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► **To cite this version:**

Delphine Boutin, Marine Jouvin. Child Labour Consequences on Education and Health: A Review of Evidence and Knowledge Gaps. 2022. hal-03896700

HAL Id: hal-03896700

<https://hal.science/hal-03896700>

Preprint submitted on 13 Dec 2022

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BORDEAUX ECONOMICS WORKING PAPERS
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Child Labour Consequences on Education and Health: A Review of Evidence and Knowledge Gaps

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Abstract

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Keywords: Child Labour, Education, Physical Health, Mental Health.

JEL: I15, I25, J24.

To cite this paper: BOUTIN Delphine and JOUVIN Marine (2022), Child Labour Consequences on Education and Health: A Review of Evidence and Knowledge Gaps, Bordeaux Economics Working Papers, BxWP2022-14

<https://ideas.repec.org/p/grt/bdxewp/2022-14.html>



Child Labour Consequences on Education and Health: A Review of Evidence and Knowledge Gaps

Delphine Boutin, Marine Jouvin¹

August 2022

Abstract

Understanding and quantifying the consequences of child labour on children's short- and long-term development is an important step in designing appropriate policies and programs to improve children's well-being. We provide an updated review of the literature on the impact of child labour on children's education and health. Specifically, this paper first explain the mechanisms by which child labour impacts children's education, physical health, and mental health, both in the short and long term. Second, we synthesize the available knowledge on the causal effect of child labour on education and health. We reviewed studies focusing on developing countries that investigate the consequences of child labour on education (25 studies selected), physical health (11 studies) and mental health (4 studies). Empirical evidence leaves no doubt about the negative impact of child labour on their physical and mental health. Although the consequences of child labour on education are mostly negative, working children could also benefit from learning additional skills. Finally, we highlight the methodological limitations and gaps of the current evidence, indicating that the empirical results reported are more an indication of potential effects than an actual quantification of the impacts of child labour.

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¹ **Acknowledgement:** Delphine Boutin and Marine Jouvin are affiliated with the Bordeaux School of Economics (France). Delphine Boutin is also affiliated with the Institute for the Study of Labour (IZA). We are grateful to Anna Bruederle, Laurent Foubert, and Megan Passey for their relevant comments and indications. We also thank the participants of the "Expert discussion on child labour, harm and cocoa" organised by the International Cocoa Initiative, especially Albert Arhin, Amanda Berlan, Eric Edmonds, Kaja Jacinska, Anna Laven, Lucy Pirkle, Rachel Sabates-Wheele, Santadarshan Sadhu, James Sumberg, Marcella Vigneri, and Katryn Wright, for their valuable insights. We gratefully acknowledge financial support from ICI initiative, although the findings expressed in this paper are those of the authors and do not necessarily represent the views of the ICI initiative. Corresponding authors: Delphine Boutin, delphine.boutin@u-bordeaux.fr and Marine Jouvin marine.jouvin@u-bordeaux.fr

1 Introduction

Much progress has been made in recent decades to reduce the prevalence of child labour worldwide: the number of working children has dropped from 246 million in 2000 to 160 million in early 2020 (ILO, 2021). Yet, these encouraging trends mask the increase in child labour over the past five years, particularly in sub-Saharan Africa (ILO, 2021), where around one in ten children were still involved in child labour in 2020. The Covid-19 pandemic, which has plunged many vulnerable households into poverty, is expected to further increase children's vulnerability to work in the near future (Ahad et al., 2020; Idris, 2020). Child labour thus remains a persistent global problem, and a thorough understanding of its consequences is needed to guide public and private policies aimed at improving children's well-being and their ability to reach their full potential.

The current academic literature and anti-child labour campaigns promoted by civil society and international organisations assume that child labour has harmful effects on children's development. These alleged adverse effects form the basis of the distinction between child work and child labour. The International Labour Organisation (ILO) defines the latter as "any type of work that deprives children of their childhood, their potential, and their dignity, and that is harmful to physical and mental development". On the other hand, child work is seen as socio-economically beneficial to the child, contributing to his education and in a broader way to his development. The question is whether and to what extent a labour task is detrimental to children. The answer is complex because it depends on many factors related to the type of work performed by children, but also the intensity of the work and their exposure to hazards or the use of dangerous tools. Other factors may come into play: two children doing the same type of work but at different ages, or for different lengths of time, will not be affected in the same way. Similarly, child labour affects girls differently than boys because of gender-specific task specialisation, although few studies make this gender distinction. Child labour situations are multiple, and their potential impacts on children are equally diverse, depending on many factors in part discussed above.

This literature review proposes to examine child labour's consequences and describe the complex, nuanced, and multidimensional relationship between child labour, schooling, and health outcomes. We focus on the key child outcomes affected by the performance of an economic activity during childhood and adolescence. These outcomes include school attendance, school dropout, and academic performance, the child's physical and mental development, and the consequences of child labour on their adult lives. To date, a few existing reviews have summarised some evidence of the impacts of child labour on education and physical and mental health (Edmonds, 2007; Dorman, 2008; Ibrahim et al., 2019). However, these reviews are primarily based on descriptive studies and case studies. The increasing

availability of data on child labour over the past 20 years has led to more research opportunities to understand better the consequences of child labour. Unlike previous reviews, we focus on rigorous quantitative studies based on research methods that allow for the estimation of causal effects. Thus, we selected for this review only articles that apply a convincing strategy to identify the causal impacts of child labour. We draw on a broader and up-to-date literature in economics, health, sociology and psychology to argue this review and explain the numerous and sometimes contradictory mechanisms at play.

We divide our updated and critical review of the evidence on the various short- and long-term consequences of child labour into three parts. First, we explain the methodology for including and excluding articles in this review (section 2). Second, we present the mechanisms by which child labour can affect children's education and health (section 3). Third, we review the body of solid quantitative evidence on the impacts of child labour. We detail the different results according to the two main outcomes: education and health (section 4). We then complement these empirical estimates with a thorough reflection on the interpretation of the results given the complex, nuanced and multidimensional relationship between child labour, schooling and health outcomes (section 5). More precisely, we investigate in this section the methodological and identification issues raised by the causal analysis of the consequences of child labour. Finally, we conclude by identifying directions for more policy-relevant research.

2. Methodology

2.1. Search strategy

The first step in our study selection process for this review was a rapid screening of the existing literature across the fields of economics, health, sociology, and psychology, by resorting to either hand-searched articles or articles found on academic search engines (Google scholar, EconLit, NBER, RePEc, ScienceDirect, Springer, Wiley, and PudMed) using two keywords. The first one relates to child labor ("Child labor" OR "Child labour" OR "Child work") and the other one to its consequences (e.g., for education: "Education" OR "Human capital" OR "Learning outcomes" OR "Schooling" OR "Dropout" OR "School attendance" OR "School performance" OR "Academic performance"). Table A1 in the Appendix summarizes the different keywords used. To be as comprehensive as possible, we also used a snowball sampling strategy to identify additional studies by tracking citations in the references of relevant articles. Finally, we considered the grey literature (reports from ILO, World Bank, Unicef) when appropriate.

2.2. Study selection

Eligible studies were limited to those written in English, from 1995 to 2021, and set in a developing country context. We were interested in studies that focused on children up to the age of 18, who

performed any type of work including market work or domestic work, paid or unpaid, for their family or someone else. We excluded studies on the worst forms of child labour, as these types of child labour are less prevalent and their consequences are difficult to measure, while undeniably harmful to children's development. Both researchers evaluated each article independently, according to criteria described in Table 1. We selected 63 studies that met the inclusion/exclusion criteria. These studies contained either descriptive insights into the channels and mechanisms by which child labour affects key outcomes, or specific quantitative estimates of the impact of child labour on children's health or education. We also draw on 33 other studies that are not specific to child labour but to child's development (cognitive and non-cognitive, physical and mental development). These articles have given us a better understanding of the mechanisms at play that can affect a child's development when he or she works.

Table 1: List of inclusion and exclusion criteria

Criteria type	Included	Excluded
<i>First screening</i>		
Children age range	Children between 5 & 18 years old	Children <5 years olds & >18 years old
Type of labour	Paid economic activities or market work Non-paid economic activities or market work Working for family or someone else Household chores	Slavery Debt bondage Prostitution Armed conflict Illicit activities (e.g. drug trafficking)
Area	Rural/Urban	
Language	English	Non-English
Countries	Developing countries	Developed countries
Date of publication	Between 1995 & 2021	Before 1995
<i>Quantitative studies</i>		
Empirical strategy	Regression discontinuity Natural experiments with panel data Double differences Instrumental variables	Descriptive studies OLS estimates

The selection among these 63 studies of quantitative studies that estimate the impacts of child labour is more restrictive. In addition to the above criteria, quantitative studies were also required to propose a causal empirical strategy. The topic of the consequences of child labour does not allow the use of causal methods based on randomization (as in randomized control trials). However, some quasi-experimental methodologies are more robust than others in estimating an almost unbiased causal relationship. In

particular, we considered credible methodologies to be those based on a threshold from a continuous scale (such as regression discontinuity), exogenous variation not controlled by the researcher (natural experiments with panel data), and econometric methods to eliminate confounding or selection bias (such as double differences or instrumental variables). Overall, 25 studies were selected for education, 11 for physical health, and 4 for mental health. Note that because the selected studies used different methodologies, the impacts are not directly comparable and prevent us from doing a meta-analysis.

