequality among families through large cash transfers, but also the overall Gini coefficient of the U.S. population. The Great Society also attempted to boost skills.

The skills programs launched in the Great Society utilized a *shotgun skills strategy*. They invested in skills at *all* stages of the life cycle under the belief that no citizen was too old to benefit from additional training and education to boost skills. Under such idealistic beliefs, policies during the 1960s assumed that job training for a 60-year old unemployed steelworker and a 15-year old prospective high school graduate were equally effective.

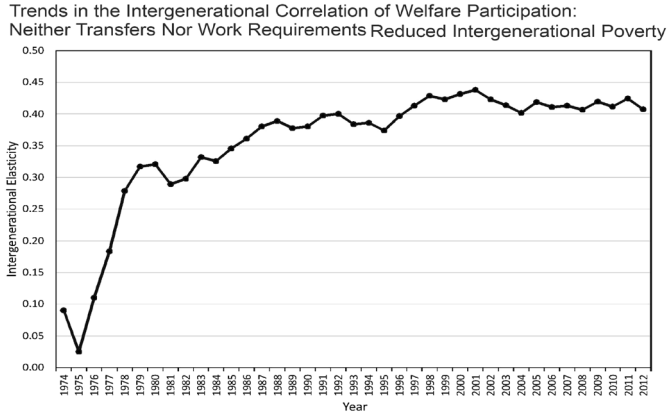
One negative side effect of the Great Society was the creation of poverty enclaves. Since welfare policies at the time were targeting specific portions of the population to guarantee that aid would be granted to those who needed it the most, policies of the Great Society ended up dividing the American poor into enclaves and detaching them from society. Consequently, there were numerous concentrated inner-city neighborhoods that were exclusively poor and sometimes far removed from employment opportunities, thus perpetuating the cycle of poverty across generations.

A recent study done by Hartley et al. (2017) at the University of Kentucky Poverty Center evaluated the success of these programs. When the Great Society initiative was launched, there was only a small correlation (0.10) between a child's

participation in welfare programs later in life and their parents' participation. Over time, as cash transfers were made routine and welfare enclaves became established, this correlation rose. It continued to rise even after President Clinton's work-fare reforms in the 1990s (see Figure 2). The Great Society failed to eliminate the intergenerational effects that limited social mobility. Money alone did little to promote mobility across generations.

Some suggest that the intergenerational persistence was due to concentration of the poor and resulting negative peer effects, or to the nature of the welfare programs that discouraged people from working. For instance, many of the programs of the War on Poverty had strongly regressive components. Individuals who fell far below the poverty line faced tax rates on earnings close to 100%. If they were on welfare programs, most of the money they earned was taken away because they became ineligible for the programs. This diminished incentives for those on welfare programs to work. The same problem currently exists in Denmark, where a strategy of heavily taxing and transferring money leads to a very low returns to skills and hence minimizes the incentive to acquire skills (see Figure 3).[3] Taking lessons from the War on Poverty and the current state of intergenerational inequality in Denmark, I will argue that the Scandinavian model of redistribution is not a good solution for eliminating structural (skills-based) inequality in the U.S.

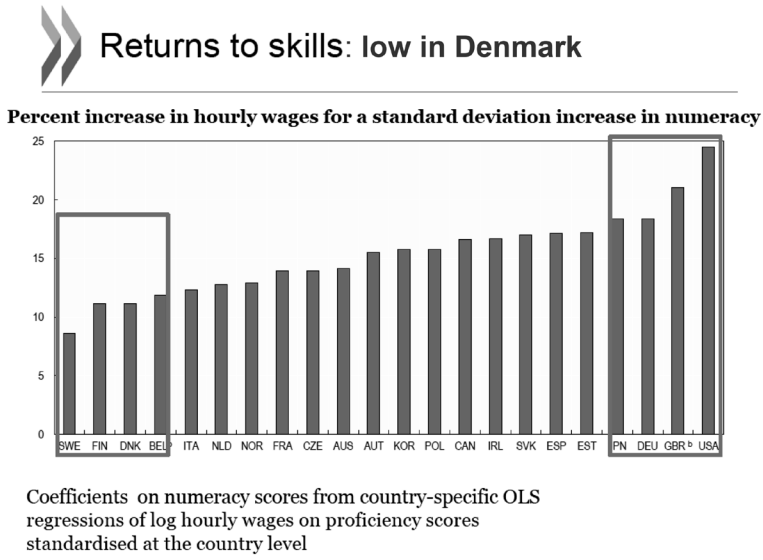
Figure 2: U.S. Taxes and Transfers System Failed to Promote Social Mobility



Source: Hartley et al. (2017)

3 The AFQT or Armed Forces Qualification Test consists of four subtests on word knowledge, paragraph comprehension, arithmetic reasoning, and mathematics knowledge.

Figure 3: Returns to Skills in Selected Countries



Source: OECD (2015)

In the past 15-20 years, American tax policies for the poor have become more progressive. Since the time of the War on Poverty, rates of taxation of the earnings of the poor have been greatly reduced, work has been incentivized, and the wealth and tax transfer system for the poor has improved dramatically.

However, since the Great Society, social-welfare policies have continued to follow Johnson's shotgun approach to fostering skills. We need to target the stages of the life cycle that prove to be the most effective for investment in skills. Lessons learned from the Great Society and more recent public welfare programs suggest that in order to alleviate poverty it is crucial to build skills and not rely solely on tax and transfer policy. Inequality in skills leads to economic inequality and immobility. By building skills, not only can long-term poverty be eliminated, but economic and social mobility can be promoted, creating equity without any tradeoff in economic efficiency (Heckman, 2008). Moreover, enhancing skills also enhances people's dignity, agency, and the ability to engage in the larger society. Rather than excluding people from participating productively in the larger society by keeping them in welfare programs or sending them off to separate housing projects as was done during the Great Society, investing in human capital and fostering skills is a policy for promoting inclusion.

2. *Sources of Economic and Social Inequality and Immobility in the United States*

2.1. The difference between skills and education

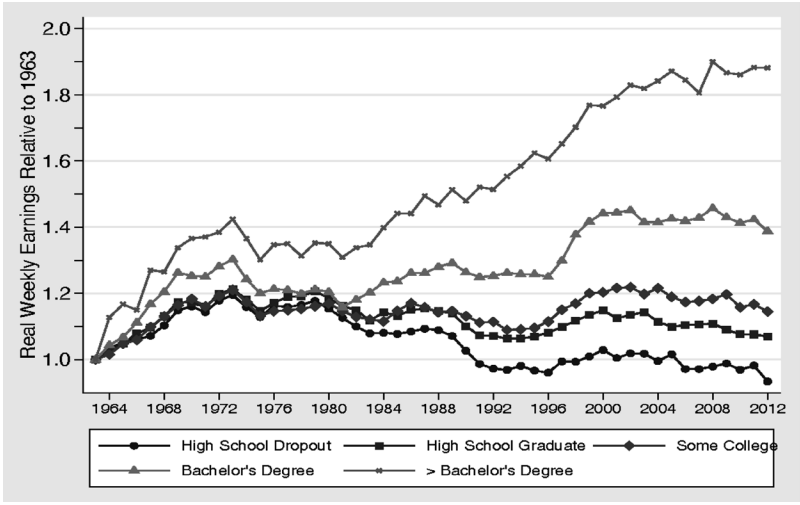
Some of the most commonly identified factors of inequality in the U.S. include race, gender, sex, and education. Policies aimed at reducing inequality through skill formation have primarily worked to improve the education system. Some of the most successful reforms build incentives into education so that principals and parents have more say over what schools do and in evaluating their efforts (see Walters, 2015). In proposing new policies for skill formation, it is important to acknowledge the difference between skills and education. Today the term "skill" has become synonymous with education. Education can promote valuable life skills, however, there are other skills that are as important, if not more important than those taught in schools. Cognition and the ability to deal with complexity are important life skills. "Soft skills," such as social and emotional skills, play a powerful role in making people adaptive, promoting economic productivity, and enhancing personal welfare of those with such skills. Further, there are important sources of skill formation other than schools.

The current emphasis placed on the importance of education and the reliance on the education system to single-handedly close skills gaps stem from two sources: available information on income or wage inequality within the U.S. population, and an overemphasis on the role of IQ in determining wages. First, data from Figure 4 reveal that the rise in real wages of full-time workers has been substantial for those with at least a bachelor's degree. Wages of workers at every other education level have stagnated. In fact, over stretches of time during much of the past 30 years, the real wages of the least skilled have not only stagnated but declined. This reinforces the belief that education determines potential income and wealth. Second, trends in achievement test scores such as PISA[4] clearly show that children whose mothers completed more education tended to have higher scores (see Figure 5, of which more later). However, only 4-5% of the lifetime variation in earnings can be explained by differences in IQ. The gaps present in achievement test scores when children are 18 are more or less present when they enter the school system (see Brooks-Gunn et al., 2006). Such evidence suggests

4 The AFQT or Armed Forces Qualification Test consists of four subtests on word knowledge, paragraph comprehension, arithmetic reasoning, and mathematics knowledge.

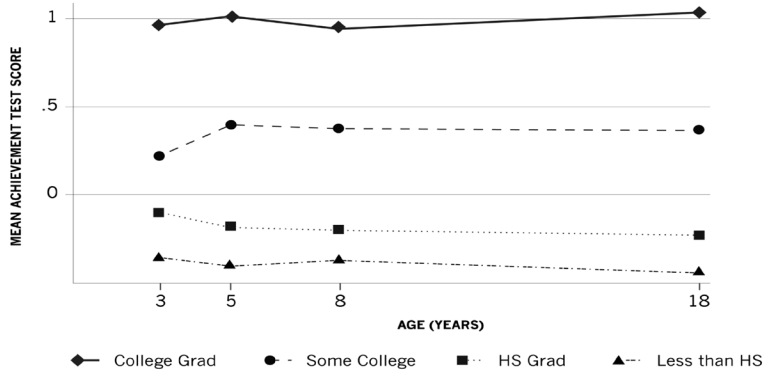
that differences in family life explain learning disparities. American schools are very unequal. Schools in neighborhoods with more educated parents are generally of higher quality, yet Figure 5 suggests that test score gaps emerge long before children enter school and are not much affected by schooling quality.

Figure 4: Changes in Real Wage Levels of Full-time U.S. Workers by Education, 1963-2012, Males



Source: Autor (2014)

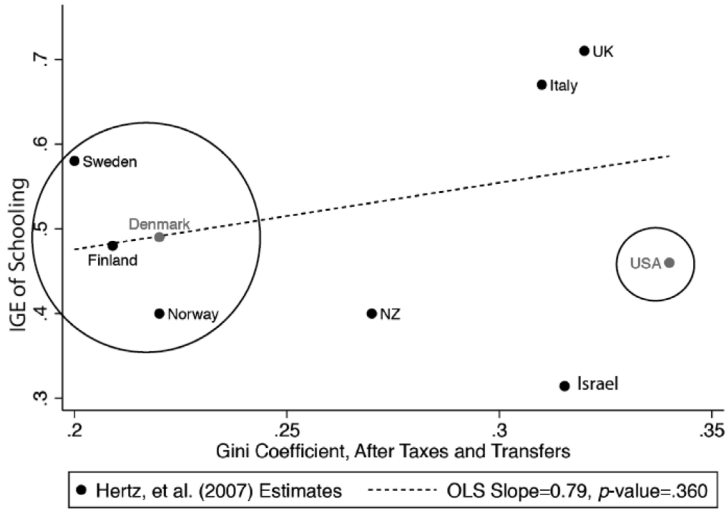
Figure 5: Mean Achievement Test Scores by Age by Maternal Education



Each score standardized within observed sample. Using all observations and assuming data missing at random. Source: Brook-Gunn et al. (2006).

Source: Brooks-Gunn et al. (2006)

Figure 6: Intergenerational Educational Mobility and Inequality



Notes: IGE of schooling: coefficient on education on parents in a regression of child's equation on parent's education.

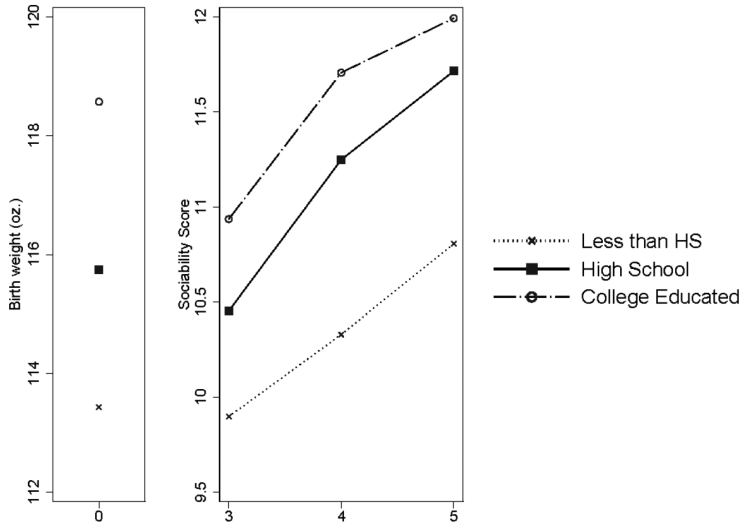
Source: Landersø and Heckman (2017)

2.2. The Important Role of Family Structure and Environment

Data from Denmark supports the claim that differences in family structure perpetuate inequality. Denmark boasts universally high-quality schools with no apparent disparity in expenditure across regions or groups, yet the country has the same high level of educational inequality as the U.S. (see Figure 6). Despite universal and equal access to health care, child care, and education including free college, Denmark still sees large gaps in educational outcomes between children of highly educated mothers and those of less educated mothers. Such gaps as large as those in the US, as can be seen in Figures 7 and 8. In light of such gaps and the Danish government's policy of equalizing school expenditures across neighborhoods, it can be surmised that family factors play a powerful role in perpetuating inequality.

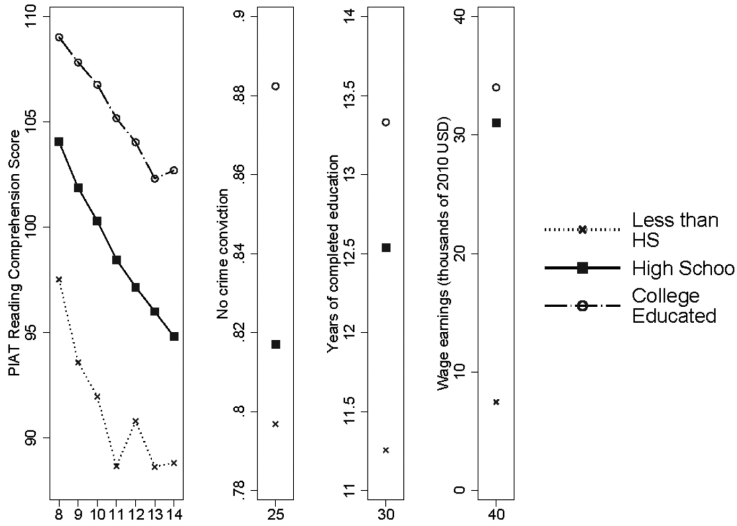
Gaps by Mother's Education

Figure 7a: U.S. CNLSY



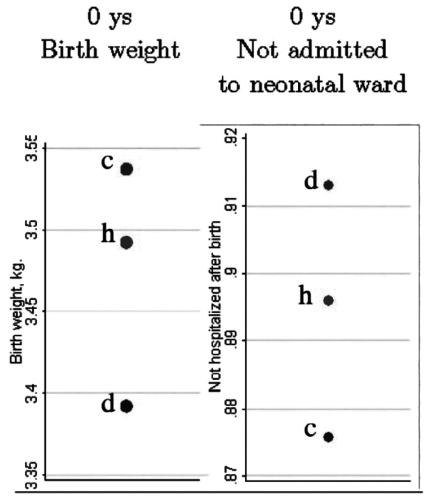
Source: Author's tabulation from Children of NLSY survey

Figure 7b: U.S. CNLSY, Cont.



Source: Author's tabulation from Children of NLSY survey

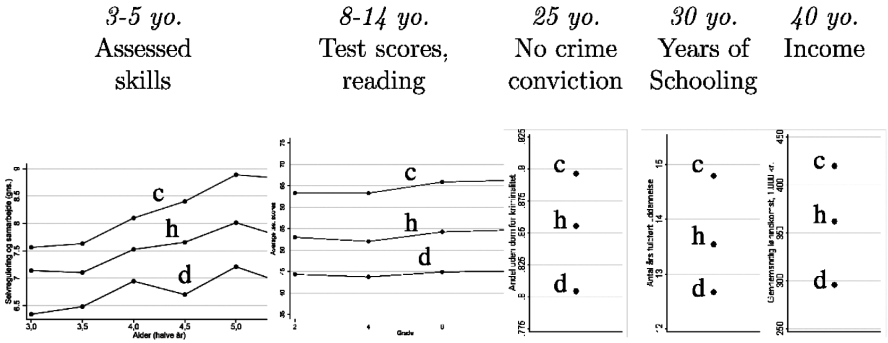
Figure 8a



Source: Author's tabulation of Danish Register data.

Note: **c** = college-educated mother; **h** = high school-educated mother; **d** = less than high school

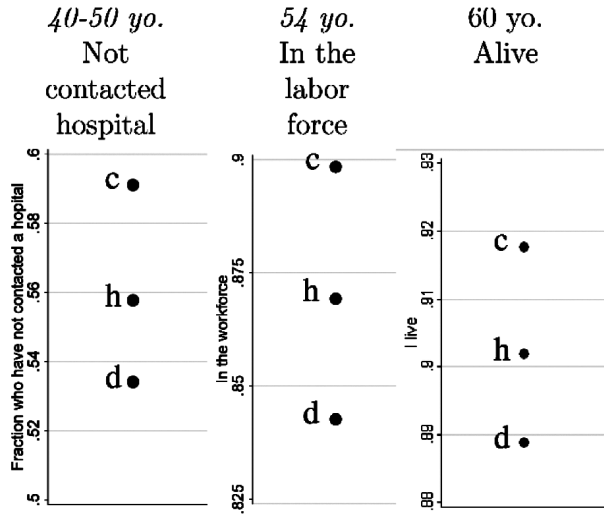
Figure 8b: Years of Schooling



Source: Author's tabulation of Danish Register data.

Note: **c** = college-educated mother; **h** = high school-educated mother; **d** = less than high school

Figure 8c



Source: Author's tabulation of Danish Register data.

Note: **c** = college-educated mother; **h** = high school-educated mother; **d** = less than high school

The Coleman Report (1966) in the U.S. demonstrated that family structure and family environment have a much stronger influence on learning disparities than school quality. Household structure plays a major role in shaping US inequality (see Figure 9). There is an inherent difference between single-parent households and two-parent households: on average, the single-parent household has fewer resources than a two-parent household. Single-parent families in which a child's parents never married, usually have the mother as the sole earner. She is typically less educated and hence earns a lower wage. Single-mother households tend to have substantially fewer financial resources compared to nuclear families. In fact, modern American society's highest family income quintile largely consists of two-parent families with both partners being high-earners and highly educated.

Inequality due to family structure is increasing as family life fractures. Between 1976 and 2016, the number of children under 18 living with a single parent rose substantially (see Figure 10). The number of births to unmarried women across all ethnic groups increased from 5% in 1940 to 40% in 2016 (see Figure 11). Such trends mean that less time and financial resources are devoted to the early development and learning of these children.

Figure 9: Inequality Measures and their Factor Components, US 1979-2007

Estimated Average Annual Percentage Change in Various Inequality Measures Accounted for by Factor Components, US 1979-2007

	Gini	P90/P10
Actual	*0.4*	*0.82*
Household Structure	*23%*	*33%*
Men's Employment	*5%*	*5%*
Men's Earning Disparity	*73%*	*50%*
Women's Employment	*-25%*	*-22%*
Women's Earning Disparity	*20%*	*29%*
Assortative Mating	*10%*	*11%*
Other	*-5%*	*-6%*

Source: Larrimore (2014)

Notes: *This is the gap between the top 10% (90) and the bottom 10% (10).

Figure 10: Children Under 18 Living in Single Parent Households by Parent Marital Status, U.S.

Source: Heckman, 2011

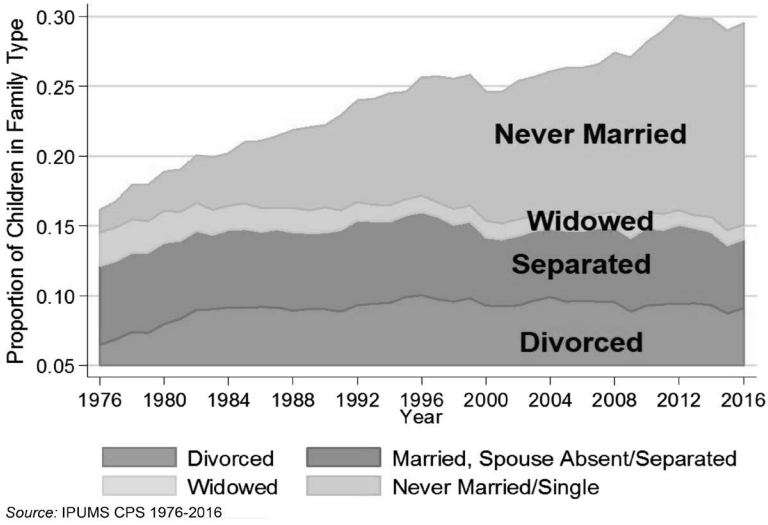
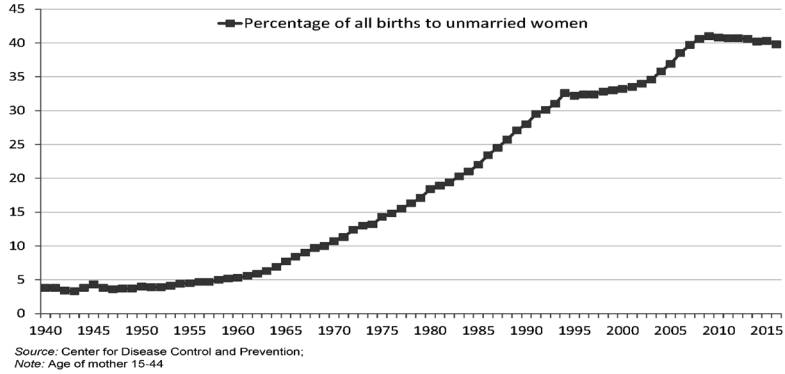


Figure 11: Births to Unmarried Women, U.S.



Source: Heckman (2017)

A 2011 study by Duncan and Murnane found that between 1972 and the late 2000s, the amount of money spent on children has greatly increased in households in the top income quintile but stagnated in households in the bottom income quintile, leading to a vast and widening divide between the two groups (see Figure 12). Given that families are the main producers of skills who impact children's skill formation prior to when they attend schools, and considering the widening differential in family resources, it becomes clear that the gaps in children's skill formation and other outcomes are driven by differences in family structures and environments.

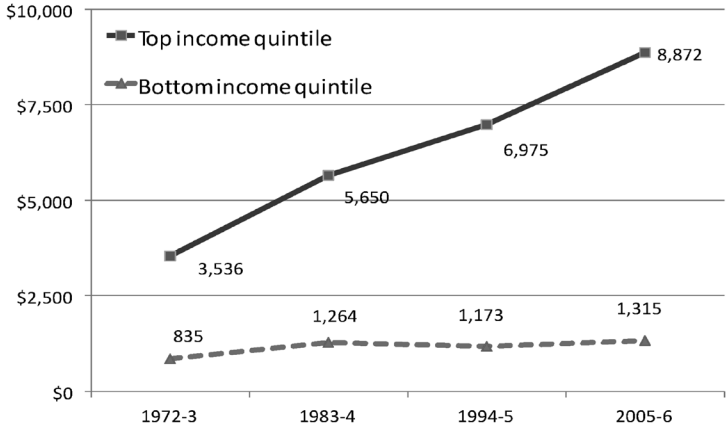
Today, more and more children are facing different household environments than those of the past, resulting in profound effects on their skill development. Beyond diminished access to financial resources, a 1995 study by developmental psychologists Hart and Risley found that children growing up in disadvantaged families suffer a learning disadvantage as early as age three (see Figure 13; Hart and Risley, 1995). For the children of disadvantaged families, the verbal environment consists of hearing roughly 600 words an hour. In comparison, children of highly educated parents might hear more than an average of 2000 words, roughly 3.5 times more words per hour. By age three, the cumulative vocabulary of a child living in a disadvantaged family is 500 words, far below the 1,100-word cumulative vocabulary possessed by a child from a professional family. The effects of this difference cumulate, resulting in the "30-million word gap" at age five, popularized by Suskind et al. (2015). This early gap of basic skills tends to persist throughout life, leading to economic inequality and social immobility.

Assortative mating further exacerbates inequalities (see Figure 9). Highly educated people marry other highly educated people, tend to live in separate neighborhoods, and create a more affluent environment for themselves and their families.

More generally, sorting is an issue in both the U.S. and Denmark. In Denmark, despite equal pay across schools, teachers with superior test score performance in college sort into the more affluent districts where kids have ample family support and resources and tend to be more motivated and easier to teach. In the U.S., sorting occurs more broadly within both the high and low ends of the income distribution, reinforcing many disparities that the education system and the tax and transfer system fail to address (see Figure 14). Although governments lack the ability to intervene in personal family affairs and alter family structures and voluntary association of people, governments can enact policies that remedy underlying skills deficits caused by differences in family structures and socioeconomic backgrounds. These policies will be discussed later in this essay.

In summary, there is abundant evidence that the persistence of poverty and inequality and differences in children's educational outcomes are caused in part by differences in family structures and environments. American society needs to move beyond focusing on education as the producer of life-relevant skills and begin to promote social inclusion and social mobility by addressing skills gaps resulting from family differences.

Figure 12: Per Capita Enrichment Expenditures on Children (2008 US$)
Top Versus Bottom Income Quintiles



Source: Duncan and Murnane (2011)

Figure 13: Home Environments Matter

Children enter school with "meaningful differences" in vocabulary knowledge.

1. Emergence of the Problem

In a typical hour, the average child hears:

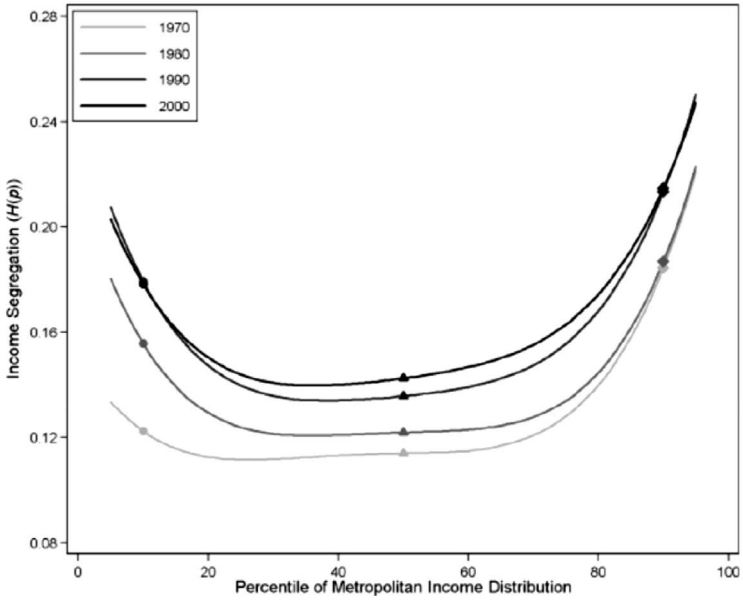
Family Status	Actual Differences in Quantity of Words Heard	Actual Differences in Quality of Words Heard
Welfare	616 Words	5 affirmatives, 11 prohibitions
Working Class	1,251 Words	12 affirmatives, 7 prohibitions
Professional	2,153 Words	32 affirmatives, 5 prohibitions

2. Cumulative Vocabulary at Age 3

Cumulative Vocabulary at Age 3	
Children from welfare families:	500 words
Children from working class families:	700 words
Children from professional families:	1,100 words

Source: Hart and Risley (1995)

Figure 14: Income Segregation Patterns in the U.S.
(Higher Levels → More Sorting)



Source: Reardon and Bischoff (2011)

2.3. The Role of Race and Ethnicity

Current gaps associated with race and ethnicity are largely skills-based. This was not always true. During his War on Poverty, Johnson launched affirmative action programs and enacted the Civil Rights Bill, both of which had profound effects on elevating African American status (Donohue and Heckman, 1991). However, Johnson wasn't solely focused on legal equity, but also equity in human ability — in skills. Thanks to policies such as affirmative action and other programs, overt discrimination in the labor market and in college admissions is no longer a first-order problem in American society. It has been documented that the gap between people of different races and ethnicities in the labor market with the same job qualifications is very small. Neal and Johnson (1996) and others have found that while gaps do exist, when adjusting for cognitive and socio-emotional skills, the gaps are significantly reduced. Were skills of minorities further developed, any remaining would be eliminated (see Figure 15). Already, college admission rates when adjusted for ability show preferences for minorities embodied in affirmative action programs (see Figure 16).

There is ample evidence that racial skills gaps exist, and that they are largely driven by what goes on in the family. Figure 17 shows a growing class gap in the rise in births to unmarried mothers. Figure 18 and 19 indicate that within the distribution of AFQT scores[5] for whites, roughly 50% of the African American population would be in the bottom 10% of whites. For PIAT scores[6] it's 40%. Figures 20, 21, and 22 reveal that after adjusting for family background, broken families, less educated mothers and other sources of disadvantaged, the gaps between races can more or less be eliminated.

An influential challenge to the claim that inequality among races and ethnicities is skills-based has been lodged by the literature on the Stereotype Threat (Steele, 2018). The Stereotype Threat literature claim argues that when an African American — or a woman — takes a test that they believe will represent their group identity, they fail to perform well. Therefore, achievement test scores are inaccurate measures of true abilities. There exists little evidence to support a Stereotype Threat of any substantial magnitude, yet its supposed existence is used to deny the presence of an all too real skills gap (see Carneiro et al., 2005).

5 The AFQT or Armed Forces Qualification Test consists of four subtests on word knowledge, paragraph comprehension, arithmetic reasoning, and mathematics knowledge.

6 The AFQT or Armed Forces Qualification Test consists of four subtests on word knowledge, paragraph comprehension, arithmetic reasoning, and mathematics knowledge.

Figure 15: Shortfalls in Hourly Wages for Blacks and Hispanics in the Last Twenty Years: Actual Disparity and Disparity Adjusted for Ability

	Male		Female	
	Actual	Adjusted	Actual	Adjusted
Black	-29%	-7%	-20%	5%
Hispanic	-14%	2%*	-9%	10%

* Denotes not statistically significant from zero
Source: Heckman 2010
Note: The racial gaps were adjusted for observed AFQT and AFQT squared scores.
*No strong evidence of any difference.

