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ABSTRACT

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264 million children work in the world today. 64 percent are in activities that satisfy legal definitions of child labor. These working children are both a cause and a consequence of a lack of economic growth. Widespread child employment dampens future economic growth through its negative impact on child development and depresses current growth by reducing unskilled wages and discouraging the adoption of skill-intensive technologies. Child employment also appears to result from a lack of economic growth. Rising incomes are associated with improvements in the family's ability to triage economic shocks without child labor, shifting production outside of the home, and a greater demand for education and leisure. All of these factors lead to declines in the economic activity of children when income levels are on the rise. Child labor is both an issue of rights and of economic development.

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child labor, time allocation, human capital, economic development

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1. Overview

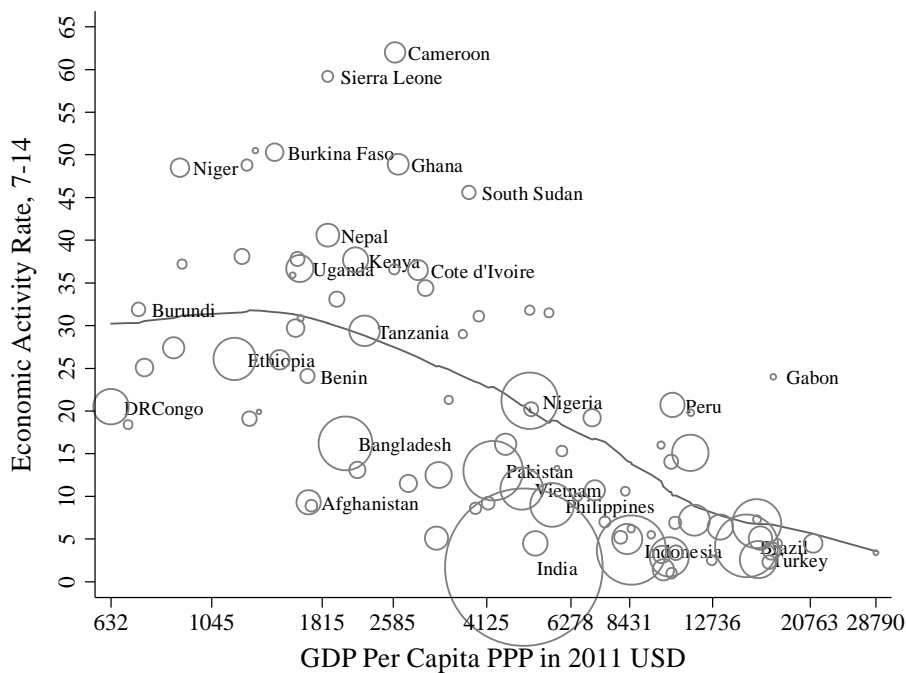


Figure 1: The Economic Activity of Children and National Income

Notes: Figure plots the fraction of children who are economically active between the ages of 7 and 14, inclusive, against gross domestic product per person adjusted for purchasing power parity and expressed in 2011 dollars. The size of each circle reflects the population of children under 15 in the country (larger circle = more children). The curve is a local kernel smoother. Source: World Development Indicators for most recent year with economic activity information available in each country.

There are 264 million working children in the world, with 168 million classified as child laborers under local laws. Historically, policy attention towards child labor has focused on it as a human rights issue. The UN Sustainable Development Goals lists the ending of child labor in all its forms as one of the measurable targets for Goal 8: “Promote inclusive and sustainable economic growth, employment and decent work for all.”¹ Is there a place for child labor in sustainable economic development? In this essay, I review the literature on the interaction of child labor and economic growth. From this review, I conclude that child labor is both a cause and a consequence of a lack of economic growth. There should be attention to child labor in the policy discussion around sustainable development.

¹ <https://sustainabledevelopment.un.org/sdgsproposal.html>

Figure 1 illustrates the close connection between child employment and national income. The figure contains a plot of the child employment rates in the *World Development Indicators* (for the most recent year available) against gross domestic product per capita (adjusted for purchasing power parity differences). Each country is represented by a bubble with a size proportional to its population under 15. The curve pictures average child employment in countries across the national income spectrum. Wealthier countries have less child employment. More than half of the cross-country variance in child employment can be accounted for by differences in GDP per capita.²

In this essay, I use *economic growth* to refer to the process by which poor countries grow richer. I use *economic growth* interchangeably with economic development or progress. I do not mean a transitory, short term burst in economic activity, nor do I mean a long-run rate of economic expansion. The striking relationship in Figure 1 illustrates the interconnection of economic growth and child employment, but the figure does not depict a causal relationship. Figure 1 does not show what would happen to child employment if countries grew richer. It does not show that countries would grow if child employment was reduced. There are many reasons why countries differ in income and child employment, and there are complex interactions between child labor and economic growth. The existing literature shows that high levels of child employment impede economic development and that economic development leads to declines in child labor.

The impact of child employment on economic growth arises through two main channels: child development and local labor markets. Child employment impacts child development by interfering with schooling and health. There is a finite amount of time in the day, so there are inevitable tradeoffs between work and school time. There is also evidence of both physical and mental health consequences of working as a child that arise in adulthood. Not all types of work interfere with child development; some circumstances can have net positive consequences. However, the observation that not all circumstances are harmful does not imply that all circumstances are beneficial. In fact, some circumstances, such as hazardous work, seem to be particularly harmful of child development. The impact of child employment on child development has long term consequences as it impacts the capacity of the next generation of adults. There is compelling evidence of intergenerational persistence: child laborers become adults with children who are also child laborers.

² Using the data from figure 1, a regression of child employment on gdp per capita has an R2 of 0.54.

