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The economic costs of childhood poverty in the United States

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This paper attempts to estimate the aggregate annual costs of child poverty to the US economy. It begins with a review of rigorous research studies that estimate the statistical association between children growing up in poverty and their earnings, propensity to commit crime, and quality of health later in life. We also review estimates of the costs that crime and poor health impose on the economy. Then we aggregate all of these average costs per poor child across the total number of children growing up in poverty in the United States to obtain our estimate of the aggregate costs of the conditions associated with childhood poverty to the US economy. Our results suggest that these costs total about $500 billion per year, or the equivalent of nearly 4% of gross domestic product (GDP). More specifically, we estimate that childhood poverty each year: (1) reduces productivity and economic output by an amount equal to 1.3% of GDP, (2) raises the costs of crime by 1.3% of GDP, and (3) raises health expenditures and reduces the value of health by 1.2% of GDP.

Introduction

Why should a country expend scarce public resources to reduce its poverty rate? The most common response to this question focuses on the *moral* case that reducing poverty is fair and just. This argument usually stresses the high costs imposed on individuals and families, especially children in poor families, when they are poor. In a nation where equal opportunity is a widely accepted goal for public policy, inequities associated with children growing up in poverty are troubling.

Others argue for poverty reduction on *economic* grounds. In this view, poverty burdens society and robs it of some of its productive potential. The economic costs of poverty to society include certain public expenditures on poor families, especially for conditions and behaviors – such as poor health and crime – associated with the poor. Costs borne by victims of crime are examples of private expenditures and losses for the poor and nonpoor that should count as burdens as well. Moreover, the income that the poor might have earned represents a loss of productive capacity and output that ultimately reduces the aggregate value of our economy. According to this argument, quite apart from considerations of equity and justice, it may be in the nation's material self-interest to reduce poverty.

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When viewed in economic terms, expenditures on effective poverty reduction policies can be viewed as public or social *investments*, which generate returns to society over time in the form of higher real gross domestic product (GDP), reduced expenditures on crime and health care, reduced costs borne by crime victims and those in poor health, and more general improvements in everyone's quality of life. To make the case for these investments, we need to estimate the social costs associated with poverty, and thereby gain some sense of the returns on investments in effective poverty alleviation policies.

Our focus on the economic and social costs of poverty adopts a very broad conception of 'poverty' by including not only low family income but also the broad range of family and community circumstances associated with low income. Before presenting our estimates, we review our conceptual framework and its limitations. We then present our estimates and conclude with some thoughts and implications.

All told, we estimate that the costs to America associated with the conditions associated with childhood poverty total $500 billion per year – the equivalent of nearly 4% of GDP. In other words, we could raise our overall consumption of goods and services and our quality of life by about one-half trillion dollars a year if the conditions associated with childhood poverty were eliminated. If anything, this calculation likely understates the true annual losses associated with US poverty.

Our approach

We seek to estimate links between poverty among *children* and the correlated elements of their behavior or circumstances as *adults* that generate economic costs for US society. A very extensive body of literature (e.g., Duncan and Brooks-Gunn 1997) documents consistent and often substantial associations between the incomes of families in which children grow up and both the cognitive and behavioral development of children as well as important outcomes they experience as adults. These unadjusted correlations reflect some combination of low childhood income; the very disparate home, school, and neighborhood environments in which more affluent and poorer children grow up; and possible genetic influences.

A recent study summarized some of the environmental differences as follows:

> [C]ompared with kindergarteners from families in the bottom fifth of the socioeconomic distribution . . ., children from the top fifth of all families are four times more likely to have a computer in the home, have three times as many books in the home, are read to more often, watch far less television, and are more likely to visit museums or libraries . . . These differences in early environments contribute to large gaps in test scores, which show up even at a very early age . . . The early years also appear to be a sensitive period for the development of noncognitive skills . . . large differences in noncognitive outcomes such as physical aggression between children in families above versus below the poverty line have been documented . . . These early gaps in cognitive and noncognitive skills tend to persist through the school years and into later life. Those who score poorly before entering kindergarten are likely to do less well in school, [and more likely] to become teen parents, to engage in crime, and to be unemployed as adults. (Ludwig and Sawhill 2007, 5–6)

Family economic conditions appear to have an impact on children because they affect the material and social resources available to children and family psychological

processes, such as parental emotional well-being and parenting styles. Low family income is also linked to environmental contaminants such as lead, which has been linked to both lower IQ and higher crime (Nevin 2000). And differences in the quality of schools attended and neighborhoods resided in by children of different family backgrounds up through the teen years likely reinforce and widen the many gaps that emerge early on in the home.

The focus of this paper is on estimating how the broad set of potentially malleable conditions associated with childhood poverty in the United States affects outcomes for adults later in life, and what these effects imply for the broader US economy and society. We estimate the reductions in the annual aggregate US production of goods and services (as measured by poor children's eventual adult earnings) associated with childhood poverty, as well as the additional expenditures (both public and private) and reduced safety and well-being due to crime and poor health associated with adults who grow up poor as children. One can think of this exercise as estimating the total economic value of increased production and higher quality of life that would accrue to the United States if childhood poverty were eliminated. We express the costs of poverty as a share of GDP. But these estimates also include some of the intangible social costs, such as the value of improved health, that are not directly counted as part of formal government GDP calculations but nonetheless have obvious value in Americans' quality of life.

As for our actual methodology, we measure the effects of poverty on these outcomes using estimates of the correlation between childhood poverty (or low family income) and such outcomes as adult earnings, participation in crime, or poor health.[1] Of course, some children who grow up poor do not become poor as adults and some who are not poor as children become poor later in life.[2] Our estimates represent the *average* likelihood of lower earnings, participation in crime, or poor health among adults who grew up in poverty.