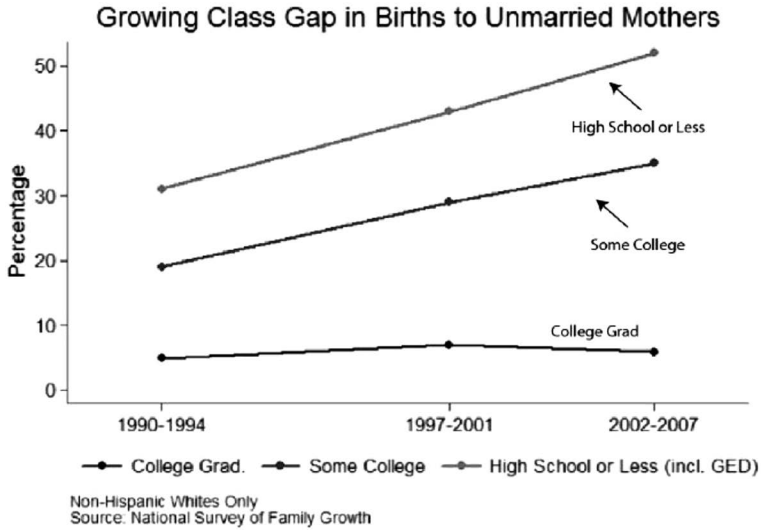
Source: Heckman (2011)

Figure 16: Differences in College Entry Proportions Between Minorities and Whites, Adjusted for ability, Mid-1990s

	Black-White	Hispanic-White
Actual	-0.12	-0.14
Adjusted	0.16	0.15

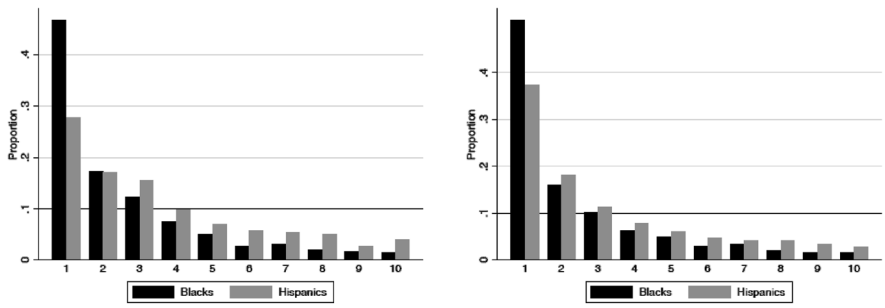
Source: Cameron and Heckman (2001)

Figure 17: Percentage of Births to Unmarried Mothers by Class



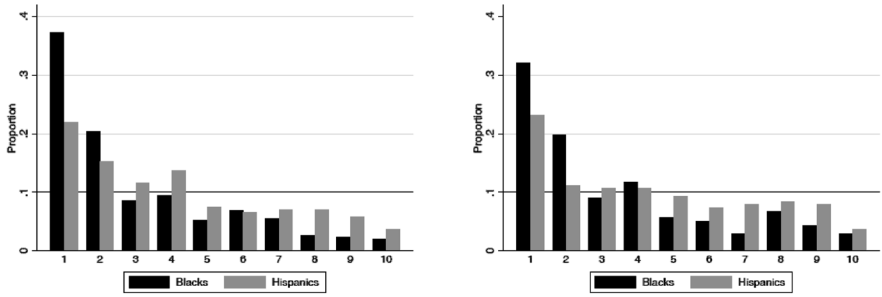
Source: Putnam et al. (2012)

Figure 18: Minority AFQT Scores Placed in the White Distribution, Males (Left) and Females (Right)



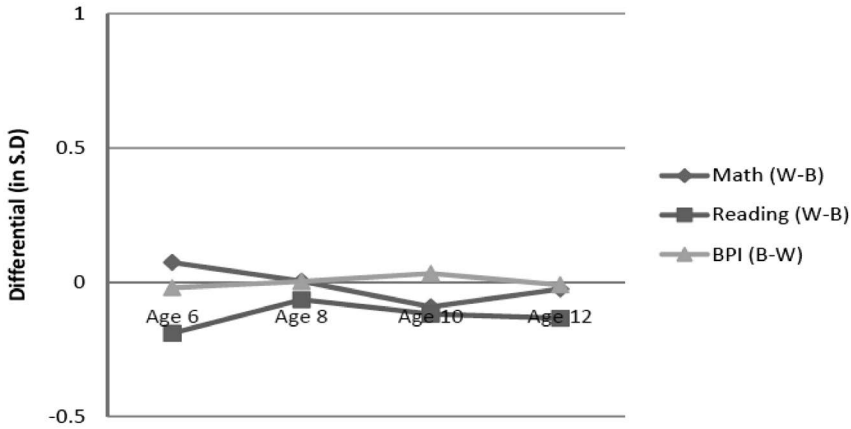
Source: Almlund et al. (2011)

Figure 19: Minority PIAT Scores Placed in the White Distribution Males (Left) and Females (Right)



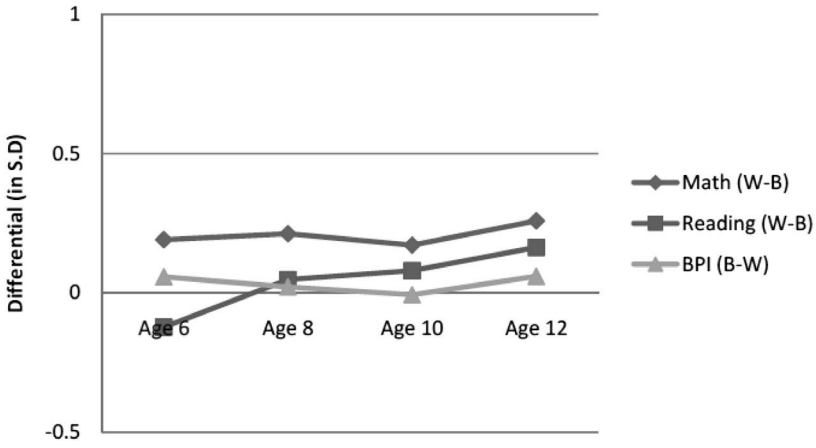
Source: Almlund et al. (2011)

Figure 20: Black-White Gaps in Skills Measures over Ages Adjusted for Family Background, Girls



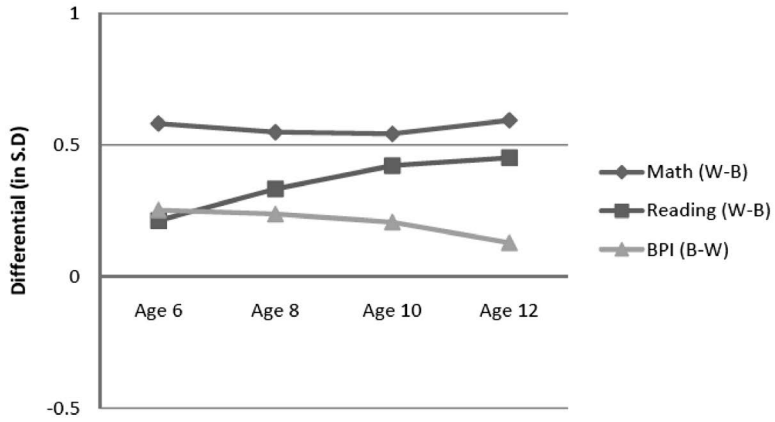
Source: Moon (2010)

Figure 21: Black-White Gaps in Skills Measures over Ages, Adjusted for Family Background, Boys



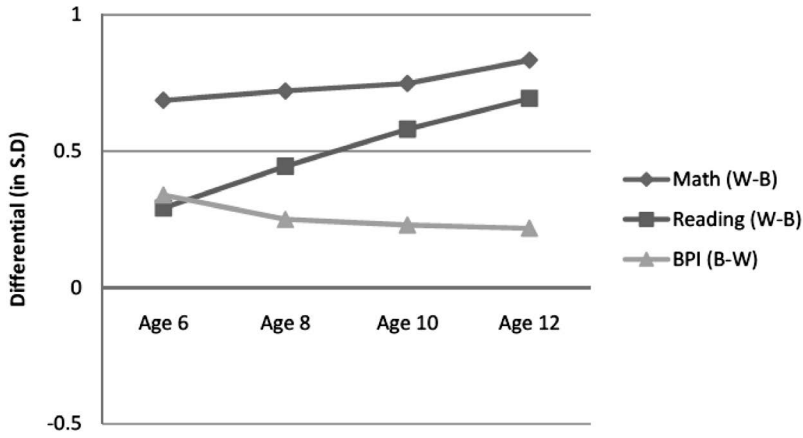
Source: Moon (2010)

Figure 22: Black-White Gaps in Skill Measures over Ages, Girls Scores



Source: Moon (2010)

Figure 23: Black-White Gaps in Skill Measures over Ages, Boys Scores



Source: Moon (2010)

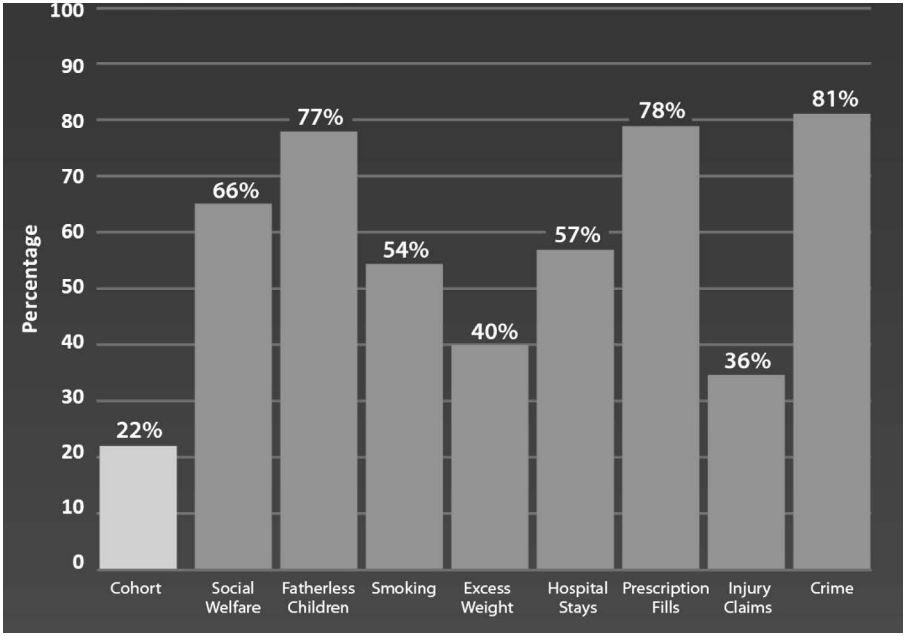
3. A Skills-Based Approach

Traditionally, governments are reactive, issuing policies and policy changes in response to a problem that has already arisen. However, simply being responsive is not necessarily as effective as preventing the problem in the first place. Many problems can be traced back to the absence of a common core of skills. Skill formation policies should be comprehensive and preventative rather than addressing problems as they arise. Moreover, in order for a skills approach to effectively reduce inequality, policies must reflect a comprehensive life cycle approach to skills formation: understanding at what stages of the life cycle society should invest and in which specific skills, so that public investments will be the most effective. By formulating policies that clearly recognize which skills matter and how they are produced, society can avoid the fragmented and often ineffective approach to public policy that misses the fundamental importance of skills. Knowing that families are the primary producers of skills, effective policies would initiate programs and policy interventions that benefit American families. We can draw on recent research to understand the consequences of family-based inequalities and develop wise skills-formation policies.

Psychologist and child development expert Terrie Moffit and her co-investigators conducted a study in New Zealand on a group of children known as the Dunedin cohort (Caspi et al., 2016). From the time they were born all the way

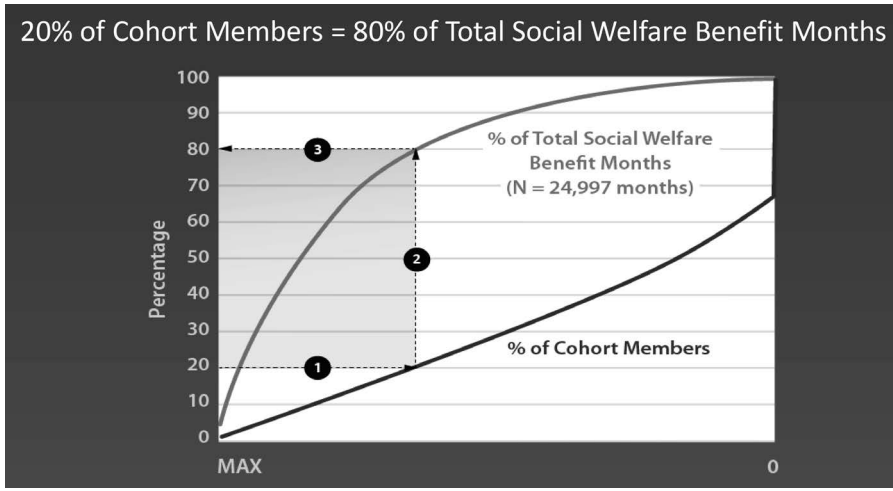
through their late 30s, Moffit documented their lives in detail, including their physical and mental health and measured various skills. Their study confirmed the accuracy of a 19th-century claim by economist and sociologist Vilfredo Pareto – now called the Pareto Principle – for the New Zealand population. The Pareto principle argues that 20% of the members in a society account for 80% of its problems. In fact, around 20% of the Dunedin cohort utilized 80% of the social welfare benefits (see Figures 24 and 25). A set of common and easily identified "early-life risks" characterized the 20% utilizing most of the welfare benefits when assessments are conducted to measure these early-life risk factors such as intelligence level, self-control, socioeconomic status, and history of maltreatment. They strongly predict which people are most at risk of falling in the 20% group. Consequently, to reduce inequality, policies to enhance early-life skills and close achievement gaps need to be designed to aid the most at-risk portions of the population.

Figure 24: 22% of the Dunedin cohort utilizing 80% of the social welfare benefits



Source: Caspi et al. (2016)

Figure 25: The Dunedin Cohort and the Pareto Principle



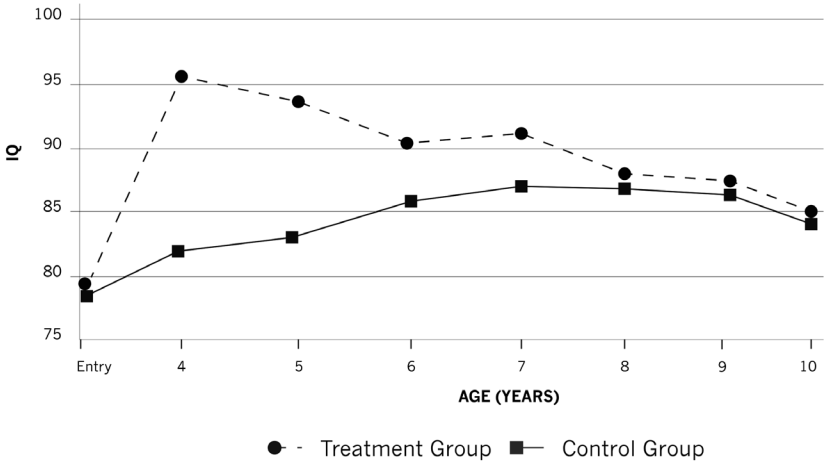
Source: Caspi et al. (2016)

Additionally, it is important that policy makers identify which skills are most appropriately developed at which stages of life. Historically the achievement gap was explained as being the result of genetics: children of intelligent parents inherited their intelligence and are thus more successful. Analysis of data from numerous studies might appear to support this argument. For example, Arthur Jensen examined the Westinghouse Head Start Study and found that while kids who participated in the Head Start program initially had higher IQs than those who did not, after a few years their IQs were equal to those of children who hadn't participated in the program (Jensen, 1969). Jensen concluded that the fadeout in IQ gains proved genetic determination of intelligence, suggesting that early-education programs, such as Head Start, would fail to close the skills gap. Herrnstein and Murray (1994) similarly claimed that there are no solutions to closing the achievement gap because inequality is a consequence of genetic differences.

However, recent studies show that targeted early childhood programs can reduce the skills gap, narrowing differences not only in IQ, but also in social and emotional skill development. The Perry Study found that children age 3-4 demonstrated increases in their IQs during and shortly after participating in the program, but as the children grew older their IQ levels began to resemble those of their peers not in the Perry Preschool Project (see Figure 33). Although such a result seemingly supports Jensen's argument that IQ must be genetic, the pro-

gram was not, in fact, a failure. While the IQ levels of program participants did "fadeout" back to normal, when analyzing their lifetime outcomes — participant earnings, avoidance of crime, health, and so on — the economic rate of return for individuals in the Perry Program was 7-10% per annum (Heckman et al., 2010). This very high rate of return derived from the social and emotional skills the children developed while in the program. So, although their IQs were not higher, participants were more engaged learners and their achievement test scores were higher because they were more active learners.

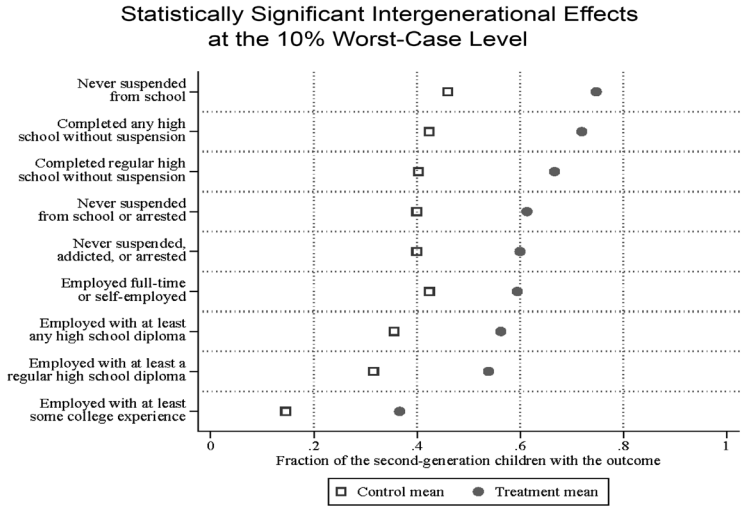
Figure 26: Perry Preschool Program, IQ by Age and Treatment Group



Source: Perry Preschool Program. IQ measured on the Stanford. Binet Intelligence Scale (Terman & Merrill, 1960). Test was administered at program entry and each of the ages indicated.

Source: Heckman et al. (2010)

Figure 27: Intergenerational Effects on Children of Original Perry Participants

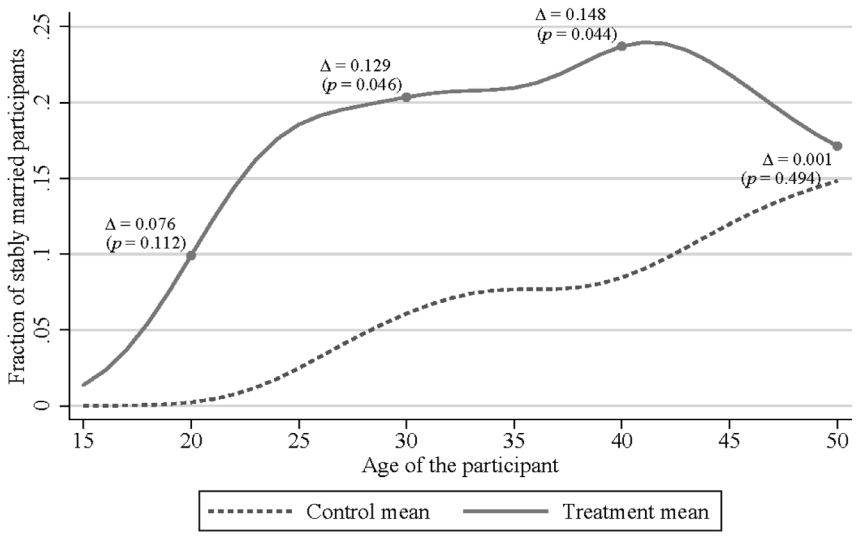


Source: Heckman and Karapakula (2019)

Perry participants were more engaged in school, with lower suspension rates and arrest rates and higher high school completion rates. These measures of social performance continued into the next generation (i.e. children of original program participants). See Figure 27. One possible explanation for why this happened can be seen in Figure 28: male participants were much more likely to get married, giving their children the opportunity to grow up under a two-parenting family structure with more income. Programs targeting the development of early-childhood skills produce alums who offer their children better family environments. This accounts for a beneficial effect on the children of the original Perry participants as adults. They do much better in school and in employment than children of randomized-out nonparticipants.

Similar benefits can be seen in participants of the more intensive Abecedarian (ABC) program which worked with children soon after birth until they were five (García et al., 2020). The program permanently boosted the IQs of the participants. Figure 29 shows that in addition to substantially boosting IQ, the ABC program improved participants' overall health because the program taught children lifelong skills such as the ability to self-regulate, follow medical instructions, and make wise decisions (Campbell et al., 2014).

Figure 28: Stable Marriage Rate over the Life Course for Male Perry Program Participants



Note: Δ = augmented inverse probability weighting estimate (AIPW) of the treatment effect; p = worst-case maximum p-value based on approximate randomization test using studentized AIPW; the control and treatment means are smoothed estimates using the Gaussian kernel with bandwidth of 3.

Source: Heckman and Karapakula (2019)

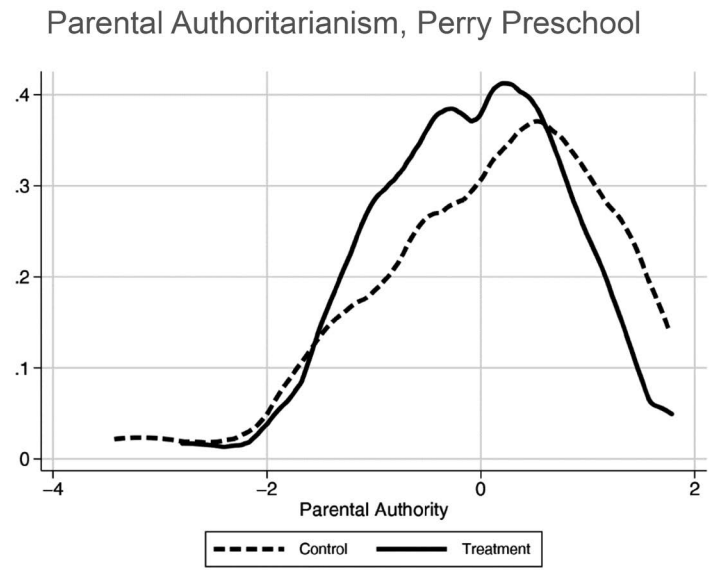
Figure 29: Abecedarian Project, Health Effects at Age 35 (Males)

	Treatment Mean	Control Mean	Treatment p-value
Systolic Blood Pressure	125.79	143.33	0.018
Diastolic Blood Pressure	78.53	92.00	0.024
Pre-Hypertension	0.68	0.78	0.235
Hypertension	0.10	0.44	0.011
HDL Cholesterol	53.21	42.00	0.067
Cholesterol/HDL-C	3.89	4.69	0.057
Abdominal Obesity	065	0.87	0.136
Metabolic Syndrome	0.00	0.25	0.009

Source: Campbell et al. (2014)

Since the family environment strongly influences children's development, the nature of parent-child interactions is very important. Studies of early-childhood development programs find that parent-child interaction patterns improved in both Perry and ABC, with many of the parents adopting a primarily authoritative, rather than authoritarian, parenting style (see Figure 30).

Figure 30: Parental Authoritarianism, Perry Preschool Program



One drawback to early-childhood development programs such as ABC, Perry, and Head Start, which are based in child-care centers, is that they are often costly. The ABC program cost roughly $80,000 for the first five years. However, the discounted lifetime benefits of the program are in the hundreds of thousands of dollars, and it has a rate of return are close to 14% per annum. Any businessman or investor would jump on this investment. Yet, governments only look at costs, and fail to consider benefits, presumably because the benefits are too long-term for election cycles.

Low-cost alternatives to center-based development programs are home-visiting programs. In such programs, parents are visited by home visitors whose education levels are not necessarily above their own, at most an hour a week. In less developed countries, these programs predominantly take the shape of women living within a village being trained to teach mothers how to interact with their

children in order to foster parent-child interaction (Heckman et al., 2020). A study of such a program in Jamaica demonstrates that children whose families participated in the program when their children were 18-36 months of age were more likely by their mid-twenties to have a job, have higher average earnings, more schooling, and stronger cognitive and non-cognitive skills and college attendance for the evidence on schooling (Gertler et al., 2014).

Preparing for Life is a home visiting program in Dublin's poorest neighborhoods in which families are visited one to two hours a month, a very low-intensity program. Over five years, families only received a total of 51 hours of intervention, in which mothers are taught how to interact with their children. It had substantial benefits on the children through age 10 (Doyle, 2019). Not only were the children's cognitive abilities fostered but compared to children not in the program, they were more autonomous, competent, and had fewer problems with hyperactivity. The program enriched the home lives of children outside of the typical childcare center and kept parental engagement active long after children left the early childhood programs.

There is a strong case to be made for implementing such programs in the U.S. They are less costly than the childcare-centered programs and are very effective. The key principle underlying these programs is that parental support and mentoring play a major role in fostering child development. Age-adapted parenting – sometimes called mentoring – plays a powerful role in shaping skills into adolescence and young adulthood.

Take, as an example, the performance of charter elementary school targeting disadvantaged children in Chicago. Steve Raudenbush, Lisa Rosen, and Tony Bryk established a charter school for disadvantaged students. Children in the program were given counseling and no child was allowed to fail, so if a kid struggled at a specific grade, they would be provided personal assistance catering to their educational needs. This is a form of individualized learning and mentoring. Results from this program indicate a closing of achievement gaps in test scores because the specialized stimulation and mentoring provided them with skills necessary to succeed, giving them an edge over those lacking such guidance. The experimental impacts are impressive (see Figures 31 and 32).

Figure 31: Effects of Achievement Outcomes for Lottery Winners and Lottery Losers, University of Chicago Enriched Charter Schools (UCCS)

	Grade 3	Grade 4	Grade 5	Middle Grades 6, 7, 8
Lottery winners[a]	.496	.393	.419	.631
Lottery losers[b,c]	.250	.098	.187	.098
Mean difference	**.246(.095)**	**.285(.114)**	**.232(.114)**	**.533(.159)**

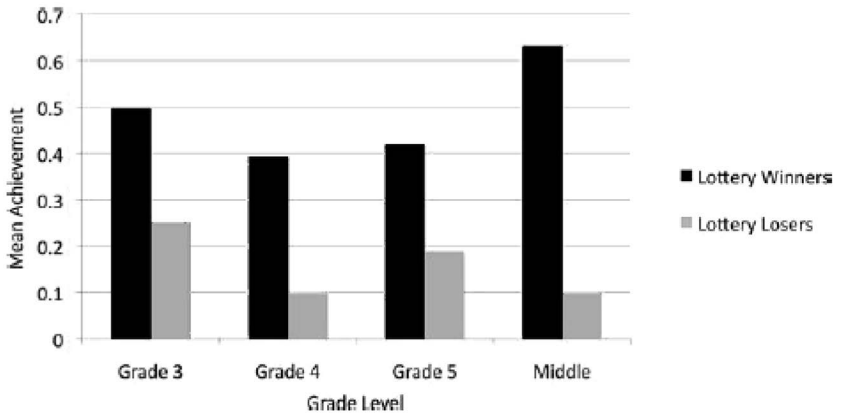
Source: Hassrick, E. M., Raudenbush, S. W., & Rosen, L. S. (2017).
Notes: a n = 138 lottery winners produced 276 test scores.
b n = 319 lottery losers produced 778 test scores.
c Lottery losers produced slightly more test scores on average than did lottery winners because (a) the probability of winning the lottery declined sharply for lotteries for grades after kindergarten, as fewer seats are open in UCCS after kindergarten; and (b) these later lotteries produced more test scores because testing begins at grade 3 (see table 8.2).

Source: Hassrick et al. (2017)

Adolescence is another period of opportunity. During adolescence, teenagers actively form their prefrontal cortex which guides regulatory decision making. Providing mentoring programs that foster judgement in decision making has lifetime benefits.

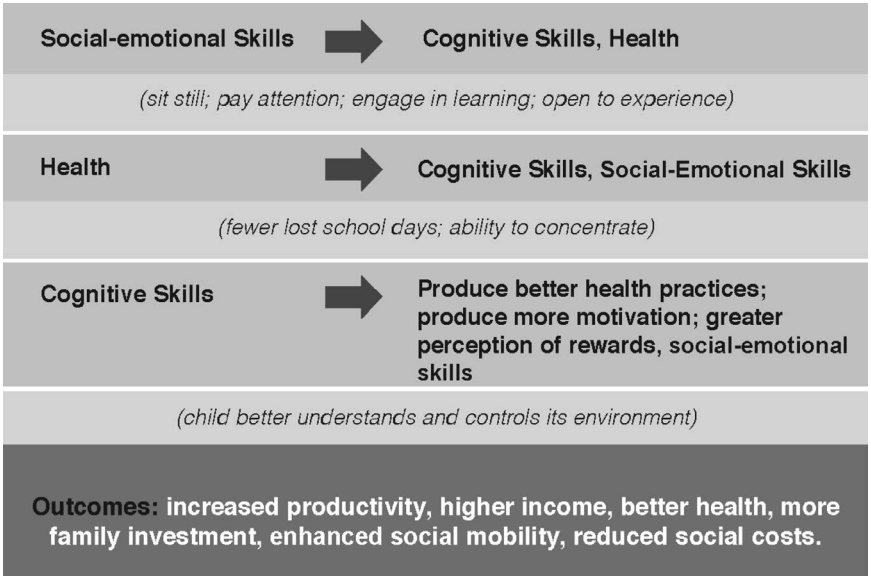
There is an intrinsic dynamic to skill formation. Parenting fosters curiosity, motivation, and wise decision making. More motivated children learn more, have more self-control, and take better care of their health. In turn, healthier kids develop stronger cognitive and socio-emotional skills, demonstrating the positive feedback loop of early childhood skills development. This is the essence of dynamic complementarity (Cunha and Heckman, 2007): early investments build a skill base that makes future investments more productive at later stages in life; the earlier the investment, the greater the effectiveness of future investment: skill begets skill (see Figures 33).

Figure 32: Achievement Test Results by Grade for Lottery Winners and Lottery Losers, University of Chicago Enriched Charter Schools (UCCS)



Source: Hassrick et al. (2017)

Figure 33: Skills Beget Skills, Understanding the Dynamics of Skill Formation and the Importance of the Early Years



Source: Heckman (2017)

4. Conclusion

Skill gaps due to differences in family backgrounds are real and not a figment of test score bias. They matter a lot in predicting life outcomes. Skills are multiple in nature and can be shaped by families and other influences, not only schools. By taking a skills-based approach, governments can solve the root cause of the problems of persistent poverty and inequality, social immobility and racial gaps in the larger society. Instead of centering policies on enhancing skills solely through the education system, policy makers should institute policies aiming to support families in engaging and nurturing their children. Building on lessons learned from effective programs which promote parenting, mentoring, and parent-child interactions, society can design policies to promote childhood skill development and begin to close gaps caused by differences in family structures and environments. More informed and motivated parents foster better schools by sending to them children who are qualified, motivated to learn, and who have already been taught basic skills.

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Investing in Human Capital across the Life Cycle to Increase Equity and Improve Outcomes

Carolyn J. Heinrich[1]

Introduction

In awarding the Nobel Prize in economics to James Heckman in 2000 and recognizing his eminent and extensive contributions to the economics literature, the Royal Swedish Academy of Sciences observed that his advances in econometric methods had become "standard tools, not only among economists, but also among other social scientists, such as sociologists, political scientists, and policy analysts." Furthermore, his own research applications of econometric tools have traversed a wide range of human development and social welfare issues, and his research findings have injected rigorous evidence into debates on policies affecting human well-being across the life cycle. Among the most influential of his theses or arguments are those he articulated in two highly cited works: his book (co-authored with Alan Krueger), *Inequality in America: What Role for Human Capital Policies?* (1999) and the research article, "Policies to Foster Human Capital" (2000).

In these publications, Heckman set forth three core arguments that were both derived from his research on education and training and that also laid out the conceptual foundations for his ongoing research following receipt of the Nobel Prize.

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First, he made the case that both cognitive and non-cognitive skills are important in producing economic and social success, but that we have been overly focused on cultivating and measuring cognitive skills among youth, to the neglect of other competencies that are critical to improving their outcomes. Second, he argued that institutions outside the formal academic system—including families and firms or other organizations in the community—have a role in imparting these skills, and that we also need to build their capacities for supporting human development. Indeed, Heckman has pushed particularly hard in the last two decades for a reorientation of public policies toward investing in the very young and their families or caregiving environments. His premise (or third argument) for this policy direction is that "skill begets skill," with the very early investments setting the foundation for building youth skills through K-12 education and beyond.

The graph that Heckman (2000) sketched to illustrate, hypothetically, the returns to investing in human capital over the life cycle—from birth into adulthood—was not generated based on hard empirical data or a formal meta-analysis of the research base (Figure 1, Returns to Human Capital Investments). Rather, it was intended to motivate additional research to test, empirically where possible, the tenets of this broad thesis that the returns to investing in human capital will be greater the earlier we begin investing in children, that is, before children get to school. That said, in the face of public budget constraints, a shift in resource investments to the early preschool years or outside of the education system to families also likely implies fewer resources to invest in secondary education and in education and training opportunities for young adults. Moreover, if parental income and other resources in the home environment are critical for children's development and early thriving, then it may be unwise to appreciably reduce funding that is aimed at strengthening the capabilities of young adults who are responsible for nurturing the next generation.[2]

Indeed, a major motivation for my own research—which continues to be shaped by the work of James Heckman, my graduate advisor at the University of Chicago—are the persistent inequities in access to opportunities for quality education and human development in our society, from preschool through young

2 U.S. Census data show an inverse relationship between education levels and fertility—women without a high school degree have a fertility rate that is nearly one birth higher than women with a graduate degree (i.e., 2.56 vs. 1.67 births per 1,000 women, respectively)—which has important implications for the level of familial income available for investing in children in larger, less-educated and likely poorer families (https://www.census.gov/topics/health/fertility/data.html).

adulthood. For instance, while the evidence base may be strongest in demonstrating high returns to early education—ranging from $7 to $10 for every dollar invested in high-quality programs (Heckman et al., 2010; Karoly, 2016)—research also shows that program capacity continues to be a major barrier to preschool enrollment (Bailey et al., 2017; Bassok, Gibbs, & Latham, 2018; Chaudry et al., 2017). Thus, even with overwhelming evidence and growing public support for preschool as an effective strategy for promoting positive outcomes of children and reducing gaps in school readiness, some of the most vulnerable children continue to arrive at the K-12 education system without this "head start."

Accordingly, I see my own research as converging around an argument for steadily investing in youth in ways that aim to reduce the inequalities that limit their healthy development. Applying a highly interdisciplinary approach and rigorous methodological tools acquired through my studies at Beloit College and the University of Chicago, I would characterize my research investigations as fitting into three life-cycle "buckets", with a lens trained on equity concerns in each:

- Getting children off to a "right start" through early intervention and supports, especially for the most vulnerable;
- Maximizing children's potential through the K-12 education system, with attention to historically disadvantaged student populations and ameliorating persistent inequities in access to quality learning opportunities; and
- Supporting their transition to healthy, productive adults who will effectively nurture the next generation.

Drawing on a life cycle approach to inform public policies that support human development and equality of opportunities and outcomes recognizes the vital linkages between helping families to give children a healthy start, so that children enter kindergarten fully prepared (emotionally and cognitively) for learning; maximizing their potential through the K-12 education system while reducing gaps in achievement, and aiding their transitions to economically productive, healthful and fulfilling lives.

Still, even with the knowledge that child, family and health interventions that aim to increase early and ongoing access to services and care and promote school readiness and success generate remarkable returns (as high as 18% annually), comprehensive efforts to intervene early and support youth remain inadequate and underfunded relative to need. This is not for lack of evidence-based models or effective approaches, for which the dissemination and adaptation outside of (and even within) their originating locales has often been disappointingly slow

given the high stakes for our children. For this reason, my research has regularly attended to the policy and institutional contexts in which interventions are launched and the political, economic and practical feasibility or relevance of the recommendations that emerge. In addition, the research I undertake is frequently conducted in partnership with public and private institutions—e.g., schools, government agencies, and nonprofit or nongovernmental organizations—which supports the direct application of research findings to policy and practice and increases the potential for expanding or disseminating successful programs and practices to other settings.

Intervening early for the most vulnerable children

Behavioral and psychosocial research, in conjunction with studies of human capital formation, support the view that the early childhood years offer singular opportunities for developing human competencies, preparing children for life-long learning and minimizing risks imposed by socioeconomic and environmental disadvantages. In fact, the quality of the early childhood environment has been shown to be a strong predictor of adult productivity, with early enrichment particularly important for the later economic success of disadvantaged children (Howard-Jones et al., 2012). Moreover, parental income is a major factor influencing the resources available to improve the quality of children's nurturing and environments (e.g., through spending on nutrition, child care, health care, the safety of their physical surroundings, opportunities for learning, etc.), and sociological theories of the life course underscore the interdependence and bi-directional influence of parents on children and children on parents (Elder et al., 1985).

Not surprisingly, the dramatic increases in economic inequality in recent decades have intensified differences in access to resources for poor children in their home environments, including the quality and quantity of parental time they receive, as well as in the effectiveness of public schools in helping them to overcome early disadvantages and bridge gaps in educational and economic opportunities and outcomes down the road. Rather than being the "great equalizer," Kaushal (2014) argues, the U.S. education system has reinforced inequalities in the distribution of resources across generations and constrained mobility of those at the bottom of the income distribution. One programmatic response to these persistent disparities has been a growing focus on "two-generation" strategies that aim to invest early in young children's education and well-being, while *simultane-*

ously helping their parents through family support services (e.g., to improve parenting practices) and education and training (Chase-Lansdale and Jeanne Brooks-Gunn**,** 2014). Whether coordinated in the context of a formal two-generation program or prodded by policy reforms to coordinate or co-locate services, recent "human capital building" efforts have sought to create "two positive, proximal environments" through early education that promotes learning and social competencies of children and complementary supports for improving adult capabilities to provide nurturing, healthy home environments.

Foremost among the family supports that complement the education focus of two-generation strategies are those that address the health of the parents or other caregivers in children's lives, while at the same time providing for the health care needs and healthy development of the children (Georgetown University Center for Children and Families, 2017).