For each article selected for the quantitative results, we assessed study quality using the modified criteria of Reeves et al. (2017). We consider several dimensions, such as:

1. Having undergone a peer review process.
2. Appropriate discussion and correction of confounding and selection biases.
3. Quality of measurement of education and health variables.
4. Measurement of outcomes before and/or after measurement of child labour.
5. Estimates over one or multiple periods.
6. Estimates of effects on the same (panel) or different (cross-section) individuals.
7. External validity of the study.

We assign each article a score based on the sum of the points obtained for each criterion. We then divide the articles into two categories according to their score: (a) weak empirical strategy and (b) solid empirical strategy (see Table A2 in Appendix).

3. How child labour can be harmful ?

This section explains the mechanisms by which work affects children's education and health, both in the short and long-term.²

3.1. Child labour may impair education

In the short term Child labour and schooling are strongly interrelated. Academic theory and the viewpoints of the World Bank and the ILO assert that there is a trade-off between child labour and education (Basu and Van, 1998; Baland and Robinson, 2000; Dunne et al., 2021).³ Indeed, a working

² This review focuses on the consequences of child labour on the working child and does not refer to the spillover effects of child labour on that child's siblings. Some countervailing effects among younger siblings or parents may indeed be found (see Manacorda, 2006; De Hoop et al. 2019; Bharadwaj, Lakdawala, and Li, 2020).

³ The empirical literature on the effects of school conditional cash transfers on child labour further supports the view that schooling and working are linked and go in opposite directions (Ravallion and Wodon, 2000; Bourguignon et al., 2003; Ferreira et al., 2017).

child has less time to engage in other activities during the day than a non-working child. This mechanical decrease in time available for education can therefore directly reduce school attendance. However, child labour and schooling are not mutually exclusive.⁴ Thus, a working child may reduce his or her time in school, but may still be able to attend some classes, thus avoiding dropping out completely. The choice between reducing school time, leisure, and/or rest time in favour of work depends on many socioeconomic factors and individual preferences related to both the caretakers and the child (Edmonds, 2007). Recent studies also show that in some cases, especially among ultra-poor populations, education and child labour might be complementary (De Hoop et al., 2019).⁵ Indeed, income generated from child labour could be used to cover school-related expenses. All else being equal, this induced effect of children paid work could benefit children's school attendance.

Working may cause physical fatigue for children who keep attending school, which may lower their academic performance, especially if work intensity is incompatible with a school day. Indeed, work-related fatigue may lower the child's concentration and motivation. A working child is also likely to have less time to study and complete homework than a child who does not work, which may impair learning and lower academic performance (Thévenon and Edmonds, 2019). These adverse effects are likely to add to the structural problem of low education quality in some countries, suggesting that learning conditions in schools are not optimal. Indeed, we acknowledge a "learning crisis" by noting that enrolled children in developing countries may score low on international assessments or demonstrate poor reading skills (Pritchett, 2013; Kremer et al., 2013; Gazeaud and Ricard, 2021).

Nevertheless, a working child may learn new skills (such as counting skills) which could be beneficial in school (Dunne et al., 2021). The skills acquired through work may also be more suitable for the child's future entry into the labour market. Work can then be seen as an "informal apprenticeship" or "situated education" and provide children with opportunities to develop entrepreneurial skills (Bourdillon, 2017; Dunne et al., 2021). In addition, most parents and children consider work as instilling a range of positive characteristics, such as independence, responsibility, interpersonal skills, and a good work ethic (Mortimer, 2010; Zietz et al., 2018). In some contexts, child work can also enhance social status, cooperation, and stable inter-dependence in families and close communities (Bourdillon, 2017).

Child labour is heterogeneous, and its impact on education-related outcomes depends on several criteria, including the number of hours worked per day and the type of work the child does. Indeed, hazardous work, defined as any work "which, by its nature or the circumstances in which it is carried out, is likely to

⁴ In fact, most working children are also attending school. Using macro-economic statistics from several middle-income countries, Edmonds (2007) describes that 93 percent of boys and 90 percent of girls aged 10-14 who are not working are attending school, compared with 90 percent and 88 percent of boys and girls engaged in any form of work.

⁵ De Hoop et al. (2019) shows that a cash transfer program in the Philippines, aiming to increase school attendance through a soft nudge, raises schooling and participation in paid work. According to the authors, working children's earnings help households fully cover the cost of education.

harm the health, safety or morals of children” (ILO), may be more difficult to combine with school than non-hazardous work due to greater negative side effects (DeGraff et al., 2016). The fatigue effect may also play a larger role when the working child is young, as he or she may have more difficulties balancing fatigue and school attendance and/or performance.

In the long term The adverse effects of child labour on education, described previously, accumulate over time and eventually result in fewer years of education than children who do not work. In the long run, accumulated educational delays may cause children to drop out of school earlier than if they had not been working. Using descriptive statistics from a multitude of countries, Thévenon and Edmonds (2019) observe a negative correlation between child employment and both school completion rates and school life expectancy.⁶ As mentioned earlier, this detrimental effect of child labour on schooling completion may, however, be offset when children involved in paid work re-invest their earnings to cover school fees, which can help them stay in school longer. The net effect of child labour on school completion remains an empirical question.

Early school dropout may also result from the poorer educational performance of working children compared to children not engaged in any form of work. Thus, child labour may negatively affect school completion, both in terms of years of schooling achieved and in terms of the level of skills and knowledge acquired by the working child. The direct consequence of lower educational attainment is to keep former child workers in low-skill, low-paying jobs. The literature on the returns to schooling shows that the level of education strongly predicts earnings and job occupation in adulthood. It is also consistent with human capital theory: low investment in human capital can lead to less employment opportunities and lower wages. This may be amplified in cases where the working child has experienced severe health problems while working, which still negatively affect his or her adult health (Beegle et al., 2008). However, a former child labourer may have acquired work experience and networks through their work history, which can be rewarding in the long run. This is especially true for adult job that requires some forms of learning-by-doing, such as agricultural work. The expected impact of child labour on adult employment outcomes is therefore uncertain (Emerson and Souza, 2011).

3.2. Child labour may impair health

Given the adverse effects on education observed in the previous section, it is expected that child labour will have a negative impact on health. Indeed, education is one of the main determinants of health (especially in the long run). However, other factors, unrelated with education, may come into play. We present them in this sub-section, separating physical health from mental health. Although these two dimensions influence each other, the latter has only recently been studied and the underlying

⁶ School life expectancy measures the average length of schooling.

mechanisms are not yet well understood.

Physical health in the short term At any age, working conditions and environment can impair a worker's health status: work-related health risks and issues can affect workers' physical, emotional and mental health. The literature on the relationship between employment and health, focusing on adults, shows that work can be beneficial to health (Van der Noordt et al., 2014).⁷ However, the positive effects of working adults on their health are unlikely to apply to working children. Conversely, adverse effects may occur when work involves intense physical requirements, stress, and exposure to radiation or pollution. These negative consequences are closely related to working conditions and environment and may therefore also apply to child work. Children are even more vulnerable than adults to the contemporary impact of work-related health hazards because of their specific features (Fassa et al., 2000; Forastieri, 1997).

First, they differ from adults in terms of physical characteristics. Children are not physically adapted to support long hours of strenuous work, and they suffer more quickly to the effects of mental and/or physical fatigue (Fassa et al., 2000). Their bodies (in terms of musculoskeletal features) are less suited than adults for doing heavy work, carrying heavy loads, or maintaining awkward body positions for long hours. Besides, their anatomical characteristics imply that the concentration of detrimental substances required to cause damage is lower than that of adults. Their dynamic developmental physiology also means that they are often subjected to higher exposures to pollutants as their bodies lack specific defence barriers (Moya et al., 2004). Consequently, children suffer more than adults do from exposure to dangerous chemical substances and radiation (Fassa et al., 2000). Moreover, there are windows of time during which the growth and development of children may be sensitive. For instance, for most chemicals, exposure at a young age appears to be more harmful the younger the child (Etzel, 2020).