In the jargon of economists, lost earnings are an *opportunity cost* – a cost that is incurred because the opportunity to be productive and generate earnings is lost. And since all earnings ultimately derive from economic output, it is reasonable to consider any forgone earnings associated with poverty as reflecting lost output for the US economy.[3]

In addition to considering lost earnings, we focus on childhood poverty's links to adult crime and poor health. These are certainly not the only possible costs of poverty, but they are likely to be the largest and most easily quantifiable. The value of other costs potentially associated with poverty, such as low cognitive skills (as measured by test scores) and low levels of education, should be largely captured by lost earnings.[4] In contrast, poor health and crime impose large costs well beyond the lost earnings of those who are sick or jailed, and these costs have been quantified by some researchers. These costs are often borne by the poor themselves and by crime victims or by taxpayers who pay for the public expenditures to deal with these problems.

The annual costs of crime and poor health associated with poverty are therefore the amount of each that is associated with the conditions associated with childhood poverty, multiplied by our estimates of the annual cost per 'unit' of crime or poor health to the US economy. Since lost earnings already represent a direct dollar cost to the economy, we need only calculate the direct loss of such earnings associated with childhood poverty. In all cases, these social costs per poor child need to be

aggregated across the number (or percentage) of all children who grow up in poverty, and then calculated as portions of GDP.[5]

An important issue raised by our approach is whether the estimated effects of poverty for children are caused by low family income *per se*, or by a broader range of family and community forces that adversely affect the poor. Susan Mayer's book (1997) argues that the costs of poverty have less to do with income than with the quality of the family life, schools, and neighborhoods that poor children experience. In turn, these non-pecuniary factors might be reflected in a range of attitudes, behaviors, and values that poor children develop and carry into adulthood, which might have been caused by their parents' and peers' attitudes, behaviors, and values in addition to (or even instead of) their low childhood income.

Of course, the latter interpretation does not imply that poverty is any less costly to the children who experience it. Rather, it implies that the mechanisms through which poverty hurts children may not be exclusively (or even primarily) financial. In that case, merely boosting the incomes of parents might not be the appropriate policy remedy. In our view, elaborated below, statistical efforts to disentangle the effects of income *per se* from other characteristics of poor parents, schools, and neighborhoods have not been conclusive.

As a result, we base our policy discussion on a very broad interpretation of the causal effects of childhood poverty.[6] Specifically, these effects are taken to include not only the impacts of low parental incomes, but also of the entire range of environmental factors associated with poverty in the United States, and all of the personal characteristics imparted by parents, schools, and neighborhoods to children who grow up with or in them. Accordingly, the set of potential policy levers that might reduce the disadvantages experienced by poor children go beyond just increasing family incomes. Of course, in defining poverty this way, we also assume that the entire range of negative influences associated with low family incomes would ultimately be eliminated if all poor children were instead raised in nonpoor households, a point to which we return in our policy discussion.

This broad interpretation of poverty effects enables us to use estimates of the correlation between childhood poverty and adult outcomes, rather than estimates from studies that adjust for factors correlated with poverty, such as parental education, race, and family structure. Our broader interpretation of the effects of poverty enables us to avoid the issue of causal effects of income *per se* and measure the impact of poverty along with its related characteristics such as neighborhood and parental characteristics.

Our broad definition of poverty risks attributing too much of the lower earnings, poorer health, and greater tendency to commit crime among poor adults to childhood poverty. In particular, we know that genes can play an important role in determining such personal attributes as height, weight, physical and mental health, temperament, and cognitive ability. The degree to which the observed association between growing up in a disadvantaged family and later life outcomes is caused by inherited rather than environmental causes remains controversial, and we do not take a strong position on this question. We also recognize that genetic research has sometimes been misused and misinterpreted (by racists or others advocating harsh treatment of the poor) in ways that we oppose.

Still, in acknowledging that there may be a hereditary component of poverty, and in order to generate a conservative estimate for the social costs of having children

grow up in poverty, we err on the side of overadjusting for possible genetic contributions to the intergenerational transmission of disadvantage. The best available studies on this topic rely heavily on comparisons of identical and fraternal twins, on studies of siblings raised separately after birth and those raised together (where the former have only shared genes and very little shared environment), or on twins/siblings adopted by families of differing socioeconomic statuses. Since such studies often generate a range of estimates (and are often based on richer data from other countries, particularly Sweden), we use estimates of hereditary effects that have been judged by respected scholars to be the most plausible and convincing in each case. Our adjustments might well overstate the hereditary component of poverty (for reasons discussed below), but we make them for the purpose of arriving at conservative conclusions.

All in all, we believe that our estimates almost certainly underestimate the true costs associated with poverty. For one thing, many children who do not grow up poor become poor as adults, and their poverty likely imposes costs on themselves and the nation. It is very difficult to separate causes from effects of poverty in these cases, so we do not attempt to measure these costs. But they are likely to be substantial. Furthermore, we cannot capture all of the many costs associated with child poverty, such as the nonmonetary costs borne by the poor themselves, or the costs of living in poor areas that are not captured by crime or health measures.

A few other analytical and interpretative issues must be mentioned here as well. The costs associated with poverty for children will almost certainly depend on the number of years they spend in poverty, and may also depend on the timing of poverty – in early childhood, primary school, or adolescence. Poverty is dynamic, with some families experiencing temporary spells of poverty and others poor for extended periods (e.g., Blank 1997). Longer (or more permanent) spells of poverty will likely be costlier to children than shorter (or more temporary) ones. Consequently, the number of years spent in poverty, or a family's average income over the years of childhood, will be used in most studies as the primary determinant of its effects. On the other hand, recent research also suggests that the timing of poverty matters as well. Given that poverty early in life may be most damaging (Duncan et al. 1998), it may well be true that even short spells of poverty during those years can impose large and permanent costs on children. Far fewer studies measure the timing of poverty for children, though its importance must certainly be acknowledged.

