Journal of Economic Perspectives—Volume 30, Number 1—Winter 2016—Pages 207–224

Roland Fryer: 2015 John Bates Clark Medalist

Lawrence F. Katz

Roland Fryer has emerged during the last decade as a leading scholar of the US racial divide and as a major figure in the evaluation of education policies to narrow the racial achievement gap and improve the prospects of low-income and minority children. He has been bold and fearless in his willingness to apply rigorous economic theory, to collect new data, and to develop and implement appropriate and compelling empirical strategies (including randomized field experiments) to assess any serious hypothesis that might shed light on racial inequality and that may provide policy tools to improve the academic achievement and long-run outcomes of disadvantaged children. Fryer's work is marked by a creative and entrepreneurial edge that has allowed him to carry out large-scale evaluations and interventions in the context of large school districts like New York, Chicago, Houston, and Dallas, often in the face of political opposition and bureaucratic inertia. His theoretical and empirical work on the "acting white" hypothesis of peer effects provides new insights into the barriers to increasing the educational investments of minorities and the socially excluded. Fryer's research output related to racial inequality, the US racial achievement gap, and the design and evaluation of educational policies make him a worthy recipient of the 2015 John Bates Clark Medal.

He was born in Daytona Beach, Florida. His tumultuous childhood and youth experiences in Florida and Texas have been well-documented in a profile in the *New York Times Magazine* (Dubner 2005). Roland went on to earn his BA from the University of Texas at Arlington in 1998 and his PhD in economics from Pennsylvania State

■ *Lawrence F. Katz is Elisabeth Allison Professor of Economics, Harvard University, and Research Associate, National Bureau of Economic Research, both in Cambridge, Massachusetts. His email address is lkatz@harvard.edu.*

http://dx.doi.org/10.1257/jep.30.1.207 doi=10.1257/jep.30.1.207

Roland Fryer

University in 2002. Fryer was a doctoral fellow and post-doctoral fellow at the University of Chicago and the American Bar Foundation from 2001 to 2003. Steven Levitt and Glenn Loury played formative roles as Roland's early mentors and collaborators. He arrived at Harvard as a Junior Fellow of the Harvard Society of Fellows in 2003, formally joined the Economics Department faculty as an Assistant Professor in 2006, was promoted to tenure in 2007, and currently is the Henry Lee Professor of Economics at Harvard University.

Fryer is an extraordinary applied microeconomist whose work spans labor economics, the economics of education, and the economics of social interactions, while continually returning to the racial divide, one of America's most profound and long-lasting social problems. I will divide this survey of Roland's research into five categories: the racial achievement gap, education policies and reforms, economics of social interactions, the economics of discrimination and anti-discrimination policies, and further topics involving the black–white racial divide. References to Roland's work in this essay will use the numbers from the selected group of his papers given in Table 1.

The Racial Test Score Gap at Different Ages

The existence of a substantial gap in standardized achievement test scores of US black and white children at school ages is well-known, but Roland advanced

Table 1
Selected Research Papers by Roland Fryer

1. "Understanding the Black-White Test Score Gap in the First Two Years of School," (with Steven D. Levitt). 2004. *Review of Economics and Statistics* 86(2): 447–64.
2. "The Causes and Consequences of Distinctively Black Names," (with Steven D. Levitt). 2004. *Quarterly Journal of Economics* 119(3): 767–805.
3. "An Economic Analysis of 'Acting White,'" (with David Austen-Smith). 2005. *Quarterly Journal of Economics* 120(2): 551–83.
4. "Affirmative Action and Its Mythology," (with Glenn C. Loury). 2005. *Journal of Economic Perspectives* 19(3): 147–62.
5. "The Black-White Test Score Gap through Third Grade," (with Steven D. Levitt). 2006. *American Law and Economics Review* 8(2): 249–81.
6. "A Model of Social Interactions and Endogenous Poverty Traps." 2007. *Rationality and Society* 19(3): 335–66.
7. "A Measure of Segregation Based on Social Interactions," (with Federico Echenique). 2007. *Quarterly Journal of Economics* 122(2): 441–85.
8. "Guess Who's Been Coming to Dinner? Trends in Interracial Marriage Over the 20th Century," 2007. *Journal of Economic Perspectives* 21(2): 71–90.
9. "An Economic Analysis of Color-Blind Affirmative Action," (with Glenn Loury and Tolga Yuret). 2008. *Journal of Law, Economics, and Organization* 24(2): 319–55.
10. "A Categorical Model of Cognition and Biased Decision Making," (with Matthew O. Jackson). 2008. *The B.E. Journal of Theoretical Economics* 8(1).
11. "The Changing Consequences of Attending Historically Black Colleges and Universities," (with Michael Greenstone). 2010. *American Economic Journal: Applied Economics* 2(1): 116–48.
12. "An Empirical Analysis of 'Acting White,'" (with Paul Torelli). 2010. *Journal of Public Economics* 94(5–6): 380–96.
13. "Racial Inequality in the 21st Century: The Declining Significance of Discrimination," 2011. *Handbook of Labor Economics*, 4B: 855–971.
14. "Are High Quality Schools Enough to Increase Achievement Among the Poor? Evidence from the Harlem Children's Zone," (with Will Dobbie). 2011. *American Economic Journal: Applied Economics* 3(3): 158–87.
15. "Financial Incentives and Student Achievement: Evidence from Randomized Trials," 2011. *Quarterly Journal of Economics* 126(4): 1755–98.
16. "Hatred and Profits: Under the Hood of the Ku Klux Klan," (with Steven D. Levitt). 2012. *Quarterly Journal of Economics* 127(4): 1883–1925.
17. "The Plight of Mixed-Race Adolescents," (with Lisa Kahn, Steven D. Levitt, and Jorg Spenkuch). 2012. *Review of Economics and Statistics* 94(3): 621–34.
18. "Getting beneath the Veil of Effective Schools: Evidence from New York City," (with Will Dobbie). 2013. *American Economic Journal: Applied Economics* 5(4): 28–60.
19. "Testing for Racial Differences in the Mental Ability of Young Children," (with Steven D. Levitt). 2013. *American Economic Review* 103(2): 981–1005.
20. "Teacher Incentives and Student Achievement: Evidence from New York City Public Schools," 2013. *Journal of Labor Economics* 31(2): 373–407.
21. "Measuring Crack Cocaine and Its Impact," (with Paul S. Heaton, Steven D. Levitt, and Kevin M. Murphy). 2013. *Economic Inquiry* 51(3): 1651–81.
22. "Valuing Diversity," (with Glenn C. Loury). 2013. *Journal of Political Economy* 121(4): 747–74.