The impact of child employment on local labor markets is less nuanced than its impact on child development. When there are more workers willing to work at a given wage than there are jobs, workers will compete and drive down wages. Hence, the more child workers in the economy, the lower the wages of jobs those children compete for (unskilled work). This creates a cycle of poverty: child labor leads to low wages leads to the need for child labor. It is certainly no coincidence that child labor laws in the U.S. became widespread and enforced during the 1930s, when adult unskilled employment was at a historic high. Child labor may have long-term consequences for growth through its impact on child development, but the more prevalent child employment today, the lower unskilled wages today. Low unskilled wages today also have long-term consequences for economic growth, as an abundance of unskilled labor discourages the adoption of skill intensive technologies. Countries adopt the technology that is complimentary to factors they are abundant in. Hence, the more child labor, the more unskilled labor, the less likely countries are to adopt technologies that take advantage of skilled labor. This further discourages the accumulation of human capital, leaving countries worse off over the long term.

Child labor impacts growth, but it is also an artifact of a lack of growth, especially among the very poor. Most working children are involved in agriculture, usually in their own family's farm. However, the fact that children are mostly involved in family based agriculture does not imply that family based agriculture causes them to work. These agricultural, unspecialized households are poorer, and there is little to suggest a relationship between industrial composition and child labor beyond the correlation between industrial composition and poverty. The introduction of new productive assets into the family at early stages of growth may lead to more child employment, but as family incomes increase, child employment appears to decline rapidly. There are several channels through which economic growth reduces child employment. Children are an important part of how poor households triage economic shocks. With growth, shocks become less meaningful in the lives of the global poor and the poor develop more capacity to cope with shocks without expansion of child labor. Children are important workers in household based production. With growth, households specialize, moving production away from the home and into activities where children are at a disadvantage. Of course, families also care about their children, and growth may overcome constraints that limit a family's ability to facilitate play, healthy development, and education. Families may also simply desire to have more of these luxuries that are alternatives to child labor when they grow richer. There has been some concern in popular

writings that economic growth will lead to more child labor through new employment opportunities for children, and in the short run, there is some evidence that children may work more to take advantage of transitory employment opportunities. However, there does not seem to be any representative evidence to suggest any merit to these concerns over the long run. Thus, there seem to be a variety of mechanisms through which development reduces the level of child labor in the lives of the poor.

Policy also plays a role in the relationship between child labor and economic growth. While my reading of the literature leaves me skeptical about the impact labor regulation can have on child labor, positive alternatives to child labor tend to expand with economic growth, and the country's capacity to encourage these positive alternatives expands as well. Similarly, as countries become richer, social safety nets expand, credit markets develop, and insurance improves, all mitigating many of the causes of child labor. Policy may evolve endogenously with development to discourage child labor, or policy may explicitly hasten the decline in child labor. Either way, there is ample reason to view child labor as an important issue in the broader discussion of sustainable development.

2. The Impact of Child Labor on Economic Growth

The UN Sustainable Development Goals lists the elimination of child labor as a practical and measurable target for sustainable development (under Goal 8). Child labor has the potential to undermine economic growth through its impact on child development, wages, and technology adoption.

2.1 Impact on child development - Education

There are a fixed number of hours in a day. As such, the time children spend working necessarily trades off with other uses of time: such as playing, studying, or schooling. Ensuring sufficient playtime for children was at the forefront of concerns about child labor in early 20th century U.S. (Fuller 1922, Pangburn 1929), but education is more central in modern discussions of the cost of child employment. Lorenzo Guarcello and co-authors (2006) provide a nice discussion of the importance of child labor in the context of UNESCO's Education for All movement.

Employed children are less likely to attend school compared to children who are not economically active, but most working children also attend school. In fact, for some children, work

allows them to afford school costs or helps their families pay for schooling (Manacorda 2006). While working to attend school can be relevant in some circumstances, in Edmonds (2008), I document that working children are less likely to attend school in each of the 34 low-income economies I examine. Some work is more difficult to combine with school than others. Deborah DeGraff and co-authors (2015) document that children in hazardous occupations in Brazil are especially unlikely to combine work with schooling. This may owe to differences in hours worked, side effects of the work, or it may reflect selection in who participates in hazardous activities.

There is also a strong negative association between school test scores and child employment, even for the most common forms of work. Beyond its impact on attendance, work reduces the child's time available for study and the child's capacity to devote attention to school or homework. Some of the most compelling evidence on this comes from Brazil, where Patrick Emerson and co-authors (2016) follow the same children over time, observing the child's performance in school and labor status. Consider two children with equivalent educational backgrounds; both are in the same year and have identical performance measures. The child who starts working while still attending school does not test as well; the working child's lower test scores are equivalent to one quarter to three fifths of a year less knowledge accumulation than the child who did not start working.

Perhaps as a result of reduced test scores and disruptions to school attendance, working children tend to have substantially diminished school progression. Ranjan Ray (2002) observes that an additional hour of wage work in Ghana is associated with more than a year's less completed educational attainment. George Psacharopoulos (1997) notes that children in wage work in Bolivia complete nearly a year less schooling than non-working children. He also discovers that working children in Venezuela have almost two years less attainment than their non-working counterparts.

Thus, the more prevalent child labor in a country, the less educated its future workers will be.

2.2 Impact on child development - Health

The impact on individuals later in life from their work as a child appears to extend beyond the impact of work on educational attainment. The strongest evidence of this comes from Brazil, where data on the age of first employment can be combined with adult outcomes (Emerson and Souza

2011). In addition to the negative impact work has on schooling (discussed above), there also appear to be important consequences of early work exposure for physical and mental health outcomes later in life.

There are many avenues through which work while young can impact health. Work induced illness and injury may directly worsen the health status of child laborers. Machinery designed for adult bodies and minds can be particularly dangerous for children. Working children typically face greater caloric demands than nonworking children. When these are not met with increased nutrient intake (either because of the circumstances of the child's work, the parent's lack of awareness about nutrition related concerns, or a lack of adequate and nutritious food), work may leave the child more vulnerable to illness, injury, and a lifetime of health issues. Working children may also suffer health consequences by foregoing the health and nutritional knowledge usually acquired in school.

Of course, work does not necessarily reduce child health. Work may bring in additional resources that foster health. Work may induce increased health investments in the working child.