In defining and measuring poverty during the childhood years, we rely on many studies that use the official 'poverty line,' despite its well-known limitations and arbitrariness (National Research Council 1995).[7] But since most of these studies use family incomes averaged over several years, those years in which family incomes were above but near the official poverty line will still contribute to poverty-level average incomes in many cases. Also, the choice of a reference group for the poor becomes critical in these calculations. We will generally use children with family incomes at twice the poverty line as our reference group for the poor, as this is considered by many researchers to be an upper bound of where a true 'poverty line' might be drawn. This level of income can also be considered an ambitious goal for antipoverty policy efforts.

Finally, we note that these definitions of poverty use an absolute rather than a relative income measure. Debate continues over whether absolute income levels or

inequality have a larger effect on outcomes, both in the United States and abroad, although the evidence suggests stronger effects of the former than the latter (Deaton 2003). This choice also suggests a more supply-based interpretation of how poverty hurts children, i.e., one that emphasizes the effects of growing up poor on individual skills, productivity, and behavior. Clearly, other economic factors also influence children's outcomes later on, such as the structure of wages and the quality of jobs generated on the demand side of the labor market. Even where the latter are important, the benefits of higher productivity, lower crime, and improved health associated with eliminating child poverty could result in an improvement in the quality of life for a broad range of Americans.[8]

Forgone productivity and earnings

As we noted above, a straightforward way to estimate the effects of childhood poverty, broadly defined, on adult earnings would be to use simple regressions in which adult earnings, averaged over several years, are regressed on the prevalence of poverty when the child was growing up.[9] Alternatively, some studies generate broader estimates of intergenerational mobility, where sons' (or daughters') earnings are related to those of their fathers (or mothers), or where the family incomes of the former are related to those of the latter. The two sets of studies differ from one another in the type of outcome they use (i.e., earnings, income, or some mix of the two), and in that the designation of an explicit poverty cutoff can allow for the effects of parental income to differ at various points in the income distribution (i.e., the estimated effects of income can be nonlinear).[10]

We draw on this entire range of studies below. All of them require longitudinal data on several years of earnings or income, both for parents and their children. In some of the most recent studies[11] that explicitly link the earnings of children to their parents' family income, Mayer (1997) and Corcoran and Adams (1997) show that doubling the incomes of families below or at the poverty line raises the earnings of their sons by 30–40% – with the larger estimates generated when longer periods of time are available for measuring sons' adult earnings, and without controls for parental education and other personal characteristics.[12] Benchmarking family income at the national median, rather than just to 1.5 times or twice the poverty line, generates effects that are roughly twice as large (as median household income is almost three times the poverty line for a family of four and more than three times the average income of a poor family).[13]

Alternatively, much of the earnings and income mobility literature in the 1990s (e.g., Solon 1992; Zimmerman 1992) generates intergenerational elasticities, in which percentage changes in parental earnings or income are related to percentage changes in those of offspring as adults. The best recent estimates suggest elasticities of at least 0.4, when many years of both parent and offspring earnings are used (in order to capture the permanent earnings or incomes of both), and near 0.5, when other statistical techniques are used to adjust for measurement error in the data.[14] More recently, when Bhashkar Mazumder (2005) uses similar statistical techniques on longer panels of intergenerational data from Social Security earnings records, he generates estimates of intergenerational elasticities above 0.6. These estimates are much higher than those generated in the 1970s and 1980s (which were often 0.2 or less), since measurement of permanent income and overall accuracy are now much

improved, and they suggest much less economic mobility over time than was previously thought.

Few of these studies show strong nonlinear effects that vary across the income distribution.[15] Differences across studies focusing on sons rather than daughters, or parental income rather than earnings, also appear to be quite modest (Solon 1999). Overall, these estimates imply effects of rising incomes for the poor that are quite comparable to those found by Mayer, Corcoran, and others who focused on poor relative to nonpoor families.[16]

To calculate the aggregate effects of childhood poverty on the earnings of adults, we use an average intergenerational elasticity estimate of 0.5 and a difference in family income of 0.98 log points, which represents the difference between the average incomes for poor families (about $14,500) and twice the poverty line for a family of four (about $38,800) in 2005. This implies a reduction of 0.49 log points in earnings for those who grew up in poverty relative to the median household. Since median adult earnings were about $30,500 in 2005, a reduction of 0.49 log points associated with poverty reduces average adult earnings to about $18,770, or by 39% relative to median earnings.[17] According to Blank (1997), 9.6% of all children grew up in families whose incomes were below the poverty line for more than half of all recorded years in the Panel Study of Income Dynamics (PSID) in the period 1979–1994. Adjusting for the fact that median earnings in the United States are about 60% of mean earnings,[18] and that earnings represent about 65% of GDP,[19] our calculations suggest that having this percentage of children growing up in poverty implies an annual reduction of GDP of 1.5%.[20] A comparable calculation for the roughly 8% of children who spend at least one-fourth of their time growing up in poor families (Blank 1997), with half as large an effect on their earnings (Corcoran and Adams 1997), is associated with an additional loss of 0.6% of GDP, for a total of roughly 2.1%.