Second, they differ from adults in their physiological and psychological immaturity. Young children may lack the hindsight and cognitive skills to perform work without injury or fatigue. During the adolescent period, the brain's impulse control structures are immature (Tottenham and Galvan, 2016). Teenagers may engage in risk-taking behaviour or be willing to work extra-hours with the intention of doing well, without realising the risks involved (Yadav and Sengupta, 2009). These developmental features may increase the child's vulnerability to health risks, even if the child has the physical characteristics or strength to perform the required tasks.

Third, children may be more vulnerable to work-related health risks because they lack experience and often have not performed any safety training. For instance, Breslin et al. (2003) show that among 15–24 years old, more than 50% of all claims in that age group occurred in the first five months on the job, suggesting that inexperience may play a crucial role for young workers. Due to this lack of experience, children are often unaware of the possible hazards, and have no knowledge of the precautions to be taken (Fassa, 2003).

⁷ For instance, having a job positively affects adult health: it provides financial security and opportunities to improve skills and social interactions and gives meaningful life purpose and a sense of personal achievement.

Beyond children's greater vulnerability to the negative health effects of work, the intensity and the type of work performed can have an even more negative impact on health for some working children. Work-related illnesses and injuries are directly related to work intensity: long working hours undoubtedly increase health risks. Therefore, work intensity should be examined in more details when considering the health effect of child labour (Ahmed and Ray, 2014). The ILO recognises that the harmful impact of child labour depends on the number of hours worked based on the age of the child.⁸ Unfortunately, there is no quantification in the academic literature of a tipping point below which the number of hours worked by children could be considered harmless to health. Besides, as O'Donnell et al. (2005) note, "Children working with dangerous materials, such as asbestos or molten glass, in unhealthy environments, such as mines or quarries, or long hours in sweatshop conditions obviously place their health in serious jeopardy". Evidently, the likelihood of a child contracting a work-related illness and its severity highly depends on the work's characteristics and the industry (Dorman, 2008). Therefore, a fundamental distinction must be made between activities that have a high probability of harming a child's health and those that have a lower likelihood of doing so (Levison and Murray-Close, 2005). Such a list of harmful activities is difficult to define for two reasons. First, this list must distinguish the likelihood of being negatively impacted from the severity of injuries and illnesses (some may have a limited duration of harm, while others may be irreversible). Second, this type of list should be country or context-specific, as the potential adverse effects of an activity may be mitigated by existing labour standards or regulations or healthcare systems.

Physical health in the long term Establishing the long-term impacts of child labour requires considering child development from a life course perspective. The literature has demonstrated that early environmental conditions impact the evolution of adolescent and adult outcomes directly related to health such as cognitive and non-cognitive skills (Heckman, 2007; Knudsen et al., 2006; Grossman, 2000). A child's development towards a future healthy state is a maturational, cumulative and interactive process, affected by several factors (Black et al., 2017; Heckman, 2007). Adverse events during childhood and adolescence as well as the health capital acquired during this period are among these factors. Children can expect to reach their full health potential when they are able to accumulate health-influencing capabilities (economic resources, educational attainment, cognitive skills) while avoiding the accumulation of impairments or depletions. As this paper shows, work directly impairs child's developmental skills by influencing their educational outcomes and increasing their risks of health complaints and diseases. Moreover, working during childhood can be seen as an adverse event that may

⁸ The ILO considers that child labour refer to children aged 5-11 years engaged in economic activity for at least 1 hour during the reference week, children aged 12-14 years engaged in economic activity for at least 14 hours during the reference week or children aged 15-17 years engaged in economic activity for at least 43 hours during the reference week. However, no justification is given for these different thresholds, which may be considered arbitrary.

induce health problems lasting into adulthood. Physical injuries or stress experienced during some child labour experiences may have particularly detrimental long-term effects (Edmonds, 2007). Similarly, the increased nutritional needs associated with arduous work are expected to exacerbate malnutrition, leaving the child stunted and wasted or vulnerable to infections (Forastieri, 1997; Dasgupta, 1997).

In addition to the fact that the immediate health impact of child labour may persist over the long term, the accumulation of negative outcomes at early stages may negate any future health benefits (Heckman, 2007). Children who start working at a young age will be exposed to environmental hazards in the workplace for a longer period of time, which will diminish their long-term developmental competencies (Nicolella and Kassouf, 2018; Forastieri, 1997; Fassa et al., 2000; Dorman, 2008). The younger a child begins working, the less likely he will be able to accumulate the capabilities required to build good health over the long term.⁹ This is especially true if work occurs during the periods of children's life when the adverse effects on their health are more substantive (Parker, 1997; Nicolella and Kassouf, 2018). Indeed, the age at which the child works matter greatly because the developmental component of a child's physiology changes over time. Skill formation theory argues that there are multiple stages of childhood, with some stages being more sensitive periods for child development (Cunha and Heckman, 2007). These "critical windows of vulnerability" create specific risks for children engaged in work that may alter children's health differently depending on the age of exposure. Thus, while some children could be resilient and catch up over time with the detrimental health effect of working, others will not if work appears during these sensitive stages. However, this theory has not been empirically tested in the case of child labour.

Mental health The impact of child labour on mental health has received recent attention due to advances in the literature on the social determinants of mental health (Evans et al., 2001; Monroe et al., 2007; Horwitz et al., 2001). These studies have shown that depressive symptoms relate to lifetime stress exposure and income level, both of which are influenced by child labour. More precisely, exposure to a negative event on a frequent or prolonged basis can lead to high levels of stress, which can damage brain development and lead to mental disorders, such as depression (Franke, 2014). In fact, the likelihood of developing depressive syndromes is linearly associated with the number (and severity) of stressful events experienced (Hammen, 2005). Most of this research, however, focuses on very severe stressful events, such as the loss of a parent or physical abuse at a very young age. Whether this evidence can be applied to child labour remains an open question.¹⁰ At the same time, the work and health nexus literature

⁹ However, health could also increase through investment, for instance, when the income generated from work has been re-invested in child's health.

¹⁰ The closest paper to the impact of major life stressors linked with child labour on mental health is the one of Blattman and Annan (2010) who study the psychological consequences of forced abduction into the military (one of the most hazardous forms of work) among children from northern Uganda. They find little evidence of sustained psychological distress once the confinement is over.

demonstrates that work-related psychosocial stress increases the risk of depression (Caplan and Jones, 1975; Pikhart et al., 2004). Non-causal studies of child labour describe that long hours or physically demanding work can lead to a lack of control and feelings of hopelessness and demoralization (Al-Gamal et al., 2013; Bandeali et al., 2008; Fekadu et al., 2006). However, there are no specific studies on the number of hours required to prevent mental health deterioration. As with physical health, these adverse effects can occur immediately or years later. These potentially negative effects are again very much related to the type of work and working conditions, in others words, to the severity of child labour. Conversely, below an undetermined intensity level, children may even develop skills and a greater sense of self-esteem if their work is rewarding or highly valued by the social norms in their communities. As with physical health, the mental health consequences of child labour are triggered by the fact that adolescence, the period when children are most likely to be working, represents the second window of vulnerability for brain development that can influence cognitive and non-cognitive skills development in adulthood (Knudsen et al., 2006; Cunha and Heckman, 2007).

Overall, the stress or burden of working conditions (or even the act of working itself) can lead to poorer mental health among working children. This is worsened by the poor economic conditions of working children's households that cannot provide children with protective factors, such as access to mental healthcare services. Moreover, work may prevent the child from attending school and, therefore, from benefiting from the stimulating environment they need to develop (cognitive and) non-cognitive skills.

4. Quantitative estimates of the impact of child labour

The mechanisms outlined in the previous section are diverse and can theoretically affect positively or negatively child development. The direction and magnitude of the effects is therefore an empirical question. In this section, we present the different empirical studies that employ a causal identification methodology (see Introduction and Appendix A for more details on the selection criteria for the papers). The objective is to estimate whether child labour does impact education and health, and if so, in what way.

