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**Article**

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*Suggested Citation:* Gruber, Jonathan (2000) : Program report: Children, NBER Reporter Online, National Bureau of Economic Research (NBER), Cambridge, MA, Iss. Summer 2000, pp. 1-7

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SUMMER 2000

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## Program Report

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### Program on Children

Jonathan Gruber\*

Policymakers and the public in general have shown intense interest in recent years in issues related to the well-being of children. For example, the 1997 Children's Health Insurance program, which potentially made millions of new children eligible for public health insurance, was the single largest health insurance coverage expansion of the past 30 years. Debates over crime, the justice system, and access to guns, particularly in the wake of recent school shootings, have especially focused on juvenile crime. The comprehensive tobacco regulation legislation proposed by the Clinton administration in 1998 was aimed primarily at reducing youth smoking. And education policy, in particular questions of school choice and the federal role in regulating education decisions, is a central issue in this year's presidential elections.

The NBER's Program on Children aims to take advantage of this growing interest and the expertise among academic economists in issues related to child well-being. It has benefited from an Integrated Research Program Grant from the National Institute of Child Health and Human Development, through which a number of our researchers have found sponsorship for their work. In this report, I summarize the activities of the Program over the past several years. These activities have focused on five broad areas: education, transfer programs, family structure, youth employment, and risky behaviors.

#### Education

Education is a centerpiece of the work done by members of the Program on Children. They have focused in particular on assessing the benefits to youths from different types of educational interventions, either contemporaneously in terms of test scores or other educational outcomes, or in the long

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run in terms of improved labor market prospects.

A central research question in labor economics is: what is the rate of return to additional years of education? But a fundamental difficulty with answering that question is that years of education are not assigned randomly to individuals but rather are chosen, and these educational choices may be correlated with the individual's underlying ability. Orley C. Ashenfelter and Cecilia E. Rouse attempt to address this issue by using data from a sample of twins to control for underlying differences in ability across families. They confirm that there is a substantial rate of return to an additional year of education, in the form of a 9 percent rise in earnings.<sup>1</sup> Work by John Cawley, James J. Heckman, and Edward Vytlačil implicitly confirms this conclusion, noting that the rising return to education in recent years is not attributable solely to a rising return to ability.<sup>2</sup>

One way to increase the educational attainment of high school dropouts is through the General Educational Development (GED) degree. But again, one cannot simply compare the outcomes of those with and without GED degrees, because it may be only dropouts with higher ability who go on to take this additional educational step. John H. Tyler, Richard J. Murnane, and John R. Willett take into account variations in state standards for attaining a GED degree; they find substantial returns to a GED degree, including an increase in earnings of 10–19 percent.<sup>3</sup> These returns are concentrated in the least able GED recipients.<sup>4</sup>

How might governments improve the quality of a given level of education, and thereby raise the return to any level of attainment? Perhaps they could reduce the number of pupils per teacher in the classroom. Alan B. Krueger evaluates an influential social experiment run by the state of

Tennessee in which some children were assigned randomly to smaller size classrooms. He finds that these children perform significantly better than the other students on exams as youths and are more likely to take (and do well on) college entrance examinations as teens.<sup>5</sup> This effect is particularly large for minority students, with small classes cutting in half the black/white gap in college test taking. Anne Case and Motohiro Yogo similarly find significant benefits of smaller class sizes for blacks in South Africa.<sup>6</sup>

On the other hand, Caroline M. Hoxby notes that real variations in pupil-teacher ratios arise from the natural variation in the population of school-age children; she finds that these class-size variations have no impact on student outcomes.<sup>7</sup> Erik A. Hanushek, John F. Kain, and Steven G. Rivkin conclude that, while smaller classes do appear to provide a modest benefit for lower income children in earlier grades, their effects are small relative to the effects of changing teacher quality.<sup>8</sup> Paying teachers more does not greatly improve teacher quality, though, according to these three economists; the primary determinant of teacher quality appears to be the quality of the student body being instructed.<sup>9</sup> Finally, Joshua D. Angrist and Victor Lavy find that in Israel increasing teacher training induced significant improvements in student achievement and may have been more cost effective than reducing class sizes.<sup>10</sup>

A significant component, perhaps the majority, of the rise in educational spending in recent years has been the special educational resources devoted to disabled students. Hanushek, Kain, and Rivkin find that more spending on special education students significantly improves the outcomes of those students without lowering the outcomes of regular education students.<sup>11</sup> But Julie B. Cullen notes that

financial incentives for labeling students as disabled lead to more students being served in special education, suggesting an important trade-off for policy design in this area.<sup>12</sup>

Another contentious area of educational policy has been school choice and the availability of vouchers, which parents can use to pay for an alternative to their local public school. Rouse evaluates a targeted voucher program in Milwaukee and finds that it had positive effects on student mathematics exam scores, but not on their reading scores.<sup>13</sup>