How much of this reduction might be hereditary as opposed to environmental? Jencks and Tach (2006) carefully review the various studies of siblings, twins, and adoptions, using mostly Swedish, but some American, data. Abstracting from possible complicating interactions between genetic and environmental components, they arrive at a best guess of about 40% for the hereditary portion of intergenerational transmission of inequality, which implies that the other 60% represents the entire range of environmental factors.[21] Overall, then, our calculations suggest that once the hereditary component is factored out, the experience of growing up in poverty or near poverty for about 17% of our nation's children reduces the nation's aggregate output by about 1.3%, or about $170 billion per year.[22]

Of course, there is a range of estimates for several of the key parameters used in these calculations, and thus the real number could be higher or lower than $170 billion. Changes over time in the child poverty rate and the demographic makeup of the poor would affect these estimates, although we believe that the net effect of such changes would not greatly change our predictions.[23] And it is important to note that these calculations are all based on studies that include only those individuals who report positive earnings in any given year. Those with zero earnings – either due to incarceration, disability, death, or any other reason resulting in permanent labor force withdrawal – are not captured in these data, and, at least among minority men, the incidence of those with zero earnings has grown (Holzer, Offner, and Sorensen 2005). Their growing absence from the data likely implies downward biases in the

true estimates today, although the growth of earnings among low-income women in the 1990s (Blank 2002) might offset this to some degree.

It is also important to note that these estimates often represent the effects of parental income averaged over many years, frequently including children's teen years. Based on a range of studies from the developmental psychology literature, however, Duncan (2005) argues that the negative effects of low parental income are likely to be more severe when children are very young than in their later childhood, adolescent, or teen years, which implies more negative effects of certain periods of transitory low income, even relative to permanent income. Transitory events in the lives of parents, such as a particular episode of job loss, also can translate into relatively permanent reductions in income affecting children in their households.[24]

The studies that generate our estimates capture permanent but not transitory effects of parental income on the later earnings of children. Various attempts in the economics literature in the late 1990s to separate the effects on children of permanent versus transitory income changes were inconclusive.[25] Some greater progress has been made in the last few years to sort out the effects on children of the timing of income changes, and also the effects of income *per se* from the broader environmental effects of poverty. These recent studies use 'natural experiments' in the policy world to do so, as well as data from actual experimental evaluations.

For instance, Dahl and Lochner (2006) use the timing and location of extensions of Earned Income Tax Credits (EITC) to estimate the effects of higher income on children's achievement in poor families, while Morris, Duncan, and Rodrigues (2006) use data from various random-assignment welfare-to-work experiments, including those where earnings supplements were provided to the mothers of small children. Both of these studies find significant positive effects of earnings supplementation on child achievement. The experimental evidence also suggests that earnings supplements are most effective in boosting the achievement of younger children. On the other hand, Jacob and Ludwig (2006) use data from households that were randomly assigned (by lottery) to receive housing assistance in Chicago and find little gain in test scores but some modest gains in the educational attainment of youth.

Achievement increases for children, if sustained, are likely to translate into increases in educational attainment and earnings later in life. But since it remains unclear at this time to what extent the estimated effects of parental income on the later earnings of children can be attributed to income poverty, as opposed to broader environmental factors, we focus on the impacts of our broad conception of childhood poverty.

Overall, then, we conclude that children who grow up in persistently poor households have lower earnings as adults, with earnings losses reducing aggregate GDP in the United States by about 1.3%. It is unclear how much of the reduction is caused by low childhood income *per se* as opposed to the conditions associated with low family income. Other transitory effects of low income during early childhood and differences in relative as opposed to absolute income across parents may also be important, although these are not well captured by the studies used for our estimates.

Crime

The costs of crime associated with poverty depend on the impacts of childhood poverty on crime among adults as well as the costs to the overall economy associated

with crime. Bjerk (2004) estimates that youth growing up in the bottom quintile of the income distribution are about 1.3 times as likely as youth from the second income quintile to be involved in serious crime.[26] When Elliott and Ageton (1980) use data from the 1977 National Youth Survey to distinguish between violent and other serious crimes and measure the frequency of offending, they find that 'lower class' youth report committing nearly four times as many violent crimes as 'middle class' youth. In both studies, the estimated differences across income or class categories for property, drug, or other less serious crimes are smaller; but Cohen (2005) shows that violent crime accounts for the vast majority (as much as 84%) of the costs to victims of crime. Given this range of estimates, we conservatively infer that low childhood income doubles the likelihood that individuals commit costly crimes, relative to children growing up in families with incomes about twice the poverty line. We use these data to infer that the annual incidence of crime attributable to poverty is thus $0.2 \times 100\%$, or 20%.[27]

This number almost certainly understates the true magnitude of the poverty effect on crime by a considerable amount, since it is well known that self-reported crime rates in national surveys understate true rates, especially among minorities. Indeed, self-reported crime and arrest rates among young black men in the 1997 cohort of the National Longitudinal Survey of Youth (NLSY) are not dramatically different from those of young white and Hispanic men (Abe 2001; Hill and Holzer 2006), even though arrest rates among young black men are several times as high as those of their counterparts (Bureau of Justice Statistics 2006). One of the best known studies on the magnitude of this problem (Hindelang, Hirschi, and Weis 1981) states that actual criminal participation by blacks is two to four times as frequent as self-reported participation; some researchers (e.g., Viscusi 1986) have used this finding to adjust upwards the self-reported criminal income of blacks by a factor of three.

We assume that underreporting for blacks relative to whites is mostly driven by the differences across groups in average socioeconomic status (SES) rather than the effects of race *per se* on survey reporting patterns. Under this assumption, we expect underreporting to occur among low-income whites and Latinos.[28] To be conservative, we use the lower end of the range identified by Hindelang and his coauthors, and adjust our estimates by a factor of two. Hence, the incidence of annual crime and its costs attributable to poverty after we adjust for survey reporting problems is on the order of 40% (i.e., $2 \times 20\%$).