4.1. Empirical effects of child labour on education

4.1.1. Contemporaneous educational outcomes

School attendance/enrolment Numerous empirical papers have tested the relationship between work and school attendance. The most convincing literature supports a negative relationship between child labour and school attendance (Assaad et al., 2010; Boozer and Suri, 2001; Ray and Lancaster, 2005; Sugiyanto and Digdowiseiso, 2019). The following causal papers¹¹, which rely mainly on data from before 2000, establish this negative relationship for children of different ages (7-18 years). In Ghana, Boozer and Suri (2001) find that a one-hour per week increase in child labour (including all types of work, except domestic work) leads to a 0.38-hour decrease in contemporary schooling for children aged 7-18 years. They find that the impact differs according to gender: work has a negative impact for boys in the short and long term, while it appears to be only a negative long-term effect for girls. Similarly, when looking at the impact of the intensity of child labour (number of hours worked per week), they find that each additional hour worked has a large negative impact on boys' schooling, while the impact is relatively small for girls. Examining the effect of the hours worked on school attendance in Egypt, Assaad et al. (2010) confirm this negative relationship for all levels of working hours, for both boys (market work) and girls (mainly involved in household chores) aged 10-14 years. They find that for the same level of school attendance, girls usually work more hours than boys and that the negative effect is larger for them. However, it is not clear whether the effect is larger for girls because they work more hours per week or whether their type of work (household chores) is more detrimental than the market work performed by boys. Nevertheless, the negative effects of child labour on school attendance remain small and insignificant below 14 hours per week for boys, and 10 hours per week for girls, suggesting that child labour would have a negligible effect on school attendance below a certain threshold. This result is also found by Ray and Lancaster (2005) in Sri Lanka, where children aged 12-14 can work up to 12-15 hours (all types of child labour included) per week without impacting their school attendance. However, this idea of a threshold is not confirmed in the other countries they examine (Belize, Cambodia, Namibia, Panama, Philippines, and Portugal) where they find that even limited amount of child labour negatively impacts school attendance. Surprisingly, Sugiyanto and Digdowiseiso (2019) find no significant relationship between the number of hours worked in market work in the week prior to the survey and school enrolment in Indonesia for teenagers (12-15 years old). This could be due to the short recall period (they only capture the number of hours worked in the week prior to the survey, which is not representative of child's yearly working time).

School performance The literature mainly suggests a negative relationship between child labour and school performance when looking at written test scores in different fields, such as reading and mathematics (Delprato and Akyeampong, 2019; Gunnarsson et al., 2006; Lee et al., 2021). For instance, analysing 15 countries in Latin America, Delprato and Akyeampong (2019) find that

¹¹ The samples used in all the papers cited in this section include all possible situations: children only attending school, children only working, children combining work and schooling.

working children aged 13-14 years and involved in any type of work within or outside the household, have lower scores than non-working children in mathematics and reading by 9 and 13 points, respectively. Dumas (2012) is an exception to the estimated negative impact of children's work on their school performance. Focusing on adolescents (14-18 years) working outside the household and for the family business in Senegal, the author finds a positive impact of child labour on oral mathematics test scores. She argues that these skills may be improved when the child has to perform calculations while working, as in commerce.

The effect of child labour on school performance is likely to increase with the intensity of child labour. For instance, Mavrokonstantis (2011) finds that a one standard deviation increase in the number of hours worked per day by children aged 12 in urban Vietnam¹² reduces maths scores by 12.45 points out of 100 three years later. Woldehanna et al. (2017) find that an additional hour of work of any type per day for children aged 12-15 in Ethiopia leads to a 6.2% reduction in their school performance. In some cases, the negative effect of child labour on school performance seems to occur from the very first hours, i.e., even for a low volume of work per week. Mavrokonstantis (2011) finds this result in the context of urban Vietnam, looking at paid market work, unpaid work for the household, and household chores for children aged 12 years old. Looking at 11 Latin American countries and focusing on paid work outside the home undertaken by children aged 8-15, Gunnarsson et al. (2006) finds that the language and mathematics test scores of children who work, even occasionally, are on average 7% and 7.5% lower than those of children who do not work. On the contrary, the negative effect of child labour on school performance might only be detrimental above a certain threshold. Bezerra et al. (2009) find that adolescent labour (13-14 years old) has little or no impact on school performance if the child works 14 hours a week or less in the urban Brazil setting, taking into account both activities performed at home and outside the home.

The extent of the impact of child labour on educational outcomes also depends on the type of work done by the child. The literature focusing on Latin American countries seems to agree that children who work outside the household experience a greater negative impact on their educational outcomes than children who work for the family business or in household chores (Bezerra et al., 2009; Delprato and Akyeampong, 2019; Kassouf et al., 2020). The authors of these studies suggest that children who work outside the household, or who work both inside and outside the household, work longer hours per day. However, no descriptive statistics comparing hourly workloads per day between the different types of work are available, so this hypothesis cannot be validated.

The age at which a child is exposed to child labour may also influence the extent to which work has a negative impact on school performance. Studying children aged 8-14 who work outside the household

¹² Results for the rural sector are not interpretable because of poor instrumentation of rural child labour.

in both urban and rural¹³ settings in West and Central Africa, Lee et al. (2021) find that the academic performance of younger children (8-12 years) suffers more from work than of older children (13-14 years). This may be due to a greater fatigue effect for younger children, who may find it difficult to combine work and school.

The literature tends to show that the negative effects of child labour on school performance do not stop at short-term effects. In Ethiopia, Woldehanna et al. (2017) find a negative effect of child labour on school performance three years later, and Kassouf et al. (2020) find a similar result for Brazil at a time horizon of 4 years, focusing on market work outside the household and household chores. Sim et al. (2017) suggest that these negative effects might be long-lasting, as they find that Indonesian children aged 10-14 and engaged in market work in 2000, compared to children who were not working, experienced 0.37 standard deviations lower growth in mathematics skills seven years later. Over the same time horizon, Mavrokonstantis (2011) comes to the same conclusion for Vietnam. This long-term effect can be explained by the seemingly cumulative effect of child labour on school performance, i.e. the academic delay accumulated in the first year of work is added to the delay accumulated the following year, and so on. Indeed, Emerson et al. (2017) find that for Brazilian boys aged 10-17 years in the urban sector, each year of work (work outside the home and household chores) leads to a 3.1 point decrease in test scores, indicating a linear and cumulative effect of child labour on school performance.¹⁴ They do not find any significant effect on girls due to the small sample size, but the sign of the relationship remains the same. Hence, it seems that the delay accumulated during the working school years is difficult to catch up with, at least in the medium term (one year after stopping work). Indeed, they find that boys who stopped working a year ago continue to have lower results than those who have never worked. The relationship appears to be the same for girls (same direction of the coefficients) but not significant (again, probably due to the small sample size).

4.1.2. Long-term educational outcomes

Years of schooling/school dropout Child labour is negatively associated with years of schooling (Beegle et al., 2008; 2009; Sim et al., 2017; Zabaleta, 2011). In the medium term, Zabaleta (2011) finds that an increase of one hour of work¹⁵ per day for children aged 6-14 years is associated with a reduction of almost 0.4 years of schooling completed three years later in Nicaragua, and a 2%

¹³ Rural child labour is mainly composed of agricultural work.

¹⁴ The authors find that the average effect of child labour on math scores for boys was a 3% decrease in standard deviation, and a 5% decrease in Portuguese.

¹⁵ The study only takes into account market work and household chores.

reduction in the probability of completing elementary school. In Tanzania, focusing on work outside the home and household chores, Beegle et al. (2008) find that, for boys aged 7-15 years, a one standard deviation increase in child labour hours (5.7 hours) is associated with a decrease of more than half a year of schooling three years later, and a 14.1 percentage point reduction in the odds of completing primary school. They find no impact for girls, who are mainly engaged in household tasks. The authors argue that girls may perform tasks that are less detrimental to education than boys, who are involved in both household chores and work outside the home, mainly agricultural work. Beegle et al. (2009) find that children aged 8-13 years who worked¹⁶ in 1992-1993 in Vietnam have a significantly lower level of educational attainment five years later compared to those who did not work. An average level of child labour (7 hours per week) leads to a 1.6 year (21 percent) decrease in educational attainment five years later.

The impact of child labour on the number of years of schooling depends on the intensity of the child's work. Zabaleta (2011) finds that above three hours of work per day, each additional hour of work is associated with a loss of four months of educational attainment three years later in Nicaragua. She also finds that below two hours per day, child labour actually has a positive effect on years of schooling. Thus, moving from one to two hours of work per day increases the number of years of schooling by about ten months. In Tanzania, Beegle et al. (2008) also find that above 15 hours per week, child labour reduces the time spent in school by 2.6 years and the probability of completing elementary school by 36% ten years later. Testing different thresholds, Beegle et al. (2008) conclude that the negative impact of child labour on schooling appears even at a moderate level of work and that the negative effects increase with the intensity of child labour.

The impact of child labour on children's education attainment may vary depending on the type of work: work for the household business, work for a business not related to the household or household chores. In the medium term, Zabaleta (2011) finds that an additional hour of work per day in market production (including work for the household farm) is associated with poorer academic progress three years later in Nicaragua, compared to an additional hour of work in household chores. In the longer term, Sim et al. (2017) confirm this relationship in Indonesia by finding that children of 10-14 years working outside the family business have about 1.5 fewer years of completed education than those working for the family business 7 years later. Cardoso and Verner (2006) find no negative impact of any type of adolescent labour (12-18 years old) on the probability of leaving school early in the context of urban Brazil. The author mainly explains the result as the fact that the income earned at work helps pay for transportation costs to continue to attend school.