(continued)

Table 1—Continued

23. "The Impact of Attending a School with High-Achieving Peers: Evidence from New York City Exam Schools," (with Will Dobbie). 2014. *American Economic Journal: Applied Economics* 6(3): 58–75.
24. "The Potential of Urban Boarding Schools for the Poor: Evidence from SEED," (with Vilsa E. Curto). 2014. *Journal of Labor Economics* 32(1): 65–93.
25. "Injecting Charter School Best Practices into Traditional Public Schools: Evidence from Field Experiments," 2014. *Quarterly Journal of Economics* 129(3): 1355–1407.
26. "The Impact of Voluntary Youth Service on Future Outcomes: Evidence from Teach for America," (with Will Dobbie). 2015. *B.E. Journal of Economic Analysis and Policy* 15(3): 1031–66.
27. "The Medium-Term Impacts of High-Achieving Charter Schools," (with Will Dobbie). 2015. *Journal of Political Economy* 123(5): 985–1037.
28. "Enhancing the Efficacy of Teacher Incentives through Loss Aversion: A Field Experiment," (with Steven D. Levitt, John List, and Sally Sadoff). 2012. NBER Working Paper No. 18237.
29. "Information and Student Achievement: Evidence from a Cellular Phone Experiment," 2013. NBER Working Paper 19113.
30. "Parental Incentives and Early Childhood Achievement: A Field Experiment in Chicago Heights," (with Steven D. Levitt and John A. List). 2015. NBER Working Paper 21477.
31. "Not Too Late: Improving Academic Outcomes for Disadvantaged Youth," (with Philip J. Cook, Kenneth Dodge, George Farkas, Jonathan Guryan, Jens Ludwig, Susan Mayer, Harold Pollack, and Laurence Steinberg), 2015. Working Paper IPR-WP-15-01, Institute for Policy Research, Northwestern University.

the debate by examining the age profile and sources of the test gap from early childhood through high school in a series of highly influential studies. Although a black–white test-score gap is essentially nonexistent in the first year of life, black children fall behind quickly thereafter, and observable background and school variables cannot explain most of the growth of differences in academic achievement between racial groups after kindergarten.

Perhaps the most novel of Fryer's papers on racial test score gaps is a fascinating study with Levitt [19] examining mental ability differences by race for very young children. Fryer and Levitt find no significant black–white test score gap for one year-olds using the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) data, a nationally representative sample of more than 10,000 children born in 2001. The children are evaluated using the Bayley Scale of Infant Development, which as they explain is based on "exploring objects (e.g., reaching for and holding objects), exploring objects with a purpose (e.g., trying to determine what makes the ringing sound in a bell), babbling expressively, early problem solving (e.g., when a toy is out of reach, using another object as a tool to retrieve the toy), and naming objects." At the ages of 8–12 months, the black–white gap is close to zero. However, the test score gap has become substantial (although much of it is explained by socioeconomic status) by the time kids are two years old. The pattern of almost no initial test score gap followed by a substantial gap by age two suggests a major role of the cumulative effects of different early-age "environments" by race.

In early work, Fryer in collaboration with Levitt [1] shows a substantial widening of black–white test score gaps from the start of kindergarten through the end of first grade using the Early Childhood Longitudinal Survey (ECLS) data. The racial test score gap is largely explained by racial differences in socioeconomic status at the start of schooling, but it expands in the early grades even after allowing interactions of socioeconomic status with age and grade. Fryer and Levitt also find a slower growth in test scores after the start of kindergarten for schools in predominantly black as opposed to predominantly white neighborhoods. The pattern suggests that school quality differences may play a key role in the growing racial test score gap with age, but the extent of racial segregation of US schools and neighborhoods makes it difficult to sort out the role of within- versus between-school factors. A follow-up paper [5] shows a continuing rise in the black–white test score gap through third grade even within schools, suggesting the growth of racial test score gaps with age goes beyond between-school differences in average school quality. Recent work by Bond and Lang (2013) suggests part of the growth in the black–white reading score gap from kindergarten to third grade in the ECLS documented by Fryer and Levitt may not be robust to somewhat arbitrary scaling decisions arising from the ordinal nature of the test scores.