Among U.S. children aged 0-5 years, 44 percent depend on Medicaid for their health insurance, and this percentage is considerably higher—including more than 4 out of 5 young children—for families with incomes below the federal poverty level (FPL). In fact, research shows that children's health insurance access is closely intertwined with that of their parents, particularly for low-income families. Hudson and Moriya (2017) found that under the Affordable Care Act (ACA), more than 700,000 children newly became covered by public health insurance when their parents gained coverage, and if all other non-expansion states had expanded Medicaid, 200,000 more children would now have access to health care services afforded by the program. They attributed these increases in part to efforts to advertise and promote the benefits of the new insurance programs made affordable under ACA, which also reduced the stigma of receiving public coverage.

Investigating the health and educational development of vulnerable children in Tennessee

In Tennessee where I reside, 26 percent of children live in families with incomes below the FPL, and half live in families without adequate resources to cover basic expenses like housing, nutrition, and education. Tennessee is a (Medicaid) non-expansion state, and in the two most recent years, the number of uninsured children in the state rose – increasing by 33 percent in 2017 and 17 percent in 2018. Over these same two years, more than 100,000 children were cut from the state Medicaid program, TennCare, so that the number of uninsured children in

Tennessee is now at the highest point since the start of ACA (Kelman, 2019).

With colleagues at Vanderbilt University Medical Center and state agency partners that include TennCare, the Department of Health and the Department of Education, we are undertaking research that investigates the health and educational development of some of the most vulnerable children in our state today, especially children living in low-resource households who face particularly high risks of developmental delays and adverse health outcomes. Children living in low-resource households, such as children in immigrant families or opioid-exposed children, may face special challenges to accessing health and human services that are needed for their healthy development, and existing research finds that they are at greater risk of adverse health and educational outcomes. They are less likely to complete secondary and tertiary education, and they are more likely to be uninsured and have worse health outcomes (Takanishi, 2004; Blewett et al., 2010). The opioid epidemic, which has hit Tennessee hard, compounds the problems these low-income families face. Opioid prescribing has been associated with higher rates of opioid overdose, abuse, addiction, diversion, emergency room visits, decreased labor force participation, and neonatal abstinence syndrome (NAS), all of which have consequences for both children and their parents or caregivers (Patrick et al., 2012; Nelson et al., 2015; Chou et al., 2015; Oei et al., 2017; Harris et al., 2018). Between 2001 and 2014, the number of children born in Tennessee with NAS increased tenfold, yet little is known about the long-term health, developmental, and educational outcomes of opioid-exposed children (Behnke and Smith, 2013).

Our research, funded by the Robert Wood Johnson Foundation that created the Vanderbilt Policies for Action Research Hub, is bringing together longitudinal health and education data to better understand the challenges faced by vulnerable children and how they correlate with observable family and child characteristics and children's outcomes. For example, some of the research questions we are addressing with access to data on both parents and children include: what is the prevalence and distribution of vulnerable children across Tennessee, and how does their prevalence and geographic distribution (e.g., within counties and school districts) correlate with county health and school resources for serving them? How many of these children and their families are accessing Medicaid and other public assistance programs, and where do we see under-identification or under-utilization of programs and services? How does identification as low-income, vulnerable, and/or high-risk correlate with health outcomes such as developmental delay,

depression, ADHD, asthma, etc. and education outcomes such as kindergarten readiness, grade retention, reading scores, absenteeism, discipline, and more? Lastly, we will also analyze the probable causal linkages between access to various types of public benefits and services for families and children and children's health and education outcomes over time.

Our research effort also recognizes that no matter how distressing some of the circumstances of vulnerable children and families that we observe in our study, we are unlikely to see any large, new influxes of resources to address the urgent and complex needs of the vulnerable children in our state, due to dwindling social welfare budgets and the lack of bi-partisan initiative at federal and state levels. We are therefore engaging policymakers and program administrators throughout the state in a qualitative research effort that aims to identify the specific ways that policy, process, and program structures create barriers to effectively serving children and families in low-resource households, and how these can be surmounted through program and policy reforms.

For example, there is increasing attention to administrative burdens—that is, barriers to or onerous encounters with government or other authorities that families face when seeking services for their children—such as high learning costs or time investments required to find out about a program and how it can be accessed; compliance costs for accessing benefits or services; psychological costs associated with the intrusiveness of the application process or rejection or stigma experienced in applying, and cultural and language barriers that may differentially create disparities on whom these burdens fall (Burden et al., 2012; Heinrich, 2016; Brodkin and Majmundar, 2010). Research consistently shows that low-income families have fewer personal resources to draw on in navigating administrative and compliance burdens associated with program access and benefits (Bustamante, 2012; Davis-Nozemack, 2012; Heinrich, 2016). Moynihan et al. (2015) found higher rates of Medicaid take-up among both the general population and children when state applications for the program had lower administrative burdens, and that efforts to reduce administrative burden and support enrollments (e.g., auto-enroll, express-enroll, increased outreach, etc.) increased children's enrollment by nearly 7 percent per month in Wisconsin (Herd et al., 2013). Through both data analysis and field research (e.g., interviews), we are working to identify these burdens in Tennessee and to foster greater cross-sector collaborations between health and education systems and between researchers and practitioners in developing new, low-cost strategies to improve children's well-being.

To offer an example of some preliminary findings from this project, we identified a way to measure homelessness among Tennessee K-12 students—i.e., children who "lack a fixed, regular and adequate night-time residence"[3] (an adverse childhood experience)—and examined the number of homeless children by school year. Our preliminary analysis shows higher rates of homelessness among the youngest children (kindergarten and early primary grades), but also that it is a highly transitory state. Not surprisingly, homeless students are considerably more mobile (more likely to enroll in two or more school districts in a given year), and they are also much more likely to be chronically absent from school (i.e., absent 10% or more of the school days). In addition, they are less proficient in their academic subjects than other economically disadvantaged peers. Together, these statistics suggest that homeless children likely have a substantially elevated risk of later negative academic and health outcomes, and that early and concerted interventions would be important to mitigate those risks.

Yet we also learned through our qualitative research that homeless students and their families face numerous barriers to getting the supportive services they need to thrive. One major impediment is the requirement on PK-12 school enrollment applications and most public assistance applications for proof of residence. As one interviewee from a federally qualified health center explained (in trying to help a family qualify for Medicaid): "*You have to have documentation of residence in the county or residence in the state, and if you are like living out of your car or you're a family living in a homeless shelter, you don't have a gas bill for two months to show."* Moreover, a transient state of living—especially in communities that lack emergency shelter and public transportation options (as in many rural areas)—can create daily problems for transporting children to school. We encountered overburdened community-based organizations and churches with volunteers drawing from their own pockets to meet needs such as these: "*I had a family yesterday that was evicted, and so they had spent the night in a local motel. The mother called and said they didn't have any way to get their children to school, so I called and got a bus and we picked them up, and then I personally picked up one of the students and took him home."* Our early findings underscore the futility of documenting the disadvantages of poor and vulnerable children without simultaneously trying to identify the policy barriers that stand in the way of getting them off to a healthier start in life.

3 Definition from the McKinney-Vento Homeless Assistance Act, https://nche.ed.gov/mckinney-vento-definition/.

Maximizing children's potential in the K-12 education system

In 1983, an influential report, *A Nation at Risk: The Imperative for Educational Reform*, warned that U.S. educational institutions were losing sight of their basic goals and high expectations and putting the economic well-being and security of the nation at risk. The report set off alarm bells by pointing out that along key educational measures compared across peer nations, the United States came in seventh. Today, we are spending close to $700 billion annually on our public elementary and secondary school system, and the public is demanding greater accountability and results. In fact, the U.S. recently ranked 4th and 5th in its spending on primary and secondary education, respectively, compared to its Organization for Economic Cooperation and Development (OECD) peers. Yet almost three decades of educational reform efforts appear to have left the country even further behind. On the Program for International School Assessment (PISA), U.S. student scores in math placed them near the bottom of 35 industrialized nations. Furthermore, a closer examination of these data shows that the proficiency levels of U.S. students appear to decline as they advance to higher grades, which is contrary to the trend in many higher-performing countries, yet perhaps not surprising given widening gaps in student achievement by race and family income over their time in K-12 education.

Interventions to improve educational performance under No Child Left Behind

One of the most extensive efforts to reverse the slide in comparative educational performance and to close racial and socioeconomic achievement gaps nationwide was embodied in the U.S. No Child Left Behind (NCLB) Act, signed into public law in 2002 "to close the achievement gap [in public education] with accountability, flexibility, and choice." President George W. Bush articulated the priorities of the act, stating that they "are based on the fundamental notion that an enterprise works best when responsibility is placed closest to the most important activity of the enterprise, when those responsible are given greatest latitude and support, and when those responsible are held accountable for producing results." Accordingly, the core legislative provisions included directives to hold states, districts, and schools accountable for student achievement, so that "parents will know how well their child is learning," and efforts to "empower" parents with

more information about the quality of their children's schools and offer educational choice to those in persistently low-performing schools. In practice, public schools that did not make adequate yearly progress (AYP) in increasing student academic achievement for three years in a row were required by NCLB to offer parents of children in low-income families the opportunity to receive extra academic assistance or to transfer to another public school. School districts were specifically required to draw on the private sector to provide eligible students with a range of choices for supplemental educational services (typically in the form of free tutoring outside of regular school hours) and were, for the most part, prohibited from directly providing these services. Although no new federal monies were allocated along with this mandate, state and local educational agencies were obligated to set aside 20 percent of their Title I funding to deliver these services and to measure their effectiveness in increasing student achievement.

The national educational reform effort launched by NCLB precipitated my foray into more than 12 years of continuous research-practice partnerships with some of the most racially segregated, high poverty urban school districts in the nation, as they sought to comply with the accountability demands of the law and to reduce achievement gaps. Because these school districts rarely had attractive school choice options for student transfers, most parents elected to have their children receive out-of-school tutoring under NCLB. And as the standards for making adequate yearly progress (AYP) increased every year, the number of schools obligated to offer these services to their students also rose, from about 20 percent in 2006 to about half of all schools nationwide in 2010. In the absence of additional federal funding flows, districts either had to reduce the funding available per student for out-of-school tutoring or limit the number of students who could participate. Still, firms flocked to the new market or newly arose to pursue the substantial funds that school districts were mandated to make available, and many providers aggressively marketed their services, offering students incentives to enroll such as computers, iPods, school supplies, movie passes, and gift certificates (Heinrich et al., 2010).

Our research showed that parental or student choice of tutoring providers directly affected provider market shares and their duration in the market, but that they often lacked information (other than marketing materials from the providers) to guide their choices, and student choices were greatly influenced by the gifts and incentives (Heinrich, 2010). In addition, the hourly rates charged by tutoring providers, well as the average number of hours of tutoring they delivered

to students, differed markedly across school districts, sometimes even within the same provider. Because school districts allocated fixed levels of Title I funds per student, the number of tutoring hours students could receive was directly related to the rate per hour charged by tutoring providers. In fact, our econometric analyses consistently found positive (albeit small) tutoring effects in only one of the major urban districts (Chicago Public Schools), where hourly rates charged by providers were the lowest (on average), and students routinely reached minimum thresholds of tutoring hours (more than 30 across the school year) that our research showed were critical to producing effects (Heinrich and Nisar, 2013; Heinrich et al., 2014).

In two other school districts we partnered with in this study (Minneapolis Public Schools and Dallas Independent School District), we were able to take advantage of "natural policy experiments" to test our findings on the relationship between tutoring intensity and student achievement. In Dallas, the district used federal stimulus funds to increase the allotted district *expenditure per student* and thereby boost the number of hours of tutoring students received for only one year. With these additional funds, student tutoring hours received increased by about 60 percent and reached the minimum hours threshold we had identified (before falling by more than half in the subsequent two school years). In Minneapolis, the district introduced a one-year trial program that, for a subset (approximately one-sixth) of tutoring participants, compelled providers to deliver more than the minimum threshold (at least 40 hours) of tutoring. In both of these school districts, we only observed positive program effects in the year when the average hours of out-of-school tutoring received by students exceeded the 30-hours threshold.

During the course of this study, we also observed *online* tutoring companies reaching increasingly larger student "market shares," serving as many as 88 percent of the participating students in one district. In another school district, we observed a single digital provider delivering tutoring to more than 10,000 students at one time. Although NCLB mandated unfettered parental choice in tutoring providers, the implementation and effects of the wide range of approaches and formats that emerged in digital tutoring were especially difficult for school districts to monitor and to assess their effects on students' academic achievement. This was of particular concern in the urban districts we studied, given that anywhere from two-thirds to100 percent of the participating students were free-lunch eligible; 90-98 percent were students of color, and up to 36 percent were English language learners.

Our research showed that digital providers, on average, charged significantly more per hour (about $20 more per hour) than non-digital providers and delivered fewer hours of tutoring services to students than face-to-face tutoring providers (Burch et al., 2016). Not surprisingly given our earlier findings, we found that students who received all face-to-face tutoring realized significantly larger benefits in terms of their academic achievement—more than three times the size of that for students receiving tutoring entirely over the Internet. We also found no positive correlation between the hourly rates charged by different types of digital tutoring programs and the programs' effectiveness in increasing student achievement. In addition, we consistently found (across sites and over time) that English language learners and students with disabilities were less likely to realize achievement gains through digital tutoring (than in face-to-face formats), raising concerns about their access to quality educational supports in the digital space.

Digital education: a "magic bullet" for underperforming schools?

Our findings on digital tutoring led us to explore in greater depth school districts' use of educational technology, not only as a supplement to day-school instruction, but also for the delivery of core instruction. Digital instruction in K-12 public schools has expanded rapidly since NCLB first opened a greater role for the private sector and ushered in increasing accountability pressures for improved high school graduation rates, and the federal government has also contributed to this growth by providing resources for public schools to purchase educational technology and requiring states to allocate funds for procuring digital educational resources (Enyedy, 2014). The Every Student Succeeds Act (ESSA) of 2015 further encouraged and provided funding for *personalizing learning* with technology to support students' individual educational needs. The pace of expansion has been particularly rapid at the secondary education level, where many large, urban school districts target students who are struggling in traditional classroom settings for online course-taking.

As more and more economically and educationally disadvantaged students are diverted to digital instruction, the enormous differences in schools' commitment and capacity to implement and support high-quality online learning raises the specter of differential access to quality learning experiences. In a longitudinal, mixed methods study of digital learning in high-poverty, urban high schools (Heinrich et al., 2019), we found that despite the promising features embedded in online

instructional programs, there was limited enactment of them by teachers and students to enhance learning and instructional quality. We frequently observed a lack of active student engagement during online instructional sessions, with students plugging headphones into cell phones instead of the computer and "Googling" for answers as they attempted to complete end-of-lesson quizzes or tests. With larger class sizes, instructors in online learning labs struggled to help students when they were challenged in their online courses, and mismatches between student reading levels and course content further discouraged student effort.

The online instructional program that we studied is used in school districts in all 50 states, including in eight of the 10 largest districts in the nation, and some have linked the recent substantial increases in high school graduation rates to the widespread use of these programs for students who repeat failed courses in an online and sometimes abbreviated format. When we analyzed the relationship between online course taking and changes in students' intermediate academic outcomes—credits earned, grade point average (GPA), and test scores—we found mostly negative associations between online course taking and these intermediate outcomes (Heinrich et al., 2019). Although upperclassmen did see increases in credits earned and their GPA, there was no corresponding growth in student learning (as measured by reading and math test scores) at any grade level. In fact, we found that students taking courses online for multiple years were set back their test score outcomes.

Yet if failing out of high school is more likely in the absence of an online option to recover course credits, and large urban school districts are lacking resources to increase instructional supports, reduce class sizes, and undertake other measures to improve student progress toward graduation, then the comparatively cheap online option for increasing graduation rates may also be the only viable one for these school districts. Furthermore, school districts lose state funding when students drop out or leave for alternative programs outside the district. Without adjusting for student or school characteristics, we saw that high school graduation and college enrollment rates are (statistically significantly) higher for high school students with no online course-taking vs. any online course-taking—graduation rates are about 4 percent higher on average, and college enrollment rates (2-year and 4-year) are about 13 percent higher on average for those not taking courses online (Heinrich and Darling-Aduana, 2019). But when we control for student and school characteristics in econometrically estimating the relationship between high school online course-taking and high school graduation and college

enrollment outcomes, we alternatively find that students taking courses online have, on average, high school graduation rates that are about 10-12 percentage points higher than similar students who do not take courses online, and their 2-/4-year college enrollment rates are also about 2 percentage points higher. However, the signs on college quality proxy measures suggest that while taking courses online may open access to postsecondary education for these high school students, they are more likely to enroll in lower-quality, open admissions institutions with poorer reputations, retention rates, and completion rates.

Heckman's research on the General Educational Development (GED) program, in which high school diplomas are awarded through equivalency exams, offers a cautionary tale on inexpensive "shortcuts" to attaining a high school credential. In his 1993 analysis with Cameron, they found that GED recipients were no more successful than high school dropouts in terms of their hourly wages in the labor market, after controlling for differences in their ability. And although they acknowledged that the GED might open the door to further postsecondary education and training, they also found that GED recipients were less likely than high school graduates to complete a 2- or 4-year college degree.

In our research on online instruction in high school, I am similarly examining the labor market and college persistence outcomes of high school students who completed or retook failed courses online and subsequently graduated from high school. If, for example, employers see high school graduation as a signal that the students have other (less readily observed) attributes that will make them good workers—which may or may not be related to anything that they learned in their courses—then completing a high school diploma through online course-taking should not affect their post-high school earnings. Alternatively, human capital theory would predict that if high school courses taken through online credit recovery are inferior in terms of the learning they impart, and if that learning is critical to workplace productivity, then these students would earn less in the labor market than those who do not complete high school courses online. However, because employers may not observe which students complete courses online, it is possible that initial post-high school earnings would still not differ between these two groups. If, over time, high school graduates who completed courses online perform more poorly on the job, then I would expect their earnings to decline over subsequent post-high school quarters or years relative to those who did not take courses online in high school.

In fact, the preliminary findings of this analysis (Heinrich and Cheng, 2020)

show a general pattern in which there are no statistically significant differences in earnings between high school graduates who were online course-takers and those with no online course-taking in high school in the first year or two post-graduation. However, the effects of online course-taking on the earnings of high school graduates turn increasingly negative and statistically significant starting in the third year post-high school. In addition, the negative effects of online course-taking (primarily for credit recovery) are even larger among the subgroup of students who enrolled in college, suggesting that any increases realized in access to post-secondary education may ultimately not pay off in their earnings. In effect, these findings resonate with those of Cameron and Heckman's (1993:1) earlier analyses of the GED, in which they concluded that there is "no cheap substitute for schooling."

Transitioning to healthy, productive adult lives

Although the graph shown in Figure 1 suggests diminishing returns to human capital investments as youth transition to adulthood, it is long understood that public financial support for higher education and for reducing the private costs of higher education are motivated at least in part by the objective to promote mobility or diminish the link between parents' socioeconomic position and their children's future social and economic success (Haveman and Smeeding, 2006). While rates of upward mobility increased among those born in the second quarter of the 20th century and were associated with growing equalization in education, mobility subsequently declined among those born later, contributing to growing concerns about stagnating rates of economic mobility (Breen, 2019; Chetty, 2016). Adding to those concerns, recent research suggests that most future jobs will require postsecondary training, and that half or more occupations are at risk of automation (Carnevale, et al., 2013; Haar & Scott, 2016).

In an extensive review of more than one thousand estimates of the returns to education in 139 countries over 60 years, Psacharopoulos and Patrinos (2018) confirmed the stable, widely consistent finding that the average returns to an additional year of schooling are around 9-10 percent. For the U.S., the private and social rates of returns to education are estimated to be substantially greater at the postsecondary education level, more than 20 percent in private returns and approximately 12 percent in social returns. Yet the U.S. still lags behind its developed country peers, coming in 10th globally in the percentage of young adults complet-

ing college (OECD, https://data.oecd.org/chart/58nF). This is due in part to profound equity gaps in college attainment that persist in the U.S. If one separated whites from nonwhites in these analyses, white young adults would come in 4th internationally in college attainment, while the ranking of U.S. black and Hispanic young adults in college attainment is drastically lower, coming in, respectively, at 28th and 35th in international rankings (Center for American Progress, 2019).

Even with a noticeable rise in associate degree attainment in the last decade, including among racial minorities such as young Hispanics—whose rate of college credentials earned increased by more than nine percentage points—average college attainment levels remain low for disadvantaged and historically underserved groups. For example, in 2017, the rate of college completion among young Hispanic adults was 28 percent, or half the rate of young white adults (U.S. Census, ACS). These statistics show both that significant improvements in college attainment rates are possible, but that we have considerable work to do to bridge gaps in attainment rates that persist for those traditionally underrepresented in higher education. Moreover, the gap between the earnings of more- and less-educated workers continues to widen, and these disparities will only be reduced to the extent that the U.S. significantly improves rates of college completion for those traditionally underrepresented in higher education, e.g., low-income, first-generation and minority students.

As noted earlier in this paper, an important motivation for increasing the earnings opportunities of young adults is that they are the providers and nurturers of the next generation, and that low-income children are less likely to thrive in environments characterized by low parental education, economic hardship, and parental stress. Postsecondary educational attainment is strongly correlated with wage growth and opportunities for upward mobility for parents, which is in turn associated with positive development and resilience among children (Chase-Lansdale and Jeanne Brooks-Gunn**,** 2014). CPS data for 2016 show that the median earnings of young adults with a bachelor's degree were 62 percent higher ($51,800) than the median earnings of young adult high school completers ($32,000).[4] In addition, in the last decade, entry-level job postings in the U.S. that include a formal postsecondary educational requirement or preference increased by about 50 percent (BLS). Furthermore, it is projected that from 2014-2024, occupations

4 U.S. Department of Commerce, Census Bureau, Current Population Survey (CPS), "Annual Social and Economic Supplement," 2001–2018.

requiring only a high school diploma will grow more slowly. In fact, in 2017, nearly a quarter (23%) of job postings included a formal postsecondary educational requirement or preference, whereas in 2007, only 15 percent did so.

"Driving to 55" in Tennessee

The National Conference of State Legislatures describes the creation of affordable, "structured pathways for students to be successful in college" as one of the most important state priorities.[5] Increased financial aid, tuition reductions and new financial aid programs to provide tuition-free access to community colleges or to ease the burden of student debt through repayment programs or refinancing of existing loans, are just some examples of policies recently advanced to increase the number of state residents with postsecondary credentials. Tennessee is among the states that have been at the forefront in developing innovative policies to make postsecondary education more affordable and to increase college attainment, in conjunction with its "Drive to 55" campaign to push postsecondary attainment from 39 percent in 2014 to 55 percent by the year 2025.[6] Two influential studies projected that by 2020, 55 – 58 percent of Tennessee jobs would require at least some college training (Carnevale, Smith, and Strohl, 2013). This analysis, alongside the Lumina Foundation's claim that 60 percent of Americans should hold a postsecondary credential by 2025, are typically cited as motivating factors behind the choice of 55 percent. Advancing post-secondary attainment is also important to the economic security of a state population where half of jobs are at risk of automation (Haar and Scott, 2016).

Although the percent of Tennessee's population with a bachelor's degree or higher rose from 21.7 percent in 2007 to 26.1 percent in 2017, Tennessee still ranks 42nd in the nation in its postsecondary degree attainment rate (of adult state residents age 25-64 with at least an associate degree). In the effort to achieve its postsecondary attainment goals, the state has launched a concerted, large-scale and multi-pronged policy effort that includes the following three major initiatives:

- *Tennessee Promise*, a tuition-free community college guarantee that offered the nation's first statewide "free college" program for traditional-aged

5 See http://www.ncsl.org/research/education/higher-education-legislation-in-2015.aspx.

6 The Lumina Foundation tracks state postsecondary attainment through its *Stronger Nation* series of reports. The most recent estimates put Tennessee's attainment rate at 42.7 percent.

students (transitioning from high school to postsecondary education) and includes college coaching and state-funded grants to cover the gap between other sources of financial aid and community college tuition and fees.

- *Tennessee Reconnect*, a tuition-free guarantee for older, nontraditional students attending one of 27 Tennessee Colleges of Applied Technology (TCATs).
- *Labor Education Alignment Program (LEAP)*, a series of competitive grants awarded to colleges, districts, and organizations seeking to strengthen the connection between schooling (both K-12 and postsecondary) and workforce needs.

To evaluate the success of these initiatives (with colleagues at Vanderbilt University and the University of Tennessee-Knoxville), we have established a research-practice partnership—the Tennessee Postsecondary Evaluation and Analysis Research Lab (TN-PEARL)—with state agencies, including the Tennessee Higher Education Commission, Labor and Workforce Development, tnAchieves[7] and others. The research lab engages in two primary types of research activities: (1) "high-frequency" policy analyses to monitor and provide new insights into descriptive trends in higher education and workforce development across the state, and (2) more in-depth and longer-term analyses that involve experimental or quasi-experimental methods and qualitative studies to evaluate the effects of specific policies related to the "Drive to 55" initiative. Broadly stated, we are investigating: How can state, local, and institutional policies raise postsecondary educational attainment? What are the labor market returns to postsecondary education and training, and what factors, institutional and individual, constrain those returns? Are recent policies working effectively to counter these constraints and increase postsecondary attainment and returns? This research is ongoing and involves more than 10 projects, so I will highlight only a few findings that illustrate why it is important to continue to develop and improve public policies that will support postsecondary education completion.

One of the subgroups that we are studying in TN-PEARL is first-generation students, who face greater challenges in completing postsecondary degrees than many of their peers, including weaker academic preparedness, fewer financial and social resources, and less institutional support. The Tennessee Promise provides exactly the types of funding support and other resources, such as one-on-one

7 Tennessee College Scholarship and Mentorship (www.tnachieves.org)

mentoring, that can aid these students navigating the college process and overcoming financial barriers to enrolling and completing. We are specifically examining how first-generation college students compare to their non-first generation college peers and how they fare in college, including their postsecondary education behaviors and outcomes that may be associated with the introduction of the Tennessee Promise program. For example, we find that first-generation students have considerably fewer personal financial resources; our preliminary analyses show that the parents of first-generation students contribute, on average, only about one-fourth of the financial support of non-first generation students. In addition, we see that following the introduction of Tennessee Promise, first-generation college students are attempting more credits in the fall of their first semester of enrollment. At the same time, and perhaps not surprising given that Tennessee Promise is available only to community college students, we observed a decrease in the percent of both first and non-first generation students enrolling in four-year colleges, and a corresponding increase in the percent enrolling in community colleges. Whether or not these students are more likely to complete college and attain better labor market outcomes is an important question we are working to address.

In fact, some students enter community colleges with the explicit intent to take a lower-cost route to a bachelor's degree. But as our research with the State of Tennessee shows, these students who seek to make a "vertical transfer" are considerably less likely to complete a bachelor's degree than those who start in a four-year college. We found that the completion gap between transfer and four-year-first students in Tennessee is nearly 12 percentage points, and about one-third of students lose credits when they make a transfer from one postsecondary institution to another. Moreover, we find that transfer credit loss is larger for non-white students, non-citizens and part-time students, who are also student subgroups that we know face greater challenges to college completion. Overall, transfer students have expected parental financial contributions that are only about half of that for students who begin their postsecondary education at four-year institutions.

The State of Tennessee recognizes the obstacles that transfer students encounter in attempting to complete their degrees and has established a statewide system of articulation agreements between community colleges and public universities that strive to mitigate credit loss and help students plan for a seamless transition between institutions. This effort, known as Tennessee Transfer Pathways, was first implemented in 2011, although unevenly across the state. Despite the shortcomings to date, Tennessee is seen as a leader in supporting student transitions

from community colleges to four-year universities, and we are working with the state to illuminate ways that it can increase the success of these efforts. In one of our projects, we are using nonlinear Oaxaca-Blinder decomposition methods to deconstruct the transfer gap into parts explained by student characteristics, by different returns to those characteristics, and by the interaction of different student characteristics with differential returns. We are also using quasi-experimental methods to analyze the effects of Tennessee Transfer Pathways on credit mobility and degree completion. We descriptively see moderate reductions in credit loss among transfer students since the introduction of this program, and we will assess whether we can attribute these improvements to the intervention, using variation in the implementation and availability of Tennessee Transfer Pathways over time and place in the state.

In general, we expect the research evidence we generate in this project to inform education administrators and policymakers well beyond Tennessee who are looking to revamp and enhance postsecondary education programs and students' experiences in them. Since launching Tennessee Promise, for example, thirty-two other states (and counting) have introduced or passed legislation to provide tuition-free college to a broad base of students. Furthermore, measuring student and college outcomes and disseminating information on institutional effectiveness should foster a more competitive market for services; contribute to more informed student choices; encourage more innovative approaches to service delivery as colleges compete for market share, and squeeze out inefficient and ineffective institutions through choice and management tools that hold institutions accountable (e.g., performance-based funding). Ultimately, increasing the skill levels of the U.S. labor force and labor force participation are going to be critical to our future workforce productivity, as well as to the sustainability of many of our federal work and social support programs that depend on a strong, working taxpayer base.

Conclusion

More than 17 percent of U.S. children were identified as poor in 2017, by a poverty standard that is very low compared to other developed countries. Using a standard comparable to that of our OECD peers, the after tax and transfer rate of poverty among U.S. children is among the highest of the OECD countries. The strong link between childhood and adulthood poverty in the U.S. calls for con-

tinuing policy efforts across the life cycle to build human capital and potential. There is no evidence that earnings growth alone will be sufficient to raise incomes above the poverty line for those with low levels of human capital.

Although there is little disagreement with the idea that there is potential to benefit from greater investments in human capital and in programs and policies that support work and families, limited resources necessarily constrain their scope and liberality. Policymakers continue to confront questions about the right mix of programs and benefits to support the well-being of children and families. The two-generation programs that have been launched to date appear to hold considerable promise for a life-cycle approach to boosting educational outcomes of both children and parents (as well as their subsequent earnings) and have been shown to have positive synergistic effects across generations, as parents are inspired to succeed in meeting their own goals as they witness and contribute to the advancement of their children's development (Sommer et al., 2018). Relatively inexpensive strategies to promote two-generation approaches include, for example, co-locating early childcare programs at or near community college campuses and coordinating parent and child school schedules to ease the logistical challenges for parents of managing family, school and work obligations. As another example, one of our urban school districts that was using educational technology for both core and supplemental instruction proposed creating a "Saturday Academy," where parents could come with their school-aged children to understand how their children were learning online and how they could help them in digital learning activities that were accessed outside of school from home. As an incentive for the parents to attend and engage, the school suggested online instructional support for parents as well, such as helping them with online job searches or identifying further education and training opportunities that could be accessed online. Sommers et al. (2018) propose combining sector-based, career pathways training for parents with Head Start programming for their young children to likewise increase educational and skills attainment among both and to increase the efficiency and effectiveness of serving low-income parents and children.

James Heckman's life's work provides a reminder that in all of these efforts to improve the development and well-being of children, *quality* programming matters, beginning with early childhood education and continuing with high-quality instruction that needs to be sustained in the K-12 years in order to ensure better education, employment, social and health outcomes as youth transition to adulthood. Indeed, his research finds that the returns to high-quality birth-to-five

programs for disadvantaged children, estimated at 13 percent per year, exceed the typical rate of return (9-10%) cited above, suggesting that with the right programming, the potential to close achievement gaps is real. As growing inequality continues to pull the top (highest-income children) farther away from the bottom in terms of parental investments in children (Pfeffer and Schoeni, 2016), it is more imperative than ever to look to the "Heckman Equation" to guide our approach to human development.

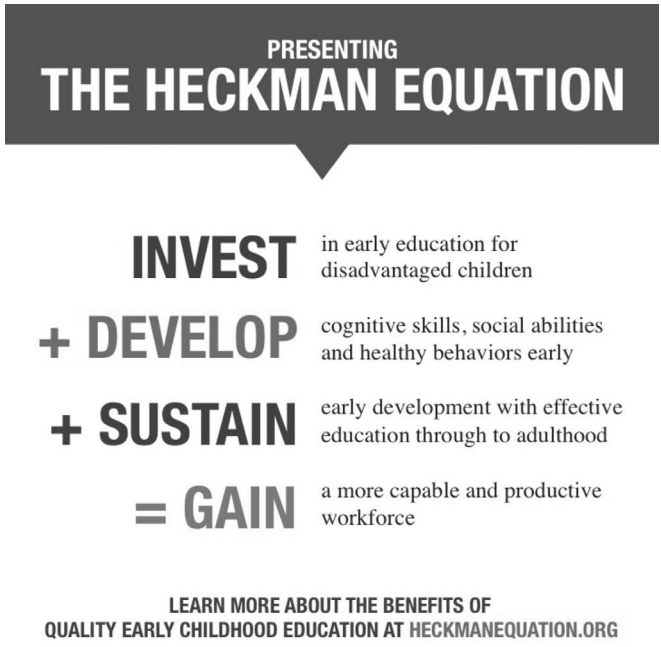
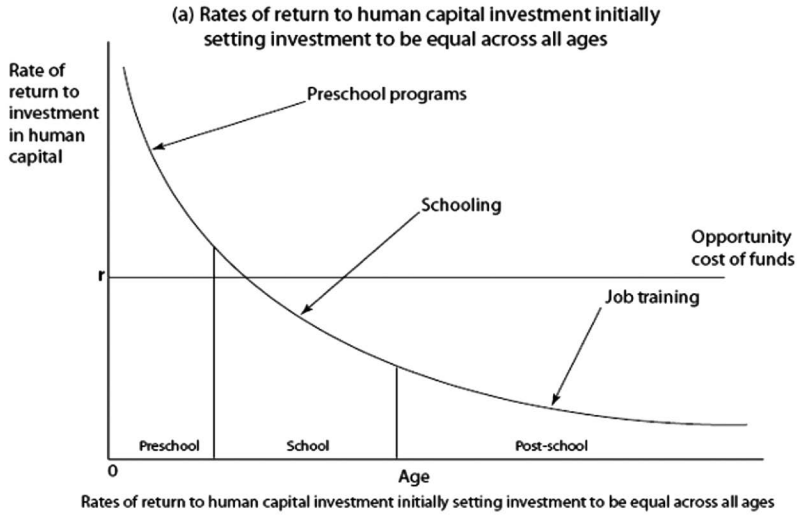


Figure 1: Returns to Human Capital Investments (from Heckman, 2000)



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The 200 Billion Dollar Bill Lying on the Sidewalk: Investing in Human Capital at Record Low Rates Is a No-Brainer

Andrew Davis[1]

Introduction

In the capital markets trading business there is an old joke. It involves two "efficient market" economists walking down the street. One says to the other, "That looks like a twenty-dollar bill on the sidewalk in front of you. Why don't you pick it up?" The other economist says - without hesitation - "No. If it really was a twenty-dollar bill, someone else would have already picked it up!" Forty-six years after Burton Malkiel wrote *A Random Walk Down Wall Street*, this old joke still has legs. It still stands, because even as more and more academic study has confirmed the validity of the efficient market hypothesis and investors have made a preference for the index funds that dominate the investment world, everyone recognizes at least the possibility that occasionally there really is a "twenty-dollar bill lying on the sidewalk." And because of Professor James Heckman's research, I will make the case that there is, in fact, a "200 billion dollar bill lying on the sidewalk," and that we ought pick it up.