Compelling evidence that working children have worse health at the time of their work is generally absent from the literature. Owen O'Donnell and co-authors (2002) look at data from 18 developing countries and observe that across these 18 countries, self-reported health status looks unrelated to whether the child is employed, in school, both, or neither. It is unclear whether the absence of evidence reflects a lack of any relationship, the countervailing factors discussed above, measurement problems, or heterogeneity in the effect of working on health.

However, there is much more evidence linking working while young to poor adult health. There are at least two basic classes of mechanisms through which a child's labor status may influence adult health. First, physical injury at work may lead to health problems that survive into adulthood. The injuries may be immediately evident to the child (e.g. a broken foot) or may take years to become evident (e.g. exposure to toxins). Second, psychological stress or trauma at work in childhood may lead to health problems in adulthood. Speculation about this second mechanism owes to the psychology literature that shows a strong correlation between stress in childhood and the persistence of mental disorders- such as depression, anxiety, panic disorders, and schizophrenia- or even health problems such as diabetes, heart disease, and immune disorders (see Heim and Nemeroff 2001 for a review).

The most compelling evidence on a link between employment while young and long-term negative health consequences is from Brazil. Ana Lucia Kassouf and co-authors (2001) observe that individuals who start work earlier have worse self-reported health status as adults. Peter Orazem and Chanyoung Lee (2010) show that some of the worse self-reported health status owes to a lack of education, but that working while young is associated with back problems, arthritis, and reduced strength and stamina in adulthood beyond work's impact on education.

Thus, high levels of child employment may have lingering effects throughout the working child's lifetime through both diminished education and lasting physical and mental health challenges. Not all work is harmful to child development, but there is enough evidence of negative effects for child labor to be a concern in any discussion of sustainable growth and development.

2.3 Poverty persistence – Child labor breeds child labor

Child laborers are disadvantaged in their youth in ways that lead to reduced education and diminished physical and mental health. Hence, when they become adults, they will be poorer than their peers who did not work as children. There is also evidence from high-income countries that there is persistence in wages and job type over the life cycle (e.g. Oreopoulos and others 2012). Because children are almost universally unskilled, they start in unskilled occupations with low wages. This poor start tends to lead to a lifetime in an unskilled occupation with low wages for that worker.

In fact, several studies document that child laborers are more likely to be parents of child laborers themselves. In Egypt, Jackline Wahba (2006) shows that the children of child laborers are 10 percent more likely to be child laborers themselves, holding everything else equal. In Brazil, Emerson and Andre Portela Souza (2003) show that the impact of having a parent who was a child laborer increases the probability that the child works. The magnitude of the increases in the probability the child works is large. Having a parent who was not a child laborer reduces the probability a child works by about the same amount as adding ten years to the parent's education. These studies tend to associate this perpetuation of child labor as being something about norms: "I worked as a child, so too should my child." There may be something to that, but, as I shall discuss below, child labor responds to small changes in living standards. If norms are relevant here, it seems that they are hardly steadfast, but rather can change quickly with development.

2.4 Poverty persistence – Child labor depresses unskilled wages

Children are generally employed in tasks that require little education and specialized training. Child labor is unskilled labor. Hence, everything else equal, a country with an abundance of child labor has an abundance of unskilled labor. Unskilled jobs tend to have lower wages, and supply and demand pressures imply that more abundant unskilled labor depresses wages further. The most compelling evidence illustrating that more unskilled labor leads to lower wages comes from the immigration literature that uses exogenous changes in migrant availability to vary the prevalence of unskilled labor (Friedberg and Hunt 1995). As I will discuss below, lower adult wages leads to more child labor. Hence, there is an unhappy circle: child labor depresses wages leads to more child labor.

2.5 Poverty persistence – Child labor discourages the adoption of skill intensive technologies

Through its impact on education and labor markets, child labor reduces incentives for the adoption of new, skill intensive technologies. Daron Acemoglu (2002) argues that technology and human capital are relative complements. Hence, child labor deters technological investment if it reduces human capital levels through decreased education. Even without decreasing education directly, more abundant unskilled labor induces the adoption of production methods that are unfavorable to skill accumulation. Richard Hornbeck and Suresh Naidu (2014) show that the prevalence of unskilled, low-wage black labor in the American South delayed the modernization of agriculture and hindered agricultural development. Further, the technologies that are adopted when unskilled labor is abundant will be those complementary to unskilled labor. This trend has a dual effect: it further depresses average wages (Kiley 99) and also reduces the efficiency of capital and skilled labor (Caselli and Coleman 2006). It is well documented in the literature that a shortage of skill-intensive technology adoption has deleterious consequence for economic growth (e.g. Galor and Weil 2000).

3. The Impact of Economic Growth on Child Labor

To understand how economic growth impacts child labor, it is useful to have simple analytical framework in mind. Poor families balance the child's potential economic contribution in each possible activity against alternative uses of child time. Different activities vary in their potential economic contribution. Families also may have feelings about these activities. Children work when

their family's valuation of the child's economic contribution is at least as large as the family's valuation of other uses of child time.



Figure 2: Pay Status of Working Children

Source: Author's Calculations from the World Development Indicators for children 7-14.

What is the child's potential economic contribution? Figure 2 is a tabulation based on the *World Development Indicators*. Among the countries with information available on the pay status of employed children, 74 percent of employed children are in unpaid economic activities. The working child's primary economic contribution comes through the help the child offers her family. Most often, this help is in agriculture or in providing domestic services that free up the adult for income-generating pursuits. When there is a family business or farm, the children often help, as working in the family business or farm is the most prevalent economic activity of children.

It should be obvious that the child's potential economic contribution, whether it is a wage or a contribution to household production, depends on the child's local economic environment. In this section, I review how the changes in the child's economic environment influence child employment. Overwhelmingly, the empirical literature emphasizes that family living standards appear to be the primary factor influencing how children spend their time.