Adults' earnings There are still few causal articles examining the impact of child labour on adult earnings. In Ghana, Lambon-Quayefio and Owoo (2018) find a negative relationship between any

¹⁶ The authors considered income-generating work, including work on the family business or farm.

type of child labour and adult earnings, with a reduction 14.3% in earnings of people who start working before the age of 12 years. They also have increased odds of being in relatively low-skilled jobs in the future compared to being in technical and more professional jobs.¹⁷ Posso (2017) finds a similar result in Ecuador, with former child workers earning 17% less than people who began work as adults.¹⁸ The author also finds that the negative effect of child labour on adult earnings is greater when individuals are 30 years and older than when they are younger. In other words, the difference in income between those who worked during their childhood and those who did not increases after the age of 30. The author suggests that there may be cognitive differences between former child workers and others, and that these become more apparent as they reach full maturity, around the age of 30. However, this remains a hypothesis and the author's regressions do not establish a causal link (or even a correlation) between child labour, cognitive skills, and adult earnings.

Looking at the impact of child labour on adult earnings in Brazil, Emerson and Souza (2011) suggest that the negative effect of child labour on adult earnings ceases when the child is between 12 and 14 years old. To understand this result, it is necessary to describe the Brazilian context in which the study took place. During the period analysed (1988-1996), the average number of years of schooling was about 6 years. Brazilian children officially started school at the age of 7, which means that on average, children left school at the age of 13. This suggests that starting to work before this age may negatively impact children's future earnings, preventing them from reaching the average level of human capital (through the classic channels: fatigue, drop in school attendance, lower school performance, etc.). Specifically, they find that an additional year of school is associated with 13.4% higher earnings in adulthood. They also point out that starting work before the age of 13-14 has a negative impact on adult earnings, even if the child frequently attends school. On the contrary, starting to work after this age could have beneficial effects through the acquisition of new skills, thus increasing their level of human capital and differentiating them from others who not have the opportunity to develop these types of skills at such a young age.

Likelihood of farming This specific outcome was investigated to see whether child labour has a positive long-term effect in a sector that requires few academic skills. The main idea is that a child working in agriculture acquires skills specific to that sector. These skills may not be easily transferable to other activities and may therefore encourage the child to remain in agriculture as an adult. This choice may be further reinforced if the child has not attained a high level of education and a large part of his or her human capital consists of knowledge and skills acquired as a child working in agriculture. Child labour in agriculture could therefore influence the likelihood of children remaining in agriculture as adults, thus influencing their future employment prospects. There are no

¹⁷ This is a correlation result, not a causal one.

¹⁸ The author provides no information about the type of child labour included in the study, perhaps because the data used did not contain this information.

causal papers supporting this hypothesis, but Beegle et al (2008) provide some interesting correlations. They found that Tanzanian boys who worked as children or adolescents (mainly in agriculture) are more likely to be farmers 10-13 years later as adults. Indeed, a one standard deviation increase in the number of hours children work per week (5.7 hours) leads to an 18 percentage point increase in the probability of being a farmer as an adult.

4.2. Effect of child labour on health

4.2.1. Contemporaneous physical health

Self-reported measure of health status Several papers employing robust empirical strategies show that working as a child decreases child's (contemporaneous and subjective) self-reported health status. Relying on a bivariate probit and instrumental variable specifications, Wolff et al. (2008) found a negative correlation between performing any economic activity between 10 to 15 years old and the probability of suffering from at least one health complaint during the previous month in Indonesia. Their conclusion is robust to various measures of health. Using pseudo-panel specifications, Nicolella and Kassouf (2018) show that a 0.1 increase in the proportion of children aged 5-15 years old working in Brazil results in a decrease of 0.4 percentage points in the proportion of children with excellent health status. They also find that the greater the number of hours of work performed by children, the worse is their health status. Using instrumental variable strategy, Posso (2017) shows that children aged 10 to 17 years old who work at least one hour a day over the week or 7 hours a week are potentially 1.7% more likely to have health concerns than children that do not work at all. While these papers demonstrate a negative relationship between child labour and health assessment, others find an absence of an effect (no paper find a positive effect of working on health). For instance, O'Donnell et al. (2005) show no effect of child (6-15 years old) agricultural work on contemporaneous health in rural Vietnam. More specifically, unpaid agricultural work for the household appears to have no short-term impact on health, while paid work may even improve nutrition and contemporaneous health. Using the same dataset as O'Donnell et al. (2005), Beegle et al. (2009) confirm that there is no effect of working for children aged 8 to 13 years old on current health. More precisely, the probability of illness is not significantly associated with child work, and the number of days ill among those who have been ill does not significantly increase with child labour.

Work-related illness Self-reported health status may be too broad to capture the specific impact of child labour on health. One way to relate more precisely the potential deterioration of health to working is to focus on child-work-related illnesses and injuries. Ahmed and Ray (2014) provide the only paper that explores the effect of any work performed before the age of 17 on whether a child reports any work-related injury or illness. Using a bivariate probit approach, they find a negative

association between child labour (participation or working hours) and child health, in both urban and rural areas. Besides, the frequency of reporting any injury or illness increases with the number of hours worked.

Contextual factors Several contextual factors may influence the severity of contemporaneous health outcomes. According to Posso (2019), location matters: children living in urban areas are generally less likely to report health problems than children in rural regions. Wolff et al. (2008) also found some differences between urban and rural areas. They find a significant effect only for the rural sub-sample.

Other robust papers propose to separate hazardous and non-hazardous work. Nicolella and Kassouf (2018) classify each child's activity as hazardous or non-hazardous (according to the Brazilian Occupation Code). They observe that hazardous occupations affect about four times more children's health than work in general. Posso (2017) also disentangle their results according to the severity of work. On average, if a child does heavy lifting at work for 7 hours per week, he or she is 0.8% more likely to have health concerns than a child who does not work at all.

Some papers investigate how the potentially damaging effect of working on reported health status is likely to differ according to the child's characteristics. Posso (2017) finds that older children are more likely to experience adverse health outcomes. Ahmed and Ray (2014) find that younger children were more likely to suffer from backaches and other health problems (infection, burns, and lung diseases) than older children. At the same time, the probability of reporting tiredness/exhaustion was greater in the oldest age group.¹⁹

Wolff et al. (2008) analyse if there is some gender difference in the effects of working on health. They exclude household chores to focus only on economic activities. Indeed, boys may be more vulnerable than girls to the damaging impacts of working as they are more likely to carry heavier workloads. The sector of activity also differs as girls are more likely to work for the family business than on farms, while boys work predominantly on farms. According to the authors, boys are therefore more likely to engage in more strenuous activities than girls. They observe that among boys, the probability of reporting a given symptom is always higher when the child works. However, no significant differences can be found between working and non-working girls.

4.2.2. Long-term physical health

¹⁹ Comparing age groups may however be inaccurate as children of different ages do not necessarily engage in the same type or amount of economic activities, and as a consequence they may be exposed to different risks. Even if they do perform the same activity, older children are probably exposed to the work-related risk of injury for a longer period than younger children. The higher report of tiredness among older children is in line with prolonged exposure to health risks.

Self-reported health measures In the long run, the effects of child labour on health are difficult to capture since several identified mechanisms can occur and impact future children's health in opposite ways. Different factors influence long-term health (economic, environmental, and socio-emotional). Identification strategies implemented to estimate the impact of child labour on long-term health is thus less robust. Yet, empirical evidence on the long-term effect of child labour on adult's health is mixed. O'Donnell et al. (2005) use two waves of panel data to examine this long-term relationship. More precisely, they study whether children aged 6 to 15 years in the first wave that have worked for household farm and business or outside of the household, report more illness 4-5 years later than non-working children. They show negative repercussions of child work for health in the medium-run: child workers are significantly more likely to report illness five years later. Contrary to O'Donnell et al. (2005), Beegle et al. (2009) use the same data but observe non-significant patterns. The contradictory results of these two studies can be explained by their different sample selection: O'Donnell et al. (2005) consider children aged between 6 and 15 years old, while Beegle et al. (2009) focus on children aged 8 to 13 years old. Besides, their definition of child labour and their empirical strategy diverge (see Appendix B).

Lee and Orazem (2010) focus on self-reported adult health (measured by the incidence of chronic diseases and by functional limitations in performing activities) and investigate whether the age of entry in the labour market matters. They found that working during childhood increases the incidence of adult chronic diseases and functional limitations. However, they observe no direct effect of child labour on adult health. Indeed, reducing years of schooling and the resulting occupational choices mainly explained these adverse effects. Using a similar strategy where child labour is measured as the age at which respondents began to work, Rosati and Straub (2007) also demonstrate that having worked as a child increases by about 40% the probability of reporting poor health as an adult. Similar results are found in Nishijima et al. (2015): entering into the labour market in Brazil before 18 years old adversely affects adults' health (propensity to chronic diseases, physical difficulty, and overall health status). However, they find that having begun the first job during childhood affects health outcomes in adulthood through both direct health factors (past injuries) and indirect educational ones (loss of school years).