In these early days of the 21st century, many people assume that "end times" must be near. The clearest indication was that, after a combined 196-year drought, the Cubs and the White Sox each won a World Series. Today the Amazon burns and the Poles melt, while Presidential Candidate Andrew Yang assures us that

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we will soon be replaced by robotic Artificial Intelligence. In return, he offers us $1,000 a month and his condolences.

I push back against this "woe is me and you" interpretation of our times. My guiding lights show the way down a more optimistic path. And the path that I see is illuminated by the work of James Heckman, endorsed by the foremost proponent of small government and "free markets for free men," Milton Friedman. I argue that if we apply the seminal thinking and analyses of Professors Heckman and Friedman to the world and markets as they are today, that "good times are just ahead," and even within our reach.

For those whose global perspective and sense of time are not centered around Chicago baseball, our twenty-first century has also been associated with "the knowledge economy." Today, intellectual property has value that is as great or greater than physical property. Education is widely understood to be the key to self-betterment and to societal advancement as well. This is in contrast to the 20th century. In 1946 Merle Travis wrote the hit song "Sixteen Tons." He sang that a poor man needed only "A mind that's weak and a back that's strong." The data backed him up, as in 1945 just over 10% of the adult population had a Bachelor's degree, Associates degree, or even "some college."[2]

Today in both raw numbers as well as percentages, more people have or are seeking formal education than ever before. Continued discussions on this topic reveal many nuances and the lock-step mantra of four-year-Bachelors-degrees-for-all is slowly giving way to acknowledgment of the value of other kinds of post-secondary training, such as career-focused Associates degrees, but the broad belief that post-secondary education is the path to a better life is demonstrated by empirical evidence, and thus is well accepted.

Economics at its most useful is the systematic exploration of how to allocate scarce resources to achieve optimal returns. The boundaries of the exploration are established when we determine where to allocate the marginal dollar (or billion dollars), how much resource to allocate; where it comes from and where it ought to go. Having established a broad positive rate of return on education, determining where to allocate new investment on the margin is one of the most important questions we can seek to answer. This is followed closely by, "and who should pay?"

2 https://trends.collegeboard.org/education-pays/figures-tables/educational-attainment-over-time-1940-2009

There will be no surprise ending here. My proposal logically follows from a full-throated support of the totality of Dr. James Heckman's professional work. The answer is government spending on early childhood education, and plenty of it!

There are many people, political parties, principals and programs that support massive government spending. Wars, roads, research, agriculture all have lobbyists and loyalists that advocate for the government to support their cause. Traditionally, Democrats have been accused of being spendthrifts. Old-fashioned Republicans and conservatives were often skeptical of the need and the efficacy of government spending. Milton Friedman was, and his ideas continue to be, at the forefront of any respectable critique of government spending.

No other conservative is better positioned to scrutinize increased government funding of social programs, nor is as universally respected by the proponents of small government.

In *Capitalism and Freedom*, first published in 1962, Friedman states his most succinct assessment of Government. "First, the scope of government must be limited." He goes on to say, "Its major function must be to protect our freedom both from the enemies outside our gates and from our fellow citizens: to preserve law and order, to enforce contracts, to foster competitive markets."

Beyond these primary functions Friedman suggests that government may be usefully employed "to accomplish jointly what we would find to be more difficult or expensive to accomplish severally." "We should not and cannot avoid using government this way. **But there should be a clear and large balance of advantages before we do.**"

In Chapter VI of "Capitalism and Freedom" titled "Role of Government in Education" Friedman makes a theoretical case for the "clear and large balance of advantages" of government investment in education. He states that an educated population has many positive externalities and that the converse is true as well. Additionally, he makes the case that society has a paternalistic concern for children that justifies our investing in their schooling. "A stable and democratic society is impossible without a minimum degree of literacy and knowledge on the part of most citizens and with the widespread acceptance of some common set of values. Education can contribute to both."

As a student continues along the continuum of the educational hierarchy Friedman finds more benefits accruing to the individuals, and proportionally fewer to society as a whole. This leads to his entirely different suggestions for funding

late-stage post-secondary education with individually funded equity investments. But public spending is best suited for young children because, "The social gain presumably is the greatest for the lowest levels of schooling, where there is the nearest approach to unanimity about content." Friedman has thus made his case based on the principles and theories of Political Economy: when investing in education, the low-hanging fruit is found in childhood education.

Now, wrapped in the embrace of the leading advocate of small-government/free-market political economics, we review the opportunities that Prof. Heckman's research reveals. The High/Scope Perry Preschool Program is a critical experiment that Heckman and his colleagues have studied and as time has revealed more data, studied again.

> *"The rate of return to the High/Scope Perry preschool program"* authored by Heckman, Moon, Pinto, Savelyev, and Yavitz in 2009
>
> *"The Perry preschoolers at late midlife: A study in design-specific inference"* by Heckman and Karapakula most recently revised in 2019
>
> *"Quantifying the life-benefits of a prototypical early childhood program"* Authored Garcia, Leaf, Schaeffer, Heckman and Dornsife, drafted in 2016 and revised in 2017

These three papers, written over ten years, consistently produced similar results for the researchers. Investments that fund high-quality preschool enrichment and social support programs for children and their families pay for themselves. The payoff comprises all of the benefits and reduced costs that you would imagine follow a richer social and emotional upbringing. The subject children spend less time in the criminal courts and prison system, and less time unemployed and receiving the commensurate benefits. Conversely, the subject students are employed at a greater rate and at higher incomes than the control groups. The public benefit of higher incomes include a higher rate of taxes paid, including payroll, income and sales. Who is surprised that healthier, happier more upwardly-mobile adults are a lesser burden on society and are greater contributors to the overall social welfare?

The care taken with the analyses, and the cautious conservatism of the assumptions that are made (when they must be), all lead to a wide and uniform

conclusion. The rates of return on societal benefit are large, and in nearly every situation match or exceed rates of return that investors have earned in the stock market over long periods of time (5.8%).

Of course, there are other investments a government could make in education. K-12 education already receives large amounts of government funding, though largely from state and local sources. Certainly, one alternative for government investment would be to pour more money into K-12. The evidence shows, though, that this would not be an effective remediation of the inequities that are currently inherent in the system. "Why The K-12 World Hasn't Embraced Early Learning," by Elliot Regenstein of the Foresight Law & Policy advisory group was published in February of 2019. Regenstein a Chicago lawyer formerly with The Ounce of Prevention organization (a distinguished early childhood advocacy group) analyzes the data that describes the "gap" between privileged and under-privileged kids as they go through K-12.

The essence of his findings is simple and disturbing. He cites data that show that the top 10% of K-12 schools can teach 1.1% of a given year's academic expectation in one year. In such a school, a student who comes to kindergarten two-tenths of a year behind the norm is likely to achieve grade level expectation after two years. This is at a top ten-percent school. What is more common and more troubling is that so many children start kindergarten already behind. They are far enough behind that, by the time they enter third grade, they will be unlikely to achieve grade-level competence by the time they reach their fourth year of High School, even if they are attending a top 10% school. By Kindergarten, it is already "too late" to remediate.

"If every single district in the country achieved growth rates from the third grade on at the levels now achieved only by the most effective districts, it would not be enough to get kids caught up at scale by high school graduation. Of course, we need to work on improving performance from third grade onward. But if that is all we do; we will never get where we want to be." Regenstein's review of the data and his analysis support Heckman's conclusion that the rate of return comes from investing in early childhood are robust and worthy of funding.

Recently I met one of the wealthiest men in Chicago, Mark Walter, Chairman and CEO of Guggenheim Investments. You may have heard his name in conjunction with the Los Angeles Dodgers baseball team. A few years ago, he bought the team. As we made small talk at a fundraiser, I asked him how he came to own the Dodgers? I was expecting a synopsis suitable for cocktail par-

ty conversation, maybe a little something about the long-term demographics of Los Angeles, or his childhood love of baseball. But his reply was logical and very brief: he told me that when he heard that the team might be for sale he inquired of a major media company what they would be willing to pay for twenty years of broadcasting rights, then divided that amount by two and offered it to the seller. *Why* he was able to do this, I don't know. You would think that the seller or the media company might have sought each other out. Luckily for him, he was not an "efficient market man" like the one who refuses to pick up a $20 bill lying on the sidewalk. Mark Walter, unencumbered by the handicap of efficient market theory, saw a two-billion-dollar bill on the sidewalk and picked it up!

Prof. Heckman has a long and highly distinguished career as an economist specializing in the study of investment in early-childhood education. His work has continued to refine and prove out theories that he has advocated for many years. What is special now is that after a lifetime of proving the case for the investment, the resources to make the investments in life-changing individual and societal betterment are on sale. Globally, 16 trillion dollars of governmental debt are "earning" negative interest rates. In the US, our Treasury now issues 30-year bonds at 2% interest. The twenty-dollar bill is on the sidewalk!

There are 20 million people under the age of 5 in the US today. To spend $10,000 on each one of them per year for high-quality early childhood learning would cost $200 billion per year. If this investment was funded with 30-year bonds that currently earn 2%, the debt service would be about one-billion dollars a year. If Heckman's lowest-end estimates of return were cut in half, the taxpayers who back-stop such a funding and their government that provides it will not only be whole, but ahead.

In a review of this paper at Beloit College's Upton Forum in 2019, Heckman noted that there are high-quality interventions that can be implemented at costs lower than my suggested expenditures. Such fine-tuning of program investments would of course be welcome and only add to the percentage rate of return on the investment as originally proposed.

In reference to governmental expenditure, the term "investment" is often used loosely. There is no doubt that it sounds better than "spending like a drunken sailor." In the case of investing in early childhood learning, the term is entirely justified and proven. Professor Heckman and his colleagues have done the heavy lifting of writing the "prospectus" for a comprehensive and massive investment in our future. The "gnomes of Zurich" are desperate to find opportunities to re-

sponsibly invest capital. In the past, heavy industry would have sopped up those billions, but who wants to invest in coal mines, power plants and steel mills today? All the heavy industry infrastructure of the past is in over-supply. Even the transparently non-existent business plans of the likes of We Works have been blessed with huge bond investments. What we are left with is logical and well-examined, but never before tried. In a different context and time Winston Churchill said that "America (he meant the United States) will always do the right thing but only after trying everything else." I propose that the same thing can be said of the bond market. Yield has been sought out in traditional investments until it goes to zero, or even negative in the case of long German bonds. This is a rare time that offers a unique opportunity. All that is left for us to do is execute. With the cover of US Government credit, global bond markets will lend our country money at 2% to 3%. With Professor Heckman's guidance and Friedman's thumbs up we will earn 5% or more on this investment. What are we waiting for?

Credit Constraints Throughout Childhood and Education Attainment

Peter Nencka[1]

Introduction

Higher education is seen as a method to boost both individual and societal welfare. For this reason, public policies aimed at increasing access to college are widespread across the globe. A key question for interested policymakers is the extent to which students are credit constrained and whether and how those constraints affect human capital accumulation. By credit constraints, I mean the lack of an effective credit market that would allow interested youth to borrow resources that they need to prepare for, apply for, attend, and ultimately thrive at college. To the extent that binding credit constraints exist, it is possible that policy — such as government transfers and loans — can improve student outcomes and welfare.

In this short article, I review recent work on the relationship between credit constraints and higher education. I focus on three broad themes related to the scholarship of this year's Upton Forum speaker, Professor James J. Heckman. First, I discuss literature — including work by Professor Heckman — that illustrates the growing importance of credit constraints to college-going decisions. Second, I highlight papers that use natural experiments to study how exogenous increases in family resources impact human capital investment. This evidence, which is closely related to Professor Heckman's recent academic and policy work, has important implications for the types of interventions that governments and

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private charities may want to design. I focus on a recent strain of the literature that studies the human capital effects of the Earned Income Tax Credit, including some of my own work in this area. Next, I review recent papers on the effects of credit constraints on the *types* and *quality* of human capital investments that youth decide to make. I focus on in-school labor supply as a particular area of policy concern that has grown in recent years and may be related to credit constraints. Finally, I discuss new sources of administrative data that allow researchers to study the relationship between credit and human capital in novel ways, while highlighting that these data also have important limitations.This article cannot do justice to the wealth of articles on credit constraints that have emerged in just the last few years, both in economics and related fields. Most glaringly, I do not discuss the large literature on programs that aim to provide direct, in-kind instructional support to families, such as Head Start. Clearly, these programs can relieve a type of credit constraint by providing support for parents who otherwise lack needed resources for their children. The work of Prof. Heckman and others suggests that similar interventions like the Perry Preschooling program can have long-lasting effects on human capital accumulation. Instead, I focus on a narrower set of research on direct resource and income transfers. Readers who are interested in a more complete overview of these areas are recommended to the excellent reviews by Lochner and Monge-Naranjo (2012) and Heckman and Mosso (2014).

Evidence on the growing importance of credit constraints

Researchers have long recognized that higher education investment decisions and family income are correlated: students from richer families are more likely to enroll in college, and conditional on attendance, are more likely to attend higher-quality institutions and finish their studies. The natural question is why: are students from lower-income families financially constrained in such a way that it affects their choices of college? Alternatively, is family income merely a proxy for child skills or parental investment that are difficult to observe? The extent to which the observed relationship between family income and schooling choices is causal has important policy implications. If there is a causal component, policy aimed at transferring income at the time of college choice or reducing college costs should shift enrollment behavior. Recognizing this importance, a vibrant literature has examined the schooling-income gradient.

Important work by Carneiro and Heckman (2002) lays out the arguments for

and against the causal interpretation of the schooling-income gradient and tests them using data from the Natural Longitudinal Survey of Youth's 1979 cohort. These youth made college choices in the early 1980s. Importantly, this survey data contains rich information on family backgrounds, college choices, and academic ability measured later in adolescence. As expected, Carneiro and Heckman find a strong correlation between income and college investment. However, they observe that this correlation dramatically falls once pre-college academic ability is controlled for. This suggests that credit constraints that bind at the time of college choice are limited and not a large determinant of college enrollment. Instead, they emphasize the potential existence of long-run credit constraints that affect the development of youth skills – a theme that we will return to in the next section.

There is similarly weak evidence for the existence of short-run credit constraints in a related set of papers that studied youth making their decisions in the 1980s. Structural papers that use survey data from the 1980s or earlier tend to find little evidence of binding credit constraints. For example, Cameron and Taber (2004) and Keane and Wolpin (2001) find little evidence of short-run borrowing constraints once academic ability and the direct and indirect costs of attending school are considered. Together, these papers suggest that while short-run credit constraints might exist, they were not pervasive in the 1980s. This impacts optimal policy. Indeed, Carneiro and Heckman (2002) write that "[s]hort-run income constraints play a role, albeit a quantitatively minor one [in college choices]. There is scope for intervention to alleviate these short-term constraints, but one should not expect to eliminate… enrollment gaps…by eliminating such constraints." Similarly, Cameron and Taber (2004) conclude that "[o]ur evidence suggests that on the margin policies aimed at improving access to credit will have little impact on overall schooling attainment" and Keane and Wolpin (2001) note that "essentially none [of the correlation between family background and schooling] can be attributed to capital market constraints."

Because these papers study groups of youth making choices in the 1980s, it is not obvious that their conclusions would hold today. In particular, the distribution of family income throughout the United States has changed over time, as have the real costs of attending college. A more recent wave of literature finds quite different relationships between income and schooling for youth making their college choices in the 2000s. Much of this work has used data from the National Longitudinal Study of Youth's 1997 cohort (NLSY97), which has a similar structure to the 1979 version of the survey. This similarity allows researchers to

compare youth across cohorts as they make similar schooling decisions.

Using both cohorts of the National Longitudinal Survey of Youth, Belley and Lochner (2007) show that the marginal effects of family income on college enrollment dramatically increased for students who were making their college choices in the early 2000s relative to the 1980s. Using the same data, Bailey and Dynarski (2011) document an increased marginal effect of family income on college completion over time. Importantly, in both papers the authors control for a measure of adolescent academic ability. This implies that the correlation between family income and schooling, even conditional on academic ability, is growing over time.

The results of these across-cohort papers are consistent with the patterns (if not always the magnitudes) of recent work using structural methods to examine the existence of credit constraints in the early 2000s. Johnson (2013) estimates a dynamic schooling investment model using NLSY97 data that allows borrowing constraints to operate through a key mechanism: student labor supply and potential delay to college going. If students are financially constrained at the time of college choice, they might delay college entry while accumulating funds. Johnson finds modest effects of credit constraints: removing all credit constraints increases college degree completion by 2.4 points by boosting college enrollment and reducing time-to-degree. Heckman and Hai (2017) estimate a structural model of human capital investment that allows for endogenously derived borrowing constraints across both private and government-run programs. They find "substantial evidence" of credit constraints throughout the life-cycle in the NLSY97. Importantly, their counterfactual exercises suggest that policies aimed at reducing ability disparities (likely most effective earlier in life) have larger effects on reducing inequality than policies aimed at reducing short-run credit constraints, like reducing tuition. Caucutt and Lochner (2020) estimate a structural schooling model that endogenizes parental transfers to study the dynamic effects of borrowing constraints that can occur at different points of childhood. They find that eliminating all credit constraints would change schooling choices dramatically, but that piecemeal efforts to reduce constraints (either at college entry or earlier in life) would have much smaller effects.

"Natural experiment" evidence relating family resources to college attendance

Structural papers allow researchers to explore equilibrium effects of dramatic changes in the policy environment (e.g., equalizing cognitive ability at age 5; expanding Federal loan limits to completely remove borrowing constraints) under the assumption that researchers have correctly modelled the environment in order to generate valid counterfactual scenarios. Other researchers have focused their efforts on an alternative approach: identifying natural experiments that shift family resources throughout life to examine how those shifts are related to subsequent schooling decisions.

Researchers in this literature have used a variety of exogenous shocks — including job loss, housing booms, lottery wins, and oil prices — to study the effects of family resources on college enrollment (e.g., Akee et. al, 2010; Løken, 2010; Lovenhiem, 2011; Hilger 2016; Pan and Ost, 2014). In general, these researchers have found sizable impacts of family resources on college enrollment. An important exception is Hilger (2016) and Mork, Sjörgen, and Svaleryd (2020), who study the effect of parental layoffs on human capital outcomes and find little effect using administrative data from the United States and Sweden, respectively. For example, Hilger's estimates imply that students are 0.432 percentage points less likely to attend any college following a layoff. Adjusting for the average income loss that he finds occurs after a layoff, this implies that a $1000 loss in family income is associated with a 0.000432 percent point decline in the probability of attendance, or roughly 0.1% relative to the base probability of attendance. Similarly, Mork, Sjorgen, and Svaleryd (2020) see only very modest effects on GPA and little effect on high school completion after a layoff. Synthesizing this evidence and understanding why some exogenous shocks to families impact human capital accumulation while others appear to have little effect will be an important direction for future research to investigate.

Beyond these non-governmental shocks to income and wealth, researchers have also studied the effects of direct policy transfers to youth on college enrollment.[2] Perhaps the largest of these transfers is the Earned Income Tax Credit

2 A large related literature, which I do not review here, studies the effectiveness of transfers that are conditioned on college attendance, such as grants (e.g., Dynarski 2003) or loans. In additional, there is an interesting and growing literature on informational and behavioral interventions aimed at increasing college enrollment, such as nudging and outreach campaigns. For an excellent review of this literature, see

(EITC). The EITC is a refundable tax credit for the working poor with children. Because it is targeted at lower income families and has expanded while spending other traditional "welfare" programs like TANF and AFDC have stagnated or declined, the EITC has quickly become a cornerstone of the US social safety net. In 2019, approximately 25 million eligible households received over $60 billion in EITC funding.

Because of its scale and policy-relevant target population, researchers have studied the effects of the EITC on a wide range of topics, including human capital. There have been large changes in the EITC program over time. Federal expansions in the 1980s and the mid-1990s dramatically expanded EITC credits and made the schedules more generous, in part by awarding additional funding for families with two or more children. At the same time, there is significant cross-state variation in EITC awards. Instead of creating separate programs, many states have passed their own supplemental EITCs that add a percentage credit to the Federal award. Because of this sharp variation, the EITC provide one of the clearest and most compelling tests for whether direct policy-generated transfers of resources can affect human capital outcomes. Unlike other shocks that can affect family income (e.g., job loss), the non-financial impact of the EITC is more limited, though as we will discuss below not entirely absent.

The earliest papers studying the EITC and education focused on the relationship between EITC generosity and short-run student achievement. Chetty et. al (2011) examined the relationship between EITC expansions and test scores, as did Dahl and Lochner (2012, 2017). Both sets of researchers find that increased EITC exposure boosts student test scores for relatively young children. Consistent with the structural evidence described in the previous section, this suggests that family resource transfers can help relieve credit constraints faced early in life. From this evidence, however, it is unclear whether these income transfers (or other similar programs) will have long-run effects on human capital accumulation. Importantly, such long-run effects could arise for two reasons. First, if the gains made early in life are real and there are no negative offsetting effects, the dynamic complementarity of human capital investment implies that there should be some long-run gains. The idea that human capital builds on itself and that early interventions can be extremely valuable builds on similar logic that Prof. Heckman and his coauthors apply to interventions like the Perry Preschool program.

Page and Scott-Clayton (2016)

Second, increased family resources via the EITC early in childhood will also be correlated with increased family resources at the time of college choice. Thus, if there are binding short-run credit constraints when students are making their college choices, more EITC funds might relieve them.

Following findings that the EITC had positive effects on child test scores, several researchers have estimated the long-run effects of the EITC on college choices and other long-run outcomes. Maxfield (2014) found positive impacts of the EITC throughout childhood on college enrollment using the CNLSY79, a sample of children of the original NLSY79 cohort. Bastian and Michelmore (2018) estimate the effect of EITC received throughout childhood using the Panel Study of Income Dynamics (PSID) on long-run outcomes. Importantly, they have sufficient variation to separately estimate the effect of EITC expansions at different ages and find the EITC received earlier in life matters most and has a sizable effect on long-run outcomes like college attendance and income. Manoli and Turner (2018) use kinks in the tax rules for the EITC and administrative tax data to study the causal effects of EITC awards on college enrollment. Given their sample, they focus on short-run effects of increased EITC awards for families with 17 and 18 year-olds and find large impacts. Using a similar empirical strategy as Bastian and Michelmore (2018), in ongoing work I expand the human capital outcomes studied to include college quality and observe an improvement in the *types* of colleges that students attend after an EITC shock. These effects are driven mostly by increased adolescent test scores (Nencka, 2020). It will be important to expand and replicate this literature going forward to understand which sources of EITC variation are best to use in academic studies and correspond to realistic plans to expand the EITC in the future.

Researchers studying the EITC have the benefit of a large program that transfers billions of dollars to lower-income families every year. However, the EITC program has its own features that complicate both extrapolation of research findings to other transfer programs and the attractiveness of the policy itself. As Prof. Heckman has noted, both in writing (e.g., Heckman and Mosso, 2014) and during the Upton Forum, the EITC might have negative effects on children. Researchers have identified a strong effect of the EITC on parental (particularly maternal) labor supply. This effect is unsurprising given the design of the program: credits phase in with income, acting as a wage subsidy. Increased material labor supply could have an unintended effect of reducing parental time with children, which in turn might have long-term negative effects on children

that could attenuate or even eliminate the positive effects seen in other papers.

This concern is important and worth further study. Work by Kleven (2019) re-examines the evidence of large maternal labor supply effects and finds them to be overstated. Bastian and Lochner (2020) use the American Time Use Survey to test how time allocation shifts within the family after EITC expansions. They find that while labor supply of mothers does increase, there is not a decline in traditional "investment"-focused activities with their children, such as reading or time spending helping with homework. More research on the potential positive and negative effects of the EITC is warranted, particularly since it is a rare government program where there is bipartisan political openness to expanding spending on it in the future.

An alternative to transfer programs that intersect with labor supply decisions, like the EITC, is unconditional income transfers. For example, recent political discussions and the COVID-19 pandemic have revived interest in Universal Basic Income (UBI) programs. UBI transfers would necessarily be less targeted than programs like the EITC, and it is difficult to project how they might relieve potential credit constraints associated with higher education. Studying the effect of these transfers on college choices, both in the US (i.e., in Alaska where all residences receive a yearly dividend) and abroad, will be an interesting avenue for ongoing and future research.

Considering the "quality" of the college experience

As researchers expand their studies into the effects of financial interventions on college outcomes, it has become increasingly obvious that the *types* of experiences that students have while on campus are important to model. This is particularly true given rising college enrollment: today nearly 80 percent of high school graduates will enroll at some sort of college within 2 years of high school graduation. This suggests that it is becoming increasingly important to consider the college experience holistically in research, particularly when thinking about the diverse effects that credit constraints might have on those experiences.

For example, today's college students are much more likely to work while enrolled than were previous generations. In 1970, 35 percent of full-time students were employed. By 2007, over 50 percent of students worked. Those who are employed now work longer hours: the average full-time employed student in 2007 worked nearly 24 hours per week, compared to 18 hours in 1970. Increased work

is associated with worse grades (Stinebrickner and Stinebrickner, 2003; Kalenkoski and Pabilonia, 2010), higher probabilities of dropout (Bozick, 2007), slower rates of credit completion (Darolia, 2014) and longer time to degree (Bound et. al., 2012; Denning, 2019). While working in college might have benefits, it is important to understand how the decision to work intersects with the credit constraints that we have discussed in the previous sections.

Belley and Lochner (2007) find that family income is related to hours worked in recent youth cohorts, but not for students in the 1980s. Kalenkoski and Pabilonia (2010) find that increased parental income transfers during college are negatively correlated with labor supply, suggesting a financial constraint motivation for much student work. Lovenheim and Reynolds (2013) estimate the effect of increased housing equity in the years immediately before college on in-college labor supply. They find increased housing equity is associated with lower labor supply while in college. Using exogenous shifts in financial aid available to students, Denning (2019) shows that additional aid reduces the real cost of college and leads students to work fewer hours outside of the classroom and take more credits, speeding time to degree. This suggests a policy failure: it is not that students are choosing their work hours during college because they think that there is a long-run benefit to that work experience. Instead, this research suggests that much of the current increase in student working while in college is a response to increasing short-run credit constraints. Reducing costs, whether through financial aid packages or through targeted transfers to affected students, may reduce this work effort, allowing for more focus on academic activities

An important caveat to this research is the observation that employers expect students to have substantial work experience at the time of college graduation, particularly in fields relevant to their areas of study. An interesting area for future research is disaggregating student labor supply between work that is more useful for a student's future careers and short-term work that is taken up solely for the purposes of financing current schooling expenses and consumption. For example, a biology major may benefit from a paid lab position, but they are less likely to benefit from a part-time job in retail or food service. Since the former jobs might be unpaid or infrequent, a credit constrained student might choose to work longer hours at a "traditional" job even if it has limited long-run returns.

Given that researchers have found that aggregate student labor supply declines after exogenous increases in resources, a natural question is whether the students who continue to work are *shifting* the type of work that they do. If increased

resources not only reduce aggregate labor supply but also shift students who continue to work into more beneficial jobs, the benefits to reducing in-school credit constraints are larger than have been previously measured. With rich survey and administrative data available to researchers, it is possible to disentangle these different types of labor supply.

Conclusion

In this article, I gave a short overview of research on credit constraints and human capital accumulation, focusing on areas of the literature that intersect with Prof. Heckman's work. As mentioned in the introduction, this is only the tip of an iceberg of exciting research being done in this area.

There now appears to be consensus within economics and related fields that credit constraints throughout childhood exist and impact future human capital investment decisions. This is therefore an exciting time for researchers interested in the optimal set of policies and programs that might relieve these credit constraints.

With new data, researchers are able to study these topics in novel ways. For example, the Ohio Longitudinal Data Archive (OLDA) allows researchers to follow students through elementary schools, into their college careers with detailed information from college transcripts, and into the labor force. Similar datasets have already been widely used in other states like Texas and Wisconsin, and it will be exciting to see how researchers are able to use these data to understand the impact that credit constraints can have on affected students. Similarly, linked Federal tax records allow researchers to observe information on parental background, college attendance, and post-college outcomes. While these new administrative datasets have important limitations relative to the survey data that has historically been used in this research, they also offer new possibilities for researchers to detect policy effects that are difficult to see with smaller samples. With this new data and evolving empirical tools, I look forward to seeing the direction that human capital research takes in future.

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To Study or To Work: Labor Market Effects on US High School Graduation Rate

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1. Introduction

Education plays a significant role in the formation of societies—it can either offer a path to social mobility, or it can be a mechanism to perpetuate social inequality. Higher levels of education are also associated with many positive societal aspects—greater financial stability, lower chances of unemployment, better health and well-being, and reduced crime (Department of Education and Skills, 2003). In addition, according to the Economic and Social Research Council, when determining health and well-being, education level is the strongest indicator when compared to age, gender, income, and others (Easterbrook, M.J., Kuppens, T. & Manstead, 2016). The economic and social benefits of education are duly noted, then we need to know what factors influence the completion of secondary education.

In a survey, spring 2002 high school sophomores, who had not completed a high school degree by 2004, stated their reason for leaving school. 27.8% of them chose to leave because they "got a job," and 20.0% of them "had to support a family" (Heckman, Humphries, Lafontaine, & Rodríguez, 2012). This survey tells us that labor market conditions such as employment opportunities and wage level might be important factors influencing high school students' decision to drop out. Some critics of the minimum wage policy argue that raising the minimum wage would cause youths to drop out of high school because it increases the

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incentive to work while of school age. If the argument is valid, lower minimum wages and higher youth unemployment rates for teenagers might discourage them from quitting school and working. This research investigates how labor market factors such as minimum wage and youth unemployment rates, and other circumstantial factors—economy and politics—affect high school graduation rates in the US.

2. Literature Review

There are many studies in the literature examining the determinants of high school completion (or dropout) in the United States. The majority of studies focus on how race, gender, socioeconomic status, and family factors affect high schoolers' dropout decisions. Some studies explore the role of economic and labor market conditions (Warren and Hamrock 2010; Crofton, Anderson, & Rawe, 2009), while others examine the role of youth's personality types (Eckstein and Wolpin, 1999; Montmarquette, Viennot-Briot, & Dagenais, 2007).

There are two main empirical approaches in this literature. Some authors employ the fixed effect model using state-level panel data sets, and the dependent variable is the high school graduation rate at the state level (Warren & Hamrock, 2010; Kearney & Levine, 2016). Other authors use the probit or logit model using individual-level data sets, and the dependent variable is a dummy indicating whether an individual finished (or dropped out of) high school (Crofton et al., 2009; Murnane, 2013; Eckstein and Wolpin. 1999; Montmarquette et al., 2007).

The literature has revealed some interesting findings. There is consensus across the literature that the dropout rates for Hispanic students are more influenced by labor market factors than other races. Higher minimum wage is associated with higher dropout rates for Hispanic students as compared to their Black, White, or Asian counterparts; also, local unemployment is associated with an increase in dropout rates for Hispanic students (Crofton et al., 2009). Dropout rates rise when the quality of the labor market increases, making the graduation gap between Hispanic-White greater than that of Black-White (Murnane, 2013). This further highlights that the effect of labor market quality on a Hispanic student's likelihood to drop out is higher.

The literature also examines the intersection of race and gender in affecting high school completion or dropout decisions. Multiple sources mention incarceration rates being a predominant factor in dropout rates for black male students in

the United States (Kearney & Levine, 2016; Binder & Bound, 2019). Similarly, in the case of female students with parental responsibilities, dropout rates increase significantly (Montmarquette et al. 2007).

Income inequality particularly influences the likelihood of male students to drop out. Kearney and Levine (2016) set a measure of inequality as the ratio of the 50th and 10th percentiles of the income (the 50/10 ratio). From this measure, they found low socioeconomic status (low-SES) boys in high-inequality states are almost six percentage points more likely to drop out of high school than low-SES boys in low-inequality states. One interesting study addresses the intersection of race and socioeconomic status: Ehrenberg and Marcus (1982) reports that students of lower-income white families responded to higher minimum wages by reducing their schooling, whereas students of higher-income white families increased their schooling.

The literature has yielded mixed results regarding the influences of economic and labor market conditions such as economic growth rate, unemployment rate, and minimum wage. Warren and Hamrock (2010) formulate models that explain state high school completion rates through minimum wage rates, state education policies, and unemployment rates. State education policies include states' maximum compulsory age of school attendance, the number of units that states require students to complete in order to graduate, and whether states require to pass an exit examination as a prerequisite for graduation. The authors find no empirical evidence to support the hypothesis that raising the minimum wage reduces graduation rates. They argue that students' decision to leave school for increased minimum wage is only applicable to a small minority. However, high school graduation rates are significantly related to each state's policy. They also find that lower unemployment rates pull high school students out of school.

Another approach taken in the literature moves beyond demographics and circumstantial decision-making factors and focuses on youth's intrinsic factors. Eckstein and Wolpin (1999) categorize four different types of students based on school attainment and the value of attending a school, consisting of both its current consumption value and the youth's perceived utility payoff to graduation. They use the 1979 youth cohort of the National Longitudinal Surveys of Labor Market Experience (NLSY79) and formulate a sequential decision model of high school attendance and working. The results show that youths who drop out of high school have different traits than those who graduate: they have lower school ability, motivation, and expectations about the rewards from graduation; they

have a comparative advantage at jobs done by nongraduates; and they place a higher value on leisure but not on school attendance. The model suggests that even with augmented ability and motivation, the youths still drop out because of their low expected value of graduation. Therefore, policies such as prohibiting work and forcing students to remain in school for five years after entry will have limited success because they do not alter the traits of youths.

Following the research of Eckstein and Wolpin (1999), Montmarquette et al. (2007) categorize two types of students: the Work, Grades, and Dropout (WGD) Type and the Grades, Work, and Dropout (GWD) Type. The WGD-type wishes to enter the labor market, and the GWD-type displays a preference to stay in school and achieve good academic performance. Montmarquette et al. (2007) use a model explaining students' academic grades and decisions with respect to working while in school and dropping out. Microdata for this study is from the 1991 Statistics Canada's School Leavers Survey and its 1995 follow-up. They conclude that low unemployment rates and high minimum wage encourage students to drop out, especially the GWD-type. Montmarquette et al. (2007) suggest increasing the age of compulsory attendance and lowering minimum wage rates for 18-year-olds.