3.1 Industrial Composition of Employment, Technological Change, and Child Labor

Economic growth is associated with changes in the industrial composition of employment. Richard Baldwin and Philippe Martin (2001) emphasize the importance of industrialization in fostering

growth, and Bruce Johnston and John Mellow (1961) emphasize that the process of economic growth tends to be associated with a decline in the agricultural labor force as well as the share of national income in agriculture. Changes in the industry mix impact growth, and growth impacts the industrial composition of employment.

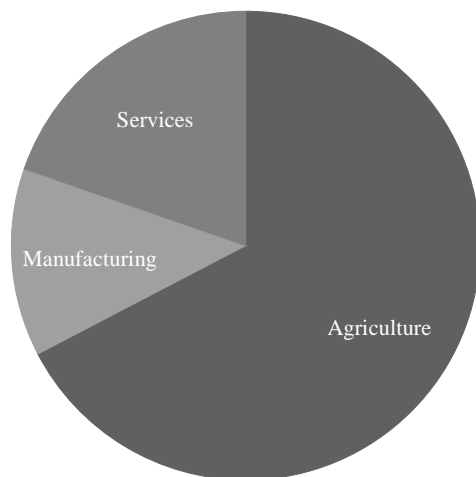


Figure 3: Distribution of Working Children by Sector

Source: Author's Calculations from the World Development Indicators for children 7-14.

Children are not uniformly distributed across industrial sectors. Figure 3 plots the distribution of working children across sectors for the limited data available across countries in the *World Development Indicators*. 65 percent of working children are in agriculture, 13 percent in manufacturing, and 19 percent in services.

The salient question here is whether changes in the industrial composition impacts child labor directly. It is plausible. Children are better at some tasks than others. Skill intensive work excludes children who have not been able to accumulate the necessary skills. Similarly, activities that require strength and physical development tend to be relatively difficult for young children. In fact, it is widely believed that child labor is an artifact of industrialization. In chapter 15 of *Kapital*, Karl Marx writes: “In so far as machinery dispenses with muscular power, it becomes a means of employing laborers of slight muscular strength, and those whose bodily development is incomplete, but whose limbs are all the more supple. The labor of women and children was, therefore, the first thing sought for by capitalists who used machinery.”

Yet there seems to be a discrepancy between what Marx and others have suggested and what the evidence indicates. Industrialization, the adoption of machine power, and the

advancement of new technologies all go hand in hand with economic development, and we know that child labor is much higher in less developed economies. Of course, it could be the case that industrialization and technological change puts upward pressure on child labor, pressure that is masked by the strong relationship between child labor and income. So, it seems reasonable to ask: is there evidence of a link between industrialization and child labor in the data?

If anything, child labor is lower when manufacturing is more prominent. Figure 4 contains a plot of the economic activity rates of children against the importance of manufacturing to each country's economy (measured as the share of GDP that owes to value added in manufacturing). Overwhelmingly, countries with greater reliance on manufacturing have fewer working children. Of course, nations with relatively larger manufacturing sectors are also wealthier, and in fact the correlation between child employment and the importance of manufacturing is much weaker after one controls for the relationship between GDP per capita and child employment. After controlling for income, manufacturing value added can account for 4 percent of the remaining cross-country variation in child employment. While the explanatory power is minimal, the conditional correlation is negative, meaning that there is less child employment when manufacturing accounts for a larger share of GDP, conditional on income levels.

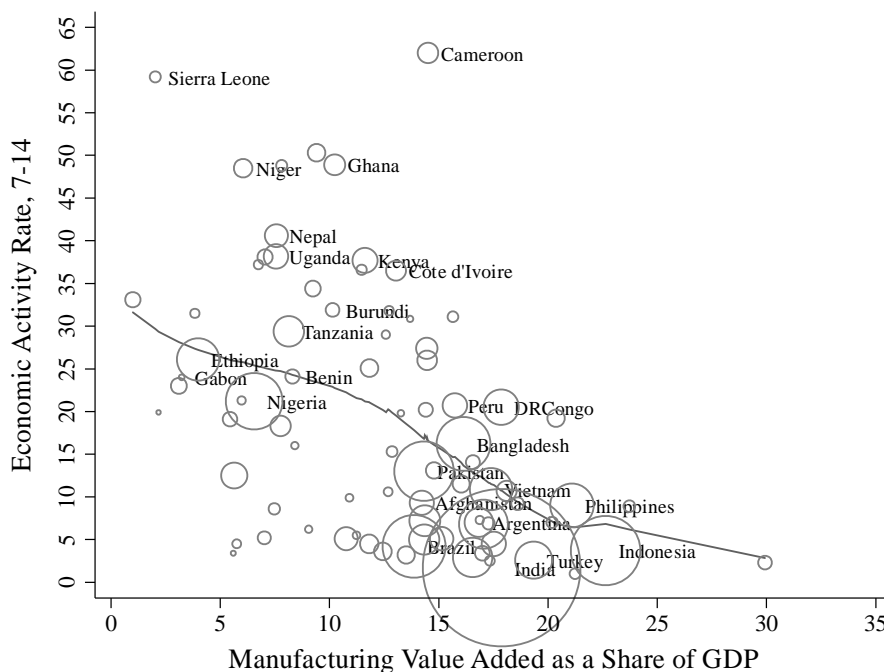


Figure 4: The Economic Activity of Children and Value Added in Manufacturing

Notes: Figure plots the fraction of children who are economically active between the ages of 7 and 14 (inclusive) against share of GDP that owes to manufacturing value added. The size of each circle reflects the population of children under 15 in the country (larger circle = more children). The curve is a local kernel smoother. Source: World Development Indicators for most recent year with economic activity information available in each country. Swaziland and Thailand excluded as outliers in manufacturing value added.

Technological advancement with growth does not need to be limited to changes in the industrial composition of employment. There can be changes in technology of production even without changes in the industrial composition of employment. For example, Martin Brown and co-authors (1992) document technological changes in the U.S. Fruit and Vegetable canning industry that led to adult workers replacing child workers in the industry. Victor Levy (1985) shows a relationship between the mechanization of Egyptian agriculture and the decline of child labor in cotton. Two important technologies he emphasizes are the spread of tractors and irrigation pumps. While Marx might have been right to emphasize that industrialization diminished the return to stature, he missed that technological advancement created technologies that require skills to manipulate productively. Children are often not capable of providing these skills.