Fryer's comprehensive chapter in the *Handbook of Labor Economics* [13] on "Racial Inequality in the 21st Century" synthesizes and extends his research with Levitt on the racial achievement gap and distills the implications for current racial differences in adult labor market and social outcomes. He presents estimates from ten large datasets including children up to 17 years old and finds that the racial achievement gap is fairly robust across time, samples, and particular assessments used. He documents that racial differences in labor market outcomes today are greatly reduced when one accounts for differences in standardized test scores. Roland infers from these findings that the major challenge for confronting racial inequality in the 21st century is to understand the obstacles undermining the achievement of black and Hispanic children in primary and secondary school. This work is important in focusing the debate on US racial inequality into how schools, parents, and neighborhoods affect the achievement of minority children.

Education Reform I: Student, Teacher, and Parental Financial Incentives

Fryer (2014) described his first major effort to improve school performance in this way in a lecture: "As befits an arrogant economist, my first thought was that this will be easy: We just have to change the incentives. . . . My solution was to propose that we pay them incentives now to reward good school performance. Oh my gosh, I wish someone had warned me. No one told me this was going to be so incredibly unpopular. People were picketing me outside my house saying I would destroy students' love of learning . . ."

The first step was to experiment with short-term financial incentives for students. Fryer [15] implemented and analyzed randomized field experiments in

over 200 urban schools across three cities where treated students were paid for working hard (reading books in Dallas), doing well on interim standardized assessments (New York City), and earning high grades in class (Chicago). Randomization of treatments occurred at the individual student level. Fryer's working hypothesis was that providing students with such financial incentives could improve student achievement if students understand how to productively increase school effort but (in the absence of short-term incentives) lack sufficient motivation to exert optimal effort (perhaps because they lack information or overly discount the future returns to schooling). In contrast, short-term financial incentives would be ineffective if students lack the resources or knowledge to convert effort to measurable achievement. In addition, financial incentives could reduce performance if they undermine "intrinsic motivation."

Although students appeared to be aware of the financial incentives and self-reported that they were motivated by them, the findings for all three cities were of essentially zero mean impact (although some evidence suggests that the incentives of paying per book read in Dallas were successful in improving student achievement for English-speaking students). Fryer concludes that short-term financial incentives are likely of limited effectiveness in improving the school outcomes of disadvantaged children in large US urban districts. The lack of student knowledge of how to improve performance and lack of complementary inputs (like tutoring and peer encouragement) appear important in why such financial incentives are not effective.

Next, Fryer [20] considered incentives for teachers through a set of randomized trials in New York City middle schools and high schools. In contrast to the positive results for some developing countries (for example, Muralidharan and Sundararaman 2011), Fryer found no effect of teacher incentives (in the form of performance bonuses) on educational outcomes. The study suggests the effectiveness of teacher performance incentives in large urban US school districts may be constrained by the relatively modest size of the incentives that appear possible and the complexity of politically feasible incentive programs.

The lack of efficacy of standard teacher incentives in US schools motivated work by Fryer, along with Steve Levitt, John List, and Sally Sadoff, to see if changes in the framing of teacher financial incentives could enhance their effectiveness by harnessing the power of loss aversion [28]. Fryer and his co-authors implemented a randomized control trial in nine schools in Chicago Heights, Illinois, in which teachers were randomly selected for a pay-for-performance program with the timing and framing of the award randomly varied as well. Some teachers were offered traditional end-of-year bonuses for improving student performance ("Gain" treatment), while others were given a lump sum payment at the beginning of the school year and informed that they would have to return some or all of it if their students did not meet performance targets ("Loss" treatment). Teachers in the "Gain" and "Loss" groups with the same performance earned the same final bonus. The striking finding is that the "Loss" treatment substantially and significantly raised student math performance (although not reading performance), and the traditional "Gain"

treatment had no detectable impact. These findings suggest the framing of teacher incentives could be a relevant policy tool.

Having studied incentives for students and for teachers, Fryer along with Levitt and List [30] then examined parental incentives. The set-up is another randomized field experiment in Chicago Heights, with this one offering financial incentives for low-income parents of pre-school children to attend parenting education sessions and to engage in behaviors designed to increase early childhood cognitive and executive-function skills. The financial incentives did increase parent attendance at parenting classes and are associated with initial improvements in early childhood achievement and readiness for school (particularly for Hispanics and as indicated by assessments of noncognitive skills).

Although some of the incentives tested do have positive effects, a main message from Fryer's forays into student, teacher, and parent short-term financial incentives is that they are unlikely by themselves to be key policy levers for dramatically improving the performance of disadvantaged students in traditional US urban public schools. Thus, Roland's efforts soon shifted to examining whether more comprehensive whole-school reforms can narrow the racial achievement gap and improve the longer-run educational and economic outcomes for disadvantaged children, particularly those growing up in high-poverty areas.