What are the costs imposed on the United States by the additional crime that is associated with poverty? In recent testimony to the Senate Judiciary Committee, Ludwig (2006) updates the well-known cost-of-crime estimates from Anderson (1999) and Cohen (2005) and argues that the total costs of crime in the United States may be as large as $2 trillion per year, of which about $1.3 trillion stems from 'street crime' and the remainder comes from economic crimes such as fraud and white-collar offenses. We conservatively assume that 'poverty' only matters for 'street crime' (though this is surely not the case in practice); that any changes in the crime rate only affect those parts of the costs of crime associated with victimization; and that protective measures against crime (such as spending on police, prisons, or private security) are essentially unchanged as a result of marginal changes in crime. The victimization costs of street crime are estimated to be on the order of $700 billion per year, based on the best available data for crime rates in the United States in recent years (Ludwig 2006).

As with forgone earnings, it is also important to net out the part of criminal activity that is likely attributable to hereditary rather than environmental factors. Here again, the available estimates are neither precise nor consistent. Raines (1993) reports that various studies of twins suggest that 50–70% of crime has a hereditary source, while the best adoption studies suggest much lower estimates, about 25%. Given the considerable uncertainty associated with such a wide range, we continue to use the 40% figure suggested by Jencks and Tach (2006) for our estimate of the hereditary component, or 60% for the environmental piece.

Overall, these figures suggest that poverty raises the costs of crime by at least $0.6 \times 0.4 \times \$700$ billion, or about \$170 billion annually. This figure represents about 1.3% of GDP today, and is still likely a lower bound to the true effect of poverty and crime on the economy.

Health

As in the case of crime, we need to compute the likely impacts of child poverty on the incidence of poor health, as well as the economic costs associated with poor health. Costs include additional expenditures on health care and the value of lost quantity and quality of life associated with early mortality and morbidity. In each case, our estimates are rather tentative.

To identify the impact of child poverty on later health outcomes, we use estimates from Case and colleagues (Case, Lubotsky, and Paxson 2002; Case, Fertig, and Paxson 2005) in which the impacts of income on self-reported categories of health (poor, fair, good, very good, excellent) are reported.[29] We use these estimates to predict the effects of family income increasing from the average of those currently in poverty to twice the poverty line (in log points), as we did earlier. We then use data on health expenditures by age group and health status (Agency for Healthcare Research and Quality 2006) to predict how child poverty affects health expenditures per age group.[30]

Finally, we convert these age-specific estimates over the life cycle to an aggregated set of annual health costs by computing the present discounted value of additional health expenses for all children born in poverty in a year, assuming four million births per year and a 15% child poverty rate.[31] Based on these assumptions, we find that poverty raises direct expenditures on health care by about \$22 billion per year. In addition, data on some other categories of direct expenditures, such as special education, along with estimates of the impact of poverty on assignments of children to special education classes generated additional direct expenditures of \$4 billion.[32] Together, these expenditures account for about 0.20% of GDP, though this no doubt understates the true effects of poverty (since expenditures on Social Security, Disability Insurance, and other categories are omitted here because of a lack of estimates of these poverty effects). Of course, the higher rates of morbidity and especially mortality among the poor have costs in terms of lost quantity and quality of life, above and beyond their effects on medical or education expenditures.[33] We use estimates provided by David Cutler and Elizabeth Richardson (1998), who estimate the value of 'health capital' at birth – in other words, the total value of lifetime health – for individuals born into poor relative to nonpoor families; and we once again convert these estimates into annual costs of mortality and morbidity for all poor children born in any given year.

The estimates of 'health capital' are the present discounted values of the expected numbers of 'quality-adjusted life years' (QALYs) for different groups. QALYs are essentially life expectancies, adjusted for the effects of various illnesses on self-reported quality of health; they thus capture the effects of both differential mortality and morbidity in one measure. Each year is then valued using an average annual 'value of statistical life,' which is routinely used to measure the cost-effectiveness of medical procedures and the value of various health and environmental risks. Some estimates of this value (e.g., Aldy and Viscusi 2006) allow it to vary over the life cycle before computing an average annual value. But these calculations are generally not based on earnings, and therefore do not overlap with the estimates of lost productivity and earnings that we calculated above.[34]

Cutler and Richardson, using a value of life of $100,000 per year (in 1997 dollars), estimate that poverty reduces the present discounted value of health capital over the lifetime of a child by about $124,000.[35] But the annual value of life on which this computation is based, or its equivalent in 2006 dollars ($127,000), is definitely at the low end of credible estimates. Alternatively, Aldy and Viscusi estimate the average annual value of life to be more than $300,000 in 2000 dollars, or about $350,000 in today's dollars. In another influential article, Miller, Richardson Vigdor, and Manning (2004) used a value of $160,000 per year, based on a survey of this literature published in the year 2000.

We conservatively use a value of $200,000 as an estimate of the annual value of life, which is much closer to the estimate of Cutler and Richardson (in current dollars) than to that of Aldy and Viscusi. As this estimate doubles the annual value of life used in Cutler and Richardson, we accordingly double their estimate of lost health capital per poor child to a value of $248,000 (in today's dollars). Again assuming that 15% of four million children born annually are born into poverty, we generate an estimate of lost 'health capital' of about $149 billion per year in the aggregate, or about 1.1% of GDP. This figure captures the economic value of lost quantity and quality of life, although not lost earnings (which we have measured separately).

Combining our estimates of additional expenditures and lost 'health capital' resulting from poverty thus generates an estimate of 1.3% of GDP. Once again, it is likely that some component of this effect is hereditary. Somewhat surprisingly, research has recently found that these components of the estimated socioeconomic impacts on health are relatively small. Using an estimate of 7%, our assessment of the impact of poverty on health costs is reduced to 1.2% of GDP per year.[36]

Conclusion

Summing the costs of forgone earnings and productivity, high crime rates and poor health associated with adults who grew up in poor households, we estimate the economic costs of US poverty to be:

Forgone earnings:	1.3% GDP
Crime:	1.3% GDP
Health:	1.2% GDP
Total:	3.8% GDP

Thus, our best estimates suggest that childhood poverty imposes costs on American society equal to nearly 4% of GDP, or about $500 billion per year.