While the body of evidence on child labor and technology describes examples where technology eliminates child labor, it is not obvious ex-ante that technological change will always discourage child labor. The types of tasks available for working children will vary with the level of development, as well as with the supply of factors like unskilled labor. Acemoglu (2007) shows that economies will develop or adopt technologies that take advantage of a factor that is relatively prevalent. Hence, more unskilled labor leads to the adoption of unskilled labor-intensive technologies, weakly increasing demand for that factor. Acemoglu (2002) emphasize the “poverty trap” nature of this dynamic: low skill-intensive technologies then induce the accumulation of unskilled labor by slowing demand for skilled labor. Thus, while technological advancement may proceed with growth, it is not inevitable that this will result in a decline in child labor.

On balance, the literature is weak on evidence linking factors that influence labor demand and child labor. The one exception appears to be how child employment responds to transitory output price increases. A temporary increase in output prices leads to higher child wages during the episode of high prices. Child employment seems to increase when there is a temporary growth in child wages. In her study of Brazil, Diana Kruger (2007) finds that short term increases in coffee prices lead to more children working while prices were high. In her case, children did not appear to be picking beans. Instead, they were helping fill in for their parents in other activities given that

parents temporarily increased their work to take advantage of higher coffee prices. This phenomenon of children working to take advantage of transitory earning opportunities is also apparent in Manisha Shah and Bryce Millett Steinberg's study of how children respond to transitory rainfall shocks in India (2013).

While child employment may be elastic to transitory earnings variation, longer-term changes consistently show that child employment is more responsive to living standards and adult wages than it is to child wages. Some of the most interesting evidence on this trend comes from studies that explore the link between international trade and child labor. In a 2005 study with Nina Pavcnik, I examine how Vietnamese households are impacted by the liberalization of rice trade in the 90s. 1 in 5 Vietnamese children were involved in rice production before liberalization. Real rice prices rose dramatically during liberalization, and I would have expected child labor to increase to take advantage of the higher prices. Instead, it appears that roughly 1 million fewer children worked as a result of rising rice prices in Vietnam, despite potentially more lucrative employment opportunities. I think the difference between this evidence from Vietnam and Kruger's evidence from Brazil owes to the permanent nature of the rice price changes in Vietnam. The government of Vietnam was actively suppressing the price of rice, and liberalization led to a permanent increase in rice prices and the income of rice farming families.

This Vietnam example is not unique. Denis Cogneau and Remi Jedwab (2012) report very similar findings from Cote d'Ivoire, where child labor is pervasive in the cocoa industry. A permanent reduction in cocoa prices should have reduced child labor by reducing the value of a child's time spent in cocoa production. Instead, they document an increase in child labor and a decline in schooling because of the decline in family income. Similarly, in a paper with Pavcnik and Petia Topalova (2010), I study the impact of India's trade liberalization in the 90s. There are substantive changes in the industrial mix of employment that should have changed the employment opportunities open to children, but again, the only detectable impacts on child employment come through changes in living standards. These findings from India are mirrored in Krisztina Kis-Katos and Robert Sparrow's (2011) study of child labor in Indonesia's trade liberalization. Employment opportunities change, but rising family incomes are the driving force behind changes in child employment.

3.2 Living Standards and Child Labor

Economic growth is generally defined as improvements in average per capita income. Child labor is overwhelmingly concentrated in the poorest of households. Hence, growth can impact child labor through changes in living standards when growth benefits the poor. While there is considerable nuance in the literature, it seems reasonable to assume that growth in average per capita income will typically raise the living standards of the poor (Dollar and Kraay 2002). This section argues that improvements in the standard of living of the poor influence child labor by changing how households cope with economic shocks, how households organize their production and consumption, and how households make decisions regarding child time allocation.

3.2.1 Growth, Shocks, and Child Labor

There is more volatility in the lives of the world's poor. They face more frequent economic shocks, and the welfare consequence of these shocks is greater because of the diminishing marginal utility of wealth. While there are many mechanisms used by the world's poor to buffer income shocks, they do not perfectly insure consumption against income risk (Dercon 2002), especially the poorest of the poor (Jalan and Ravallion 1999). Economic risk is not the only source of risk in the lives of the world's poor. Health shocks can have enormous consequences, and Edward Miguel and co-authors (2004) add that civil conflict is negatively correlated with economic growth as well. Thus, growth should reduce the extent and frequency of shocks in the lives of the world's poor.

This reality is important for child employment because child employment is an important component of how households manage negative economic shocks. In studying how Indian families deal with unanticipated rainfall shortfalls, Hanan Jacoby and Emmanuel Skoufias (1997) find that families self-insure by varying child employment and school attendance. Specifically, they observe declines in schooling and increases in child employment in households that experience both household-level and aggregate shocks. Moreover, they decompose variation by separating predictable seasonal variation in income from unpredictable variation in income. They find that small farm households adjust schooling and work in response to both predictable and unpredictable variation in income. Hence, they argue that small farms are not well-insured ex-ante, and they do not have access to seasonal borrowing and lending. A similar study in Tanzania was conducted by Kathleen Beegle and co-authors (2006). They correlate self-reported crop shocks with changes in

child employment. They observe a significant increase in child employment in households that report experiencing a crop shock, and that this shock is larger among households with fewer assets.

Insurance failures and child labor are not just interconnected in rural agrarian societies. Using data from urban Brazil, Susanne Duryea and co-authors (2007) compare households in which the male head becomes unemployed to households in which the head male is continuously employed. They find that an unemployment shock significantly increases the probability that a child enters the labor force (by as much as 60 percent) and decreases the probability that a child attends school. They do not observe changes in labor supply in anticipation of shocks. Hence, they conclude that the child's labor supply in part compensates for the lack of unemployment insurance. Moreover, Duryea and co-authors observe a strong negative correlation between schooling completion and adult unemployment. For girls in particular, it seems that the loss of employment for the male household head often triggers a complete and permanent withdrawal from school.