Education Reform II: Charter Schools and Comprehensive Whole-School Reforms

Some schools seem clearly more effective than others. But there is always a question as to whether such success is driven (at least to some extent) by the selection of students who might thrive in any environment, or by principals and teachers who have superb but idiosyncratic skills that cannot be transferred to other schools. Fryer's work in this area began with a focus on testing the effectiveness of what appeared to be high-performing charter schools using estimates generated by the random lottery process for admission to oversubscribed charter schools. He then sought to enumerate the policies that characterize the most effective charter schools, and then to test whether such policy combinations can be utilized successfully in regular public schools. His exciting and impressive recent work [25] indicates that policies from charter schools can be moved into poor-performing public schools in Houston, Denver, and Chicago and can generate large math test score improvements.

The Harlem Children's Zone (HCZ), a 97-block area in Harlem that combines "No Excuses" charter schools with a host of neighborhood services (including early childhood education, after-school programs, college guidance, and family support and community health programs), has provided Fryer with a rich testing ground for the role of school-based and neighborhood-based interventions for boosting children to achieve escape velocity from low-income areas. ("No Excuses" doesn't have a precise meaning, but it typically refers to schools that are built on high expectations

for both academic performance and behavior. Such an approach is manifested by a college preparatory curriculum for all students and an emphasis on the school culture, often backed up by a longer school week and by an unambiguous set of rules and punishments.) Fryer and Will Dobbie have exploited the lottery used for admission to the Promise Academy (a charter school that is part of the HCZ), which allows them to examine the effects of the charter school on student outcomes and also to look at differential impacts for students living in and out of the HCZ neighborhoods. In their first paper [14], they examine short-term impacts on student test scores from gaining entry to the Promise Academy and find improvements in math test scores for middle school and elementary school students that are large enough to close the racial achievement gap, as well as substantial gains in reading for elementary school students. A follow-up study [27] finds similar effects on medium-term outcomes including college enrollment, high school graduation, and reductions in risky behavior (teen pregnancies for females and incarceration for males).

The Dobbie–Fryer studies of the HCZ show similar positive impacts for residents and nonresidents of the HCZ indicating high-quality schools alone even without the other HCZ community resources are effective. Also comparisons of lottery losers on the two sides of HCZ residential border reveal no differences in school test scores and medium-term outcomes indicating the HCZ community resources alone do not have much impact on student achievement.

However, a study of the impact of attending SEED schools, urban boarding schools in DC and Baltimore, suggests that greater exposure to standard English outside the classroom can improve test scores. In [24], Fryer and Vilsa Curto consider evidence from the admissions lotteries of the SEED schools, which combine a No Excuses charter school model with a five-day-a-week residential environment and extensive after-school activities and tutoring. The findings indicate large improvements in both math and reading achievement for poor minority children. The math impacts are similar to other high-performing charter schools without a boarding component. But the reading impacts are larger, which suggests that a change in residential environment from inner-city households in neighborhoods where nonstandard English is often spoken to a setting with standard English predominating could be a pathway to improved reading skills.

After providing compelling lottery-based evidence that certain charter schools substantially improve student performance, Fryer has tried to determine the specific policies behind charter school effectiveness and whether such practices can be transferred to other schools. In [18], Fryer and Dobbie collect data on the inner workings of 39 New York City charter schools from interviews and surveys of principals, teachers, and students, along with administrative data. They correlate the school policies and characteristics with estimates of school effectiveness in raising math and reading test scores using lottery-based estimates for 29 of the schools and quasi-experimental matching estimates for the other ten schools. The typical charter school in their sample has only modest impacts on test scores, but the variation across schools is huge. Traditional school input measures—such as class size, spending per pupil, and teacher certification—have little explanatory

power for school effectiveness. But a bundle of five school policies suggested by their in-depth qualitative research—frequent teacher feedback, the use of data to guide instruction, high-dosage tutoring, increased instructional time, and high expectations—are strongly positively correlated with high-performing schools and explain about 45 percent of the cross-school variation in effectiveness.

A concern is that this bundle of five policies that are highly correlated with charter school performance could be just a proxy for idiosyncratically talented principals and teachers, or perhaps for some other set of unmeasured practices. Thus, the next step was to test in large-scale field experiments whether implementing these five school practices in regular public schools generates similar improvements in student performance.

Following intense political negotiations, the public school system in Houston, Texas, was willing to implement this bundle of five best practices from high-performing charter schools in a group of low-performing, traditional public schools. Fryer [25] implemented both a school-level randomized field experiment among 18 low-performing elementary schools as well as quasi-experimental comparisons of Houston public elementary, middle, and high schools getting and not getting the five practices. The study involved major management efforts across a large number of public schools, along with wide-ranging data collection. The findings (covering two years) indicate that injecting these five best practices from charter schools into traditional Houston public schools significantly increased math achievement by 0.15 to 0.18 standard deviations per year (similar to the impacts of high-performing charter schools) but had little effect on reading achievement (as is the case with similar charter schools as well). Fryer also implemented such practices in public schools in Denver and Chicago with similar positive short-run results using convincing quasi-experimental estimates.