Finally, there is the critical area of higher education. Susan M. Dynarski has studied the impact of educational subsidies paid under the Social Security program on the educational attainment of children of deceased parents. She finds that these substantial grants have led to more college attendance and completion; at standard rates of return to college education, this was a very cost-effective program.<sup>14</sup> But Stephen V. Cameron and James J. Heckman conclude that long-term factors, such as parental income and educational attainment, are most important for determining children's higher educational attainment.<sup>15</sup> In either case, David Card and Thomas Lemieux confirm that the returns to attending college are large and rising over the past several decades; these returns may be attributable to the falling supply of college graduates, which has not been explained.<sup>16</sup> There are also differential returns, though, to attending the "right" college: Stacey B. Dale and Krueger find that attending a more selective college does not have significant returns in the labor market, but attending a more expensive college does.<sup>17</sup>

### **Transfer Programs**

There are a large number of government transfer programs that affect

the well-being of children. Perhaps the most important is the Medicaid program, which provides health insurance to low-income children (and other groups). A substantial body of work that I have reviewed finds that the expansions of the Medicaid program over the 1980s and early 1990s raised Medicaid coverage of children (while lowering, to a lesser extent, their private insurance coverage), increased their health care utilization, and improved their health outcomes.<sup>18</sup> In other work with Janet Currie, I find that Medicaid eligibility increases the intensity with which low-income populations are treated in the hospital. However, eligibility also reduces treatment intensity for middle-income populations who may be dropping their private coverage and moving to Medicaid coverage, which provides lower reimbursement levels to physicians.<sup>19</sup> Leemore Dafny and I find that Medicaid eligibility reduces the incidence of avoidable hospitalizations among youth, presumably by improving their use of preventative care.<sup>20</sup> This conclusion is confirmed by Robert Kaestner, Theodore Joyce, and Andrew Racine, but they find little impact of Medicaid eligibility on self-reported measures of health.<sup>21</sup>

Finally, a major current concern with the Medicaid program is that many children who are eligible for this benefit do not take it up. Currie and Jeffrey Grogger find that as Medicaid eligibility expands there is both more Medicaid coverage and more use of medical care, but that both fall as the welfare system contracts, as it has in recent years.<sup>22</sup>

Cash welfare payments represent another transfer program of particular interest to both the research and policy communities. Christina Paxson and Jane Waldfogel find that reductions in welfare benefit levels are associated with increases in child maltreatment.<sup>23</sup> Phillip B. Levine and

David J. Zimmerman find no evidence of an association between welfare benefits and child cognitive outcomes, though.<sup>24</sup> Robert F. Scheoni and Rebecca M. Blank observe that recent reforms to the welfare system have led to significant reductions in public assistance participation and to increases in family earnings.<sup>25</sup> Bruce D. Meyer and Daniel T. Rosenbaum also find that reforms of the welfare system have led to increased labor supply for single mothers, although this represents only a small share of the striking upward trend in the 1990s in work by single mothers. They suggest that expansions in the Earned Income Tax Credit are a much more important explanation for this trend.<sup>26</sup>

Other studies have focused on related transfer programs targeted to low income populations. Richard B. Freeman and Waldfogel find that the substantial expansions in child support programs across the states over the past two decades have increased awards and receipt of child support significantly, explaining as much as one-fifth of the impressive gains in child support payments over this period.<sup>27</sup> Currie and Duncan Thomas have documented substantial gains in test scores from participation in the Head Start preschool program, but these effects appear to fade out quickly for blacks, because of the low quality schools in which they enroll after this intervention.<sup>28</sup> Currie and Aaron Yelowitz show that, while public housing projects have substantial disadvantages, they are better than the alternative housing arrangements available to children who receive this entitlement: public housing reduces residential crowding and grade repetition for those children.<sup>29</sup>

Another major focus of NBER researchers is child care and parental leave policies. Patricia M. Anderson and Levine find that lower prices for child care significantly increase the odds of work among mothers.<sup>30</sup>

Robert J. Lemke, Ann D. Witte, Magaly Queralt, and Robert Witt conclude that child care subsidies are an important determinant of the work decisions of welfare mothers.<sup>31</sup> But Karen Norberg sounds a cautionary note about attempting to measure the effect of child care on youth outcomes: she points out that the mothers of the least able children do not appear to put these children into child care settings. Thus it is difficult to do simple comparisons of the typical child in and out of a child-care setting.<sup>32</sup> In related work that focuses on parental leave, Christopher Ruhm finds that, across developed nations, increased access to leave is associated with significant improvements in child health.<sup>33</sup>