The idea that child labor is part of the household's self-insurance strategy seems broadly supported in the literature. Dean Yang's (2008) study of how Philippine households with overseas members were affected by the 1997 Asian financial crisis is especially useful for understanding the insurance component of child labor supply. Migrants from the Philippines work in dozens of countries. Thus, the financial crisis was broadly felt in the Philippines, but there is a great deal of heterogeneity in how families were impacted by the crisis depending on what country their migrant members lived. Yang observes that a 10 percent appreciation in the Philippine / foreign exchange rate is associated with a 6 percent increase in remittance flows. Schooling increases, schooling expenditures increase, and work declines in households that benefited from the appreciation. Schooling is an investment, and families seem to be "saving" transitory income through increased schooling and less work.

This observation that children tend to work more during economic downturns, when the economic contribution of children is lower, may seem surprising. Even when the net economic contribution of the working child is small, it may be important to the welfare of a poor family. I have previously mentioned that children also seem to work more during transitory positive shocks to their earnings potential. Thus, child employment can be an important component of how families respond to transitory changes in their environment, whether the shock is positive or negative.

3.2.2 Growth, Household Production, and Child Labor

Most working children do so within the home. Hence, the economic organization of the home is tremendously important for how children spend their time. In this section, I argue that growth discourages child employment if production shifts out of the household but has the opposite effect if it brings productive assets inside households that previously lacked such assets. As such, children in extremely poor households may become more likely to work when incomes rise, but child employment appears to fall as subsistence concerns abate.

Economic growth expands the extent of the market, creating opportunities for household specialization and demand for higher quality products than could be self-produced at home (Locay 1990, Goodfriend and McDermott 1995, and Kelly 1997).

Research on household specialization and child labor has largely focused on urbanization or trade. Marcel Fafchamps and Forhad Shilpi (2005) observe that in Nepali data, there appears to be greater household specialization as proximity to urban areas increases, and Fafchamps and Wahba (2006) argue that children are more likely to attend school and not work as specialization increases with urban proximity. Interestingly, Fafchamps and Wahba note that while work in the household is reduced with urban proximity, there is a rise in child labor outside of the household. However, this increased in hours worked outside the household is not enough to offset the total decline in hours worked.

In the study of rice trade liberalization mentioned above, Edmonds and Pavcnik (2005) document that growth in rice trade in Vietnam led to increasing incomes and a resulting decline in child labor. In a companion paper (Edmonds and Pavcnik 2006), we argue that a rise in household specialization underlies much of this decline. Rising income leads to demand for better quality goods than can be produced within the household. The shift in demand for goods produced outside the household reduces the employment opportunities within the home.

While household specialization discourages child employment within the home, economic growth may also bring productive assets into the home. The availability of land, livestock, and other productive assets within the household can be an important influence on the child's potential net economic contribution. Children can only work in family businesses when there is one. Given that wage child labor is rare in most countries, studies frequently find that children are more likely to work if their household owns a business (e.g. Edmonds and Turk 2002). Hence, growth could increase child employment if it brings more productive assets into the household.

Some types of businesses and productive household assets are more conducive to child involvement than others. John Cockburn and Benoit Dostie (2007) observe that children in Ethiopian families are more likely to work on the farm when there is small livestock present than large livestock. Of course, families that own productive assets are often wealthier than families without productive assets. A recent study from North India by Kaushik Basu and co-authors (2007) documents that the relationship between family landholdings and child labor follows an inverted U-shape. Poor children work more as their family adds productive assets, but at some point, child labor declines with the addition of productive assets as the family becomes sufficiently wealthy to avoid child labor.

In fact, I think this story from Basu and co-authors is probably the most useful for understanding the complex interactions between growth, the economic organization of the household, and child employment. At very low living standards, growth can bring in productive assets and employment opportunities for children that would not otherwise have been available. However, as living standards improve, the technology of production may shift away from children. Household's demand for home produced goods declines in favor of higher quality goods available in the market. Combined with the family's general desire to keep their children out of labor, discussed in the next section, we see declines in child employment with increases in living standards.

3.2.3 Growth, the Demand for Education and Leisure, and Child Labor

The canonical child labor model is Basu and Van's (1998) "Economics of Child Labor." In that model, they argue that the absence of child labor in a family is a luxury good for parents. In particular, they postulate that child labor occurs if and only if parents cannot provide the family with an above subsistence living standard absent child labor. This theory is called the "luxury axiom." This view of preferences about child labor is extreme, but it appears consistent with the findings of several recent papers, including two that I have written.

In studying changes in child labor in Vietnam during its rapid growth of the 1990s, I use data from the early 90s to understand what families perceive as subsistence. I then compare the changes in living standards observed in the 1990s to these subsistence perceptions (Edmonds 2005). Child labor levels were cut in half in Vietnam in the 1990s, and I find that the progression

of living standards from below to above subsistence levels in Vietnam can account for 80 percent of the decline in child labor.

In a study with Norbert Schady in Ecuador, I examine the impact of randomized unconditional cash transfer provided to families in the poorest 40 percent of the population (Edmonds and Schady 2012). The lottery led to a transfer that was equivalent to 7 percent of monthly expenditures, and it was associated with a 78 percent reduction in paid employment. The transfer is less than child labor foregone earnings. Hence, the cash transfer leads to a reduction in household income, because families use the transfer to keep children in school and out of the labor market. This is consistent with the luxury axiom. The transfer is enough that, between the transfer and adult income, families can meet their subsistence needs without child labor. Hence, families forego child labor even though that leads to a reduction in total household income.