We emphasize the tenuous nature of these estimates. In many cases, especially with respect to our attempts to attribute these costs to their hereditary and environmental components, the range of estimates we found in the relevant literatures was often very large. In these cases, we combine our assessment of the best scholarship with our best judgments to generate the most plausible point estimates. We cannot be certain that the effects we observe are driven by absolute or relative differences in parental income (or the rationing of a limited number of 'good jobs' on the demand side of the economy irrespective of the supply of skills), though these issues might affect the policy implications derived from this work.

On the other hand, we have good reason to believe that, if anything, our estimates understate the true costs of poverty to the United States, and therefore should be considered lower bounds of the true effects. First, we focus only on the effects of childhood poverty on subsequent outcomes for youth and adults, rather than poverty among adults who were not poor as children. Second, we consider only three components of costs (forgone output, crime, and health), and ignore others that are harder to quantify. Environmental costs such as the blight of poor urban neighborhoods and the costs of 'sprawl' generated by those who flee this blight when moving to the suburbs and exurbs in our metropolitan areas are ignored. Our calculations of earnings and crime costs omit a whole range of important non-pecuniary costs, mostly borne by the poor themselves, that reflect the 'psychic' costs and scars of unfulfilled potential, pain, and grief in the lives of poor individuals.

Our adjustments for the underreporting of crime in survey data and for the value of life when computing lost 'health capital' use calculations that are at the lower end of the range of credible estimates in the literature. Since our estimates of forgone earnings are based almost exclusively on those who participate at least marginally in the labor force each year, the experiences of those who do not – because of disability, early mortality, or other factors – are not captured in those estimates, nor are certain categories of additional public expenditures, such as disability and Social Security payments. Our estimates of the impacts of low family income mostly capture permanent income effects, rather than those transitory effects during early childhood years that could have important long-term negative effects on children. All of these considerations suggest that true poverty costs exceed our estimates.

What does all of this imply for public policy? Our $500 billion annual cost of childhood poverty to the United States suggests large *potential* returns to effective anti-poverty strategies. Because we defined poverty effects to include the broad range of environmental components associated with low childhood income, and we did not attempt to sort out the specific mechanisms through which poverty operates on children, our policy implications are, at best, very general. A very wide range of antipoverty policies might be effective at reducing the costs we estimate. The creation of higher-wage jobs (through a higher minimum wage, more collective bargaining, and so on), income supplementation (especially for working parents, along the lines of the EITC or earnings disregards for welfare recipients), education and training policies (including early education, class-size reduction, teacher training, or other reforms), neighborhood revitalization and housing mobility, marriage promotion, and faith-based initiatives might all be potentially useful in reducing those costs. In

each case, rigorous evaluation will continue to be needed to determine exactly which of these policies work and which do not.

Our $500 billion is large enough to suggest that the investment of significant resources in poverty reduction might be more socially cost-effective over time than we previously thought. Our calculations are not inconsistent with evidence from Dickens and Sawhill (2006) suggesting that making high-quality pre-kindergarten programs universally available to children might result in returns that could easily dwarf the related costs. Their preferred calculations suggest, in steady state, that such a program would increase GDP by 3.7% annually.[37] Interestingly, this magnitude suggests that very high-quality early childhood efforts could offset a very large part, though perhaps not all, of the costs of poverty to the United States that we estimate. Other investments, such as those which make the EITC more generous to working poor families, might have important positive effects as well (according to Dahl and Lochner 2006; Morris, Duncan, and Rodrigues 2006). At a minimum, it is clear that the high costs that childhood poverty imposes on the United States should motivate us to identify cost-effective strategies to reduce childhood poverty.

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Notes

1. These estimates come from regressions that take the following form: $Y_i = a + b\text{POVERTY}_{i+} u_{i,}$ where Y represents adult earnings, participation in crime, or poor health for person i and POVERTY is a dichotomous measure of whether person i spent at least a certain number of years as a child in a poor household. The coefficient b then represents the average (presumably negative) effect of childhood poverty on earnings, or its (positive) effect on their likelihood of engaging in crime or having poor health. In some cases, we use estimates based on a measure of average parental income rather than a poverty indicator as the independent variable. Using family income rather than poverty as the independent variable leads to expectations of a positive sign on the estimated coefficient b when the dependent variable is earnings or income, and a negative coefficient when it is crime or poor health. In this case, calculating $b \times$ POVINC - INC, where POVINC represents the poverty-level income and INC is a comparison benchmark level of income, generates a predicted impact of poverty with the same sign as the coefficient estimated from a poverty variable. The magnitudes of the estimated impacts of these income differences on outcomes should be comparable to those based on a dichotomous poverty indicator, as long as the effects of income on any outcomes are linear.
2. According to Corcoran (2001), the poverty rates at ages 25–27 for those who grew up in poor as opposed to nonpoor households are about 24 and 4%, respectively.
3. One previous attempt to calculate the economic costs of poverty in a similar manner can be found in a report by the Children's Defense Fund (1994).
4. This is not strictly true, as there are likely benefits to education that go beyond the higher wages and salaries they generate for individuals, but these are not easy to quantify.
5. Forgone adult earnings per poor child are ΔLOSTEARN/ΔPOVERTY, whereas the loss associated with crime would be ΔCRIME/ΔPOVERTY $\times \Delta$COST/ΔCRIME; and the

losses associated with poor health would be comparable to those of crime. Multiplying these fractions by POVERTY, that is the percentage of children who grow up poor, generates aggregate losses and costs that can be calculated as a percentage of GDP. Based as it is on marketed good and services, GDP does not capture all of the crime and health costs that we estimate. So while we express our total cost estimates as a fraction of GDP, it is not strictly true to say that GDP itself would increase by the total value of our estimated costs associated with childhood poverty.