### Family Structure

The past several decades have witnessed a remarkable shift in the nature of the American family; a number of NBER researchers have studied the factors relating to this shift and its implications for youth outcomes. One of the most important changes over this period was the increased availability of abortion. A key question raised by this increase is: what would have happened to the children who were instead aborted? Levine, Douglas Staiger, and I examine the characteristics of cohorts born before and after the expanded availability of abortion in the early 1970s and conclude that the children who were not born would have lived in much worse circumstances than the average child, with a higher likelihood of living in poverty or in a household headed by a single female.<sup>34</sup>

Another key demographic shift that has been studied is the rising incidence of teen motherhood. Somewhat surprisingly, V. Joseph Hotz, Seth G. Sanders, and Susan W. McElroy find that women who become teen mothers do not appear to suffer, in terms of later educational

or labor market outcomes, relative to otherwise comparable women whose childbearing is delayed because of miscarriages.<sup>35</sup> Furthermore, Angrist and Lavy conclude that being born to a teen mother has no impact on childhood disabilities, while it has a sizeable effect on the incidence of grade repetition.<sup>36</sup>

Finally, family structure has been modified by growth in nontraditional family arrangements. Case, I-Fen Lin, and Sara McLanahan find that children raised in stepfamilies receive less food, for example, than children raised by their biological mothers. This suggests that biological ties to parents may be important for child outcomes.<sup>37</sup>

### Employment

A number of NBER researchers are interested in the determinants and implications of work by youth. Francine D. Blau and Lawrence M. Kahn find that youth employment and wages are higher in Germany than in the United States; these differentials appear to be the result of a much stronger public sector presence in the German labor market.<sup>38</sup> David Neumark and William Wascher conclude that higher minimum wages reduce youth employment across developed nations, but this impact is mitigated by labor market flexibilities (such as a youth subminimum wage).<sup>39</sup> In terms of implications, Hotz and his co-authors find that, in the United States the net effects of work during the high school years are uncertain and probably modest.<sup>40</sup>

### Risky Behaviors

The pursuit of risky activities by teens — including substance use and abuse (smoking, drinking, using marijuana), criminal activities, unprotected sex, dangerous driving, dropping out of school, poor nutrition, and suicide — is a critical issue for the well-being of children.

Recently, I coordinated a project on these topics entitled *Risky Behavior among Youth: An Economic Analysis*.<sup>41</sup> This project brought together papers that focused on the determinants and implications of risk taking by youth.

The studies in this project presented three important conclusions. First, economic incentives — in the form of prices, regulations, or opportunity costs — are an important determinant of the decision to engage in virtually every risky behavior we studied. For example, Jonathan Zinman and I find that youth smoking is very sensitive to the price of cigarettes, with each 10 percent rise in price leading to a 6.7 percent decline in the incidence of smoking by high school seniors.<sup>42</sup> Rosalie L. Pacula and her co-authors conclude that use of marijuana among young people is also fairly price sensitive.<sup>43</sup> Steven Levitt and Lance Lochner find that a central determinant of the criminality of youths relative to adults is the stringency of the legal system with respect to youth versus adult crime.<sup>44</sup> Thomas S. Dee and William N. Evans observe that mandatory seat belt laws reduce vehicle fatalities among youths by 8–10 percent, and higher minimum legal drinking ages are also associated with significant declines in fatalities.<sup>45</sup> Phillip J. Cook and Michael J. Moore find that the legal drinking age is a key determinant of the pattern of drinking among youth, and particularly of binge drinking.<sup>46</sup> Levine shows that the incidence of unprotected sex among teens falls with the availability of labor market opportunities for women and the incidence of AIDS.<sup>47</sup> Card and Lemieux find that state college tuition policy is an important determinant of the decision to dropout of high school: when state tuition is low, individuals are more likely to complete high school, because the cost of continuing education is reduced.<sup>48</sup> And Jay Battycharya and Currie conclude that

exposure to free meals in school improves the quality of diet of youth.<sup>49</sup>

However, economic incentives alone cannot explain much of the dramatic trends over time that we have seen in these risky behaviors. In the 1990s, substance use among youths was rising significantly, with a one-third increase in the rate of smoking and a doubling in the rate of marijuana use. But there were equally significant reductions in youth crime (40 percent) and teen pregnancy (20 percent). There is no simple unifying story to explain these disparate trends, nor do the papers in this volume find a dominant explanatory role for the factors already discussed. Clearly, more work is needed to understand what is driving the striking and inconsistent movements in these indicators of risk taking by youths.