These results suggest that charter-school best practices can be used to increase student performance substantially in low-performing traditional public schools. The elementary school intervention was implemented with no additional financial costs, but the secondary school intervention required modest increases in school spending of $1,837 per student (driven by the costs of high-dosage tutoring) similar to the additional costs of high-performing charter schools. Recent work by Abdulkadiroğlu, Angrist, Hull, and Pathak (2014) reinforces Fryer's findings in showing that charter school takeovers of failing public schools in New Orleans and Boston led to similar large improvements in student performance even for nonvolunteer, incumbent groups of students. Also, Fryer's results are supported by the substantial positive impacts of student achievement (as well as on high school graduation and college going) of the reorganization of large New York City public high schools into Small Schools of Choice (typically implementing charter-school best practices) from research by Bloom and Unterman (2014) using lottery-based estimates.

The additional costs of high-dosage tutoring in Fryer's Houston experiment meant it could not be implemented in all the schools. Indeed, Fryer finds substantially larger improvements in student achievement in middle and secondary schools with the high-dosage tutoring versus those without it. These findings motivated an

attempt to test whether the provision of individualized instruction from high-dosage tutoring alone can improve the academic achievement of disadvantaged youth. Fryer and a group of coauthors [31] implemented a large-scale randomized control trial in 12 public high schools in Chicago for ninth and tenth grade disadvantaged males, in which intensive individualized academic instruction—high-dosage math tutoring from Match education (the provider also used in Fryer's Houston experiment)—was provided to a randomly selected individual students. They report striking results, with increases in math achievement scores from high-dosage tutoring of 0.2 standard deviations, large reductions in course failures, and large increases of 0.5 standard deviations in math grades.

The benefits from high-dosage tutoring are interrelated with another concern: Is the supply of talented teachers available to teach in low-performing inner-city schools adequate for expanding successful practices into these schools? Fryer makes the case that individualized high-dosage tutoring allows the use of recent college graduates who don't need teacher training. Another source of talent in inner-city schools is programs such as Teach for America (TFA). Fryer and Dobbie [26] estimate the effect of voluntary youth service as a teacher in TFA using a discontinuity in the TFA application process and a follow-up web survey. They find that marginal TFA participants are 20 percentage points more likely to work in K–12 schools and education more broadly following the end of their TFA service period than those who just missed the TFA selection cut-off. TFA has been criticized for hiring individuals who stay only briefly in education, but these results suggest that service programs such as TFA potentially can be a mechanism to expand the supply of talented teachers and administrators for US public schools.

Fryer's work in the area of school reform continues to expand in scope and depth. For example, Fryer and Dobbie are working with administrative data from Texas to examine long-run impacts of adult earnings from attending the earliest Texas charter schools, using quasi-experimental comparisons to comparable students in regular public schools. Overall, this remarkable and sustained body of research on school-based interventions shows that those based on the best practices of charter schools can substantially improve student performance even for students in failing US urban public schools and even when the interventions start in middle school or later in secondary school. Moreover, the improvements in student performance also appear in some cases to generate longer-term gains through improved high school graduation, higher college enrollment, and reductions in rates of teen birth and criminal activity.

Economics of Social Interactions, Identity, and Acting White

In some minority communities, "acting white" can be an insult meant to convey that a person is turning their back on the minority culture and instead shaping their behavior, appearance, and speech to correspond with expectations of white culture (Fordham and Ogbu 1986). Depending on how these cultural expectations

are defined and enforced, it's possible for a situation to arise in which the accumulation of education may come into conflict with belonging to a cultural group.

Fryer's first major research involved the development of new conceptual frameworks and empirical evidence to understand better the role of "culture" (or identity or cultural capital) in the creation and persistence of racial and ethnic group differences in educational investments and other social outcomes and behaviors. His early work [6] developed an equilibrium model of "cultural capital"—which can be thought of as group-specific investments valuable for future social interactions with a peer or social group. Group-specific investments to facilitate local interactions can in some circumstances run into conflict with investments to increase economic success in broader society. The model provides an explicit foundation and new testable empirical predictions for "acting white" behavior in poor and middle-class black neighborhoods as well as related apparent subculture behaviors for other minority and immigrant group settings. For example, the model highlights that this tension between cultural capital and accumulating education increases as social mobility or geographic mobility become more realistic options for individuals growing up in poor and segregated communities. It also suggests a nonmonotonic relationship between social isolation (and segregation) and the importance of group-specific investments as a signaling device to indicate that an individual will be "sticking around" the neighborhood.

An aversion to "acting white," as well as rejecting those who try too hard in school or accumulate too much education, can arise from what is known as a "two-audience signaling quandary" in the elegant model of Fryer and David Austin-Smith [3]. The two audiences are potential employers and one's peer group, and the signals like educational investment that lead employers to offer high wages can also induce peer group rejection. Without peer pressure, the model looks like a standard (Spence 1973) signaling model in which educational investments are rising monotonically and continuously in academic ability. With peer pressure, "acting white" equilibria can arise where the highest-ability individuals continue to signal their academic ability with high educational investments, but middle-ability youths pool on a common lower education level to get accepted into their peer group. Improvements in outside labor market opportunities encourage more youth to get high education levels and to leave the peer group, but simultaneously can cause those left in the peer group to invest less in education and end up worse off in the mainstream economy.