6. Note that we omit from our cost estimates the poverty 'gap' of poor households themselves, defined as the difference between a household's income and its poverty threshold. To do so would be tautological: the costs of poverty would be defined as poverty itself. Nor do we estimate the effects of adult poverty on earnings capacity, crime, or health, since it is very difficult to determine whether adult poverty is a cause or an effect of crime and bad health.
7. Many studies we reference below use the average ratio of family income to poverty threshold-based 'needs' (with the latter based on family size) when children were growing up as the primary variable reflecting child poverty; ratios below one represent families below the poverty line. Some studies use family income as a linear variable rather than its ratio to needs; average income for a family of four, conditional on being in poverty, can be used in these cases to calculate the effects of childhood poverty on later earnings.
8. For instance, if there are a limited number of high-wage jobs in the economy for less educated workers (Andersson, Holzer, and Lane 2005), then childhood poverty might restrict the ability of individuals to compete for those jobs, but ultimately the 'causes' of their low earnings would include these demand-side economic variables as well as their own characteristics. Whether the labor market over the long run generates enough high-wage jobs to match rising worker skills remains a controversial issue in the economics literature. But, even if it does not, the benefits of higher productivity could be distributed to these or other workers, in the form of publicly subsidized wages or benefits or other publicly provided goods and services. The benefits of lower crime and better health would still accrue more directly to the public.
9. An even more straightforward way of estimating impacts of poverty would rely on experimental variation in income. In four income-maintenance experiments in the 1960s and 1970s, families were randomly assigned either to treatment groups that received income supplements or to a control group that received no special income supplements (Institute for Research on Poverty 1976; Kershaw and Fair 1976; US Department of Health and Human Services 1983; Salkind and Haskins 1982). However, child outcomes were not measured very well in the evaluation studies. School performance and attendance were affected positively in some sites for elementary school-age children, but not for high school-age adolescents. In the two sites reporting high school completion and advanced education, these outcomes were higher for the experimental group.
10. Nonlinear effects of income can also be tested even in studies that use a broader income measure, with various nonlinear (e.g., quadratic or logarithmic) functional forms.
11. Other studies besides those listed here include those of Hauser and Sweeney (1997) and Haveman and Wolfe (1995). We focus on the few studies below that were most recent and generated the empirical estimates that most closely follow the methodology described above.
12. Mayer finds that doubling average family income during the 13–17 age period from $15,000 to $30,000 in 1992 dollars (when the poverty line for a family of four was roughly $15,000) increases the earnings of sons by just less than 25%; but her equations include controls for parental education and other personal characteristics. Corcoran and Adams show that these controls reduce the coefficients on family income by about 40%, implying an effect in Mayer's estimates of about 0.4. In the Corcoran and Adams paper (Table 15.3), growing up in poverty reduces the adult family's income-to-needs ratio by about

20% relative to families with average income-to-needs ratios of 100–200% of the poverty line in an equation controlling for other factors, or about 35% without controls. In both papers, the ages of the adult offspring are only in their twenties or early thirties, which likely biases their estimates downward.

13. In Corcoran and Adams, those growing up in poverty (i.e., with average family incomes/needs below one) had incomes as adults about 35% lower than those who grew up in families with income-to-needs ratios between 200 and 300% of the poverty line when other factors are included as control variables, implying about a 60% difference without controlling for other factors. When they compare those who spent more than half of their childhood in families with below-poverty incomes to those who either spent less than half of their childhood in poverty, or those who were not in poverty at all, the estimates are almost identical. Mayer's estimates also imply similar magnitudes when comparing those at the poverty line to the median income level. In Corcoran (2001), the earnings of those who grew up poor on average are only 40% lower than those who were not poor on average, though her sample of adult men is very young and based only on three years of data.
14. Earnings and incomes in these studies are always measured in natural logs, which allow the estimated coefficients to be described as elasticities. Both Solon and Zimmerman use instrumental variables (IV) methods to reduce measurement error in parental income, which is likely to generate downward biases in estimates; in fact, their IV estimates are generally larger than those based on more traditional regression methods (i.e., ordinary least squares). These studies generally find that the estimated elasticities rise with the number of years of data included for both parents and offspring, and with the age of the offspring. A good review of the 1990s' literature can be found in Solon (1999).
15. On the one hand, Corcoran and Adams find larger effects on income elasticities at the very bottom of the income ladder, compared with the median. But Solon (1992) argues that the sons of the poor seem a bit more likely to rise out of poverty than the sons of the wealthy are to fall; his estimates, using earnings rather than income, are based on a quadratic functional form that does not necessarily allow estimated effects at the bottom to be larger than those at the middle of the income distribution. Hertz (2005) estimates income elasticities separately for blacks and whites over the entire income range; his estimates show little nonlinearity between the bottom and the middle of the income distribution.
16. For instance, a doubling of parental earnings or income from the poverty line to twice the poverty line, which implies an increase of 0.7 log points, would generate a rise of earnings or income of about 0.35 log points, or about 40%, using an estimated intergenerational elasticity of 0.5.
17. Our estimates of median annual earnings are based on weighted averages of full-time and part-time workers in 2005, aged 25 and above (Bureau of Labor Statistics 2006).
18. A variety of estimates suggest that *mean* annual earnings are now about $50,000. More details are available from the authors.
19. Gollin (2002) provides a range of estimates of the ratio of employee compensation to GDP.
20. In other words, $0.096 \times 0.39 \times 0.60 \times 0.65 = 0.015$.
21. Bowles, Gintis, and Groves (2005) argue that the most credible estimate of the hereditary effect is closer to one-third, though other papers in this literature suggest estimates of more than one-half. Also, Turkheimer et al. (2003) suggest that genetic inheritance and socioeconomic status (SES) of children interact, with very low hereditary effects for low-SES children and very high ones for high-SES children (since the environments of the latter allow them to reach their full innate potentials while those of the former do not). These interactions suggest that the 40% figure might well overstate the role of inherited traits for those from low-income families.