Anthropometric indicators Anthropometric indicators are proxy measures associated with children's development. These health measures are considered more objective as they are measured worldwide with the same methods. Besides, they are responsive to environmental and economic changes, and thus can capture the dynamic and cumulative effects of working over time.²⁰ Different indicators have been studied such as weight-for-age (O'Donnell et al., 2005), height-for-age (Kana et

²⁰ There is no evidence supporting a contemporary negative impact of child work on anthropometric indicators (O'Donnell et al., 2005).

al., 2010; O'Donnell et al., 2005), body-mass index (BMI) (Beegle et al., 2009; Kana et al., 2010), and height growth (O'Donnell et al., 2005; Beegle et al., 2009). All these studies find either little or no effect of child labour on these indicators at the individual level, perhaps because these indicators are primarily determined during early childhood, before a child is susceptible to work.

4.2.3. Mental health

The literature on the effect of child work on mental health is still in its infancy and is characterised by the use of diverse measurements and samples, making the different articles not very comparable between them. Four recent papers employ robust empirical strategy and give an insight into the effect of child labour on mental health.

Contemporary effects Trinh (2020) focuses on the contemporaneous effects of labour on child mental health measured by the Strengths and Difficulties Questionnaire (SDQ) in Vietnam and India. He finds that working children under 15 (defined as having worked in the past two weeks) present a lower mental health than non-working children. Feeny et al. (2021) explore the effect of child (between 12 and 18 years old) labour on several psychosocial measures that are likely to be affected by labour, including happiness, hope, emotional well-being, and measures of being scared and being stressed in rural India. Their empirical strategy consists of comparing working and non-working siblings, which enable to control for parental characteristics associated with mental health, such as genes and parental education. The causal interpretation is therefore delicate because it is subject to the strong hypothesis that child labour is quasi-randomly assigned, conditional on gender and the number of younger and older siblings of each gender. They interestingly show that child labour is negatively associated with psychosocial well-being. On average, working children display statistically significant lower levels of happiness, emotional well-being, self-efficacy, and hopefulness.

Long-term effects Other papers analyse the labour effect in the longer run. In a recent (unpublished) paper, Baryshnikova and D.G. (2020) investigate how child labour (among children between the age of 5 to 14 years old in 2007 in Indonesia) affects mental health seven years after. The latter is assessed using one of the most commonly used self-reported measures of depression based on 10-item Centre for Epidemiological Studies Depression Scale (CES-D-10). Using instrumental variables estimations, they find a substantial negative impact on a child's long-term mental health status. They complement their study by providing some heterogeneity analyses according to the type of work and show that working for wages (outside the family business) is even more detrimental for mental health, as it increases the average score by 6 points (suggesting the presence of significant depressive symptoms). However, working in family business does not alter mental health. Aransiola et al. (2018) study how having worked as a child labourer in Brazil (before the age of 14) affects

adults' mental depression diagnosed by a doctor or medical practitioner. Using a probit model, they show a positive relative correlation between starting work before the age of 14 and the probability of depression, compared to those who started at subsequent ages. However, their results are to be considered as subjective evidence as they are not correcting for the selection into work bias.

5. Beyond these results

In this section, we explain the complexity of identifying the causal relationships so that the reader is aware that the results presented above are only suggestive. Next, we outline the various in the quantitative literature on child labour's educational and health consequences.

5.1. Challenges in identifying the causal consequences of the child labour

Several empirical challenges arise when looking for causal identification, which can bias the results and their interpretation. First, the role of income is complex because it is both a cause and a consequence of child labour, having a direct impact on education and health. Isolating the pure effect of child labour from that of income is difficult. Other confounding factors (such as parental preferences) may alter the causal identification. Furthermore, most studies consider education or health as isolated outcomes, whereas multiple interactions exist.

5.1.1. Interdependencies and confounding factors

The complex role of poverty Household income and socioeconomic status are intrinsically related to child labour and the outcomes studied. The level of household's poverty has a direct impact on child labour: it is the primary determinant of the trade-off between work and education. The luxury axiom of the Basu and Van's (1998) seminal theory postulates that children in the household will only work if the family cannot meet its basic needs.²¹ The poorest households may find it difficult to pay for their children's schooling. When access to credit markets is limited or impossible (due to lack of collateral), parents have no choice but keep their children out of school, and thus they are more likely to make their children work (Hazarika and Bedi, 2003; Shafiq, 2007; Edmonds, 2007). Moreover, when a shock with adverse consequences for household income occurs, child labour will help mitigate these negative impacts (Kochar, 1999). Indeed, child labour provides an additional source of money and thus plays an insurance role, especially if households have little access to credit and insurance.

Poverty status is also the main determinant of health and education. Better-off households are able to

²¹ However, the relationship between parental poverty and child labour is not linear. Market imperfections (credit, land, labour) may even push rich rural households to use child labour: this is the wealth paradox of Bhalotra and Heady (2003), that shows that child labour is positively correlated with the size of the household land, which is a good predictor of wealth.

pay for their children's schooling and invest in health (Steckel, 1995). Because of these interrelationships, it is unclear whether the poorer health status and school performance of working children are due to working or are solely a consequence of initial household poverty. On the other hand, some children are engaged in paid work, and through their work, contribute to household income.²² This additional income could be reinvested in human capital (e.g., health and education). When this is the case, child labour does not necessarily impair health or education. This is particularly true for health, as the additional resources provided by children may improve nutrition or allow children to capture family resources (Edmonds, 2007). The *Lifeboat hypothesis* follows this idea: the family may consider a working child as a productive member. As such, the working child's family may allocate a disproportionate share of household income to the child in order to boost or preserve the child's strength and health, and thus his or her ability to generate income (Pitt et al., 1990; O'Donnell et al., 2005; Ahmed and Ray, 2014). Thus, the consequences of children's engagement in paid work may be favourable for their nutritional and health status, at least in the short term.

Other unobservable factors. Other factors omitted from the estimates may bias the relationship between child work and its educational and health consequences. For example, households differ on observable characteristics (such as poverty discussed above) and on unobservable dimensions correlated with child labour, and health and education outcomes. This is the case, for example, with concerns for children, also known as parental preferences (Beegle et al., 2009; O'Donnell et al., 2005; Ahmed and Ray, 2014). For instance, some parents tend to invest more in the children's well-being than others, which could result in higher health care expenditures, a higher interest in education and a lower likelihood of child labour. These parental preferences are generally not captured by standard surveys. Thus, the data analyst might observe a negative statistical relationship between work and education and health, which would actually be more a manifestation of these unobservable parental preferences than an effective impact of work. Child ability is another potential unobservable factor: a child with higher ability is likely to perform better in school, which influences parents' decisions about whether to keep the child in school or to send the child to work. One way to isolate the causal effect of work from the impact of various unobservable but influential factors (such as parental preferences, children's ability, the child's environment since birth) is to use regression models with household or child fixed-effect. Fixed-effect estimates, requiring panel data, eliminate time-invariant characteristics, whether observable or not. Unfortunately, such panel data are difficult to collect and subject to various biases, such as attrition. Consequently, most of the current empirical papers presented above follows a cross-sectional design.

²² Even children doing unpaid work for the family business or farm can contribute indirectly to household income by reducing expenditure for hired labour or by increasing the production of the family business or agricultural activities.

Education and health interaction. When attempting to estimate the consequences of child labour, one should bear in mind that the links between education and health can confound results. These two dimensions of human capital are so strongly interrelated that it is actually difficult to isolate the impact of child labour. The causal links between education and health are, in fact, multiple and multidirectional (Grossman, 2000; 2015). First, schooling has an impact on health: a high level of education is one of the main determinants of health. Indeed, schooling is linked to better access to and understanding of information, which facilitate the adoption of healthier behaviours. In the long term, education leads to better paid jobs and higher social status, which increases the amount spent on adult health care, and reduces stress and mental health problems (Cutler and Lleras-Muney, 2006). Second, health determines education: students with poor health may have difficulties completing school or learning efficiently. In addition, if there are large siblings and limited household resources, parents may choose which child(ren) will attend school (and which will not), on the basis of their physical and mental characteristics (e.g. the brightest child goes to school, the healthiest child goes to work). Finally, health and education are affected by several omitted factors that are difficult to take into account, such as wealth level, time preferences, early environment and experiences, and supportive parents' relationship. There may be a trade-off between education and health, as discussed by Wolff et al. (2008). When resources are limited, as is often the case in households using child labourers, parents may choose between spending on health or education. This complementarity between education and health implies that spending on one dimension will reduce spending on the other one. When empirical studies of child labour outcomes focus on a single dimension, the findings may be unreliable because of these multiple relationships between education and health. Indeed, results may be underestimated or overestimated (depending on the direction of the prevailing links between education and health). Studies of the impact of child labour on education often ignore the confounding effect of health, while papers on health often mention these interdependencies that may invalidate their conclusions. Because health may be mediated by its effect on schooling, most articles focusing on health choose to include only in-school working children in their sample. These sample choices are not trivial since they may induce a selection bias and exclude children who may be most impacted by child labour (the ones not attending school while working).