Additional income might also solve other household problems, like an inability to transfer resources over time, that contribute to child labor. In a paper in South Africa, I have argued that illiquidity has an important influence on child labor decisions (Edmonds 2006). This would be consistent with our observation that income growth reduces child labor, as households would be better able to afford things like school fees where liquidity is important. Along with Pavcnik and Topalova (2010), I argue that both illiquidity and school fees cause poor families to experience a relative increase in child labor and decline in schooling when family incomes fall. Illiquidity can also explain why child labor rises in temporary economic downturns as discussed above. Families resort to child labor to cope with transitory events, if they cannot easily borrow against future earnings.

Of course, the decision to work does not depend on the potential economic contribution of the child alone. It also depends on the perceived returns to other available activities. Schooling is important, and economic growth may change the returns to schooling (either in the future or through improving current school quality). It may also change how the family values schooling. Schooling is not the only alternative use of a child's time outside of work. Leisure and play are important components of how children spend their time and may be critically important for child development. The family's value of play and leisure may also change with growth. Hence, many forces may be working against child employment in the course of economic development.

4. The Role of Governments

A review of how governments can foster growth- or how growth impacts the functioning and activities of governments- is beyond the scope of this essay. This section presents a brief overview of the types of actions governments may take that will directly impact child labor. Each topic could be worthy of its own separate review.

4.1 Regulation

Encouraging the adoption of anti-child labor regulations and minimum age of employment laws was the center of 1990s global child labor policy. As such, now nearly every country in the world has a minimum age law.

Elsewhere, I have argued that these laws appear to largely be unenforced (Edmonds 2014). Matthias Doepke and Fabrizio Zilibotti (2009) argue that unenforced laws run the risk of undermining demand for real, meaningful regulation. They may even have negative effects. Marco Manacorda (2008) documents that enforced child labor laws in the US in 1920 may have decreased schooling of the siblings of child laborers, and Prasthant Bharadwaj and co-authors (2015) document an increase in child labor among children directly impacted by child labor regulation in India. They argue that imperfectly enforced laws decrease child wages because of the risk of a fine and that lower wages for children lead to more child labor.

There are no encouraging signs in the literature that economic growth will lead to either improvements in regulation or in the enforcement of regulation and thereby a reduction in child labor. Further, the focus of regulation is typically based on a child rights framework, and this framework is too narrow to prevent the deleterious consequence child labor has on economic development. The United Nations Convention on the Rights of the Child (UN-CRC) emphasizes the importance of protecting children from: "work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development" (1989, Article 32). The public's general understanding of the concept of child labor applies to activities that violate this standard, and this general idea of child labor as work that is undesirable for the child is also in ILO Convention 182 on the Worst Forms of Child Labor that followed the CRC. Child labor regulations attempt to reflect CRC and C182.

This rights-based definition of child labor is built on a lot of ambiguity. Whether work is hazardous depends on the tasks performed in the work and working conditions, and one can debate what hazardous means. When does work interfere with education? When is it harmful to the child?

The economics literature that is the focus of this study uses a broader definition of child labor. Economics is the study of decision-making under constraints, and the definition of child labor in the academic literature takes into account that there is a constraint on child time. Hence, child participation in any activity has a cost to the child in terms of foregone opportunities. In the same way, child participation in any activity also has a return or benefit to the child. Researchers cannot distinguish between child employment and child employment that is net harmful (which would seem more consistent with the rights definition of child labor). As a result, the economics literature often uses child employment and child labor interchangeably much as adult employment and adult labor are used.

The implications of this for child labor policy are important. If labor regulation is focused on a child rights definition of child labor, even effective labor regulation will ignore the types of child employment that may be most important for the impact of child development discussed in section 2. The idea of promoting positive child activities discussed in the next section then seems like a more practical approach for avoiding the negative effects of child labor on growth.

4.2 Promoting Positives

The strongest evidence of successful action against child labor works through raising the family's value of child time in activities other than child labor. Given the close connection of poverty and child employment, taking punitive action against those engaged in child employment runs the risk of punishing the poor for being poor. This, coupled with the fact that political will for the regulation of child employment appears directed against a subset of activities, suggests that anti-child labor efforts stand the best chance of improving welfare if they focus on encouraging positive actions by parents and children rather than discouraging negative.

What types of policies, programs, and projects raise the value of child time outside of child labor? The options are vast. Conditional transfer programs give poor families additional resources for sending their children to school. Programs like Mexico's Progresa, which provides cash transfers, have been shown to substantively alter child time allocation, increasing schooling and sometimes decreasing child labor at the same time. Ariel Fiszbein and co-authors (2009) have

assembled an exceptional review of conditional cash transfer programs and their effect on the welfare of the world's poor. By increasing returns to education and reducing poverty, conditional cash transfers appear to both reduce the net economic gain from having the child work and diminish the family's need for that economic contribution.

Children in hazardous forms of child labor are often both negatively selected in that they come from the most disadvantaged families (Edmonds 2010, DeGraff and others 2015) and tend to receive greater compensation for their work, perhaps as a compensating differential for the hazards of the work. Hence, it is reasonable to be skeptical about the scope for conditional transfers to be effective against hazardous forms of child labor. The evidence seems to suggest otherwise. Discouraging child labor does not require full earnings replacement with the transfer (Dupas et al 2012). In Nepal, Maheshwor Shrestha and I evaluated a conditional transfer to children associated with carpet factories in Kathmandu (Edmonds and Shrestha 2014). The value of the transfer was 20 percent of the income children could earn as weavers, and we found that it nearly eliminated child participation in weaving during the period of the incentive.

Conditional transfers are expensive and may not be affordable in low-income economies. Short-term projects providing conditional transfers may not provide lasting impacts. In our Kathmandu study, for example, we revisited subjects after a year and a half and found no lasting evidence of an impact of the program on schooling or child labor. Thus, using conditional transfers may require enduring support that is unaffordable in many settings.