3. Theory Discussion and Empirical Methodology

The theoretical effect of economic and labor market conditions on high school dropout rate is ambiguous. On the one hand, a stronger economy and labor market (higher GDP growth rate, lower unemployment rate, and rapid wage growth) improve household income, so more households can afford to keep their kids in school—we call this the *income effect*. On the other hand, a stronger economy and labor market mean that the opportunity cost of staying in school, i.e., the foregone wage, is higher, which creates a disincentive to stay in school—we call this the *opportunity cost effect*.

For the high school-age population, the relevant labor market segment is the low-skilled segment, for which the minimum wage plays an important role. The effect of minimum wage on high school graduation rate is mostly through the opportunity cost effect; that is, minimum wage affects the opportunity cost of staying in school, which affects youth's decision on whether to stay in school. However, it is unclear whether a higher minimum wage will increase or decrease the opportunity cost of staying in school. On the one hand, a higher minimum

wage means the foregone wage is higher, which creates a stronger incentive for kids to quit school. On the other hand, a higher minimum wage might cause a higher unemployment rate among youth, discouraging kids from quitting school to go to work.

So the effect of economic and labor market conditions and minimum wage on high school dropout rate is ultimately an empirical question, which we examine in this paper. We estimate the following fixed effects model and apply it to a panel data set at the state level:

$$(1)\ gradrate_{it} = \beta_{0t} + \beta_{1t} yunemp_{it} + \beta_{2t} gdpgrowth_{it} + \beta_{3t} gdpgrowth^2_{it} + \beta_{4t} minwage_{it}$$
$$+ \beta_{5t} leducexp_{it} + \beta_{6t} lincome_{it} + \beta_{7t} legicon_{it} + \delta statefixed_i + u_{it}$$

where i is the state index and t is the year index. Table 1 below gives the labels of variables' used in the regression and their expected signs.

Table 1. *Variable Labels*

Variable Name	Label Explanation	Expected Sign
gradrate	High school graduation rate	NA
yunemp	Youth unemployment rate	+
gdpgrowth	GDP growth rate	?
gdpgrowth2	Square of GDP growth rate	?
minwage	Minimum wage	?
lpcexp	Natural log of per capita education expenditure	+
lincome	Natural log of median household income	+
legicon	Legislative control of state categorical variable	Democratic +

As mentioned before, higher youth unemployment rates would increase graduation rates. The effect of higher minimum wages on high school graduation rate is ambiguous because there are two opposing effects: higher minimum wages raises the opportunity cost of staying in school (the foregone wage), but it might also lead to higher youth unemployment rates which discourages youths from quitting school. Similarly, the effect of higher GDP growth rates on high school graduation rate is also ambiguous. Higher GDP growth rates would decrease youth unemployment rates and hence decrease graduation rates. However,

it would also increase household incomes that would increase graduation rates. We put *gdpgrowth*[3] in the regression to test the hypothesis that there is a non-linear relationship between GDP growth rates and high school graduation rates, and that at a much higher level, GDP growth rate might impact graduation rate differently. Also, higher education expenditures means better school quality and more students staying in school, so this variable is expected to have a positive sign. If household incomes are higher, students do not need to work as much, so the variable median household income should have a positive sign . Finally, we anticipate that states whose legislations are controlled by the Democratic party would have higher graduation rates than Republican states because the Democratic party tends to prioritize education more.

We use a state fixed-effects model to control for time-invariant state characteristics that might bias our estimates of the association between minimum wage and high school graduation rates. One important assumption of the fixed effects model is that the state-specific effect is a random variable that is allowed to correlate with the explanatory variables. If this assumption is not valid, i.e., if the state-specific effect is a random variable that is uncorrelated with the explanatory variables, then a random-effects model should be used. We ran the Hausman test and found that the state fixed-effects model is more consistent than a random-effect model. Therefore, we present and discuss the results of the state-fixed effects model.

4. Data and Descriptive Statistics

4a. Data Sources

This research uses a panel data set of 50 states in the U.S. for 16 years from 2001 to 2016. There are a total of seven variables measuring the states' economic and labor market conditions, educational attainment and expenditure, and politics. Most of them are collected from various departments of the US government. Data on state education expenditure per pupil, public high school 4-year adjusted cohort graduation rate (ACGR), and the averaged freshman graduation rate (AFGR) are from the National Center for Education Statistics (NCES); state youth unemployment rate is from Kids Count Data Center; state GDP growth

3 Further explanations of the individual definitions of AFGR and ACGR in the "State High School Graduation Rates." section below.

rate, state unemployment rates, state median household income, and state minimum wage rates are from the Federal Reserve Economic Data; state partisan composition is from the National Conference of State Legislature.

4b. Variable Definitions

Table 2. *Variable Definitions*

Variable	Definition
Graduation rate	The Averaged Freshman Graduation Rate (AFGR) and the Average Cohort Graduation Rate (ACGR)
Youth unemployment rate	Percentage of the population aged 16 to 19 who are considered unemployed or do not participate in the labor force. The civilian labor force includes persons who are employed and those who are unemployed but looking for work. Data derived from survey.
GDP growth rate 4a.	The growth rate of Gross Domestic Product for each state
Square of GDP growth rate	The growth rate of Gross Domestic Product for each state squared
Minimum wage	The lowest wage that can be legally offered by an employer in each state
Natural log of per capita education expenditure	The natural log taken of the state expenditure on education divided by the state population
Natural log of median household income	The natural log of the median household income for each state
Legislative control of state categorical variable	A categorical variable assigned to each outcome of legislature control: democratic, republican, split. The variable allows analysis of the difference in graduation rates from the control of a democratic legislature to the opposing categories of split and republic legislatures.

We had to graft two different graduation rates—the Averaged Freshman Graduation Rate (AFGR) and the Average Cohort Graduation Rate (ACGR) be-

cause many states have changed the calculation method in recent years. We use AFGR from 2001 to 2009 and ACGR from 2010 to 2016. The ACGR calculates a precise graduation rate since it uses detailed student-level data to track enrollment and completions over time, while the AFGR estimates a graduation rate by using aggregate enrollment data and diploma counts (NCES, n.d.).

4c. Summary Statistics

Table 3. *Summary Statistics of variables used in the regression analysis*

Variable	# of Obs	Mean	Max	Min	Variance
Y = Graduation Rate (%)	793	78.29	92.70	54.22	55.37
X1 = Youth Unemployment Rate	796	63.77	81	42	64.93
X2 = GDP Growth Rate	799	0.88	11.5	-9.4	5.98
X3 = Minimum Wage	800	6.64	10	5.15	1.4
X4 = Education Expenditure	800	10,508	20,795	4,895	8,355,961
X5 = Median Household Income	800	49,700	76,260	29,359	83,160,444
X6 = Legislature Control	784	Categorical: Republican, Democratic, Split			

4d. Descriptive Statistics

State High School Graduation Rates

Figure 1. *Map of Graduation Rate by State (2016) and Boxplot of Graduation Rate*

There are wide disparities among states in terms of high school graduation rates. This variable ranges from 54.22% to 92.70%, with a mean of 78.29% and a standard deviation of 40.49%. The distribution of this variable has a strong negative skew. In 2016, the center and North-Eastern regions had relatively higher graduation rates. The top three states were Iowa (91.3%), New Jersey (90.1%), and West Virginia (89.8%). The bottom threes were New Mexico (71%), Nevada (73.6%), and Oregon (74.8%).

Youth Unemployment Rates

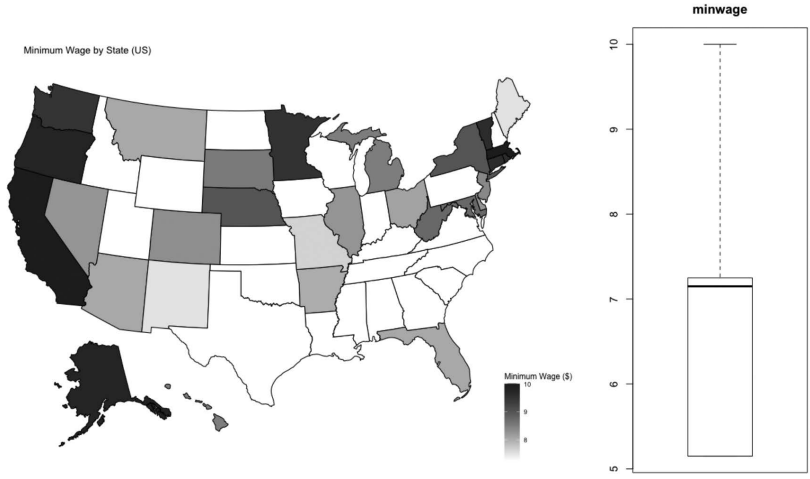
Figure 2. *Map of Youth Unemployment Rate by State (2016) and Boxplot of Youth Unemployment Rate*

The distribution of the youth unemployment rate is normally distributed with a slight negative skew. The youth unemployment rate ranges from 42% to 81% between 2001-2016, with a mean of 63.77% and a variance of 64.93%. States with higher youth unemployment rates tend to be located in the South-Western and South-Eastern regions of the United States, while states with lower youth unemployment rates tend to be located in the Midwest. The states with the highest youth unemployment rates for the year 2016 were Mississippi (77%), California (76%) and New York (75%), while the states with the lowest youth unemployment rates were North Dakota (51%), Iowa (52%) and Utah (52%). Comparing Figures 1 and 2, there seems a weak negative correlation between high school graduation rate and youth unemployment rate.

Through this map overlay we are able to observe geographical groupings, this raises some interesting questions regarding the determining factors as well as the indication of the labor market quality for youth groups. Youth unemployment serves as our indicator as to job availability for people of high school age. According to the opportunity cost effect lower unemployment rates suggest that the job market for youth is of a higher quality and therefore the opportunity cost of being in school is higher. Through this theory, areas with a lower unemployment rate would also have a lower graduation rate than their counterparts.

Minimum Wage

Figure 3. *Map of Minimum Wage by State (2016) and Boxplot of Minimum Wage*



For the base year 2016, the majority of the observations (21 out of 50 states) offered the federal minimum wage ($7.25), as can be seen from the map above. States with the highest minimum wage in 2016 were California and Massachusetts at $10 per hour, followed by Oregon and Alaska at $9.75 per hour. The minimum wage variable has a low variance of 1.4, and the mean rests at $6.64. The map shows that West and North-East states tend to have higher minimum wages and overlap in the youth unemployment rate map, which implies a positive correlation between the two variables.

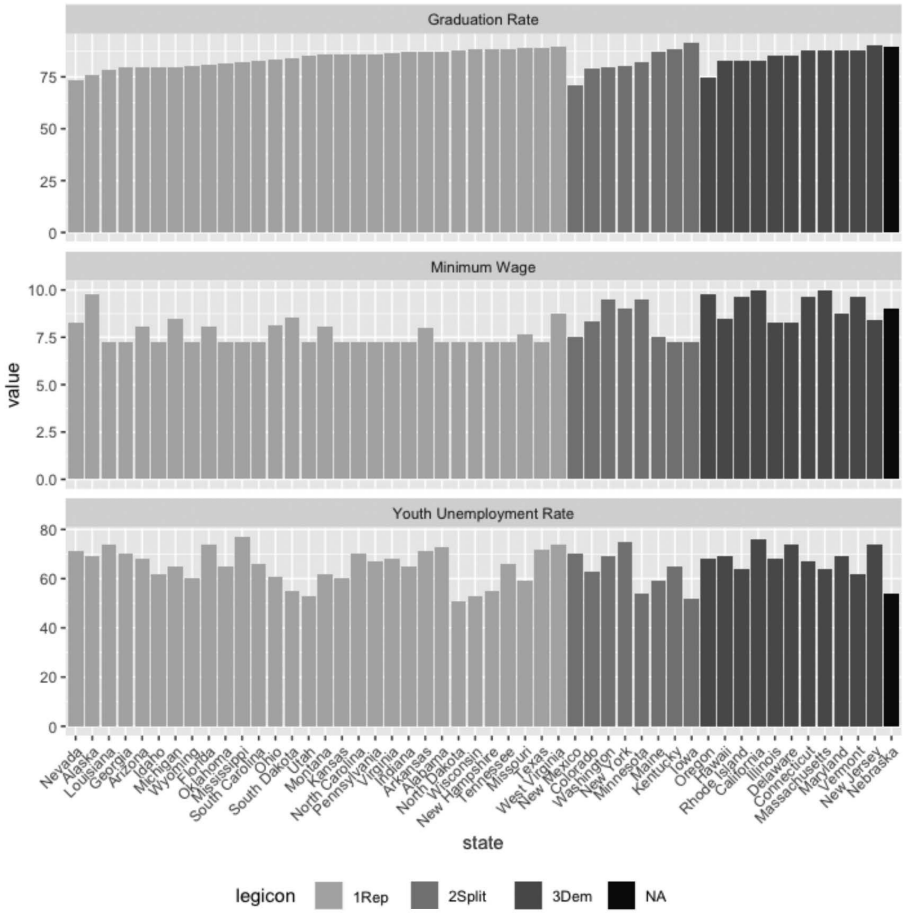
Minimum wage is our most important variable as we investigate the claim that higher minimum wage would incentivize high school students to drop out. Again, through the opportunity cost effect, the areas on the map above with higher minimum wage - namely, California, Massachusetts and Oregon - should also have the lowest graduation rates if this effect exists.

State Legislature Control

State legislature control is a categorical variable and has three categories: Republican control, Democratic control, and split between Republican and Democratic control. In 2016, there were 30 Republican, 11 Democratic, 9 split, or nonpartisan states. For the base year 2016, no Democratic state offered the federal

minimum wage, but 19 out of 30 Republican states kept the federal minimum wage. The average minimum hourly wage was $7.65 for Republican-control states and $9.30 for Democratic-control states. Other than the minimum wage, it is hard to observe any pattern of state legislature control. Figure 5 shows no apparent correlation between state legislature control and youth unemployment rates and graduation rates.

Figure 4. *Legislature Control, Graduation rate, Minimum Wage, and Youth Unemployment Rate (2016)*



Other Covariates

Figure 5. *Boxplots of Other Covariates*

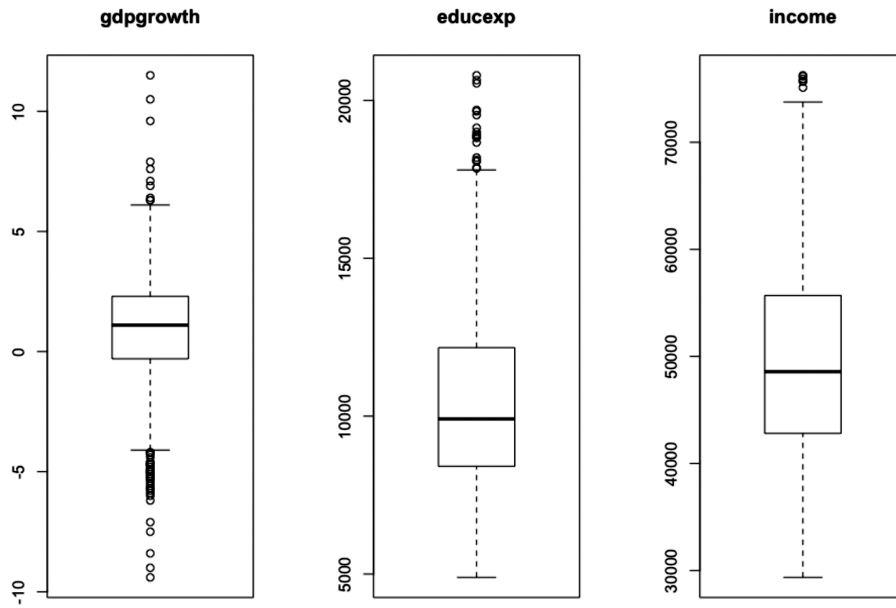


Figure 5 summarizes the other covariates: GDP growth rate, education expenditure per pupil, and median household income. GDP growth rate ranges from -9.4% (Nevada in 2009) to 21.9% (North Dakota in 2012)—these two observations are deleted from our data set because they are outliers. The mean for the period 2001 to 2016 is 0.88%. Education expenditure per pupil ranges from $4,895 to $20,795, and the mean is $10,508. Vermont, New York, and Wyoming spent the most in 2016. Median household income is normally distributed with a mean of $49,700, and the difference between the highest (Idaho) and lowest (Maine) in 2016 is $35,161.

5. Results and Discussion

Table 4 presents the regression results. Model (1) is our unrestricted ordinary least squares (OLS) model, which is shown for comparison purposes. Model (2) is the state fixed-effects model with youth unemployment rate and minimum wage as the only independent variables. Model (3) is the state fixed-effects model with all independent variables we have in the data set; this is our primary model

of interest so Figure 6 visualizes the estimates of this model. Model (4) substitutes the youth unemployment rate of the model (3) with total unemployment rate for comparison and robustness check.

The results from model (3) support the income effect but yield a mixed result on the opportunity cost effect. Higher GDP growth rate and higher household income are associated with a higher graduation rate, as expected. A 1% increase in GDP growth rate is associated with a 0.13% increase in high school graduation rate. Also, a 1% increase in median household income at the state level is associated with a 6.07% higher graduation rate. So in a strong economy and with higher household income, more families can afford to keep their children in school, as predicted by the income effect.

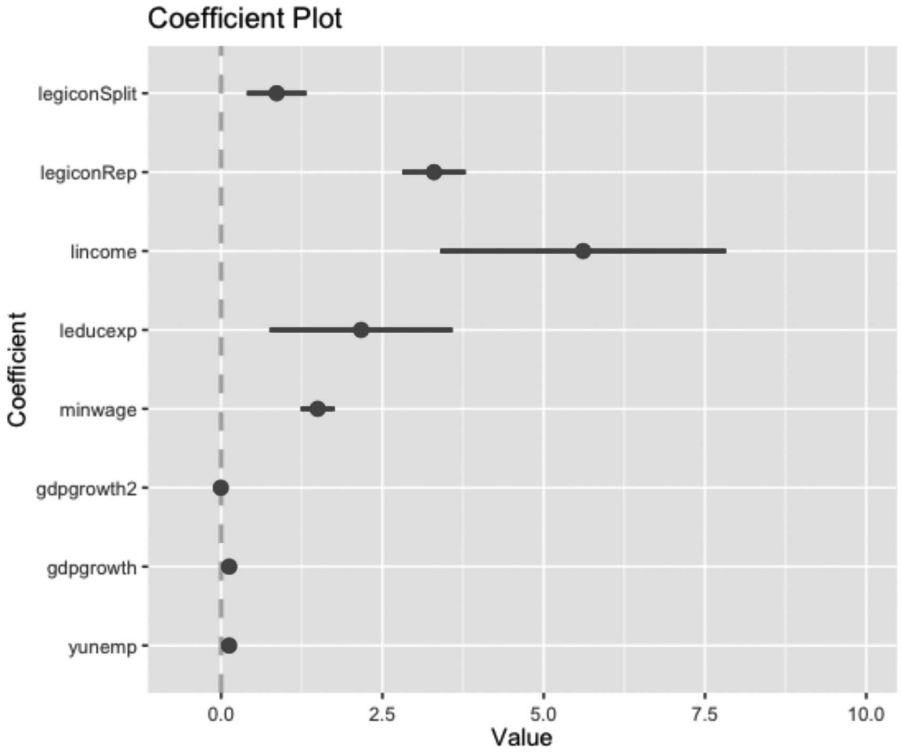
The evidence on the opportunity cost effect is mixed because of its presence in the relationship between youth unemployment rate and graduation rate, but absence in the relationship between minimum wage and graduation rate. Although in model (1) when state fixed effects are not controlled for, youth unemployment rate is negatively associated with graduation rate, but in model (3) when state fixed effects are controlled for, the opposite result is found: a 1% increase in youth unemployment rate is related to a 0.12% increase in high school graduation rate. This result indicates that when the youth unemployment rate is higher, the opportunity cost of staying in school is lower for youth, so the high school graduation rate is higher.

Table 4. *Estimates of Ordinary Least Squares and State Fixed-effects Model*

	Dependent Variable			
	Graduation Rate			
	OLS		*Fixed Effects*	
	(1)	(2)	(3)	(4)
Youth Unemployment Rate	-0.378***	0.106***	0.124***	
	(-0.031)	(-0.041)	(-0.042)	
Total Unemployment Rate				0.161*
				(-0.095)
GDP Growth Rate	0.269***		0.125**	0.148***
	(-0.088)		(-0.053)	(-0.055)
(GDP Growth Rate)^2	-0.07***		-0.005	-0.006
	(-0.018)		(-0.011)	(-0.011)
Minimum Wage	2.054***	2.381***	1.496***	1.718***
	(-0.28)	(-0.189)	(-0.261)	(-0.249)
ln (Education Expenditure)	9.656***		2.17	3.028**
	(-1.019)		(-1.416)	(-1.38)
ln (Median Income)	1.53		5.611**	5.577**
	(-1.426)		(-2.213)	(-2.382)
Republican Legislature Control	2.107***		3.300***	3.324***
	(-0.473)		(-0.489)	(-0.491)
Split Legislature Control	-0.378		0.861*	0.857*
	(-0.618)		(-0.46)	(-0.46)
Constant	-17.507			
	(-16.672)			
Observations	772	789	772	776
R2	0.392	0.422	0.48	0.475
Adjusted R2	0.385	0.383	0.439	0.434
Residual Std. Error	5.822 (df = 763)			
F Statistic	61.366*** (df = 8; 763)	269.595*** (DF = 2; 737)	82.415*** (DF = 8; 715)	81.195*** (DF = 8; 719)

Note: *p<0.1; **p<0.05; ***p<0.01

Figure 6. *Coefficient Plot of the Unrestricted State Fixed-effects Model (3)*



At the same time, one striking result is that a higher minimum wage is positively associated with high school graduation rate after controlling for youth unemployment rate and other factors, rejecting the opportunity cost effect. This result is very robust across the four models, even in model (2) when minimum wage is the only independent variable. This finding makes an important contribution to the debate on minimum wage policy. It lends support to a higher minimum wage policy, as it clearly rejects the argument that a higher minimum wage has the side effect of causing more youth to drop out of high school, lowering the graduation rate.

Another interesting and robust result is the effect of political party control over legislatures. States with Republican-controlled legislatures have a 3.3% higher graduation rate compared to states with Democratic-controlled legislatures. This effect is very large. We do not have a clear narrative for why this is the case, but we have a hypothesis. Places with higher immigrant populations tend to have lower schooling outcomes, including lower high school graduation rates. So the

lower high school graduation rates of Democratic states might be driven by their higher immigration populations. This is clearly an area for further research.

In model (4) when youth unemployment rate is replaced with total unemployment rate, the results are mostly similar to those in model (3), providing some credibility and robustness to results in model (3).

6. Conclusion and Policy Discussions

Using a panel data set of 50 states over the period 2001 to 2016, this research studies the factors that influence high school graduation rates at the state level, in particular labor market conditions such as youth unemployment rate and minimum wage. We test the income effect hypothesis that a stronger economy and a better labor market improve households income, which enables households to keep their youths in school, increasing graduation rate. Results from a fixed-effects model support the income effect hypothesis, as GDP growth rates and median household incomes are positively associated with high school graduate rates, ceteris paribus. We also test the opportunity cost effect hypothesis that a stronger economy and a better labor market raises the opportunity cost of staying in school (the foregone wage of youths), lowering graduation rate. The fixed-effects model yields mixed evidence on this hypothesis. Higher youth unemployment rate (worsening labor market) is found to be positively associated with graduation rate, supporting the opportunity cost effect hypothesis. At the same time, higher minimum wage (higher opportunity cost of staying in school) is associated with higher graduation rate, rejecting the opportunity cost effect hypothesis. However, as the literature outlines, the existence of the opportunity cost effect varies over social factors such as race and socioeconomic class. This paper uses macro-level data and thus cannot capture nuanced and more complex relationships at the micro level. Some other relevant empirical results include: states with Republican-controlled legislatures have higher graduation rates ceteris paribus, and state's educational expenditure per student has no effect on high school graduation rates.

This research observes the two forces that can affect high school students' decisions to drop out and work. The results show that the opportunity cost effect is weak and ambiguous, whereas the income effect is more substantial and apparent. Students drop out not because they are motivated to work and earn more money, but because their circumstances caused by lower-income households make them quit school. Decreasing the minimum wage—an incentive to work—does not

help increase high school graduation rates. It is somehow associated with more dropouts. Thus, to keep the graduation rate higher, the government has to take care of the income effect. We suggest that the government provide safety net policies for low-income students and their families to make sure the students finish high school education, since helping the kids graduate high school can be the most effective means of overcoming poverty for the individuals, reducing inequality of society, and growing the economy. Finally, this paper suggests that it is important to more effectively use the education budget, because we find no evidence that higher educational expenditure per pupil leads to higher high school graduation rates (though we suspect there might be other benefits associated with higher education expenditure per pupil that are not captured in high school graduation rate figures).

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Finding the Profit in Peekaboo: Moving Towards Relational Health as a Goal

Dipesh Navsaria[1]

Now, I am a physician — a pediatrician to be more specific. A good piece of what I do is what you might expect a medical doctor to do: caring for patients, research work, and involvement in public health. Part of what I do is clinical pediatrics; I have spent many years as a primary-care pediatrician, and have valued the time I've spent in front of children and families, hearing about their hopes, desires, troubles, dreams, and dismays. This is, ultimately, the core practice of medicine — the engagement with patients and those around them in the exam room or at the bedside.

Along with clinical practice, I do substantial work in public health. As I explain to those less familiar with the distinction, traditional medical work is being a physician for an individual patient, but public health work is being a physician for entire populations of humans. By thinking about the "big picture", we're able to advance health and well-being for not just a few, but for many.

Another substantial element of what physicians become involved in is research. In fact, when invited to contribute to this, the specific language of the invitation asked me to discuss "my research". I have a confession to make to you: I'm actually a terrible researcher. Yes, it's true — I've tried, but I honestly don't have the patience to do it well, and the various statistical games and travails of publication feel like too much work for very little yield. I'm very glad there are many others out there who are deeply committed to research and seem to have the talent to know how to do it well.

However — one area that I did not mention yet is the field of public engagement. While I'm not adept at research, I am very good at taking other people's

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research and translating it for others — whether that's the general public, policymakers, or experts in other arenas. One of the vast challenges we have in our society is that we are rather good at producing knowledge, but we are equally skilled at siloing that knowledge — and ourselves — so it remains within very specialized communities.

It is already impossible to keep up with the literature in the field of pediatrics alone, let alone medicine in general. There is ample quality research being produced every month, yet it remains locked up in our journals, and only occasionally covered outside of those specialized tomes. To keep up with even five or six major pediatric journals takes significant time, and venturing into the world of general medical journals such as the New England Journal of Medicine, medical education journals such as Academic Medicine, or public health journals such as the American Journal of Public Health is borderline impossible. Venturing into the adjacent fields of psychology, social work, or health policy is unlikely to happen, and certainly not something somewhat further afield such as economics.

So I thank you for not only having me write here, in proceedings published by a Department of Economics, a field that is definitely well outside of my comfort zone — more on that in a bit — but also for honoring the work of Dr Heckman, who has been able to clearly articulate his work to an audience outside his field of study. The impact has been tremendous.

II.

Let me turn back to the subject of how we approach the flourishing and thriving of children and their families.[2] In our society, being able to finance this kind of work is of key importance — family support programs, early childhood education, prenatal and well-child care, housing, nutrition support — these all take money. Volunteer work can help, but in order to implement with any kind of consistency and quality, there needs to be the ability to pay for the work.[3] (And I'll add that I am a believer in the maxim that "budgets are moral documents"; they say—more clearly than almost anything else we may produce—

2 I would be amiss if I did not note that the concept of children and their families "flourishing" is one I have heard most ardently articulated by Joe Waters of Capita. https://www.capitasocial.org

3 See, for example, the argument I make on "surface charity" and the need for more depth in our charitable giving and work: https://madison.com/ct/opinion/column/dr-dipesh-navsaria-looking-the-gift-horse-of-help-in/article_0b8718eb-e7bc-56fa-bf71-dcba3c321f40.html

what we value and deem worthy of investment.)

Professor Heckman has certainly articulated the economic case for doing this type of work, and I will not attempt to reiterate it.[4] However, I want to put a related question to you: should it matter? Should the financial rate of return on an investment be the primary criterion by which we judge the value of doing so?

We run into a significant challenge when we attempt to articulate the non-economic benefits of activities such as home visiting, prenatal care, prevention, and the like. It's all too easy to haul out platitudes such as "It's the right thing to do" and "Think of the children!". While these may indeed be true, they are functionally useless, because they rest atop vague notions of what we value in such deeply nonspecific ways that they can justify nearly anything — and often are, by people of all sorts of political stripes and persuasions.

Yet, attempts to more carefully quantify such efforts have been less than satisfactory, despite much work and even institutionalization of said efforts.[5] My research colleagues are well familiar with statistical significance; a significant p-value is the object of much desire, to the point of being subject to much mathematical manipulation, a phenomenon known as "p-hacking".[6]

And further still, despite such findings, countless research papers still trumpet significant findings, without consideration of whether the overall "big picture" is improved. Famed microbiologist René Dubos stated, "Sometimes the more measurable drives out the most important".

Even reasonably done research is often deeply misunderstood. Correlation is frequently mistaken for causation. Context is routinely ignored, and reported poorly in the press. Take, for example, the literature on probiotics.[7] Probiotics have been shown to sometimes have utility when very specific strains of beneficial bacteria are taken in specific dosing regimens for very specific conditions. However, in most instances, they will do nothing. Granted, probiotics are harmful only to the contents of one's checking account. However, the limited positive research somehow, gets broadly generalized into an overarching message of "Probiotics Good!", reinforced by sloppy marketing, and turned into a vast industry, likely for fairly little actual benefit.

4 https://heckmanequation.org/resource/13-roi-toolbox/

5 https://www.aafp.org/practice-management/improvement/basics.html

6 Head ML, Holman L, Lanfear R, Kahn AT, Jennions MD (2015) The Extent and Consequences of P-Hacking in Science. PLoS Biol 13(3): e1002106. https://doi.org/10.1371/journal.pbio.1002106

7 For more details and analysis, see articles like this: https://www.nytimes.com/2019/11/27/style/self-care/probiotics-benefits.html

III.

These issues move beyond the arena of research and into the world of clinical care. For the last couple of decades, quality improvement (QI) methodology has taken hold in the world of health care. There can be significant value to QI — an organized, systemic process by which changes within a system are tested out, evaluated, and adjusted by an iterative method can be of vast utility.

Yet, QI has great flaws within it. Recall that these processes came out of automobile manufacturing, where changes in the assembly line process could be attempted and evaluated. This works very well for certain things, such as medical procedures. Dr Atul Gawande's work on checklists works very well if you are putting in a central line through which medication can be infused — such a procedure should have discrete steps, performed properly, and in a particular order, each and every time.[8] This avoids complication, infection, and needless harm.

However, human beings are not cars. They are not uniformly produced, and even identical twins have variations. They may have different needs for information, for support, and for guidance. A Connors Rating Scale for symptoms of inattention and hyperactivity is not meant to diagnose attention-deficit disorder — such a scale would provide a false positive for inattention in a child with hearing problems. That child needs an audiology evaluation, not a prescription for Ritalin. There is only so much that we can mechanize and industrialize the appropriate delivery of health care and family support.

Additionally, much like in research, context matters. QI generally instructs participants to only analyze factors that are within your ability to control. This has a purpose, since the goal is to improve things that you can actually immediately influence. However, a community health center's QI process to improve no-show rates is likely to have a very limited impact when examining only what the clinic can affect — the effects of poor transportation options, housing insecurity, shifting work hours, lack of living wages, and more are much larger influences which are not generally addressable by the clinic in their day-to-day health care operations.

(This, incidentally, is a key reason to do advocacy work — if the system is the problem, then change it. QI creates a mentality that you can't change the outside world. As a now-apocryphal quote says, "I am no longer accepting the things I cannot change. I am changing the things I can no longer accept.")

8 https://www.newyorker.com/magazine/2007/12/10/the-checklist

With all of these things, however, there is a tendency for the big picture to get lost. Again I remind you of the Dubos quote — are we missing what is most important? Often we offer up all sorts of data to funders as evidence of progress, but much of it consists of process measures. One literacy nonprofit recently sent a report about their "impact" — said impact was measured merely in the number of books distributed to children.

While I understand fully the difficulty of measuring actual change (such as later reading scores) or even intermediate measures (like parents reading to their child every night), we have no proof that merely dropping books into a home necessarily does anything beneficial to a child in and of itself. A book only does its magic when it is open in the hands of a child and a caring adult to read it aloud with them in a responsive manner, what we call dialogic reading.[9] Book distribution efforts likely do no harm to that child or family[10], but they also do very little in isolation — it's only when coupled with intentional skill building through supportive enquiry, modeling, and coaching that they work well.

(This, incidentally, is the central idea of Reach Out and Read, a program that trains clinicians to help build this capacity in family units in the context of the regular checkups performed routinely in early childhood — by way of full disclosure, I am the founding medical director of Reach Out and Read Wisconsin, and on the board of Reach Out and Read National Center.)[11]

IV.

Yet, how do we measure effectively the richness of responsive interactions over books? This is possible in a research setting through intensive coding — I actually used to be a research assistant on this kind of work, back in my undergrad days.[12] However, that kind of intensity of analysis isn't feasible as a regular occurrence.

A parallel issue is the entire concept of "school readiness" that permeates early education. The measurable metrics for this tend to be technical ones, such as letter recognition, and largely amenable to a "drills and skills" approach. However,

9 https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/WWC_Dialogic_Reading_020807.pdf

10 Although they can distract from other efforts, or take up funding or volunteer support for projects that do have demonstrated efficacy, so arguably if a child doesn't receive a service for that reason, it could be thought of as indeed having caused some harm.

11 http://reachoutandread.org

12 https://blogs.scientificamerican.com/thoughtful-animal/ed-tronick-and-the-8220-still-face-experiment-8221/

less easily measured are socioemotional ones — how does one interact effectively with other human beings? When does one learn patience? What are the social norms of being in a place with others?

I was once asked to offer a functional definition of socioemotional development. My response was to offer a contrast:[13]

> Gross motor skills allow you to walk.
>
> Fine motor skills allow you to draw and write.
>
> Speech & language skills allow you to speak and communicate.
>
> Socioemotional development allows you to know when to use — and not use— those other capabilities.

Again, the issue is clear — how does one measure this effectively, efficiently, and usefully?