These models of cultural capital and "acting white" behavior provide a foundation for empirical work on peer effects in school—particularly relationships between student popularity and academic performance—and in showing how what looks like "oppositional" youth cultures can arise as the equilibrium outcome for "rational" actors in a two-audience signaling model. For example, Fryer and Austin-Smith [3] also have used this framework to illuminate the success of the residential-based Job Corps program that provides job training to youth in geographically isolated sites away from neighborhood peer groups as compared to the failure of the JOBSTART program using the same curriculum but operating in a youth's current residential neighborhood (Cave, Bos, Doolittle, and Toussaint 1993).

In complementary empirical work, Fryer has sought to assess how racial differences in culture (or identity) and in peer group interactions may affect youth educational and social behavior. Fryer and Paul Torelli [12] produced a fascinating empirical study using rich data on friendship networks for high school students from the National Longitudinal Survey of Adolescent Health (AdHealth). They uncover noticeable racial differences in the relationship of student popularity and grades, especially in schools with greater interracial contact. The findings are consistent with Fryer's two-audience signaling model of "acting white" with a less positive impact of grades on popularity for blacks in schools with more interracial contact. This work uses improved measures of friendship networks and on the popularity and racial isolation (segregation) of one's friends based on Fryer's [7] own rigorous work, discussed later, in creating a new index to measure the extent of segregation at the individual level.

In yet another approach to looking at effects of peer groups, Fryer and Dobbie [23] take advantage of the fact that New York City has several elite "examination" high schools, where admission is determined by being above a certain threshold point on an entrance test. As a result, a regression-discontinuity strategy can compare the longer-term experience of students with very similar test scores, some of whom were just above the threshold and thus admitted to a school with a different peer group, and those who were just below the threshold. The authors show that being admitted to an elite examination school leads to a substantial difference in average peer quality; however, they find no effect of admission to an elite high school on college attendance or graduation rates for marginal admits. Of course, the marginal admits may go from getting extra resources and attention as a top student at a non-elite school to being lower-tier students getting less attention at the elite examination schools.

Might an information-based intervention overcome what can be negative peer influences on educational attainment? In a randomized field experiment in Oklahoma City Public Schools, Fryer [29] provided daily information about the link between human capital and future outcomes, via messages to freely provided cellular phones. The information intervention changed students' *reported* beliefs about links between education and life outcomes and reports of school effort. But the treatment had no detectable impacts on school attendance, behavioral problems, or test scores. The findings suggest that disadvantaged students do not know which strategies of studying and learning are needed to translate their beliefs about gains from education into measurable improvements in their own level of education—a finding which echoes the results of Fryer's [15] experiments on student financial incentives mentioned earlier.

Other work has tested and confirmed Fryer's "acting white" hypothesis based on differential peer pressure influences across settings. In a recent example, Bursztyn and Jensen (2015), in a randomized control trial for disadvantaged eleventh grade students in Los Angeles public schools, provide free access to an SAT prep course and randomize whether the decision to take-up the offer is private or made public to one's classroom peers. They find that student take-up is

much lower in the public than private treatment in non-honors classes, but find no difference in take-up by treatment in honors classes. The same pattern holds for honors students across different classroom environments.

The role of racial identity and cultural capital seems to matter for other social behaviors, too. Of particular note is Fryer's work with Levitt [2] examining changes in patterns of first names of black and white children. Based on individual-level California birth certificate data, blacks and whites chose relatively similar first names for their children in the 1960s. But starting in the 1970s that pattern changed substantially, with blacks (particularly those living in racially isolated neighborhoods) adopting increasingly distinctive names. Fryer and Levitt convincingly argue that the rise of the Black Power movement in the late 1960s and the 1970s influenced how blacks perceived their identities and that first names of children provide a useful window for measuring racial identity. They further document that first names increasingly provide a strong signal of socioeconomic background for US blacks in a way that was not previously the case for those born prior to the 1970s.

Economics of Discrimination, Affirmative Action, and Anti-Discrimination Policy

Studies in social psychology indicate that individuals typically process information with the aid of categories. Fryer and Matthew Jackson [10] use this idea to explore the psychological foundations for racial discrimination. In their model, specific biases emerge from a combination of optimal categorization with a fixed number of categories. Types of experiences and objects that are less frequent in the population tend to be more coarsely categorized and lumped together. Decision-makers make less accurate predictions when confronted with such objects. This can lead to discrimination against minority groups that looks like what is called "statistical discrimination"—which refers to treating all members of a minority group as part of one category and not making finer distinctions—even with no malevolent "taste" for discrimination.

The controversies concerning affirmative action often do not reflect the fact that such policies can be implemented in quite different ways. For example, an affirmative action policy can be a "sighted" one that takes race explicitly into account, or an "unsighted" or "color-blind" policy that is based on a factor that will have the effect of advantaging some members of a group without explicitly taking race into account. Examples of color-blind affirmative action policies for college admission include taking into account a student's socioeconomic status (family income or parental education) and guaranteeing admissions to flagship state universities to students in the top 10 percent of their public high school class. The correlations of socioeconomic status with race and the substantial racial segregation of US neighborhoods and public high schools mean such color-blind policies can impact the racial mix of students admitted to a college. Affirmative action policies can also be implemented either in the form of development assistance, like preferential access

to training or schools, or in the form of job placement advantages, like a goal or quota being set for hiring. Such differences need to be taken into account to accurately evaluate the proper mix and efficacy of affirmative action policies.