5.1.2. Timing issues

The potential consequences of child labour may appear directly or several years later. The time period chosen in the empirical exercise implies methodological choices and limitations, which are outlined here.

In the short run : the problem of simultaneity. Studying the causal impact of child labour on health and/or education in the short run involves a few methodological issues. First, there is simultaneity issue: hours of work may be determined simultaneously with schooling hours and the

health status of the child. Second, there may also be a short-term reverse causality problem between child labour and education and health outcomes. For example, a child's health may influence whether he or she works: a child in poor health conditions will not be able to work, which may lead to a positive relationship between health and child labour. Similarly, the direction of the relationship between child labour and education is not so clear: does the child start working because he or she is no longer in school? Or does the child drop out of school because of work? This endogeneity problem necessarily implies the mobilisation of appropriate econometric methods to address this issue. Otherwise, it is impossible to determine a causal relationship between child labour and health or education.

In the long run : limited information and complex health mechanisms. In long-term studies, usually those that focus on returns to education (i.e., earnings in adulthood) or health in adulthood, the issue of reverse causality no longer arises. Researchers are then faced with other types of issues. One of the main limitations of long-term analyses is that there is only limited information available on child's work during childhood or adolescence. Usually, the only information available is the age at which the child started working. No other information regarding the type of work performed, the sector in which the child worked, the intensity of the work done, or the conditions under which the work was done is available. Yet, it is likely that the impact of child labour on long-term health or adult earnings will differ according to the characteristics of the work performed. It is also difficult to explain a poor health status in adulthood by the mere fact of having worked at a young age. Causality may be even more difficult to establish, as health relies on multiple socio-economic factors. This is even more difficult because individual's health status is constantly changing over time. For example, a long period may have elapsed between the time the child began working and the date of the study. There is therefore a risk of missing changes in health status that have occurred between these two periods. For instance, child labour may have damaged a child's health, but by the time the child is interviewed as an adult, a recovery mechanism may have occurred. Similarly, some health issues can take many years to develop (Dorman, 2008; Levison and Murray-Close, 2005). This is particularly the case for cancers, which can occur late in life despite childhood exposure to risk factors, such as pesticides or chemicals. Similarly, studies that look at the long-term impact of child labour on children's education, such as the number of years of education, also face the challenge of taking into account partial information about child labour. Indeed, these papers estimate the impact of one or two periods of child labour (corresponding to the survey periods) on children's education in the long run, rather than the overall impact of child labour experienced by the child throughout childhood or adolescence.

5.2. Measurement issues

Self-reported measures are prone to bias In many of the causal studies discussed in this literature review, variables related to child labour, education, and health are often self-reported subjective measures. These variables are opposed to variables obtained objectively, i.e., by using an administrative register (register of childhood illnesses declared at the hospital, wage record, etc.) or observed by a third party. Subjective variables are widely used because they are easy to access (generally by conducting a household survey), compared to objective variables (usually found in private records). Self-reported variables, especially those related to health, have been shown to be good predictors of future mortality (Idler and Benyamini, 1997; Kaplan and Camacho, 1983), and to contain valuable information on health status of respondents even in the presence of objective health measures (Idler and Benyamini, 1997).

Nevertheless, these self-reported measures may be subject to many biases, such as memory bias. For example, respondents, whether children or adults, may forget information when asked to recall events that took place in the past (e.g., the number of times they were sick, or the exact number of hours they worked), or may confuse the chronology of some events (e.g., including an event that did not actually take place in the time period of interest). Beyond memory bias, children as respondents may not mention critical information that they do not consider important. For example, children may be unaware of the hazardous nature of an activity (e.g., pesticide application) and not report it when asked (Levison and Murray-Close, 2005). Similarly, if work-related injuries become recurrent, children may normalise them and not report such injuries when asked (O'Donnell et al., 2005). When child labour questions are asked to an adult in the household, a social desirability bias may also come into play. Indeed, when asked about sensitive topics, such as child labour, respondents are likely to lie to avoid negative social or economic consequences (Jouvin, 2021). These measurement errors are likely to bias the estimations, which is even more critical when these biases are not random but correlated with other variables of interest in the study (e.g., income). For example, self-reporting measures related to health may be correlated with income (Sadana et al., 2002; Strauss and Thomas, 1998), which is also a determinant of child labour.

Limits of outcome variables The different outcome variables used in causal studies looking at the impact of child labour on education and health also have inherent limitations. To measure children's physical health, anthropometric indicators, such as height-for-age, are sometimes used as explained variables. Nevertheless, these health indicators are particularly relevant when looking at children in their early years, before they even start working. Thus, anthropometric indicators can be invariant to work-related health issues, such as injuries that a working child may experience (O'Donnell et al., 2005). Mental health indicators, such as whether a child is depressed, are a complex and intertwined combination of biological, psychological, and socioeconomic factors, making it difficult to isolate a causal link of a single factor such as child labour. Moreover, in the case of education, some outcomes are overlooked by researchers, such as school dropout or repetition,

which are likely to be negatively affected by child labour.

Representativity issues Causal studies of the impact of child labour on children's health and education are generally only representative of a particular context, depending on the country in which the study is conducted, the activities performed by the children, their age, or the sector(s) of activity considered in the study. The findings of causal studies generally lack external validity, i.e., they can hardly be generalised to other contexts, however close they may be. Most of these studies are also only marginally representative for girls, who are usually engaged in domestic work, often because of the lack of a large enough sample size to detect a significant effect.

Instruments Most of the selected papers use an instrumental variable (IV) strategy to estimate causal effects between child labour and education or health. When using the IV method, the researcher has to find a variable (an instrument) related to child labour that does not have an impact on health or education. The availability of such an instrument is rare, and so far, no empirical study has really succeeded in finding a suitable instrument. In particular, the instruments used are not very exogenous as they correlate with the household's poverty status or its location, which is likely to be related to the studied outcomes, independently of child labour. Therefore, the results should always be interpreted as evidence of association rather than causality. In addition, the findings obtained by using the instrumental variables method are quite sensitive to the instrument selected. Thus, since each paper using this method relies on different instruments, the findings cannot be compared between studies.

6. Conclusion

Overall findings on the consequences of child labour are often mixed (see Appendix B for detailed results). The literature tends to find a detrimental effect of work participation on school attendance, due to a mechanical reduction of the hours available for successful schooling or a fatigue effect. There is, however, no consensus on whether there is a threshold (in terms of hours worked) beyond which child labour becomes negative for attendance. Most of the literature finds that work also interferes with school performance. The negative effect of child labour is cumulative: the academic delay accumulated in the first year of labour adds to that of the following year, and so on. In the long run, child labour affects the number of years of schooling completed only when children work more than 15-20 hours of work per week. By impeding school completion and learning performance, child labour can also have an impact on adult labour market outcomes, particularly for employment requiring academic skills. A working child is likely to have lower earnings in adulthood than a non-working child. The penalty associated with child labour on adult earnings may peak when former child workers reach the age of 30. The relation is not linear: Emerson and Souza (2011) suggest that

the negative effect of child labour may stop and turn into a positive effect on adult earnings around the age of 13-14.

Children are more vulnerable than adults to work-related health risks due to their specific physical and maturational characteristics, and lack of experience. Even though most papers find a significant negative relationship, a few papers do not find any significant effects. In the long term, the impact of child labour on adult health is complex, as opposing mechanisms may be at play. Injuries and stress, as well as the accumulation of several years of work, are likely to deteriorate health. For less severe (or more reversible) injuries, children may be resilient over time and recover their initial health status, especially when healthcare services are efficient and accessible. Income generated from work may also be reinvested in health care and nutrition. Empirical causal studies show, however, mixed evidence: some studies find a negative impact of having worked during childhood on adult's health, while others show no results. Studies focusing on anthropometric indicators find no relationship with child labour, probably because these indicators, although highly correlated with the individual health status, are rather determined before the age at which a child is likely to start working. The question of the short- or long-term impact of child labour on children's mental health is extremely recent, and the mechanisms by which child labour affects mental health are still poorly understood. Currently, studies treat mental health as a similar outcome to physical health, and therefore the same transmission channels apply. Although these studies show a detrimental effect of working on psychosocial health, we lack the necessary hindsight to conclude a negative impact.