Besides the obvious relationship that I've been repeatedly referencing — the parent-child one — there is another relationship that is critical in all this, the relationship of patients and families and of those professionals that support them. Social workers, home visitors, early childhood educators — and yes, physicians and other clinicians — are all examples of where this matters. As I noted earlier, there are far too many cases where improvements in process metrics are mistaken for actual betterment of life. As I have frequently asked: "Is anyone better off as a result of what was done?"

V.

What, then, do I propose as a focus for examination? I'm certainly not arguing that we should do away with all measures — after all, lead screening rates in Medicaid populations *should* be high, and if they are anything but high, it should prompt further enquiry. (And mind you, I said "further enquiry". Far too often what it prompts is the handing of a printout to a clinician and they are left to their own devices to figure out how to rectify the situation, as if it reflects a lack of commitment to "quality patient care". It's very difficult to screen for lead in your

13 https://vimeo.com/336567325

patients if they never come to their appointments, after all.)

I have, over the last year, been considering that the fundamental basis of these human exchanges — "transactions", if you will — is one of trust. Trust between a parent and a child, trust between a family and professionals. If trust isn't strong, then many things will crumble as a result. Either measures and metrics will suffer, or, perhaps, they will remain high but longer-term, broader outcomes still are poor, giving a false sense of security or accomplishment when, in reality, no such thing occurred.[14]

How, then, do we measure trust? This is what I've been wrestling with, and most of my colleagues would shrug their shoulders and say it isn't definable. It occurred to me, however, that trust is an important concept in another field — yes, economics. Now, as I've told you, I have almost zero education in economics, so please be gentle and forgive my novice understanding — but I think it's critical to how we consider trust as a foundation for interpersonal and professional relationships.

As I noted, I am not an expert in this; I turned to an Actual Economist who I had the pleasure of being a co-speaker with at a conference, Rob Grunewald of the Minneapolis Federal Reserve. While he told me that this is not his area of study, he was happy to outline some basic principles of how economists think about trust. (I should state clearly that he is not speaking in an official capacity or on behalf of the Federal Reserve.) Even better, he did it in a way I could understand. In the spirit of intellectual diffusion, this was covered in a blog post co-written with the National Institute for Children's Health Quality.[15] To summarize his key points, adapted from the blog post:

> *One. Historical track record: A positive track record builds trust between market participants. For example, if your bank has consistently treated you fairly and responded to your concerns, you are more likely to keep banking with them.*

The significance of a positive track record is directly applicable to parent-practitioner relationships. If a professional has done right by a family before—

14 There is an interesting phenomenon I've encountered where situations that border on clear malpractice have occurred, but the family remains intensely loyal to the clinician involved, despite an objectively bad outcome that's clearly traceable to the actions (or inactions) of the clinician.

15 https://www.nichq.org/insight/economics-creative-paradigm-importance-trust-pediatric-care

addressed the family's needs, made correct diagnoses, responded to their concerns—they've developed a foundation of trust. Moreover, each interaction builds on the previous interaction, both directly and indirectly. First impressions matter.

Importantly, the entire system and continuum of care — and every person in it — is responsible for establishing a positive track record. The experience families have on the phone, with the front-desk staff, or another professional will help inform their overall view. Remember, your organization is only as courteous as your least-courteous staff member.[16]

> *Two. Flow of information: Open channels to understandable information builds trust and gives market participants confidence to act on information. For example, if you are considering investing in a company, you'll be more inclined to invest if the company has 1) given accurate information about its revenue and expenses, 2) provided that information in a comprehensible format, and 3) clearly explained your different investment options.*

Prioritizing open channels of communication can build trust and improve care. Knowing a professional is being honest with them builds confidence their opinions are being heard. Small gestures like physically showing results of a test directly to families (and explaining it) can make a key difference.

Second, families should receive information in a format they can understand. If not, clientele may leave health encounters confused about the next steps. What did the test or evaluation actually conclude? Are choices the family or patient made responsible for what happened? Confusion is not only an issue in and of itself, but erodes trust.

Finally, families need to feel they can act on the information given. Even if families understand a recommendation, their social, environmental, personal, and psychological circumstances may make the recommendation difficult to follow.

> *Three. Institutional framework: Markets work better when institutions are transparent about rules and consequences. Individual participants will often make market transactions irrespective of their trust level of*

16 As was encapsulated beautifully in a short comment by Dr Francis Rushton Jr., a pediatrician in South Carolina.

other specific participants if the institutional framework is transparent and consistent. Simply put: institutional trust matters. For example, if you trust the banking system, you are more likely to put your money in a bank than keep it in a safe at home, even if you haven't yet built a strong relationship with a particular bank.

This, in particular, is key on a broad, societal, and systemic level, and a significant challenge. There is a long historical legacy of health care not being transparent, especially regarding underserved populations. Segregation of care, unethical clinical studies, outright racism and discrimination, and repeated microaggressions are past and current contributors to erosion of trust. Organizations should have purposeful transparency behind how their decisions are made and that they are consistent with their stated mission. This means building structures, accountability, and internal controls to ensure it does indeed occur.

Ultimately, my central point that I offer here is the consideration of trust as the fundamental transaction underlying human relationships. The notions of a strong positive historical track record; open, accurate, clear, and comprehensive flow of information; and transparent, consistent rules and consequences all hold true for professional interactions — and, interestingly, also in the difficult task of parenting.

VI.

I will also take this moment to argue for a valuation of building in young children a sense of curiosity and enquiry. This is a deeply unmeasurable attribute, but think of a child who is curious about the world around them, and learns to productively enquire after that world. They have very likely had not only early surroundings that allow the neural pathways for these attributes to form, but also are likely to become adults with these core characteristics that also drive success as an engaged citizen and a positive contributor to society, in whatever way that may be reflected.

Ultimately, I view these concepts as manifestations of robust relational health — the health of relationships. This is not new by any means — we have known for a long time that individuals who are socially disconnected are at elevated risk for not only mental health concerns, but also physical health. We also use an interesting term for those who have extensive connections, influence, and ability to call upon supportive individuals when needed — "social capital". This is indeed a

reflection of how much the idea of a storehouse of relationships is thought to be as valuable and protective as traditional financial instruments.

While these are not measurable via traditional metrics, there are ways to evaluate the strength of relationships. One route is through skilled observation. Think of a pediatrician who has been trained in the Reach Out and Read model which I referenced earlier, which incorporates asking, assessing, discussing, modeling, and coaching around home book sharing activities as a routine part of checkups with young children. That doctor is able to assess many elements of relational health just through observing a child's interaction with books. A toddler who takes a book, studies it for a moment, and then walks over to their parent holding it out in a "read to me" gesture has told us quite a bit about their familiarity with books, their positive associations with them, and their trust and expectation that if they show it to their parent, shared book reading will ensue. This kind of intentional, skilled observation happens frequently in health care, and is greatly needed.

Another route would be to simply ask participants what their overall assessment was of the value of a particular interaction, using a simple Likert scale. If both offer high ratings, then I believe it is safe to say that some element of good quality care was offered. (Keeping in mind that it's possible both participants may be ignoring important aspects of care that would be ultimately deleterious to ignore). If both are low, then there are further questions to be asked, but at least both recognize the dissatisfaction present.

If the responses are discordant — then there is work to be done to solve that discrepancy and understand why there are such divergent viewpoints. Are there wholly differing agendas? Is there a misunderstanding about what the purpose of an encounter is? Is there a misevaluation of some element of care that's not being communicated well? While I've cast this as taking the form of a short survey in analyzing a health care encounter, it may have value in other types of relationships.

I don't think it's out of the question to consider this at least as a conceptual frame when working with parents and children who are disagreeing. A teenager and a parent may have very different views about a particular decision, and recognizing and responding to that is something a therapist does all the time. Even the interaction between an adult and a young child can be viewed as a set of offers, acceptances, and rejections.[17]

17 https://www.simpleinteractions.org/the-si-tool.html

VII.

Ultimately, the work of assessing relational health is critical, because the research shows that these non-monetary returns have both non-monetary *and* monetary returns. I am reminded of the eloquent summary of the research around child development, human relationships, and resilience by psychologist Dr Urie Bronfenbrenner:

> *In order to develop normally, a child requires progressively more complex joint activity with one or more adults who have an irrational emotional relationship with the child. Somebody's got to be crazy about that kid. That's number one. First, last, and always.*

The promotion, protection, and growth of these relationships should be the central point of any work that engages early childhood, and, indeed, should be core to societal progress, given how foundational early childhood is to all that follows, writ large or small. While one may initially regard a moment of peekaboo as a trivial amusement, that shared interaction—repeated with theme and variation countless times, as part of a larger, longer, and lovely relationship—affects the human brain deeply in positive ways that fuel exactly that broad communal benefit I speak of. There is, indeed, a great profit in peekaboo — we now need to recognize it and nurture it as a core value of our public contract with one another.

I hope I have not succeeded in an attempt to convince you that an examination of the financial return on investment in early childhood is fallacious. Rather, my aim is to have argued that an examination of less quantitative concepts such as trust, curiosity, and enquiry is a co-equal goal along with the traditional economic argument. If anything, the fact that I have grounded my approach to relational health in an economic consideration of trust is, I hope, perhaps a mark of my respect for your field and what it may offer when applied across contexts in unique ways.

Patterns of Human Capital Formation among Indonesian Transmigrants

Shatanjaya Dasgupta[1] **and Edward Kosack**[2]

Introduction

Managed internal migration has been a hallmark of the migration history of Indonesia since the days of Dutch colonial rule. This state-sponsored, state-funded, and state-controlled movement of people from the highly populated provinces of Java and Bali to the relatively more sparsely populated Outer Islands is known as the Transmigration Program. Movement from one locality to another can be viewed as an investment to improve economic outcomes for a family. It can also prove to be a costly disruption. Economic immigrants usually weigh the costs and benefits of the decision to migrate to determine whether it is worth it for them and their families. They may migrate, even if it is costly, to find better work with higher wages or to improve the opportunities available for their children. However, under the Transmigration Program, the state controls when and where the migrants will move, as well as determines the initial allocation of assets with which they will be endowed at the new location. If the move is made under asymmetric information whereby the state has better knowledge about the relative costs and benefits of the move than the migrants themselves, then the outcome can be unpredictable. This is especially true for the youngest members of the family who depend on the infrastructure in the new location in order to continue investments in their human capital. Thus, it is important to evaluate patterns between the Transmigration Program and human

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capital outcomes for the participatory migrants.

We ask two research questions in this paper. First, we explore whether or not Transmigration affected human capital outcomes (i.e., completed years of education) relative to other types of migration from Java and Bali to the Outer Islands. Second, we analyze heterogeneity in these relationships between Transmigration and human capital on the basis of sex. A priori, it is not obvious whether child transmigrants should have better or worse education outcomes. Migration can disrupt a child's life and therefore can lead to worse outcomes for children. Parental income and work opportunities as well as the quality of infrastructure and education in the new location can affect children's schooling positively or negatively. This is an empirical question that we will explore in this paper.

Our main contribution is to empirically identify the relationship between the Transmigration Program in Indonesia and educational outcomes of children. The literature speaks to the impact of childhood migration on education, finding that children who migrate and arrive at earlier ages (in an international context) generally have better outcomes in the host country (Bleakley and Chin, 2004; Bleakley and Chin, 2010; Cortes, 2006; Gonzalez, 2003). However, it remains to be seen whether these same advantages exist for child migrants when the moves occur within the same country (similar language, culture, customs, etc.) and in the context of state-managed, internal moves. Additionally, the current literature also provides some insight into the relationship between the Transmigration Program itself and human capital. For example, we know that skill transferability is important and that the quality of the match between migrant human capital and agricultural endowments in the destination has an effect on productivity (Bazzi et al., 2016). We also know that transmigrants who had more education were more likely to work off the farm in the transmigrant village than those who had fewer years of education (Leinbach et al., 1992). It remains to be shown, however, how the program impacts the subsequent human capital accumulation of the migrants who arrive as children.

Education and human capital investment is extremely importance for future success. The experiences that young children have in terms of inputs into the human capital formation process have profound consequences on their levels of productivity later in life (Heckman, 2006). One can look to Glewwe (2002) for an extensive review of the importance of education (both quantity and quality) on future outcomes, particularly in the context of developing areas. Migration is especially salient when thinking about children and education because it both

disrupts the child's environment at a critical, young age, and it alters the menu of opportunities for education along dimensions of both quantity and quality. We know from work on early childhood programs in the United States that interventions at this critical period can have lasting positive effects into adulthood (Heckman et al., 2013). In the case of Transmigration, if the change the child experiences is positive, it could have a profoundly positive impact on their future. If the change is negative, it could have lasting, negative consequences for these vulnerable populations. Thus, it is important to determine just how the Transmigration Program alters the educational trajectory of the children involved.

A secondary contribution is to empirically show the pattern of selectivity into Transmigration. We know that migrants are a self-selected group of individuals who are more able and highly motivated (Borjas, 1987). We also know that the pattern of selectivity can depend on factors such as the size of immigrant networks that can alter the costs of migration (McKenzie and Rapoport, 2010). Anecdotally, we know that transmigrants were recruited from the poor, landless, rural populations in Java and Bali (Hardjono, 1988). It remains to be shown, however, that these individuals are systematically different than other types of migrants.

Another secondary contribution is to explore gender differences in migration outcomes in the context of the Transmigration Program. A study by Antman (2012) shows that paternal migration to the United States improves educational attainment for daughters left behind in Mexico, but not necessarily for sons. In the Indonesian context, we can test whether or not the specific conditions associated with internal migration to areas not of the migrants choosing, but of the state's choosing, would also have a distributional impact on the relative educational outcomes of females versus males.

The data to estimate the relationship between Transmigration and human capital investment come from two distinct sources. We obtain individual-level data from the Indonesian population censuses (including intercensal surveys). We also use information from Bazzi et al. (2016), which the authors transcribed from the Indonesian Transmigration Census, to identify transmigration regencies and to proxy exposure to the program. That is, we use information about villages that received transmigrants and the dates which they received them to identify transmigrant regencies. An individual is a transmigrant in our sample if they migrated from Java or Bali to one of the transmigrant regencies during a time that the villages in that regency were receiving transmigrants. A simple specification would compare the eventual educational attainment of those who were transmigrants

with those who were not. However, any difference could be the result of selection into the Transmigration program (i.e., pre-migration characteristics) and the effect of the move itself. In order to separate these two effects, we compare transmigrants to other migrants from Java and Bali to the same regencies in the Outer Islands (i.e., eliminating any general selection into migration itself) and look at the differential impact of age-at-arrival between these two groups. Essentially, we estimate the differential impact of arriving younger (i.e., with exposure to the new, transmigrant location when schooling investments are still being made) to arriving older across the two different types of migrants. We also include province dummies, year of birth dummies, and census year dummies to control for unobserved heterogeneity.

We find that transmigrants were negatively selected on education, relative to other migrants, with adult transmigrants achieving about 0.291 fewer years of schooling. We also find that those arriving to the Outer Islands at younger ages from Java and Bali find themselves disadvantaged relative to older migrants with non-transmigrant children attaining about 0.785 fewer years of schooling than older non-transmigrants. Finally, we find no differential impact of the Transmigration program on the educational attainment of migrants. In addition, our analysis of the heterogeneity of these patterns by sex reveals no evidence of differential effects for females and males. The negative selection is likely due to the fact that poor and landless farmers tended to be recruited for the program. We attribute the poorer outcomes for younger arrivals to the fact that the infrastructure and educational opportunity was likely worse in the relatively undeveloped and unpopulated Outer Islands compared to the densely populated regencies of Java and Bali. Finally, even with the investments made by the government in village infrastructure, as well as the money and land provided to the family, young transmigrants were not shielded from the negative effects of moving to the Outer Islands compared to other migrants moving at similar young ages. While we don't have data to test this directly, we conjecture that the absence of differential effects of the Transmigration Program on educational outcomes of children could be due to the low returns from education in the Outer Islands because of lack of opportunities to work other than the agricultural sector.

The remainder of the paper proceeds as follows. The next section provides a brief overview of the history and background of the Transmigration Program. Then we include a section that describes in detail the data and methodology that we use in our analysis. The following section presents summary statistics and de-

scribes the estimation results. The final section of the paper offers some discussion and provides concluding remarks.

Background on the Transmigration Program

Established in 1905 on a small-scale basis, the Transmigration Program had its origins in the Dutch colonial era (Hardjono, 1988). The program was later continued by the Indonesian government after independence in 1948 and, in fact, became the cornerstone of domestic policy under the Suharto regime (late 1960s to late 1990s) with over one million families (or over four million individuals) sponsored to move during that time period (Fearnside, 1997). According to the World Bank, this was the largest government-sponsored voluntary resettlement program in the world (World Bank, 1988).

The primary motivation of the program was to reduce the skewness of population distribution in Indonesia by relocating entire households from the densely populated areas of Java and Bali to the sparsely populated Outer Islands of Sumatra, Kalimantan, Sulawesi, Maluku, Nusa Tenggara, and Papua (Hardjono, 1988). Through this program, the planners also aimed to increase food production via the provision of labor to the unsettled areas (Hardjono, 1988). This, in turn, would ensure economic development in those regions (Abdoellah, 1987). In addition, Indonesia has a vastly diverse population with about 300 different ethnic groups and the Transmigration program sought to develop unity and a national identity by bringing together various ethnic groups (Abdoellah, 1987; MacAndrews, 1978).

From the point of view of our analysis, the significant feature of this program was that there was no systematic matching or assignment of people into places. Migrants could not choose their destination villages (Bazzi et al., 2016). Sites in the Outer Islands were chosen for settlement and cleared by the government. Many years could pass from selection to settlement, and even more time could pass until settlers received titles and the settlement received village status (Whitten, 1987). Moreover, the program intensity was dictated by how much revenue the government had in its coffers, which in in turn fluctuated due to external shocks such as changes in oil prices.[3] For instance, Bazzi et al. (2016) confirm that more transmigrants were placed when oil prices were high and that the program

3 Indonesia has generous reserves of natural resources and is an exporter of crude oil.

shrank amidst fall in oil prices.

Transmigrants were recruited from among the poor, landless farmers in the poorest rural villages of Java and Bali (Hardjono, 1988). Participation was voluntary but volunteer migrants had to be married, be of good character, and have previous farming experience (World Bank, 1988). Participants would sell their assets and then leave for transit camps located in each of the four provinces of Java and Bali where they would wait to be transported in groups to the Outer Islands (Bazzi et al., 2016). The government provided these transmigrants with transportation to their destinations along with housing, a two-hectare plot of agricultural land, and food allowance for one year (Fearnside, 1997; Hardjono, 1988).

Data and Methods

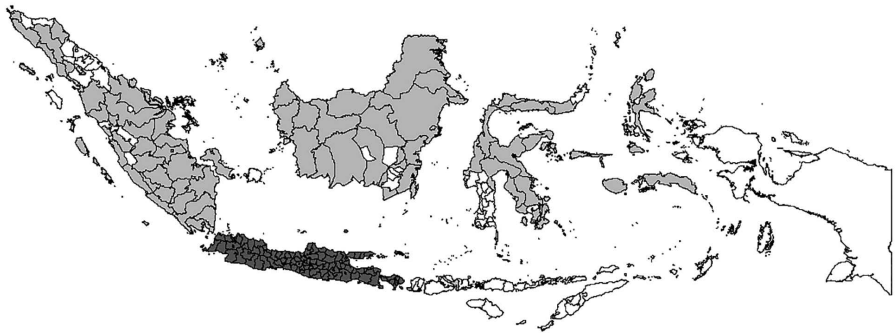
In order to investigate the relationship between Transmigration and human capital accumulation, we need data on individual-level characteristics (year of birth, birthplace, sex, educational attainment, etc.) and information that helps identify exposure to the Transmigration Program.

For our first source, we use data from the 1980 and 1990 Indonesian population census, together with population intercensal surveys of 1985 and 1995.[4] These provide individual-level data on age, sex, place of birth, current residence, age at migration, and years of education, which are all relevant to our analysis. As we noted previously, Transmigration is a phenomenon with a long history that has continued into recent times. However, previous studies indicate that the program reached its peak of intensity in the 1970s before slowing down in the late 1980s (Bazzi et al., 2016; Fearnside, 1997). Thus, these years of census and intercensal surveys give us the best opportunity to capture a large number of transmigrants with completed education.

Our second source of data is information on the location of Transmigration villages in Indonesia. The data, which come from Bazzi et al. (2016) and were transcribed by those authors from the Transmigration Census of 1998, identify the villages that received transmigrants and the years in which they receive them. We aggregate this information to the regency-level (second-level administrative sub-division) so that we can pinpoint destination regencies and the first and last

4 These data have been downloaded from the Integrated Public Use Microdata Series – International (IPUMS-International) database.

year transmigrants were settled in those regencies. We show the origin and destination regencies in Figure 1. The dark gray colored regencies fall in the islands of Java and Bali. We label these the regencies of origin since transmigrants originated from these populated areas. The light gray colored regencies are the recipient or destination regencies and represent those areas to which people were relocated via the Transmigration Program.



Notes: Transmigrant regencies are colored light gray while regencies from which the migrants in the sample originated (i.e., Java and Bali) are colored dark gray.

Source: Data to complete the map come from Bazzi et al. (2016) and authors' calculations.

Our sample consists of all adults, aged 25 years or older, who currently live in rural areas in one of the Outer Islands that received transmigrants and who were born in one of the regencies in Java or Bali. We know that migrants are a select group (more able, aggressive, competitive, entrepreneurial and productive, less risk averse, etc.) and not a random draw from the population (Borjas, 1987; Chiswick, 1999). Thus, to ensure that we are comparing similar kinds of people, we limit our sample to migrants to the Outer Islands only, who are identified as those who currently reside in a regency in the Outer Islands (i.e., one that received transmigrants) and who were born in one of the regencies in either Java or Bali. In this way, our analysis compares migrants who made the same type of move and relies on the timing of that move relative to the establishment of transmigrant villages in the Outer Islands. An individual who migrated to one of these regencies during the time that some villages within the regency were receiving transmigrants is identified as a "transmigrant" in the data. An individual who migrated to a regency outside of the time the villages within that regency were receiving transmigrants is identified as an "other migrant" in the data. Finally, because our

outcome of interest is educational attainment, we want to ensure that we include only those who have completed their investment in education. Therefore, we limit our sample to people older than 25 years of age.

In order to identify the relationship between transmigration and human capital accumulation, one might compare the completed educational attainment between transmigrants and other types of migrants. A simple comparison of educational attainment between "transmigrants" and "other migrants" (as defined previously) is given by:

$$yrs\_educ_{itpc} = \alpha_0 + \alpha_1 Transmigrant_{itpc} + \pi_t + \gamma_p + \delta_c + \varepsilon_{itpc} \quad (1)$$

In this specification, yrs_educ_{itpc} is the total years of education of individual i born in year t residing in province p and surveyed in census year c. $Transmigrant_{itpc}$ is a dummy variable that equals one if the individual is identified as a "transmigrant" and zero if identified as an "other migrant." Province dummies, denoted by γ_p, and year of birth dummies, denoted by π_t, are included to control for unobserved heterogeneity at the province and cohort levels, respectively. Census year dummies are also included as controls.

Any difference in completed education between a migrant and some other individual is some combination of pre-migration characteristics (i.e., selection effects) and the effect of exposure to the migration (or new destination) itself. One way to attempt to isolate the effect of exposure to the destination is to compare individuals from the same group (i.e., migrants) with different dosages of exposure to the new location. The census data allow us to calculate the age of arrival at the destination for every individual and we group them into younger or older arrivals: younger arrivals are those who migrated between 0 and 15 years, and older arrivals are those who were aged 16 years and above when migrating. Those who arrived before 15 years of age are "treated" in the sense that their human capital accumulation decisions could be affected by the new location while those who arrived as adults would have already completed those decisions. The comparison of educational attainment by age of arrival is given by:

$$yrs\_educ_{itpc} = \alpha_0' + \alpha_1' Young\_Arrival_{itpc} + \pi_t' + \gamma_p' + \delta_c' + \varepsilon_{itpc}' \quad (2)$$

In this specification, $Young\_Arrival_{itpc}$ is a dummy that equals one if the individual migrated between 0 and 15 years of age and zero if they were older when migrating. The other variables are as defined earlier.

Finally, we can combine these two specifications to identify the specific relationship between Transmigration and human capital accumulation. Specifically, we compare the age-at-arrival effects for those who are identified as a "transmigrant" to those who are identified as an "other migrant." To carry out this comparison, we use the following equation:

$$yrs\_educ_{itpc} = \beta_0 + \beta_1 Transmigrant_{itpc} + \beta_2 Young\_Arrival_{itpc} + \beta_3 Transmigrant_{itpc} \times Young\_Arrival_{itpc} + \pi_t'' + \gamma_p'' + \delta_c'' + \varepsilon_{itpc}'' \quad (3)$$

The coefficient β_1 gives the difference in years of education between adult transmigrants and other adult migrants and therefore is a measure of selection into the Transmigration Program. The difference in years of education between younger and older non-transmigrant migrants is given by β_2; these are the age-at-arrival effects. Our coefficient of interest is β_3, which gives us the differential effect of Transmigration on the educational attainment of individuals migrating between 0 and 15 years of age. If one believes that, conditional on controls for unobserved heterogeneity at the province-, year of birth-, and census year- levels, the selectivity differences between adult transmigrants and other migrants is the same and that the age-at-arrival effects are only different between the two groups because of the different modes of migration, then one can interpret the estimated coefficient on the interaction term as the effect of Transmigration on human capital accumulation.

Before proceeding to discuss the results, we highlight a few limitations of the empirical approach we use. When analyzing educational attainment, it is important to control for parental characteristics especially their educational levels. Since our sample is limited to people aged 25 years and older to include only those with completed education levels, most of these respondents no longer live with their parents. Unfortunately, the census data does not have parental information for individuals for who are not currently residing with their parents. Next, we employ a crude method to identify transmigrants (recall that we identify

people as transmigrants if they arrived in a regency that received transmigrants in some villages within that regency during that period) since the data does not tell us whether an individual actually migrated as part of the Transmigration Program or not. This will likely introduce some measurement error when we try to identify the exposure of an individual to the program.

Results

The summary statistics of our sample of 134,901 individuals are given in Table 1. The average individual has 3.37 years of education. 33% of our sample are designated transmigrants and the remaining 67% are "other migrants." Females constitute 45% of the study sample. The average age of the individual migrant is 43.70 years and, on average, these migrants arrived at the age of 26 years at the destination. Approximately 20% of the sample are "young arrivals" meaning that they migrated between 0 and 15 years of age.

Table 1: Sample summary statistics

Variable	Mean (1)	S.D. (2)
Yrs_educ	3.37	3.60
Transmigrant	0.33	0.47
Female	0.45	0.50
Age	43.70	13.41
Age at arrival	26.00	13.07
Young_Arrival	0.20	0.40
Observations	134,901	

We present the results of our analysis of the relationship between Transmigration and human capital accumulation in Table 2. The regression results from estimating Equation 1 is given in Column 1. The negative sign on the *Transmigrant* coefficient indicates that, on average, transmigrants have fewer years of completed

schooling compared to other migrants who move from Java or Bali to the Outer Islands. Specifically, they have 0.144 fewer years of education, an estimate that is statistically significant at the 1% level. This estimate could be the result of negative selection into the program, which is consistent with what we know about the types of people (poor landless farmers) who volunteered to participate in the program. It could also be that the program itself lowered human capital investments in children. In Column 2 we present the results from estimating Equation 2. Again, the negative sign on the *Young_Arrival* coefficient indicates that, younger migrants from Java or Bali to the Outer Islands, defined as those who migrated between 0 and 15 years of age, have fewer years of completed schooling compared to those who migrated at older ages. This difference amounts to about 0.726 fewer years of schooling and is statistically distinguishable from zero. The question remains, however, whether or not this difference is the same for transmigrants as it is for other migrants.

Table 2: Results for people over the age of 25 years

	Full Sample		
	(1)	(2)	(3)
Young_Arrival		−0.726***	−0.785***
		(0.021)	(0.024)
Transmigrant	−0.144***		−0.291***
	(0.020)		(0.022)
Young_Arrival × *Transmigrant*			0.162
			(0.051)
Observations	134,901	134,901	134,901
R-squared	0.266	0.271	0.272

Notes: Dependent variable is an individual's years of education. All controls have been included but not reported. Robust standard errors are given in parenthesis. ***p<0.01.

Equation 3 allows us to assess the differential effect of the Transmigration Program on years of schooling by age-at-arrival, and we present these results in Column 3. The first row of Column 3 reiterates the result that those who migrate

at younger ages have fewer years of schooling compared to those who migrate at ages 16 and above. Specifically, non-transmigrants from Java and Bali to the Outer Islands have about 0.785 less years of schooling if they migrate younger than if they move at an age over 16 years. Similarly, our evidence of negative selection into the Transmigration Program is reaffirmed, given the negative sign on the *Transmigrant* coefficient in the second row. Adult transmigrants (i.e., those who were older and unlikely to have human capital investment decisions affected by the new location) have about 0.291 fewer years of schooling than other migrants who moved at older ages. The coefficient on the interaction term, *Young_Arrival* × *Transmigrant*, is positive and suggests that younger migrants under the Transmigration Program do better in terms of years of schooling than other migrants who arrive younger from Java and Bali to the Outer Islands. However, the coefficient on the interaction is statistically indistinguishable from zero, which implies that there is no differential impact of the Transmigration Program on the education outcomes of migrants.

Next, we explore heterogeneity in these patterns by sex and estimate Equation 3 separately for females and males. We present these results in Table 3. In Column 1 we find that "other migrant" females who arrive younger have about half a year less of education than those who arrive older, female transmigrants have about quarter of a year less of education than other females who arrive as adults, and the differential effect of Transmigration on early arrival (and greater exposure to the new location) for females is about 0.018 more years of completed education. In Column 2 we show that males who arrive younger have 0.742 less years of education less than those who arrive older, male transmigrants have 0.310 less years of education than other males who arrive as adults, and the differential effect of transmigration on early arrival for males is about 0.031 less years of education. Similar to the results for the full sample presented in column (3) of Table 2, in Table 3 as well, the coefficients on *Young_Arrival* and *Transmigrant* are found to be statistically significant but the coefficient on the interaction term, *Young_Arrival* × *Transmigrant*, is statistically indistinguishable from zero. Thus, the estimates reveal no evidence that the patterns observed between Transmigration and human capital are heterogeneous by sex and the general trends we described previously are qualitatively the same for both females and males.

Table 3: Results disaggregated by sex

	Females (1)	Males (2)
Young_Arrival	–0.527***	–0.742***
	(0.029)	(0.034)
Transmigrant	–0.258***	–0.310***
	(0.028)	(0.030)
Young_Arrival × *Transmigrant*	0.018	–0.031
	(0.063)	(0.074)
Observations	60,735	74,166
R-squared	0.317	0.293

Notes: Dependent variable is an individual's years of education. All controls have been included but not reported. Robust standard errors are given in parenthesis. ***p<0.01.

Overall, our results indicate that transmigrants were negatively selected on education, relative to other migrants that make the same trip (i.e., from Java or Bali to the Outer Islands). Furthermore, exposure to the Transmigration Program appears to have no differential effect on children in terms of their human capital accumulation, relative to other migrants to the same areas. In addition, there is no evidence that these patterns are differentially driven by the sex of the individual migrant.

Discussion and Conclusion

In this paper we examine educational attainment of individuals relocated under the Transmigration Program in Indonesia. Our strategy is to compare transmigrants to other people who migrated outside this program by age-of-arrival. Our main result is that the Transmigration Program had no differential effect on the educational outcomes of children. We also find no evidence that results differ by the sex of the migrant.

It is important to think about why we might observe these relationships

between Transmigration, other migration from Java and Bali to the Outer Islands, and human capital investments. First, it is unsurprising that transmigrants are negatively selected because they were specifically recruited from the poor and landless, rural populations in the provinces of Java and Bali. Other migrants likely come from other populations with relatively higher socioeconomic status, especially since they have to fund their own trip to the Outer Islands. Second, we believe that younger arrivals to the Outer Islands from Java and Bali in general end up with lower levels of educations than older arrivals because they are leaving more densely populated areas with established infrastructure and arriving in less developed parts of the country. These less developed parts of the country likely have fewer opportunities for educational advancement for those who arrive as children. Finally, one could expect the Transmigration Program to shield young arrivals from a negative impact on their educational attainment compared to other migrants since transmigrant families were provided with resources by the government that might relieve initial income constraints in the new area, and also given the large investments undertaken by the government in clearing, surveying, and setting up the new land for settlement. However, the finding that educational attainment for young transmigrants are no different than that for other migrants could attest to the low returns from education in the Outer Islands where agriculture continued to be the main source of work and income.

A large-scale migration program, such as the Transmigration Program, is bound to have numerous impacts, on the lives of the migrant families and their children and on the origin and destination economies. In this study, we take a first look at how this program affected educational outcomes of children. This is important because alterations in the educational inputs of these children at young ages can have large impacts on their productivity, wages, and other outcomes as adults. The patterns of human capital formation among transmigrants uncovered from this analysis are interesting and we think that these underlying trends warrant further investigation to better understand the effects of a state-managed internal migration program such as this one in Indonesia.

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Educational Inequalities in Andhra Pradesh, India: An Analysis of Gender and Caste Differences in Students' Performance in English and Mathematics

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Introduction

India is located in South Asia and is the seventh-largest country in terms of land area and second in terms of population. It is also the most populous democracy in the world. India has no official languages; however, it is still the second-largest English speaking country in the world. In the past few decades, India has experienced rapid economic growth accompanied by poverty reduction, and the economy has become more integrated into the global economy. India's GDP increased from 321 billion USD in 1990 to 468.4 billion USD in 2000, and 1.67 trillion USD in 2010, an average growth rate of 6.6% per year during this 20 year period (Economic Times, 2011). This economic growth helped pull 170 million people out of poverty between 1990 and 2013, reducing the number of people living in poverty by 25% (World Bank, 2015). Despite such progress, India has failed to address the persistence of poverty among certain sub-groups in the population, in particular among people belonging to lower castes. Economic inequality and social immobility due to gender and caste discrimination continue

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to be an entrenched problem.

Social stratification in India has a long historical root and has manifested in inequalities in education, employment, and income by gender and caste. The caste system in India is 3,000 years old, consisting of 3,000 different castes and 25,000 sub-castes. For official purposes, the government of India has distributed these castes and religious minorities into four major categories, namely: Scheduled Castes, Scheduled Tribes, Other Backward Classes, and General Castes. It is a complex hierarchical system that used to dictate every aspect of life in the Indian society, including education, employment and marriage. The system privileges people belonging to the upper castes while discriminating against and oppressing those in the lower castes.