In expositing the economics and consequences of affirmative action, Fryer has done first-rate work with Glenn Loury in this journal [4] showing both empirically and conceptually the inefficiencies of "color-blind" affirmative action for increasing racial diversity in university admissions or hiring [9]. Fryer and Loury show that the use of color-blind affirmative action policies to try to maintain a given level of racial diversity leads to distortions in college admission rules for all students (minority and nonminority) and can also cause negative feedback into the investments made before college by high school students by suboptimally changing incentives for taking harder courses, getting involved in extracurricular activities, and improving skills evaluated on standardized tests.

In their foundational theoretical piece on affirmative action policies entitled "Valuing Diversity," Fryer and Loury [22] develop a model of a population of agents belonging to distinct social groups who invest in human capital, and then compete for assignments that give them an opportunity to use their skills. One group is disadvantaged, and policies to enhance opportunity for the agents in that group are considered. Relative to the existing literature on affirmative action, Fryer and Loury provide a more rigorous analysis in the tradition of optimal tax theory and provide close attention to the key distinctions like whether such programs are sighted versus unsighted, or whether they are applied at the stage of skill acquisition or the stage of hiring. Their model implies that optimal sighted affirmative action policies should take place at the hiring stage, but optimal color-blind policies may include interventions at the education stage.

Further Topics: Segregation, the Crack Epidemic, Interracial Marriage, HBCUs, and the KKK

Common empirical measures of segregation such as the "dissimilarity index" or "isolation index" have typically been based on group statistics such as the distribution of shares of different groups (defined by race, sex, or ethnicity) by fixed geographic units such as a Census tract or zip code. Such measures are inevitably vulnerable to the concern that different arbitrary partitions of space could lead to very different results. In contrast, Fryer and Federico Echenique [7] develop a new measure, the Spectral Segregation Index, that can be disaggregated to the individual level. The Spectral Segregation Index is based on the premise that an individual is more segregated the more segregated are the agents with whom he or she interacts. Fryer and Echenique show how three reasonable properties for such an index—monotonicity, homogeneity, and linearity—generate the Spectral Segregation Index. In practice, the Spectral Segregation Index looks a lot like the familiar isolation index for measuring the extent of geographic racial segregation. However, because it is calculated from the individual level it can also

reveal the determinants of racial patterns of friendship networks in high schools and a wide range of other social interactions. The Spectral Segregation Index was a concept in advance of the data available when it was developed a decade ago. However, it is now possible to do individual-level measures of segregation on geocoded microdata from the historical US Censuses of Population up to 1940 and with new big online datasets from social networks and mobile apps that track locations of consumer purchases and social interactions. The value of the Spectral Segregation Index for individual-level measure of segregation was demonstrated in Fryer's [12] work on the relationships between grades and popularity by race and school demographics discussed earlier.

Although it is commonly believed that the "crack epidemic" of the 1980s and early 1990s had strong negative effects on black youth and families, detailed empirical studies were hampered by the absence of a direct measure of the prevalence of crack cocaine. However, Fryer [21] produced impressive work with Paul Heaton, Levitt, and Kevin M. Murphy on measuring the prevalence of crack cocaine by city and over time through the construction of an index based on a range of indirect proxies (cocaine arrests, cocaine-related emergency room visits, cocaine-induced drug deaths, crack mentions in newspapers, and DEA drug busts). Their crack index reproduces many of the spatial and temporal patterns described in ethnographic and popular accounts of the crack epidemic: for example, the rise in the crack index in certain cities fits with rising black youth homicides and poor birth outcomes in the late 1980s and early 1990s.

The United States has a long history of legal restrictions on interracial marriage, which evolved across different states at different times. In this journal, Fryer [8] presented a fascinating historical analysis and descriptive work on marriage patterns by race and inter-racial marriage trends from 1880 to 2000 using microdata from the US population censuses. Fryer also explores the explanatory power of a Becker-style marriage model with some racial discriminatory tastes for explaining the patterns in the data. Fryer along with Steven Levitt, Lisa Kahn, and Jorg Spenkuch [17] has empirically examined "The Plight of Mixed Race Adolescents," documenting that mixed-race children have economic outcomes between blacks and whites, but that mixed-race kids have higher levels of risky and problem behaviors as adolescents. Fryer and his coauthors show that a model in the style of Roy (1951) focused on peer interactions can help explain this pattern with mixed-race kids having no predetermined peer group and choosing more risky behaviors to gain acceptance.

Until the 1960s, the "historically black colleges and universities" (HBCUs) were practically the only institutions of higher learning open to many blacks in the United States. However, the role of these institutions has changed substantially since about 1970. Fryer and Michael Greenstone [11] have produced a careful empirical study of the changing role of the historically black institutions in the higher education of US blacks. Using nationally representative data from the 1970s and the 1990s, Fryer and Greenstone find that in the 1970s HBCU matriculation was associated with higher wages and an increased probability of college graduation for blacks, relative to attending a traditionally white institution.