Smaller scale versions of the same idea (raise the net return to alternatives to child labor) may be more sustainable and still impactful. This might include the reduction in school fees, investments in school quality, or improvements in school access (Guarcello and others 2006). All three of these seem to generally accompany the process of economic development, so there is scope for them to directly influence child employment and child labor beyond the general changes we expect to see as a result of rising living standards. That said, Saqib Jafarey and Sajal Lahir (2005) point out that when households face liquidity constraints, resource transfers to the household might reduce child labor more than equivalent resources transferred to the schools for quality improvement.

The direct promotion of vocational skills and job training is another avenue through which positive alternatives to child labor could decrease the prevalence of child employment. It seems that historically, there is an association between economic development and a rise in

availability and interest in vocational education (which may then fall as development continues, Benavot 1983). There seems to be a lot of optimism about this in the child labor policy world at the moment, and there is some evidence from Orazio Attanasio and co-authors (2015) of long-term benefits to vocational education, at least in Colombia. However, direct evidence of an impact of vocational skills or job training on child labor is not available at the time of writing.

4.3 Social Safety Nets, Credit and Insurance

As countries grow wealthier, it is not usual to see the emergence of social safety nets that protect the most vulnerable from the circumstances that lead to child labor. To the extent that child labor is motivated by subsistence concerns as in the canonical model of child labor, social safety nets eliminate motives for child labor. In the evidence from Ecuador discussed above, it seems that a minimum income was enough to induce families to forego the larger child labor earnings. Indunil De Silva and Sudarno Sumarto (2015) review the wide range of social assistance programs in place in Indonesia and argue that these programs play an important role in discouraging child involvement in paid work. Hence, we can expect social safety nets to be important in eliminating motives for child labor.

The impact of positive incentives such as conditional cash transfers alone might not be enough to protect children from working when the family faces an economic crisis. Alain de Janvry and co-authors (2006) study the impact of the conditional cash transfer in Mexico on child employment when families face idiosyncratic shocks. They find that, while families protect child school attendance during a crisis (the transfer is conditioned on schooling), they also turn to the children for assistance through child labor. Interestingly, Emla Fitzsimons and Alice Mesnard (2013) study the impact of a father's permanent departure in Colombia. There, they find that conditional transfers can compensate for the loss of the father, without causing the family to turn to child labor. The contrast between their study in Colombia and the Mexico study highlights that the extent to which social assistance can mediate an event may depend on how permanent the shock is.

Of course, with development come improvements in credit markets that may help families transfer resources through time without relying on child labor. In a study in South Africa, I find that families are unable to smooth consumption against anticipated changes in income and that this leads to more child employment (Edmonds 2006). Hence, functioning credit markets can prevent

some instances of child labor. Amarakoon Bandara and co-authors (2015) document that families with bank accounts in Tanzania seem to be able to avoid relying on child labor when farming families face a negative crop shock. Across, countries it appears to be the case that those with more developed credit markets experience less child labor (Dehejia and Gatti 2005).

This positive link between credit and the absence of child labor does not imply that microfinance projects can be presumed to decrease child labor. If successful, they change the economic structure of the household. Depending on the impact of microfinance on the availability of employment opportunities, the location of employment opportunities, the types of work available, and the living standard of the household, microfinance projects can increase or decrease child employment and child labor. For example, Asadul Islam and Chongwoo Choe (2013) document decreases in schooling and increased child labor in Bangladeshi households involved in a microcredit program there. I have already discussed the mixed relationship between the technology of production and child employment. That discussion is relevant, and just as ambiguous, in the context of microfinance.

Much like credit, formal insurance contracts tend to emerge with development (perhaps as an artifact of the ability to enforce contracts that evolves with development). Above, I reviewed the bounty of evidence that shocks lead children to work. Health shocks are incredibly important to the lives of the poor, and there's ample evidence that adult health shocks increase child employment (e.g. Dillon 2012). Extreme health events like parental disability seem to be strong predictors of vulnerable children transitioning into worst forms of child labor (Edmonds 2010). Recent causal evidence from Andreas Landmann and Markus Frolich (2015) shows the provision of health and accident insurance to participants in a microfinance project in Pakistan helped reduce child labor and participation in hazardous activities.

Interestingly from this Pakistani example, the impact of health and accident insurance on child labor occurred in both households experiencing a health shock as well as those that did not during the study period. One likely explanation for this is that, when households know that future shocks are likely and will induce child labor, they may choose to have children work in the present. That seems especially relevant in the realm of health where some sort of negative health shock is inevitable in life.

5. Conclusion

Child labor is a human rights issue. This essay is motivated by the question of whether child labor is also a sustainable development issue. Based on my review of the literature, I think it is.

The world's 264 million working children depress economic growth in the short run by depressing the wages of unskilled labor, worsening poverty, and discouraging the adoption of skill intensive technologies. In the long run, work today depresses child development and leaves a country with a substantive share of the future adult labor force poorly positioned to take advantage of new opportunities for growth. Of course, not all child employment is on balance bad for the country, but the developmental impact of both common forms of work and hazardous forms of child labor merits attention in the process of sustainable development.

Because of this impact of child labor on economic growth, there is a strong case that child labor policy can be part of policy efforts to promote sustainable development, without appealing to human rights issues, even though those issues can be important. This essay has reviewed child labor policy that is likely to evolve with economic growth. It is not a thorough review of policy tools available to combat child labor. Nonetheless, the main lesson from the policy discussion herein seems broadly relevant: promote positives and social safety nets. Promoting alternatives to child labor leads families to choose those alternatives, and social safety nets can eliminate motives for child labor. An important lesson from all the literature reviewed herein is that child labor can change dramatically and quickly in countries as a result of changes in the economic and policy environment.

While sustainable development projects and programs can focus on child labor and child labor policy may hasten its decline, this study has also documented how central poverty appears to be in explaining the existence of child labor. Thus, a lack of attention to child labor may understate the benefits of projects that promote sustainable economic growth and development. There is evidence to suggest that in the short run sustainable development projects could increase child employment as households first acquire productive assets or transitory opportunities that induce families to engage their children to take advantage of a short-term opportunity. However, long-run growth and development should eventually lead to declines in child labor as motives for child labor become less salient with improved living standards.

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