Another issue haunting the Indian society for centuries is gender inequality. India has one of the highest female foeticide incidents in the world. The female child population in the age group 0-6 declined from 78.83 million in 2001 to 75.84 million in 2011 (Census of India, 2001 & 2011). During the same period, the child sex ratio declined from 927 to 914. The girls who get to live are considered to be a burden. They are forced to drop out of school and focus on their part of the division of labor, which is to devote themselves to household chores. From the perspective of many parents, Girls are also married off early to pass on the burden to a different household. In 2014, UNICEF reported that one-third of the world's child brides are girls in India. The District Information System for Education also reported that 42% of married women in India were married as children. All these measures are taken by households to prevent expenses on the upbringing and education of a girl child.

When the education system is inclusive, and access to quality education is equal, education becomes an incredible vehicle for upward social mobility. But when access to education is unequal, it becomes a mechanism for intergenerational immobility and perpetuation of inequality. Through the education system, the Indian government has attempted to uplift historically disadvantaged populations, including women and people belonging to the lower castes. Policies such as affirmative action and The Right to Education Act were enacted and implemented. Critical improvements have been observed. For instance, literacy rates have expanded from 27% in 1950 to 64% in 1991 for males (ages five and above). For females, the rates increased from only 9% to 39% in the same period. While both groups have seen improvements, the gender gap in literacy rate remains large and even widened from 19% in 1950 to 25% in 1990.

Affirmative action policy favors disadvantaged and previously discriminated individuals and groups by reserving positions for them in colleges and government jobs. However, even after more than 70 years of affirmative action in India, the participation rates of people belonging to lower castes in overall education is not proportionate to their share in the population (Chauhan, 2008). The Right to Education Act (RTE), a Parliamentary Act enacted by the Central Government on August 4th 2009, assures the provision of free and compulsory education for all children between the ages of 6 to 14 years in India. Regardless of this act and progress, even today, females are discriminated against in most Indian households.

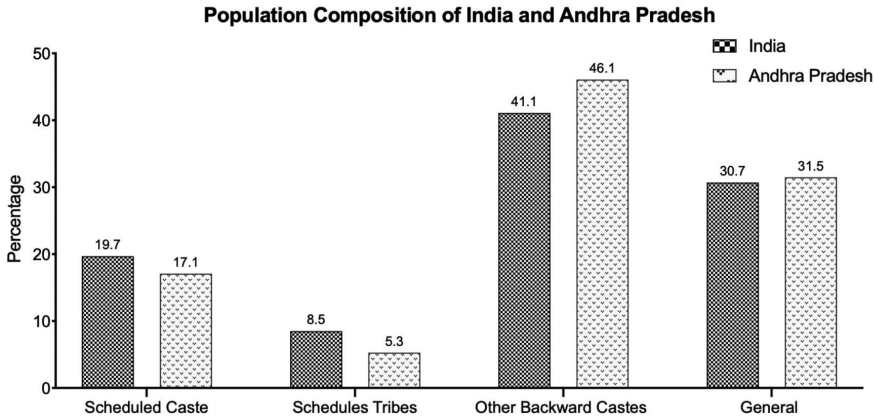
Utilizing the data set "Young Lives: School Survey, India, 2010-2011" from the Young Lives Survey, this study analyzes how gender, caste and family background factors such as parental education, family income, and access to school resources influence Andhra Pradesh students' academic performance, in particular, English and math test scores. One contribution of this study to the literature is to investigate the intersection of gender and caste. Additionally, another contribution is to examine how the effects of gender and caste vary in rural and urban areas. The objective is to help policymakers develop targeted policies to address existing inequalities in the educational system and identify critical areas that may be under-researched.

Andhra Pradesh

Located on the southeastern coast of India, Andhra Pradesh is the seventh-largest state in terms of land area. The state's population has grown from 84.58 million people in 2011 to 88.63 million people in 2016, a growth rate of 4.79%. People speak more than seven languages, including English, Hindi, and Telugu. However, the official language of the state is Telugu. Andhra Pradesh's economy is one of the fastest-growing economies in India. It is ranked 9th in the country, with a nominal GDP of 120 billion USD in 2019, and saw 15.3% growth from 2018 to 2019.

Figure 1 shows that the population composition of Andhra Pradesh is similar to the national averages, making it an accurate representation of the country in terms of caste distribution.

Figure 1: Population Composition based on Castes for India and Andhra Pradesh



Source: 2011 Census of India.

Literature Review

The literature on India's education often examines the role of caste, gender, and parental education in influencing children's educational outcomes. Despite some disparities in findings, the authors have found a few common factors associated with children's educational achievements. Kochar (2001), Ermisch and Francescon (2001), Mohanty & Nandakumar (2005). Singh-Manoux (2008), Chudgar (2012), Azam and Bhatt (2015), White et al. (2015) have all found that gender, caste, parental engagement, and parental education affect children's schooling outcomes. These authors employ popular data sets such as the National Family Health Survey (NFHS), India Human Development Survey (IHDS), and Human Development Profile of India (HDPI) conducted by the National Council of Applied Economic Research (NCAER) and reported by the Education Commission and the Government of India.[3]

3 The National Family Health Survey is a multi-round survey conducted as a representative sample of households throughout India (International Institute for Population Science, 2009). The survey provides information on fertility, infant and child mortality, the practice of family planning, maternal and child health, reproductive health, nutrition, anaemia, utilization and quality of health and family planning services. A part of the India Human Development Survey was drawn from the Human Development Profile

Caste and Educational Outcomes

Studying caste often comes with complexity. According to Chauhan (2007) and Singh-Manoux (2008), the most disadvantaged groups sometimes lack representation in surveys because of biased sampling techniques. While analyzing the current affirmative action policies in India, Chauhan (2007) and Singh-Manoux (2008) realize that these policies are more beneficial to the financially advantaged group than the disadvantaged members of the society. The researchers highlight that social, pedagogic, psychological, and political issues form part of the policy of reservation and suggest that quotas should be based on economic criteria rather than on caste considerations. On the other hand, Deshpande (2000, 2006), Chauhan (2007), Desai and Dubey (2011) conduct a descriptive analysis on inequalities in education and employment in India among Scheduled Castes, Scheduled Tribes, Other Backward Castes, and the General or Forward Castes. Based on the study outcome, the caste hierarchy in India has the strongest and the most crucial historical roots. It divides the Hindu society into more than three thousand different castes. The three major socioeconomic categories defined by the caste combinations are General or Forward Castes, Scheduled Castes and Scheduled Tribes, and Other Backward Castes (Chauhan, 2007). Because of the highly stratified social hierarchy, politicians have tried various means to level the societies. However, success has been limited.

To underscore social stratification, Deshpande (2006) conducts a study to determine the statistical representation of each cohort. Based on the findings, the General or Forward Castes, Scheduled Castes, and Other Backward Classes (including all Muslim minorities) is 30%, 13%, and 57%, respectively. However, the share of General Castes in the population of highly educated people is twice the size of share in the general population (Deshpande, 2006). The researcher notes that the share of the highly educated among the disadvantaged is on the increase. Consequently, Chauhan's (2007) highlights that Scheduled Castes and Scheduled Tribes have lower literacy rates as compared to national averages. According to Chauhan, once enrolled in higher learning, Scheduled Castes and Scheduled Tribes do not complete their courses and show a higher frequency of dropouts

of India, an earlier survey conducted by NCAER. In addition to health outcomes, IHDS and HDPI cover topics concerning education, employment, economic status, marriage, gender relations, and social capital, in addition to health outcomes. When HDPI data was collected, it was not expected to be available to researchers outside of the organization, due to which documentation was not maintained.

(Chauhan, 2007). In another study, Desai and Dubey (2011) and the Government of India (2003b), observed that only 9.4% of Scheduled Castes and 3.2% of Scheduled Tribes have completed high school and entered a university or college. Desai and Dubey (2011) further documented that 25-59 years old men from General Caste have higher years of education compared to their Scheduled Caste, Scheduled Tribe, and Other Backward Classes counterparts. All the authors relate lower castes to underachievement and argue that the caste system creates durable and self-producing mechanisms where different castes are unequal in their access to higher education. The same sentiments were shared by Deshpande (2000) in his case study of castes in Kerala.

Gender and Educational Outcomes

Gender and educational outcomes have been found to have a strong correlation. According to Steele (1997), gender roles and stereotypes significantly affect a student's educational performance. The author determines that a significant portion of students in rural India does not complete school, out of which a majority is girls. Hickey & Stratton (2007) report that among all the Indian states, females score lower on literacy measures than males regardless of rural or urban setting. On the other hand, Sekhon (2000) observed that gender differences are magnified in villages where girls are less likely to be enrolled in schools. Parents and teachers are particularly found to negatively influence girls' self-confidence in their capabilities as learners (Bandura et al. 1996: Bussey and Bandura 1999). In most Indian communities, society considers daughters as mere family liabilities; therefore, parents mainly prepare them for household chores as young women. White (2016) as well determines that girls tend to perform behind the boys in school. Parents, therefore, are less enthusiastic about investing in them; instead, they dedicate their time and financial resources in educating sons (Desai et al. 2010).

Parental Backgrounds and Educational Outcomes

Many Indian parents stress about their children's educational attainments and test scores. According to Devi (1998), mothers especially spend much time assisting their children with schoolwork. The author highlights that parents' attitude towards their children's education is crucial. A mother with a higher educational

background is more likely to maintain an educational environment in the household and support their children's needs (Devi, 1998). However, because collinearity and heteroskedasticity can influence the results of econometric analysis, Singh-Manoux (2008) highlights that it is hard to determine the independent effects of maternal and paternal influences.

Through a multilevel logistic regression model, Ermisch and Francesconi (2001) use the British Household Panel Study conducted from 1991-1997 to study the impact of family background on children's educational attainments. The study reports that students with educated parents perform better at school and have higher test scores. Similarly, Becker (1981), Becker and Tomes (1986), and Behrman et al. (1995) recognize in their studies that parents make human capital investment decisions on behalf of their children. The studies show that higher academic achievements of students are an outcome of a higher socioeconomic background, represented by parents' years of education and occupation. Ermisch and Francesconi (2001) further suggest that parents' educational attainments are potent predictors of children's educational attainment. Their results show that the differences in educational attainment ultimately transfer to differences in earnings and are consistent with the argument that higher education is associated with higher earnings (Azam and Bhatt 2015). Hence, it can be deduced that the family background, specifically parents' education levels, plays a crucial role in their children's educational attainments.

Some studies use illiteracy among parents instead of parents' years of education as a measure of parental education. In a study that adopted this approach, Kochar (2001) established that school quality significantly affects the performance of children under the care of uneducated mothers at school, and has a statistically insignificant effect on the performance of literate mothers' children. Additionally, while illiterate families are good at encouraging their children to acquire academic skills, they are unable to provide additional learning opportunities while failing to plan children's future educational trajectory (Chudgar, Miller, and Kothari 2012). Based on the findings, parental education level directly impacts a child's educational development and outcomes.

In summary, the literature on India's education is abundant, and many studies have found that caste, gender, and parental educational background all influence children's educational outcomes. The literature finds that girls fall behind boys in educational achievements, and the problem worsens when girls come from disadvantaged backgrounds. The literature

also finds that students belonging to lower castes are disadvantaged regardless of their locality and access to resources. The literature's primary limitation is the over-reliance on qualitative data in analyzing the intersection of gender and caste. This study will explore the English and math performance differences between female and male students, and among students of different castes and family backgrounds in Andhra Pradesh, India.

Data and Descriptive Analysis

This paper uses the cross-sectional data set "Young Lives: School Survey, India, 2010-2011" which is part of The Young Lives Surveys, collected by the Oxford Department of International Development. The Young Lives project is a multi-disciplinary longitudinal study of childhood poverty in Ethiopia, India, Peru, and Vietnam. The data set for this study includes 9,820 children from 249 schools in Andhra Pradesh, India. Data collection took place from December 2010 to March 2011. The survey provides information on students' characteristics, family background, and family resources. The observation units are children or students, and the schools they attend. Math and English tests were also conducted by fieldworkers to assess students' academic outcomes.

Table 1 below displays summary statistics for all continuous variables of interest, and table 2 shows the caste and gender composition of the sample.

Table 1: Summary Statistics for Continuous Variables of Interest

Variables	Observation	Mean	Median	Standard Deviation	(Minimum, Maximum)
Math Raw Score	9,574	17.55	17	6.6	(0,40)
English Raw Score	9,596	25.6	24	10.92	(0,50)
Days Present at School	9,817	28.65	28	10.76	(0,56)
Number of Siblings	9,669	1.88	2	1.38	(0,12)

Table 2: Caste and Gender Composition of the Sample

Castes	**Male (%)**	**Female (%)**	**Total (%)**
Scheduled Castes (%)	6.13	11.06	**17.19**
Scheduled Tribes (%)	9.63	8.81	**18.44**
Other Backward Classes (%)	21.60	27.39	**48.99**
General Castes (%)	5.99	9.39	**15.38**
Total (%)	**43.35**	**56.65**	**100**

The dependent variables used in the regression analysis are math and English raw scores for students in Andhra Pradesh, India. The math scores range from 0 to 40, while the English scores range from 0 to 50. There are 246 missing values for the math raw score and 224 missing values for the English raw score.[4] Given the low percentage of missing values and that there is no apparent sample selection caused by missing values, we excluded them from the sample when running regressions.

In the original survey questionnaire, castes are classified into four categories, namely Scheduled Castes, Scheduled Tribes, Other Backward Castes, and General Castes. For the regression analysis, a dummy variable is created for caste, where General Caste is High Caste and equals 1, while Scheduled Castes, Scheduled Tribes, and Other Backward Castes are combined into Low Caste and equals 0.

Figures 2a and 2b below display the distribution of the dependent variables, math and English raw scores. Math raw scores are relatively normally distributed compared to the English raw scores, which have an asymmetric distribution. While the math raw scores have five zero values, English raw scores comprise only two zero values.

4 On the day of the conduction of the tests, 77 students were absent, so after excluding these students, the true accounts for missing values are: 169 (about 1.72% of the sample) missing values for math raw scores and 147 (about 1.50% of the sample) missing values for English raw scores.

Figure 2a: Distribution of Math Raw Scores

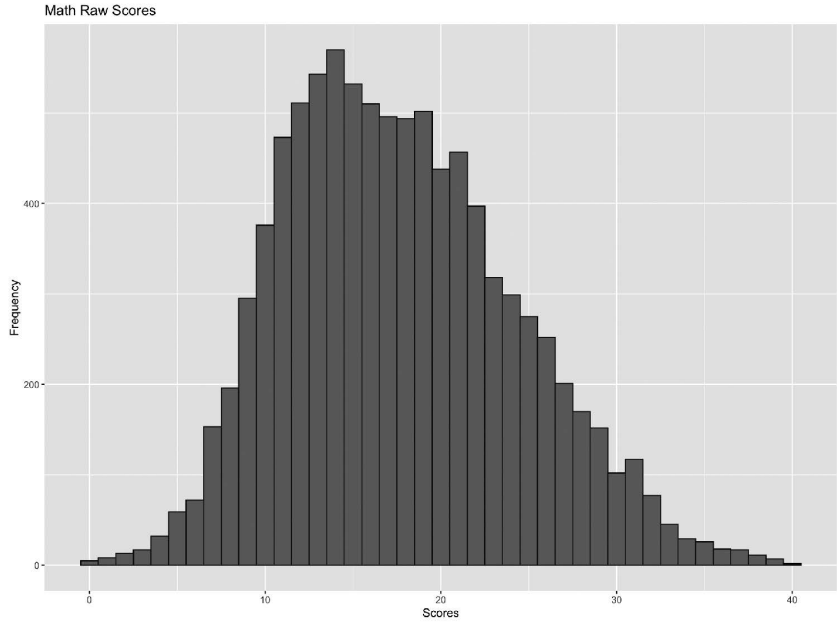
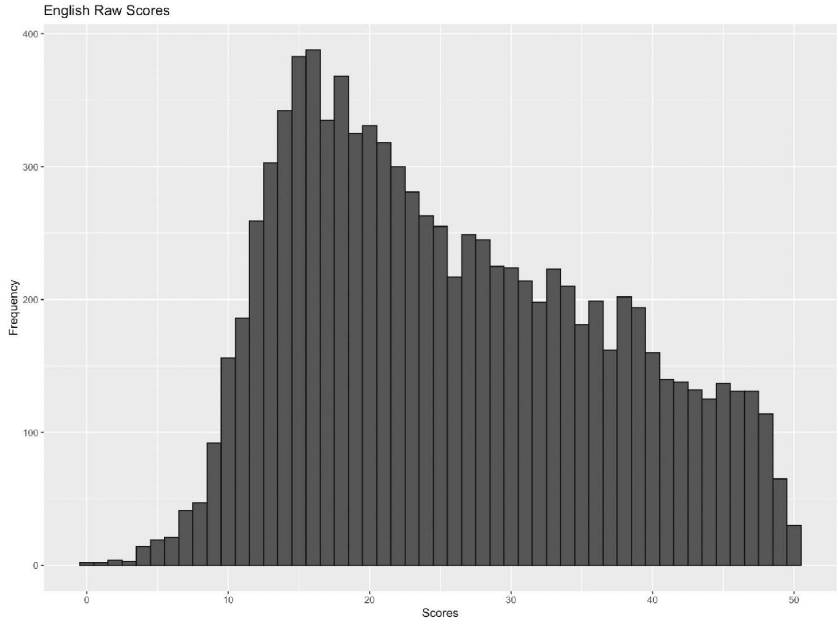


Figure 2b: Distribution of English Raw Scores



Tables 3a and 3b show the mean differences in test scores between students from high and low castes and male and female students, respectively. The test score gap by caste is large and statistically significant at 99% confidence level: high-caste students have math and English scores that are, on average, 3.71 points and 10.33 points higher, respectively than those of low-caste students. The test score gap by gender seems smaller and less statistically significant. Male students' math scores are, on average, only 0.71 points higher than that of female students. The difference in English scores between male and female students is tiny and not statistically significant. However, these mean differences are unconditional; that is, other factors are not held constant. In the empirical analysis in the next section, we will use a multivariate regression analysis, which will allow us to hold other factors constant while examining the effect of caste or gender on test scores.

Table 3a: Average Math and English Raw Scores for High and Low Castes.

	High Caste	**Low Caste (SC+ST+OB)**	**T-test**
Average Math Raw Score	20.76	17.05	19.79
Average English Raw Score	34.44	24.11	35.57

Table 3b: Average Math and English Raw Scores for Males and Females

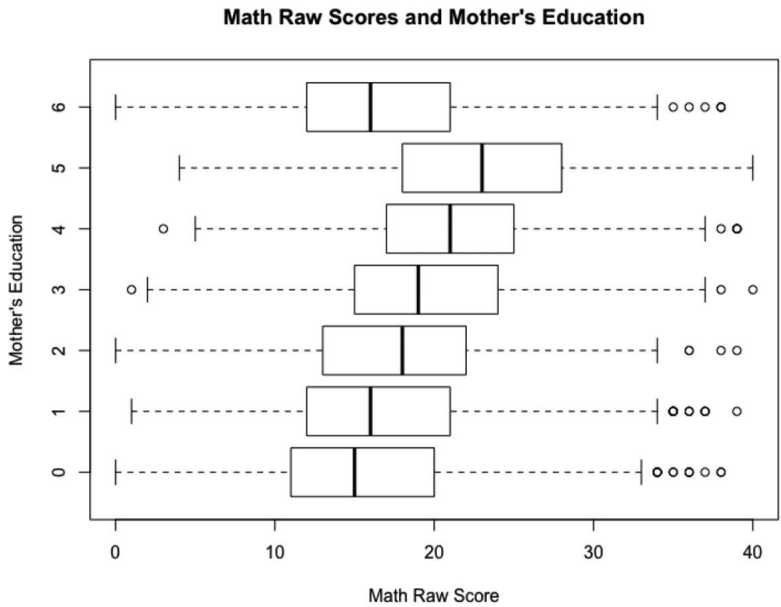
	Males	**Females**	**T-test**
Average Math Raw Score	17.98	17.27	5.17
Average English Raw Score	25.67	25.66	0.03

Figures 3a and 3b show that mother's education and children's math and English raw scores have a positive correlation, which is not surprising since this is a result declared in many other studies. Interestingly, there are outliers in terms of both unexpectedly high achievers and unexpectedly low achievers. There is a cluster of outliers to the right of the mean English score for when the mother's educational level is zero or one; that is, there exist high-performing students despite their mother's low educational background. Similarly, there is a cluster of outliers to the left of the mean English score for when the mother's educational

level is five, meaning there exist low-performing students despite their mother's high educational background. For math test scores, there are outliers only to the right of the mean.

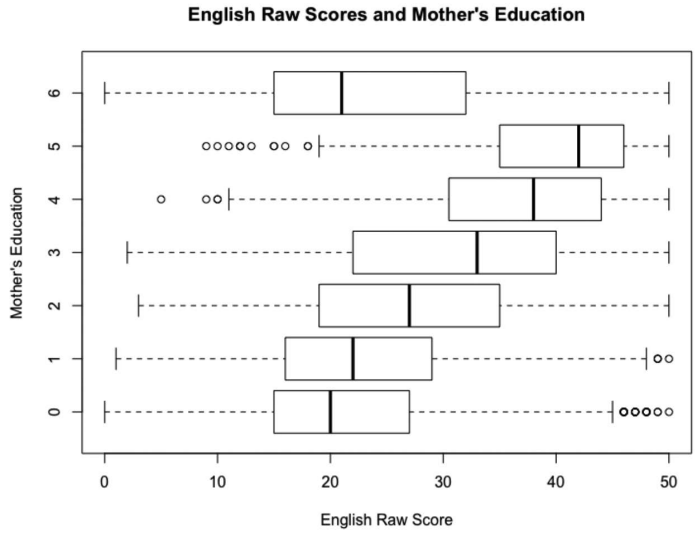
Figure 4 shows that high-caste mothers have higher educational achievements than low-caste mothers, as expected. High-caste mothers contain a much larger proportion of mothers who have completed high school (grades 11-12) compared to low-caste mothers (12.53% vs. 4.12%). The proportion of mothers who have attended college is approximately four times higher for high-caste mothers when compared to low-caste mothers (11.58% vs. 2.89%). For high-caste mothers, the proportion who have never attended school is about one quarter that of low-caste mothers (10.84% vs. 37.04%). These statistics indicate the intersection of gender and caste: gender gaps in educational outcomes are worse among the low-caste population. However, as we will see in the next section, this relationship between the gender gap in education and caste status is not always in this direction.

Figure 3a: Box Plots Comparing Math Raw Scores Based on Mother's Education



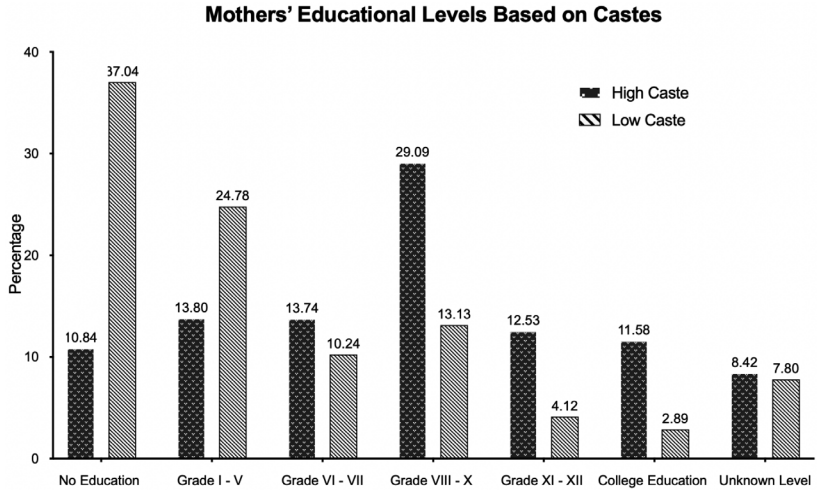
Note: On the horizontal axis, 0 = no level of education, 1 = primary school (grade I-V), 2 = upper primary school (grade VI-VII), 3 = high school (grade VIII-X), 4 = junior college (grade XI-XII), 5 = higher education (university degree or diploma), and 6 = an unknown level of education

Figure 3b: Box Plots Comparing English Raw Scores Based on Mother's Education



Note: On the horizontal axis, 0 = no level of education, 1 = primary school (grade I-V), 2 = upper primary school (grade VI-VII), 3 = high school (grade VIII-X), 4 = junior college (grade XI-XII), 5 = higher education (university degree or diploma), and 6 = an unknown level of education

Figure 4: Mother's Education Attainment Levels Based on Castes



Regression Analysis

This study uses the ordinary least squares (OLS) technique to examine the factors that influence children's math and English test scores. The dependent variables are math and English raw scores. The independent variables include student's characteristics (gender, caste) and family factors such as the number of siblings, mother and father's educational attainment, conversations about school work with parents, location (rural or urban), family income (proxied by access to a car and air conditioner at homes). Additionally, access to resources like books, a computer, and the internet is also included in the regression as they are expected to correlate with better academic outcomes.

Tables 5 and 6 display results from various OLS regressions where math and English raw scores are the dependent variables, respectively. In both tables 5 and 6, the first model uses the full sample. The second and third models run the same regression but separately for female and male subsamples, while the fourth and fifth models use the urban and rural subsamples.

Table 5: Regression Results Set I, dependent variable: Math Raw Scores

Results Set I					
Dependent Variable: Math Raw Score					
	(1) Total Regression	**(2) Subset Female**	**(3) Subset Male**	**(4) Subset Urban**	**(5) Subset Rural**
Gender (DV, Female=1)	-1.27*** (0.13)			-1.02*** (0.20)	-1.51*** (0.16)
Locality (DV, Urban = 1)	-0.08 (0.14)	0.193 (0.19)	-0.35 (0.23)		
Caste (DV, High Caste=1)	1.30*** (0.07)	1.76*** (0.29)	2.52*** (0.31)	1.47*** (0.22)	2.88*** (0.35)
Mother's Education	0.25*** (0.04)	0.18*** (0.05)	0.29*** (0.06)	0.41*** (0.07)	0.13** (0.05)
Days Present at School	0.12*** (0.01)	0.108*** (0.01)	0.17*** (0.01)	0.08*** (0.01)	0.15*** (0.01)
Number of Siblings	-0.49*** (0.05)	-0.58*** (0.06)	-0.49*** (0.07)	-0.48*** (0.07)	-0.55*** (0.06)
Father's Education	0.17*** (0.04)	0.22*** (0.05)	0.08 (0.05)	0.31*** (0.06)	0.09* (0.05)
Conversations on School	0.49*** (0.05)	0.65*** (0.07)	0.51*** (0.07)	0.32*** (0.08)	0.68*** (0.06)
Books at Home	0.58*** (0.06)	0.51*** (0.08)	0.67*** (0.09)	0.78*** (0.09)	0.52*** (0.07)
Car at Home (DV, Car = 1)	0.24 (0.24)	0.23 (0.31)	0.16 (0.38)	0.23 (0.31)	-0.10 (0.36)
Air Conditioner at Home (DV, Air Conditioner = 1)	-0.18 (0.26)	-0.29 (0.34)	-0.20 (0.41)	-0.42 (0.31)	-0.30 (0.47)
Access to Computer (DV, Computer = 1)	1.31*** (0.25)	1.41*** (0.33)	1.37*** (0.40)	0.97*** (0.32)	0.89** (0.42)
Access to the Internet (DV, Internet = 1)	0.95*** (0.22)	0.75** (0.31)	1.23*** (0.32)	1.74*** (0.32)	0.01 (0.30)
Constant	9.11*** (0.28)	11.08*** (0.35)	11.06*** (0.36)	12.89*** (0.47)	11.54*** (0.31)
Observations	9,305	5,298	4,007	3,571	5,734
	0.211	0.172	0.216	0.203	0.157
Adjusted	0.210	0.170	0.214	0.200	0.156

Note: Standard errors are reported in parentheses and are robust. *, **, *** indicates significance at the 90%, 95%, and 99% confidence levels, respectively.

Table 6: Regression Results Set II, dependent variable: English Raw Scores

Results Set II					
Dependent Variable: English Raw Score					
	(6) Total Regression	**(7) Subset Female**	**(8) Subset Male**	**(9) Subset Urban**	**(10) Subset Rural**
Gender (DV, Female=1)	-1.23*** (0.21)			-0.79** (0.33)	-1.28*** (0.23)
Locality (DV, Urban = 1)	3.36*** (0.22)	3.00*** (0.30)	3.26*** (0.34)		
Caste (DV, High Caste=1)	5.03*** (0.41)	5.04*** (0.36)	5.37*** (0.45)	4.53*** (0.35)	5.50*** (0.49)
Mother's Education	0.67*** (0.06)	0.70*** (0.08)	0.52*** (0.09)	1.07*** (0.10)	0.34*** (0.07)
Days Present at School	0.11*** (0.01)	0.10*** (0.01)	0.16*** (0.01)	0.05*** (0.07)	0.15*** (0.01)
Number of Siblings	-0.51*** (0.07)	-0.74*** (0.09)	-0.44*** (0.10)	-0.61*** (0.11)	-0.55*** (0.09)
Father's Education	0.62*** (0.06)	0.68*** (0.08)	0.46*** (0.08)	0.96*** (0.10)	0.40*** (0.07)
Conversations on School	0.78*** (0.07)	1.00*** (0.10)	0.77*** (0.10)	0.79*** (0.13)	0.91*** (0.08)
Books at Home	0.925*** (0.09)	0.96*** (0.12)	0.94*** (0.13)	1.53*** (0.15)	0.67*** (0.11)
Car at Home (DV, Car = 1)	0.82** (0.36)	0.73 (0.48)	0.72 (0.55)	0.73 (0.49)	0.33 (0.53)
Air Conditioner at Home (DV, Air Conditioner = 1)	1.23*** (0.39)	0.85 (0.52)	1.36** (0.60)	0.47 (0.49)	1.13* (0.68)
Access to Computer (DV, Computer = 1)	2.98*** (0.39)	3.26*** (0.50)	2.29*** (0.58)	2.01*** (0.51)	1.85*** (0.60)
Access to the Internet (DV, Internet = 1)	2.11*** (0.33)	2.15*** (0.47)	1.88*** (0.47)	3.22*** (0.75)	0.07 (0.44)
Constant	10.75*** (0.43)	14.08*** (0.54)	14.41*** (0.52)	17.57*** (0.75)	15.43*** (0.45)
Observations	9,328	5,264	4,064	3,642	5,686
	0.328	0.341	0.314	0.341	0.135
Adjusted	0.327	0.339	0.312	0.339	0.133

Note: Standard errors are reported in parentheses and are robust. *, **, *** indicates significance at the 90%, 95%, and 99% confidence levels, respectively.

Overall, in all regressions for both math and English raw scores in tables 5 and 6, the majority of the independent variables are statistically significant at a 99% confidence interval, and their signs stay consistent across regressions. Though not shown to save space, their signs and statistical significance also stay consistent in various specifications of the model (when different sets of independent variables were included in the regression). So we feel reasonably confident about the robustness of these coefficient estimates.

The full-sample regression in table 5 (model 1) shows that females, on average, score 1.27 points lower in math compared to their male counterparts, ceteris paribus. Results on most other covariates are as expected. Caste, mother's education, and father's education have positive and statistically significant effects on math scores for all students. The number of siblings has a negative effect on math scores. Ceteris paribus, an additional sibling in the family decreases a student's math performance by approximately 0.5 points. While access to resources like books, computers, and the internet positively impacts student scores, the variables used as proxies for family income like access to a car and having an air conditioner at homes have no effect on student performance. This result indicates that *social factors seem more important than economic factors in determining students' test scores*, at least for this sample of students from Andhra Pradesh, India. Surprisingly, the urban dummy does not have any statistically significant effect on math test scores, once other factors are controlled for. Finally, conversations about school work with parents have a positive and statistically significant effect on math test scores--an expected result.

In models 2 and 3 in table 5, where the regression is run on male and female subsamples separately, it is interesting to see the interaction of caste and gender. The positive impact of belonging to a high caste is larger for the male sub-sample (2.52 for males vs. 1.76 for females). This implies that the gender disparity is even more pronounced in high-caste families--an unexpected result. One would think that given high-caste families' higher education and income background, gender bias would be less of a problem for them. Yet our results indicate that this is not the case, so policies to reduce gender disparity in education should target families of all castes and must not make the assumption that gender discrimination is less severe among high-caste families.

It is somewhat puzzling that the positive effect of a mother's education on her child's test score is bigger for the male sub-sample (0.29 for males vs. 0.18 for females). However, the positive effect of a father's education is large and

statistically significant for the female sub-sample (0.22) yet small and statistically insignificant for the male sub-sample. We do not have any hypothesis for why this may be the case and suggests that this is an interesting area for future research.

The number of siblings has a more substantial negative impact on the scores of females compared to that of males, as expected. It is widely known that in societies with a strong son preference, when there is a larger financial burden caused by a family's large size, it is often the girls' schooling that is sacrificed. Also, in large families, girls have to do more household chores, raising their opportunity cost of going to school or doing homework. This negatively affects girls' test scores and also increases their likelihood of dropping out of school relative to boys'. This result implies that policies aimed at reducing family size have the dual effects of reducing poverty and helping to improve girls' school performance.

Finally, the amount of conversations students have with their parents regarding school work has a more substantial impact on female students compared to male students (0.65 vs. 0.51). This finding makes sense intuitively. Girls growing up in India suffer from negative stereotypes when it comes to schooling; they are often told or receive cues that they are not as good as boys in schooling (and in many other things). So having supportive parents is more important for girls than for boys. The policy implication is clear: the government and schools should implement programs that promote parental involvement and encourage parents to talk with their children about school work, especially their daughters, to help them gain self-confidence and motivation.

In models 4 and 5 in table 5, the regression is run using the urban and rural subsamples separately. The hypothesis is that rural India is more conservative than urban India; thus, the discriminatory effects of gender and caste should be larger in rural India. The results confirm this hypothesis. The negative effect of being female is 1.51 in the rural subsample, compared to 1.02 in the urban subsample. The positive effect of belonging to a high caste is 2.88 in the rural subsample, compared to 1.47 in the subsample. The positive effect of mother or father's education is also smaller in the rural areas, which is not surprising.

Access to a computer and the internet are both significant at a 99% confidence interval for students going to schools in urban areas; however, for students in rural areas, access to computers is significant at a 95% confidence interval, and access to the internet is insignificant for math scores. This may be due to the difference in teaching methods: in urban areas, computers and the internet are more frequently used, while this is not the case in rural areas. Conversations about

school work with parents also have a stronger positive impact on students' math scores in rural areas than in urban areas. The explanation for this finding likely parallels the explanation for an earlier finding that conversations about school work with parents have a stronger positive impact on girls' math scores than on boys'. Compared to urban areas, it is more of a norm in rural areas that education is not important, as children are expected to take over the family business or farming which requires less education. So similar to the fact that girls need supportive parents more than boys, rural children need supportive parents more than urban children.