By the 1990s, however, there is a wage penalty for blacks attending the HBCUs, resulting from a 20 percent decline in the relative wages of HBCU graduates between the two decades. They explore a range of explanations for these patterns, and also consider the satisfaction with their educations of blacks attending both historically black and traditionally white institutions. Fryer and Greenstone's data find modest support for the possibility that the relative decline in wages for graduates of historically black institutions is at least partially due to improvements in the effectiveness of traditionally white institutions at educating blacks, rather than declines in the "quality" of the historically black colleges and universities.

Finally, one of the most infamous and grisly racist organizations in US history is the Ku Klux Klan, which claimed millions of members during its heyday in the mid-1920s. Fryer and Levitt [16] analyze the 1920s Klan: who joined it and also its social and political impact. They utilize a wide range of newly discovered data sources: information from Klan membership rolls, applications, and robe-order forms; an internal audit of the Klan by the accounting firm Ernst and Ernst; and a census that the Klan conducted after an internal scandal. Combining these sources with data from the 1920 and 1930 US population censuses, they find that individuals who joined the Klan were better educated and more likely to hold professional jobs than the typical American. During this time period, they uncover few tangible social or political impacts of the Klan and little evidence that the Klan had a large effect on black or foreign-born residential mobility, or on lynching patterns. Fryer and Levitt conclude that the 1920s Klan, at least outside the Deep South, is best described as a social organization built through a wildly successful pyramid scheme in which individuals at the top of the Klan got rich by charging fees and selling robes to individual members, with the entire process fueled by an army of highly incentivized sales agents selling hatred, religious intolerance, and fraternity in a time and place where there appears to have been much "demand" for such a "product."

Conclusion

As this review of his work illustrated, Roland Fryer has shown an extraordinary willingness and ability to master tools from many disciplines to use the most appropriate scientific methodology available to tackle research topics that help illuminate racial inequality and policies to address it. For example, he has designed, implemented, and analyzed large-scale field experiments in low-income urban schools and neighborhoods. Much of this work is done through EdLabs, the Education Innovation Laboratory at Harvard University, which Roland founded in 2008 and where he continues as its director. He has employed a wide variety of other approaches as well, ranging from historical archival research to alternative credible identification strategies including regression-discontinuity designs. He also has done pathbreaking theoretical work on the economics of affirmative action, models of peer effects, and the measurement of segregation.

I have had the pleasure of being able to interact with and learn from Roland on a regular basis since he arrived at Harvard in 2003. Roland combines much good humor and geniality with a seriousness of purpose and laser-beam focus on data, research methods, and theory. For an easily accessible taste of Roland's intellectual approach and persona, interested readers can watch his 2014 Henry and David Bryna Lecture at the National Academy of Sciences on the subject, "21st Century Inequality: Does Discrimination Still Matter?" Video and slides from the lecture are available at http://sites.nationalacademies.org/DBASSE/DBASSE_088044, and an edited version of the talk is published as Fryer (2014). I look forward to continuing to learn from Roland's ongoing projects, including short-run and long-run impacts of school and neighborhood interventions, as well as the measurement of potential racial biases in policing. His innovative and creative research contributions are sure to continue to deepen our understanding of the sources, magnitude, and persistence of the US racial divide and of broader issues related to social and economic inequality.

References

Abdulkadiroğlu, Atila, Joshua D. Angrist, Peter D. Hull, and Parag A. Pathak. 2014. "Charters without Lotteries: Testing Takeovers in New Orleans and Boston." NBER Working Paper 20792, December.

Bond, Timothy N., and Kevin Lang. 2013. "The Evolution of the Black-White Test Score Gap in Grade K-3: The Fragility of Results." *Review of Economics and Statistics* 95(5): 1468–79.

Bloom, Howard S., and Rebecca Unterman. 2014. "Can Small High Schools of Choice Improve Educational Prospects for Disadvantaged Students?" *Journal of Policy Analysis and Management* 33(2): 290–319.

Bursztyn, Leonardo, and Robert Jensen. 2015. "How Does Peer Pressure Affect Educational Investments?" *Quarterly Journal of Economics* 130(3): 1329–67.

Cave, George, Hans Bos, Fred Doolittle, and Cyril Toussaint. 1993. *JOBSTART: Final Report on a Program for School Dropouts*. October. MDRC, Manpower Demonstration Research Corporation. http://www.mdrc.org/sites/default/files/full_416.pdf.

Dubner, Stephen J. 2005. "Toward a Unified Theory of Black America." *New York Times Magazine*, March 20.

Fordham, Signithia, and John Ogbu. 1986. "Black Students' School Success: Coping with the Burden of 'Acting White.'" *Urban Review* 18(3): 176–206.

Fryer, Roland. 2014. "21st Century Inequality: The Declining Significance of Discrimination." *Issues in Science and Technology* 31(1).

Muralidharan, Karthik, and Venkatesh Sundararaman. 2011. "Teacher Performance Pay: Experimental Evidence from India." *Journal of Political Economy* 119(1): 39–77.

Roy, A. D. 1951. "Some Thoughts on the Distribution of Earnings." *Oxford Economic Papers* (New Series) 3(2): 135–46.

Spence, Michael. 1973. "Job Market Signaling." *Quarterly Journal of Economics* 87(3): 355–74.

This article has been cited by:

1. Kate Cooney. 2017. Legitimation dynamics: How SROI could mobilize resources for new constituencies. *Evaluation and Program Planning* **64**, 110-115. [Crossref]