22. GDP is currently measured at roughly $13.2 trillion dollars per year by the US Department of Commerce.
23. The child poverty rate rose between the 1980s and mid-1990s, declined substantially in the late 1990s, and has risen modestly since 2000. The largest change in the demographics of the poor is the growth in the representation of Hispanics among them, mostly owing to immigration. Blacks have much lower mobility out of poverty than whites (Corcoran and Adams 1997; Hertz 2005), though we have few estimates for Hispanics alone. While the children of less educated immigrants traditionally have high intergenerational mobility, this has been much less true of Hispanic and especially Mexican-American immigrants in the past few decades (Borjas and Katz 2005).
24. Oreopoulos, Page, and Stevens (2005), using Canadian data, find that children whose fathers lost their jobs due to a plant closing had annual earnings that were about 9% lower than children from similar family backgrounds where the adult earner did not suffer a similar job loss. The decline in family income that results from job loss is certainly one plausible explanation for this pattern.
25. See, for example, Duncan et al. (1998) and Blau (1999) for estimates using a variety of 'fixed effects' models to sort out permanent and transitory effects.
26. Bjerk (2004, Table 1) shows that the estimated relationship between family income and involvement in serious crimes in the NLSY97 (after trying to adjust for measurement error with the family income variable) is equal to -0.043. The mean rate of involvement with serious crime for youth in the bottom income quartile in his data is 0.189 (personal correspondence between Jens Ludwig and David Bjerk, 11 August 2006), which implies that the mean offending rate for the second quartile is 0.146 and so (0.043/0.146) = 29%.
27. The 0.2 reflects the fact that 20% of children fall into the bottom quintile of the household income distribution. Also, the vast majority of serious crime in any year is committed by young men, so we can apply this estimate to the overall rate of serious crime commission per year. To the extent that some crime is committed by those beyond the age category of 'youth' (say, above the age of 24), we effectively assume that the estimated relationships between growing up in poverty and the incidence of crime in any year hold for this group as well.
28. For example Kling, Ludwig, and Katz (2005) use data from the Moving to Opportunity (MTO) experiment, which has a program population that is about two-thirds African-American and one-third Latino, and compare self-reported rates of arrest against arrest rates measured from administrative data, and find substantial underreporting. We might expect underreporting to be even more pronounced for actual criminal behavior rather than arrests, since the latter is at least in principle verifiable.
29. These papers report coefficients from ordered probit estimates of self-reported health on log parental income for different age groups, using American and British data, respectively. The 2002 paper presents estimates of the impact of poverty with no further controls, and also the impact of poverty when other characteristics such as parental education are accounted for, and in general the former coefficients are 1.5 times the latter. The 2005 paper only presents estimates controlling for other characteristics, so we inflate the reported coefficients by 1.5. We transformed the probit coefficients into partial derivatives for different categories of health. Studies using British data rely on a four-point self-reported health status measure instead of the five-point scale used in the United States. To make those comparable, we collapsed the top two categories in the US data ('excellent' and 'very good') into a single category. The work of Case and her coauthors also helps to establish the direction of causality as running from socioeconomic status in childhood to health of adults, since data on incomes and health of adults are plagued by causality running in both directions (Smith 1999).
30. We obtain the distribution of self-reported health status and average medical spending across various age groups (0–4, 5–17, 18–24, 25–44, 45–64, and 65–90) in 2003 tabulated

from the Medical Expenditure Panel Survey using the MEPSnet interface on the Agency for Healthcare Research and Quality website. We then estimate the percentage change in self-reported health status across age groups implied by the Case and colleagues ordered probit models for an income increase of 1.3 log points, and multiply the changes by the average costs by age and health status group to obtain average cost savings by age group.

31. We compute the present discounted value of health costs over the life cycle because these costs vary so much with age, and given changes over time in the sizes of birth cohorts and life expectancy, we never really reach a 'steady state' that would enable us to aggregate across the current age structure of the population. We assume a 3% discount rate and a 3% rate of inflation in real medical costs (compared to about a 2% annual increase over the past decade, but about 3.6% over the previous two decades).
32. According to the Office of Special Education's 2003 annual report, elementary and middle school students are 4 percentage points more likely to be in special education if they live in poverty compared to those in a middle-income group. High school students in poverty are 5 points more likely to be in special education. These increased rates are multiplied by the additional $12,600 spent on special education students, on average, per year (US Department of Education 2005). See also Chambers, Parrish, and Harr (2004).
33. For example, Smith (1999) cites studies showing that poverty reduces the life expectancy of white and black men by an average of seven years.
34. These various estimates use different statistical methodologies but are usually based on actual expenditures or surveys of willingness to pay for additional years of life for different demographic groups.
35. They also use a 3% discount rate, as we did above in our calculations of the discounted value of future medical expenditures.
36. Case and her colleagues estimate that it might be as little as 7% in their data, since controlling for parental health status only reduces the relationship between child poverty and health by that amount.
37. Their estimates assume that early childhood interventions as successful as the Abcedarian or the Perry Preschool Program could be implemented nationally, with net new enrollment rates of 70%. Given that both of these efforts were very small and intensive, our ability to generate these benefits on a large national scale remains very uncertain. Other small experiments in education that have generated large returns, and that might be brought to scale, include the class-size reductions of the Star program in Tennessee (Krueger and Whitmore 2001).

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