The full sample model for English scores (model 6 in table 6) displays similar results to that of the full sample model for math scores (model 1 in table 5) . Females score 1.23 less than their male counterparts in English tests. Belonging to a high caste boosts up students' scores by 5.03 points in English, which is approximately double the magnitude of the caste coefficient in the regression on math scores. Family's educational level and access to resources like books, a computer, and the internet continue to have a positive association with English scores. The number of siblings continues to have a negative impact on students' academic performance.

There is one noticeable difference compared to earlier results in the regression on math scores: locality, unlike for math scores, has a statistically significant and positive relationship with English scores. Ceteris paribus, an urban student on average scores 3.36 points more than a rural student. The reason may be that there's a distinct rural-urban difference in the popularity of learning and speaking English, while there isn't such a rural-urban difference related to math.

In the regressions using gender-specific subsamples (models 7 and 8 in table 6), location and castes don't seem to have big differential effects on English test scores of male and female students. This result is different from earlier results in the regressions on math test scores. The number of siblings continues to have a more substantial adverse effect on female students compared to male students because of the reasons mentioned earlier. Location is a significant factor at a 99% confidence level for all models in table 6 where it is an independent variable. The reason is that English is a lot more popular in urban areas in India.

Moving on to the regressions based on location-specific subsamples (models 9 and 10 in table 6), the results are similar for caste and gender when compared to the regressions on math scores. The negative effect of being female is 1.28 in the rural subsample, compared to 0.79 in the urban subsample. The positive effect of

belonging to a high caste is 5.50 in the rural subsample, compared to 4.53 in the urban subsample.

Ironically, the number of siblings affects the English performance of urban students more than rural students, which contradicts the initial hypothesis and may require further investigation. Interestingly, the variables used for analyses for the location subsets display a massive difference in their respective. While the variables of interest explain 34.1% variance in English scores in urban areas, the same variables explain a 13.5 % variance in English scores in rural areas. This result suggests that there are many other omitted factors affecting academic performances in rural areas.

Conclusion

This study investigates factors associated with English and math test scores of 9,328 students aged between 12 and 18 in 2011 in Andhra Pradesh, India. The study's main result accords with that in the literature: ceteris paribus female and low-caste students perform worse than males and high-caste students, confirming the gender and caste discrimination that pervades Indian society. The study contributes to the literature by examining the intersection of gender and caste, and by examining how gender and caste effects vary in rural and urban areas. Some interesting and policy-relevant results are found. First, social factors seem to play a stronger role than economic factors in influencing students' performance. This implies that policies to improve students' academic performance should prioritize addressing social issues and barriers, such as gender and caste discrimination, that negatively affect students' performance. Second, the discriminatory effects of gender and caste are stronger in rural areas than in urban areas. So policies aimed at reducing academic achievement gaps should prioritize rural areas. Third, the gender disparity in academic performance is actually worse among high-caste families who tend to have more advanced educational backgrounds and to be less financially constrained. Thus policies aimed at reducing gender bias should not assume that gender discrimination is less severe among well-off and high-caste families. Finally, students of all gender, caste and locality in India benefit from having supportive parents who frequently converse with them about school work. But female and rural students in India especially need such parental support, because they traditionally suffer from the negative stereotype that education is less important for female or rural students.

Education is one of the most fundamental factors necessary for sustainable economic development in a country. The modern economy requires a competitive workforce that is well versed in technological skills and knowledge. By substantially investing in human capital development, countries like China and Vietnam have increased their nation's productivity and reduced poverty levels and equality gaps. China's investment in both science and arts education has enabled its labor force to be competitive in both high technology and knowledge-based service industries, while Vietnam's vocational education training system has aligned the skills and knowledge of its population with the needs of the modern economy. As a result, China has become one of the world's largest manufacturers, gaining a competitive advantage over other strong economies such as the US through its ability to produce at a large scale with low cost (Gottvald, 2017); while Vietnam has also significantly increased its global competitive index (Vo, 2016).

Although India has continued to advance its industrial technology, factors such as gender discrimination and the caste system have prevented it from fully exploiting its human resource and achieving its economic potential. Gender inequality has left a large part of India's workforce less productive, and inherited caste identity continues to determine life opportunities for many Indians (Mosse, 2018). Therefore, India's caste network economy marginalizes several groups that end up getting the least education, the worst jobs, and the most impoverished living standards. This complex institution has contributed to the country's persistent human capital disparities and socioeconomic inequalities. Therefore, there is an urgent need for policy changes that will address both socioeconomic discrimination and remove barriers towards India's progressive economic growth and development.

In future studies, more attention should be paid to studying gender and caste disparities among states. The reforms in policies and interventions suggested only outline a brief overview compared to a structured, detailed, and localized approach. It is important to value recommendations made at the grassroot levels for permanent solutions rather than stopgaps. Further research may thoroughly study differences in educational outcomes in urban and rural areas. Investigating the intersection of caste and financial ability or income may uncover the efficiency of affirmative action policies. It would be pragmatic to look at government expenditure in different areas of education with a focus on gender, as this could indicate the attempts being made by the state. Rates of employment and unemployment with reference to education levels would be useful to observe in another study.

Finally, the results show a strong existence of gender and caste bias in Andhra Pradesh, India. Even though Andhra Pradesh is a reasonably good representation of India in terms of population distribution based on caste, these results cannot be generalized for the whole nation. The reason being, India is a very diverse nation where every state differs based on caste composition, gender, and level of urbanization. However, the use of this analysis should provide an important baseline for future in-depth studies.

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Appendix

Figure 5: Data Composition based on Table 2

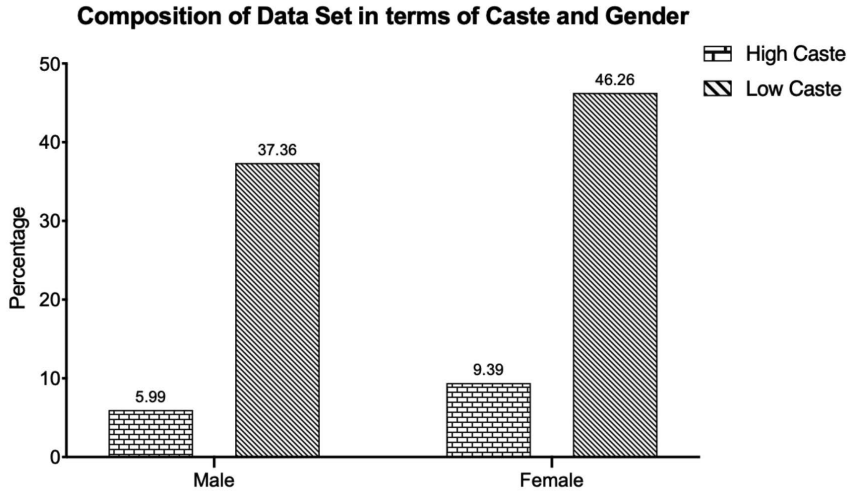


Figure 6: Average Math and English Raw Scores for High and Low Castes based on Table 3a

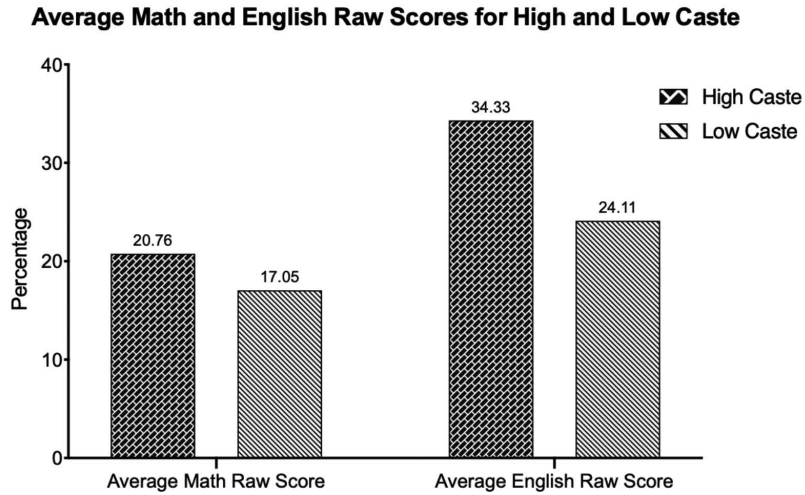
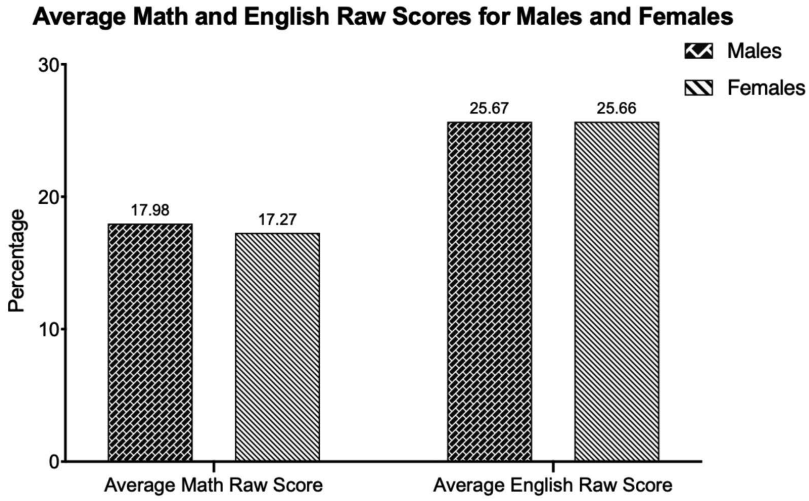


Figure 7: Average Math and English Raw Scores for Males and Females based on Table 3b



Suzhi, Relevance, and the New Curriculum

A Case Study of One Rural Middle School in Northwest China

Jingjing Lou[1, 2]

Introduction

Promoting human capital and the knowledge economy has been a driving force behind many education reforms internationally. At the macro level, human knowledge and creativity is seen as key elements in the production of wealth. The acquisition of new knowledge, the kind that meets the demand of the new economy, through education, training and learning, is essential to the development of national economy (Schultz, 1961, 1963, 1971, 1981; Becker, 1975). At the micro level, scholars take a closer look at the efficiency of education spending and the production process within the black box of schooling. They examine school attainment, specifically, number of years of schooling one attains, and students' school performance, specifically their cognitive skills development often measured by their math and reading test scores, and argue the importance of investing in both areas in order to grow the national economy (Hanushek, 1972, 1986; Hanushek et. al., 2008).

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2 The article is a reprint of the author's published article (see reference below) and has received permission from the publisher (Taylor & Francis, https://www.tandfonline.com/):

Lou, J. (2011). *Suzhi*, relevance, and the new curriculum: A case study of one rural middle school in Northwest China. *Chinese Education and Society*, 44/6, 73–86. DOI: "http://www.tandfonline.com/doi/abs/10.2753/CED1061-1932440605" 10.2753/CED1061-1932440605 "https://www.researchgate.net/publication/286011163_Suzhi_Relevance_and_the_New_Curriculum_A_case_study_of_one_rural_middle_school_in_Northwest_China_Chinese_Education_and_Society" (PDF)

This article presents China as a case study in its efforts to reform the curriculum in order to promote knowledge economy in the past two decades. In particular, the article deconstructs the meaning of "quality education", a central goal of the curriculum reform. It reveals that quality education aims to produce a new generation of citizens who are far more creative and well-rounded and to move China from a labor-intensive economy to a knowledge economy and become globally more competitive. It, however, widens the socio-economical gaps already in place between urban and rural youth and put rural citizens further behind with education reforms that favors the urban and the elites. This article is based on a case study conducted with rural students, teachers, and administrators in Northwest China and how they negotiated with the new curriculum reform. Levin (1989) has pointed out how human capital theories have different impact on different groups of people and women and minority groups are often at the disadvantages. This case study is another example of how education reforms driven by human capital theory work against the marginalized and underprivileged communities at the local level.

Curriculum reforms are not new to China. There have been eight curriculum reforms since the People's Republic of China was founded in 1949. The one before the most recent reform was the seventh curriculum reform, which took place in 1992. Educational scholars in China consider the current curriculum reform the most extensive and substantial among all eight, because it is designed to move teachers and students from a subject-centered, knowledge and fact-centered, and teacher-centered curriculum to an interdisciplinary, comprehensive qualities-oriented, and student-centered curriculum. It is necessary, according to domestic education scholars, because, first, the new curriculum is demanded by the booming of China's knowledge economy and increasingly fierce global competition. Second, the old curriculum was proven problematic. It was too narrow to meet current demands. Besides, it further exacerbated the exam-oriented pressures and priorities of the system (Zhu 2002). Thus, the new curriculum also intends to create a less exam-oriented and more quality-oriented education system and to alleviate students' heavy academic burden.

Regardless of the good intentions and work of many education scholars and the Ministry of Education, after almost a decade of discussion, experimentation, and implementation of the new curriculum, many practitioners still have strong reservations about the new curriculum. Major difficulties in its implementation come from (1) the dichotomy between a more innovative new curriculum, which

asks for more diverse and flexible assessment and the current exams-based evaluation mechanism that dictates teaching and learning at almost every level of the schooling; and (2) the gap between the demanding new curriculum which is more interdisciplinary, critical and creative in nature and the current teaching force which is still used to traditional subject-centered lecturing. These problems are especially serious in rural schools, where teachers have very limited opportunities to pursue professional development.

To study these challenges facing rural schools, the author conducted an ethnographic study in 2007 in a rural middle school in northwest China. This study confirms many of the above discussions about the new curriculum. Furthermore, it reveals more problems involved in the implementation of the new curriculum in a rural setting. This article explains that rural schools face additional challenges mostly because of the urban-centered nature of the new curriculum, the standardization of the national curriculum, and the undifferentiated goals of education for all. By analyzing textbooks and deconstructing the concept of quality or *suzhi*, which is key to the new curriculum, the author points out the new curriculum's failure in considering the context and needs of the rural community. The consequence is rural students becoming less interested and less engaged in their schooling, or even dropping out. The new curriculum places rural students in an even worse position by reproducing and increasing the educational and socioeconomic gap between rural and urban societies. The findings of the study have major implications for policymakers and education practitioners.

Methodology

The author conducted one semester of fieldwork from early March 2007 to mid-July 2007 in Longma Middle School in Hong County of South Shaanxi. Hong County is about a four-hour drive from the provincial capital, Xi'an. This agricultural area features a rugged mountainous environment and poor roads and is one of the poorest counties in the country. According to interviews with local officials, Hong County has a population of about 297,000. The average annual per capita income of the county is RMB1,400.[3] Longma Middle School was founded in 1986. Academically, it ranks second among all middle schools in the county. Longma has 1,050 students, grouped into twenty-four classes, and ninety-two

3 The dollar equaled approximately RMB6.8 at the time of this study.

teachers and staff members. Longma receives students from twelve villages, some of which are within walking distance and some in remote mountainous regions.

This case study employs primarily ethnographic research methods. I teach seventh through ninth graders oral English two hours every week as an extracurricular activity. I live in the dormitory on campus. This makes it possible for me to observe students' daily life in and after class, at and outside school, on weekdays and weekends. I also conducted multiple casual and formal interviews with students, teachers, and administrators. I frequently revisited some students to conduct in-depth follow-up interviews. These students, taken as a whole, broadly represent Longma's demographic picture. Furthermore, I asked some students to write short essays or paragraphs of answers in response to nineteen open-ended questions I posed to help them reflect on their home, school, and community life. Not only did these essays provide me with a breadth of student thoughts about particular issues, but they also helped me identity those students who were more articulate and mature, who I later conducted interviews with. In total, I collected 163 essays from all students across three grades. Last but not least, I analyzed textbooks of different subjects used at Longma and sat in classes of different subjects to observe how some texts were carried out by teachers and received by students.

Analyzing New Textbooks: Questioning the Meaning and Relevance of Schooling

During my interviews, many students used the metaphor "prison" or "iron cage" to describe their school. They feel school is a big prison and they are being suffocated inside. This is partially due to the school's tight management and the extremely long school day, which lasts from 6:20 a.m. to 8:40 p.m. and is packed with various formal lessons and tutoring sessions. The school administrators deem that the long school day is what can help make up the gap between their students and their competitors from cities enjoying more resources and better teachers. Yet, this is not the only reason students feel that school is like prison. If studying were a fun experience, students might not mind sitting in such a "prison." However, studying appears to be a dull experience, and many students are bored.

English is one of the least popular courses at Longma. There are three major reasons for this: First, most students do not like English, because they do not do well. According to English teachers Wu and Mo, rural middle school students lag behind from the first day of their English class in middle school. The seventh

grade English textbook assumes that students have already taken some English in elementary school, which is true in almost every urban school and starts at Grade 3 or even Grade 1. Yet, only in very recent years have some rural schools started English in third grade. Some remote rural elementary schools still do not offer English at all, or only little. Thus, the level of textbooks is too advanced for rural students, even though the edition of the English textbook chosen for the school is already one of the easiest. Many students lost interest in English from the very beginning of their middle school years. Second, many students do not see English as being useful, as ". . . there are no foreigners here for me to practice with. Also, I do not think I will have a chance to talk with foreigners in the future, like what those kids do in the English textbook." Rural students have a hard time relating the subject of English to their daily life or even their future life.

Last but not least, the content of their textbook further exacerbate these biases toward English as a school subject. The relevance issue is probably most salient in this subject. The English textbook adopted in 2004 works hard to be provocative and student centered. Longma uses the book by Hebei Education Publishing House. It is designed by Chinese educators with the assistance of Canadian consultants. All texts center on two urban children from Shijiazhuang, the capital city of Hebei province, and their Canadian friends. Their communication and interactions form the main storyline in the textbook. Both Wu and Mo complain that the lives depicted in the textbook are too removed from the current lives of their students. Most of the outings and exchanges depicted in the text, such as having e-mail pen pals, taking museums trips, and traveling alone to foreign countries, are strange or unrealistic to Longma students. Wu states, "It is important, of course, to expose students to all these things as they are important to their future life. It is useful to learn about all these . . . but all this fancy stuff does not resonate with my kids in the classroom. Sometimes they do not even think it makes sense, let alone interest them. So it is very difficult to teach them." Rural children and their lives are completely excluded from their English textbook, and Longma students do not find themselves represented there.

A problem that Wu and Mo failed to mention in our conversation is their instructions. I sit in on both Wu's and Mo's classes, and their teaching is not among the most interesting to the students. Sometimes it is because the teachers themselves are not able to comprehend the texts very well, based on their own life experiences, knowledge repertoire, and professional training. Thus, as Wu and Mo point out, the key problem that has plagued current curriculum reforms is

an urban-centered curriculum and its lack of relevance to rural contexts. When I teach oral English at Longma, students know how to talk about city life or even Western life in English. Their English textbook has taught them vocabulary in this regard, but none of them is able to describe to me their own life at home in English.

I examined other textbooks and found similar urban-centered trends. The Chinese textbook published by a People's Education Press does a better job of including some rural content. Some texts, such as *Dates*[4] in the ninth grade Chinese text, effectively represent some very current urban–rural problems, such as migrant workers and social changes in rural China. What seems problematic to me is how the textbook designers think the texts should be taught. In questions posed after every text passage, students are asked to refer to the Internet or the library for more resources. Lack of reference books, let alone daily computer use and Internet access, is a problem for students in rural areas. The same problem applies to other subjects, such as geography, history, and biology.

In science textbooks, such as geography and biology textbooks,[5] designers propose some interesting projects very relevant to rural life. For example, in the eighth-grade geography textbook, a chapter on northwest China includes a case study asking students to investigate local grape plantations in Xinjiang province that are designed to boost local agriculture and industry to improve rural farmers' standard of living. This lesson could be easily adapted to other cases relevant to the local situation in communities such as Longma. Discussions of pollution, environmental protection, and deforestation are also included. In the eighth-grade biology textbook, homework assigned in some chapters asks students to explore the plants, insects, and animals around them. This may be advantageous and engaging to rural students, as their lives may be much more closely linked to the natural environment than are their urban counterparts'. The new curriculum and the new textbooks make some attempt to include rural contents and encourage local adaptation.

However, when I observed teaching and learning in those two classes, both the eighth-grade geography and biology teachers skipped these meaningful proj-

4 *Dates* is a short piece of fiction depicting a dialogue between a grandfather and his grandchild. The two of them discuss the harvest of their date tree, while at the same time implying the exodus of rural youth and adults to *dagong* in the city and the consequential problems, such as children and seniors in the village being left behind.

5 Both geography and biology are offered only in the seventh and eighth grades. In ninth grade, they are replaced by chemistry and physics.

ects most relevant to their students' life. I talked to students after class. They did not feel strongly about this issue, as they already have too much on their plates and do not mind having "one less thing to do." I asked both instructors about this. Biology teacher Yang answered with a very familiar refrain, "As a teacher, I also wish I could spend more time discussing these projects, but we do not have enough time to cover them. Students need to take the county-level biology exam, and we have to achieve good grades for the school. There is so little time but so many things to teach. Doing a project is simply not an option." I hear similar comments from one of the history teachers. Their textbook also has models of class discussion and after-school projects for in-depth research. The teacher cannot afford the time to implement these innovations.

In the case of math, chemistry, and physics, the new textbooks now encourage more experimentation and more applications. In the classes I observe, however, application is regularly replaced by worksheet exercises. Math teachers say they do not have enough time to elaborate on math applications in daily life, even though the textbook suggests such exercises. To improve students' grades, they can only ask their students to practice what they have learned as much as possible in and after class. As for chemistry and physics, the school has two labs, but students report they use them only once or twice each year. Biology and chemistry teachers usually carry small kits and materials into the classroom and present a class demonstration. Students have little opportunity to do experiments themselves. The school administrators explain that it is too expensive to maintain labs, so they usually keep the labs closed as much as possible.

Among all the subjects, Chinese presents the most opportunities for more relevance and innovation. In addition to the wide coverage of the textbook, Longma has also developed a supplemental text for its Chinese course. The supplemental text is essentially a research project by some Chinese teachers, which is necessary for them to achieve rank promotion. This textbook is composed of useful literary knowledge as well as local folklore and proverbs. It represents a successful attempt to adapt to and supplement Chinese class with local culture. According to Chinese teacher Deng, the text is also an effort to expand students' knowledge horizon so they can do well on the high school entrance exam. According to Deng, entrance exams now demand knowledge that surpasses the information in their textbook. This is why they have designed a supplemental text. Some teachers use this opportunity to include local culture. Such an approach, however, is not typical at Longma and other schools, as local culture is not tested on entrance

examinations, especially the national college entrance examination.

The lack of direct relevance of the current curriculum to rural students' lives partially contributes to many rural students' lack of interest in schooling. Furthermore, the way that the courses are supposed to be taught—with the assistance and supplementation of the Internet, library references, and lab work and with many discussions and student-based hands-on activities—and the way teachers actually teach in rural schools such as Longma create a sharp dichotomy. Urban-centered textbooks as well as instruction design gradually, if unintentionally, distance rural students from their own lives while offering little in return to provide them meaningful direction.

In short, ineffectively implemented or resisted curricular reform has distanced rural students' schooling further from their lives. Quite a few students I talked with question the meaning of schooling. For example, Sun Ting, as a representative "weak" student, is particularly outspoken: "I know many of them are supposed to be useful. But they are going to be useful only later if I get to high school or college. For now, a lot of the knowledge I learned at school does not seem to make sense to me. What if I cannot go to high school? If so, what is the meaning of all the stuff that I am learning here?" Many students whose academic performance is at the bottom or in the middle range raise such questions, because they sense that they probably cannot "make it." "It" refers to kaoxue (promotion to upper levels of schooling through entrance exams). Vice Principal Yu speaks to me frankly, "What these students learn in middle school and high school is not going to be useful to them later, unless they go to college. So I do think it makes sense for some of them to go *dagong* (work, usually not on a stable contract, often in cities or towns other than one's hometown) rather than go to high school. Of course, I would not say this to those in education bureaus, or even to my students. But that honestly is what I think." Top students like Yang Ming and Chen Mi also wonder and have doubts. But as both of them state they "believe" that what they learn now—especially those things that are most foreign to their current life, science subjects in particular but also other subjects—must be useful "in the future," either in college or after they start working "in society." That is what holds them to their studies; their top rank, good grades, and their sense of accomplishment, especially, have become their great motivation.

Discussion

The New Curriculum Reform: Old Wine in a New Bottle

The New Curriculum Reform in fact has disappointed educators who are interested in improving the relevance of rural schooling. Ninth grade Chinese teacher Deng explains, "This is exactly the problem with the current new curriculum reforms. We all know it is simply a new bottle filled with old wine. The textbooks are much fancier now and indeed very provocative. Yet, the evaluation system remains test based. So, new textbooks encourage more student-centered, hands-on activities and more discussion and project time, but, in reality, it is not possible. Teachers still use traditional teacher-centered lecturing (*mantangguan*) and heavily rely on homework, quizzes, and tests to improve students' grades. It is the most effective and efficient way." Vice Dean of Students Wang later added that the lack of teacher training opportunities and resources has also prevented teachers from moving to a more innovated pedagogy that better fits the new curriculum.

As many students mentioned in interviews, sometimes the textbooks could be taught in a more interesting way. What bothers students is how lessons are all about reciting and cramming. Teachers ask students to repetitively recite, recite, and recite. Teachers ask students to squeeze as much spare time as possible into their studies. During classroom periods, even the "best" students get bored. The new curriculum reform has served to push rural students further from the path of achieving upward mobility through education. Yang Ming, the top performer in ninth grade, confessed to me, "I do not like many of our teachers' assignments. It is all repetition." It is a common practice at Longma. To make sure students master the knowledge points and remember them well, teachers ask students to recopy their schoolwork into a notebook one more time after finishing it once already. "I think it is really stupid. But our teachers keep doing so. Not just one of them, actually all of them did that to us." Sun Ting, whose grades are at the bottom level of the class, agreed with Yang Ming.

Li Sha adds one more problem, "… I do not like how my teachers are always trying to control me. Not only my physical freedom, like how I should not do this but should do that … but also my mental freedom." She gives a specific example, "Sometimes in the morning reading or evening self-study sessions, when I am reviewing English or Chinese in my own way, my teachers approach me and tell me not to do it that way but to follow her or his ways, as if only her or his

way is the true model. I have no freedom to explore myself." Li Sha is obviously very frustrated.

School administrators like Vice Principal Yang also admit that there are problems with Longma teachers' instructional strategies, "I also feel that such strategies [repetition, cramming] are not appropriate for all students. They might be helpful to those students who are mediocre but definitely are not appropriate for those top students and those bottom students." But he also holds that it is all they can do to make sure the majority of students survive entrance exams. He also states that, not only Longma but all other schools in Shangluo are doing the same thing. "We need to make sure as many students get into high schools and the good high school [Hong County High School]. So we actually encourage our teachers to continue their current approach."

The new textbooks have been quickly and extensively adopted in Shangluo City and its affiliated counties since their introduction in 2004. In 2007, the first graduates under the new curriculum reform entered high school. When I spoke to two tenth-grade English teachers in the nearby key point Hong County High School, teacher Yan complained to me that current students are much more difficult to teach than those of previous years were. She says, "I also looked at their new textbooks in middle school. They are fun, but they also lack the knowledge points to get students ready for the national college entrance exams. Their middle school English does not lay a firm enough foundation for them to get through the big exams." Yan is concerned that teachers have to spend extra time in tenth grade to build a foundation for the students, although they are supposed to be ready when they enter high school. She says, "I know many specialists do not like to hear it. But I have to spit it out. I think my tenth graders are mostly quite ruined by the new curriculum. How could they get ready for the big test? I worry about their future."

(Re)Defining Knowledge and Quality (Suzhi)

Major scholars in academia are also divided in their positions regarding the most recent curriculum reform. Wang Cesan, a senior scholar from Beijing Normal University, takes a more conservative stance when examining the new curriculum reform. Zhong Qiquan and his colleagues from East Normal University in Shanghai, on the other hand, actively advocate and defend the new curriculum reform (Wang 2004, 2006, 2008; Zhang 2004, 2005; Zhong 2009; Zhong and

You 2004). The two groups argue over what accounts for real knowledge. Wang questions the new curriculum's heavy reliance on childbased inquiry and directive learning and argues that it spoils the integrity and system of knowledge. Zhong and his colleagues view Wang's criticism as "moldy cheese" (Zhong and You 2004: 70). They state that the new curriculum brings a more holistic and broader definition of knowledge. In addition to the traditional definition of knowledge as being factual knowledge and skill sets *(zhishi, jineng)*, it adds two more vectors: procedures and methods (guocheng, fangfa) and the individual's dispositional characteristics, including emotions, attitudes, and values *(qinggan, taidu, jiazhiguan)*. Thus, the new curriculum aims to educate students with more *suzhi* and to be versatile and successful in multiple settings rather than only in a narrow major or field. In other words, compared with the old curriculum, which tends to benefit only those who do well on tests, the new curriculum contributes to the development of mass education and is deemed to improve equity in education overall.

These debates between the two groups of scholars go on. It is especially interesting how their arguments, starting from defining what counts as knowledge and what pedagogy and curriculum best pass down such knowledge, eventually touch on discussion about elite education, mass education, equality, and equity of the education system. Yet, in the end, both groups of scholars do not intend to address urban-rural differences and relevance issues through the new curriculum (or the traditional curriculum) and how this might influence their debates about equity of education. Scholars from both sides define the terms of knowledge education and *suzhi* education. Yet none of them question how their definitions or presumptions about knowledge and *suzhi* and the corresponding prescribed education practices might impact students from urban and rural areas very differently.

As Kipnis (2001) noted several years ago, the new curriculum, with an emphasis on cultivating *suzhi*, has put rural students in a very disadvantageous position. *Suzhi* is always associated with traits like creativity, innovation, knowledge vision, and pro-social skills, which work to the advantage of urban students thanks to the dense information-saturated environment in which they live. As Kipnis argues, rural students used to have an advantage in their ability to *chiku* (eat bitterness) and sustain fierce educational discipline, which has helped them excel in entrance exams. Now with the emphasis on *suzhi*, educational discipline gives way to overall *suzhi*. That is why I hear many students saying, "I have tried so hard. How come I still don't improve [in grades/tests]?" This is also why so many rural students come to lose interest in studying. In the context of the even more

urban-centered new curriculum, rural students find it even more difficult for them to succeed in formal schooling and achieve upward social mobility through that.

A few other scholars (Xiao 2006; Yu 2002) who studied rural curriculum reform in China also discuss the suitability of the new curriculum within the framework of relevance education. They point out how urban-centered curriculum has reinforced and reproduced the socioeconomic gaps between urban and the rural societies in China. Furthermore, Yan describes how *suzhi* and its associated traits, which represent modernity and urbanity, "formal education, civility, discipline, initiative, cosmopolitanism" (Yan 2008: 94), are constructed as missing from rural citizens. Rural schools aim to educate citizens with high *suzhi* to contribute to the modernization process. By turning rural youth into moderns and cultivating them with high *suzhi*, rural schooling steers rural youth further away from what, by intention and default, is constructed as their backward countryside (Lou 2011).

Conclusion

The absence of reforming assessment criteria and the continuous and increasing entrance exam pressure, together with the poor quantity and quality of material and human resources in rural schools indeed make new curriculum reform old wine in new bottles. New textbooks are taught in old ways, only with more redundancy and repetition, more relentless cramming, and much stricter control of what students should do and how, and what students should learn within classrooms and within school. What is supposed to be a more lively, more innovative, and more student-based curriculum has become even more dull and confining to students. No wonder they think schooling is a suffocating prison.

Meanwhile, education scholars claim that the new curriculum will improve more students' overall *suzhi* to facilitate their personal, educational, and professional growth. It aims to shift Chinese education from elite education, which benefits only a few, to mass education, which benefits the general population. However, rural students find themselves lagging even further behind their urban counterparts, as the new rules of the game are defined to the advantage of the urban with its request of *suzhi*, which is associated with urban residents and downplaying the worth of some of their only strengths, such as *chiku*. When *suzhi* education and the new curriculum aim to encourage students to explore more of their potential and venture to take advantage of more opportunities for further learning and development, rural students find themselves left with even less room to grow and develop in school.

The discussion of the connotation of *suzhi* is closely linked to the argument about the relevance of education. Such a discussion is not unique to the Chinese context. A common theme running through the literature on rural education in both developing and developed countries is exactly this "relevance education" (Sinclair and Lillis 1980)—the relevance of rural schooling, in particular the contradictions between rural needs and urban values, between rural vocational education and general education, and between world/national standards and local practical needs.

Although urban values anchor the entire education system and general education has become the standard for rural education, educators need to be especially cautious and aware of the imposition of urban-style reforms on rural schools over the past century (DeYoung 1987, 1995; DeYoung and Lawrence 1995; Howley 1997; Rosenfeld and Sher 1977; Stern 1994). Rural schools have adopted a misguided view of education by default, ignoring rural concerns and rural needs. As a result, rural schools now actively contribute to the decline of rural areas, in both environmental and human terms, as is the case in China. Such imposition is further justified by teacher-training institutions that teach future educators to accept and teach general, "universal" curricula and define knowledge and *suzhi* in urban terms. The unique experience of students and unique settings of the rural is ignored or looked down on.

Educational institutions serve the manifest interests of the whole of society. Gur'ianova (2000) points out in his study of rural education in Russia that in rural villages, schools are called on to provide the kind of instruction and upbringing that are relevant to the needs of society—all aspects of society: local agricultural production, the grand social sphere, families, and the individuals. The discourse of globalization has also added to "the grand social sphere" the question of schools meeting global standards (Haartsen, Groote, and Huigen 2000). How should schools and teachers balance and meet all these needs? How can educators develop the "most relevant" education for rural schooling that is also appropriate for students who must also be held accountable to the demands of the national education system?

These are questions requiring urgent exploration in China. The current urban-centered curriculum and definition of knowledge and *suzhi* have already positioned rural students somewhere between rural and urban. Students feel they hardly have enough credentials (through college education and advanced degree) to move to professional jobs in the city. Meanwhile, their rural home lives also

have lost meaning for them. They are not motivated to go back even if they could. Rural students find themselves stuck between city and village, between modernity and rurality. This tension adds to the anxiety, frustrations, and disengagement of students at school and leads to confusion regarding their future and their aspirations. This in-between space rural students find themselves in raises serious and significant questions for teachers and curriculum reform about the definition of what is relevant, what is effective, what is supportive for rural schooling. Most important, do national educational policies such as curriculum reform serve rural children well? Have rural schools become a laboratory of failed education policies and practices? Is there a set of universal standards for both rural education and urban education and what they should be? Answering these questions is key not only to the improvement of rural education but also to the future of rural China.

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ISBN 978-0-578-80488-0
90000>
9 780578 804880