Finally, some of these studies show that there are important long-run implications of youth risk taking. Zinman and I find that higher smoking rates among groups of young people are associated with higher smoking rates by those same groups as adults. We also find that those who faced higher taxes on cigarettes as youths were less likely to smoke in their adult years.<sup>50</sup> Similarly, Cook and Moore show that those who faced lower drinking ages as youths are more likely to be binge drinkers as adults.<sup>51</sup> Finally, Card and Lemieux find that youths who drop out of school in response to lower unemployment rates do not return later in life to complete their education.<sup>52</sup>

## Conclusions

The work summarized here obviously encompasses a wide range of topics, and this summary does not even include other recent work by Program affiliates on an additional variety of subjects. A common theme throughout these papers is careful attention to making a convincing case

for the behavioral effects being documented. This work is on the cutting edge of empirical public finance and labor economics methods that are increasingly able to surmount the traditional problems of sample selection and endogeneity which plagued previous efforts to assess the impact of economic factors on child well being. The result is a convincing set of studies on some of the most important policy questions affecting children today.

The Children's Program continues to grow and expand its scope. Through projects such as those described above, the members of this Program are forming a strong base of evidence that can both advance economists understanding of the determinants of child well being, and provide an empirical basis for rational policy making for this important population group.

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<sup>2</sup> J. Cawley, J. J. Heckman, and E. Vytlačil, "Cognitive Ability and the Rising Return to Education," NBER Working Paper No. 6388, January 1998.

<sup>3</sup> J. H. Tyler, R. J. Murnane, and J. B. Willett, "Estimating the Impact of the GED on the Earnings of Young Dropouts Using a Series of Natural Experiments," NBER Working Paper No. 6391, February 1998.

<sup>4</sup> R. J. Murnane, J. B. Willett, and J. H. Tyler, "Who Benefits from Obtaining a GED? Evidence from High School and Beyond," NBER Working Paper No. 7172, June 1999.

<sup>5</sup> A. B. Krueger, "Experimental Estimates of Education Production Functions," NBER Working Paper No. 6051, June 1997; and A. B. Krueger and D. Whitmore, "The Effect of Attending a Small Class in the Early Grades on College Test Taking and Middle School Test Results: Evidence from Project STAR," NBER Working Paper No. 7656, April 2000.

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<sup>50</sup> J. Gruber and J. Zinman, "Youth Smoking in the United States: Evidence and Implications," in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

<sup>51</sup> P. J. Cook and M. J. Moore, "Environment and Persistence in Youthful Drinking Patterns," in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

<sup>52</sup> D. Card and T. Lemieux, "Dropout and Enrollment Trends in the Post-War Period: What Went Wrong in the 1970s?" in *Risky Behavior among Youth: An Economic Analysis*, J. Gruber, ed., forthcoming.

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## Research Summaries

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### Stock Markets, Behavior, and the Limits of History

William N. Goetzmann\*

Like many of my colleagues in financial economics, I have long been fascinated by the dynamics of the stock market. While the highs and lows of the Dow Jones Industrials Index are a topic of constant discussion in the financial press, the underlying forces behind its movements — both in the long and the short term — largely remain a mystery. For example, few scholars have a good explanation for why stock prices on a given day suddenly may be worth 20 percent less than the day before. By the same token, scholars disagree widely over the magnitude of the equity premium — that is, how much investors expect to be compensated for taking stock market risk over the long term. However, despite our lack of understanding of its daily and long-term motivating forces, most of us are will-

ing to invest a substantial portion of our savings in the stock market.

I have conducted much of my research on the stock market in close collaboration with co-authors intrigued by the same questions. In one way or another, our work has been tied closely to the dominant, underlying model of stock market behavior, Brownian motion, otherwise known as the random walk. In simplest terms, we look at what causes the market's apparent Brownian motion, when the market violates the laws of Brownian motion, and what happens when Brownian motion interacts with the forces of history.

Biologist Robert Brown in 1827 first observed through his microscope the curious random dance of suspended pollen particles, but it took nearly a century for science to understand how the movement results from bombardment by unseen molecules. The impact of tiny particles only could be inferred from motion, not observed directly. Until recently, stock market researchers have confronted the same problem. While we can chart the path of the market on a minute-by-minute basis, we rarely observe who buys, who

sells, and how demand and supply shocks affect price movements. We have many interesting theories about how the behavior of different investors moves prices, but empirical evidence on the critical link between observable investor decisions and price dynamics is hard to find.

#### Investor Behavior and the Brownian Price Process

Despite the dearth of direct empirical links between demand and price changes in asset markets, some interesting exceptions exist.<sup>1</sup> For example, when the composition of the widely held S&P 500 Index changes, investment funds that hold the index need to rebalance. It is now well established that on such rebalancing days, the prices of added stocks move up and the prices of deleted stocks move down.<sup>2</sup> This evidence recently led my co-author Massimo Massa and me to ask whether daily shifts in demand by index funds could move the value of the entire S&P 500 Index rather than moving just one stock. In our NBER Working Paper,<sup>3</sup> we document a positive relationship between daily demand shifts by investors in S&P 500 Index funds and broad movements in the stock market. We

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