The policy implications of these findings are thus difficult to draw. Although we cannot precisely quantify the effects, we can be reasonably confident about several facts:

- An increased intensity of child work (both in the number of hours worked or the physical or cognitive difficulty of the task) is associated with increased harm.
- There is a threshold in the intensity of child work above which harm occurs and below which working may be neutral or have beneficial consequences.
- The severity of child labour overtime is a cumulative process. Gaps in education and health at a young age persist and undermine the benefit of any improvement at a later stage. The skill accumulation process has dynamic complementarities so that investments made at a later age (e.g. education and health promotion during adolescence or adulthood) will have greater returns if they are preceded by investments at an earlier age ([Cunha and Heckman, 2007](#)). We therefore recommend intervening from an early age to prevent the cumulative effect and enable children to reach development potential through acquiring academic, behavioural, socio-emotional, and economic competencies.

These empirical studies face numerous identification issues in causally imputing the adverse effect on

children's (or adults') education and health to the sole fact of having worked as a child. None of these studies address the full range of conceptual and methodological considerations to isolate the pure effect of child labour. In addition, all studies use different definitions and methodologies, making it difficult to compare and estimate the magnitude of the effects. We identify several gaps in this literature.

First, these studies examine the impact of work globally without necessarily distinguishing the type of activity or sector. Without this distinction, it is impossible to make policy recommendations for a particular sector or country, as the severity of the impacts on education and health depend on the intensity and type of work performed. To better understand the consequences of child labour by type, intensity, and other characteristics, it seems crucial to conduct causal studies using more granular data on the type of work performed by children. This would allow for a better understanding of the effect of child labour in more specific contexts and more effective and better-targeted policies. In the same vein, theoretically, the severity depends on the age of exposure to work: some periods are more sensitive, called “windows of vulnerability”. Unfortunately, the selected papers consider childhood as a single period, without distinguishing effects according to the age category.

Second, the literature on the consequences of child labour omits a key dimension: non-cognitive skills, which appear to be important determinants of educational and health outcomes in the short and long term. Non-cognitive skills include several dimensions such as perseverance, motivation, time preference, risk aversion, self-esteem, self-control, and preference for leisure. Emerging literature shows that the environment can influence non-cognitive skills during childhood (Heckman, 2007; Cunha and Heckman, 2007). These skills are likely to be affected, in positive or negative ways, by the act of working and by the type and intensity of work performed. Moreover, due to the direct link with education and health performance, it is also worth investigating whether and how these skills can mitigate the detrimental effect of child labour.²³

Finally, too few studies distinguish between girls and boys. However, the consequences of child labour are likely to be quite different depending on the gender of the child. First, the nature of child labour differs: boys and girls engage in different occupations. For instance, boys are more likely to undertake activities in agriculture (62.8% for boys versus 37.2% for girls according to the ILO, 2021), while girls are more likely to perform household chores. Often, this division of tasks leads to an underestimation of girls' work when using standard definitions of child labour (i.e. the performance of economic activities). Gender can also determine the conditions, the exposure to risks and hazards, and work hours. Besides, in many societies, gender roles often dictate education (partly due to the different returns to education for boys and girls) and access to health (partly due to social norms).

²³ A recent exception is Trinh (2020), which investigates whether child labour impacts children's emotional and behavioural development. This study shows that peer problems and prosocial behaviour are significantly impacted by working. According to the author, children who engage in the labour market will have less time for other activities, especially social ones, and are therefore more likely to have behavioural issues.

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- 102.

Appendix A: Selection criteria

Table A1: Keywords used

Outcomes	First keyword	Second keyword
Education	"Child labour" OR "Child labor" OR "Child work"	"Education" OR "Human capital" OR "Learning achievement" OR "Schooling" OR "School dropout" OR "School attendance" OR "School performance" OR "Academic performance"
Health	"Child labour" OR "Child labor" OR "Child work"	"Health" OR "Mental health" OR "Psychological health" OR "Cognitive health" OR "Cognitive development" OR "Physical health" OR "Injuries" OR "Health consequences" OR "Pesticides"
Adults' earnings	"Child labour" OR "Child labor" OR "Child work"	"Wage" OR "Adults' earnings"
Others	"Child labour" OR "Child labor" OR "Child work"	"Age of marriage" OR "Farming"

Table A2: List of studies included in the body of evidence

Education

Title	Context	Outcome	Quality
Attendance			
Assaad, R., Levison, D., & Dang, H.-A. (2010) How much work is too much? Effects of child work hours on schooling—the case of Egypt. <i>Child Labor and the Transition between School and Work</i> .	Egypt Rural/Urban	School attendance Short-term	Weak
Beegle, K., Dehejia, R., & Gatti, R. (2009) , Why should we care about child labor? The education, labor market, and health consequences of child labor. <i>Journal of Human Resources</i>	Vietnam Rural	School attendance Long-term	Solid
Boozer, M. A., & Suri, T. K. (2001) Child labor and schooling decisions in Ghana. Manuscript, Yale University.	Ghana Rural/Urban	School attendance Short-term	Solid
Beegle, K., Dehejia, R. H., Gatti, R., & Krutikova, S. (2008) The consequences of child labor: evidence from longitudinal data in rural Tanzania., <i>The World Bank</i> .	Tanzania Rural	Years of schooling Long term	Solid
Cardoso, A. R., & Verner, D. (2006) , School drop-out and push-out factors in Brazil: The role of early parenthood, child labor, and poverty. <i>Policy Research Working Paper; No. 4178. World Bank</i> .	Brazil Urban	School dropout Short-term	Weak
Sugiyanto, E., & Digdowiseiso, K. (2019) Do incidence and duration of child labour matter on schooling in Indonesia? <i>International Journal of Education Economics and Development</i>	Indonesia Rural/Urban	School enrollment Schooling duration Short-term	Weak
Zabaleta, M. B. (2011) The impact of child labor on schooling outcomes in Nicaragua., <i>Economics of Education Review</i>	Nicaragua Rural/Urban	Edu. attainment Short-term	Weak
Ray, R., & Lancaster, G. (2005) The impact of children’s work on schooling: Multi-country evidence., <i>International Labour Review</i> .	Belize, Cambodia, Namibia, Panama, Philippines, Portugal, Sri Lanka Urban/Rural	School attendance School performance Short-term	Weak
Sim, A., Suryadarma, D., & Suryahadi, A. (2017) , The consequences of child market work on the growth of human capital. <i>World Development</i> .	Indonesia Rural/Urban	Human capital Short-term	Weak

Performances			
Bezerra, M. E. G., Kassouf, A. L., & Arends-Kuenning, M. (2009) , The impact of child labor and school quality on academic achievement in Brazil. <i>IZA Discussion Papers</i> .	Brazil Urban	School performance Short-term	Weak
Delprato, M., & Akyeampong, K. (2019) , The effect of working on students' learning in Latin America: Evidence from the learning survey TERCE. <i>International Journal of Educational Development</i>	Latin America Rural/Urban	Learning Short-term	Weak
Dumas, C. (2012) , Does work impede child learning? The case of Senegal. <i>Economic Development and Cultural Change</i>	Senegal Urban/rural	Learning Medium-run consequences	Weak
Emerson, P. M., Ponczek, V., & Souza, A. P. (2017) , Child labor and learning. <i>Economic Development and Cultural Change</i> .	Brazil Urban	Learning Short-term	Weak
Gunnarsson, V., Orazem, P. F., & Sánchez, M. A. (2006) , Child labor and school achievement in Latin America. <i>The World Bank Economic Review</i>	Latin American Rural/urban	Learning Short-term	Weak
Kassouf, A. L., Tiberti, L., & Garcias, M. (2020) , Evidence of the Impact of Children's Household Chores and Market Labour on Learning from School Census Data in Brazil. <i>The Journal of Development Studies</i> .	Brazil Urban	Learning Short-term	Weak
Lee, J., Kim, H., & Rhee, D.-E. (2021) , No harmless child labor: The effect of child labor on academic achievement in francophone Western and Central Africa. <i>International Journal of Educational Development</i> .	Western and Central Africa Rural/Urban	Learning Short-term	Weak
Mavrokonstantis, P. (2011) The Impact of Child Labour on Educational Attainment : Evidence from Vietnam. <i>Young Lives Student Paper, Oxford: Young Lives</i> .	Vietnam Urban/Rural	Learning Short-term	Weak
Woldehanna, T., Gebremedhin, A., & Araya, M. W. (2017) . Is child work detrimental to the educational achievement of children? Results from Young Lives in Ethiopia. <i>Ethiopian Journal of Economics</i>	Ethiopia Rural/Urban	Learning Short-term	Weak

Adult's earnings

Title	Context	Outcome	Quality
Emerson, P. M., & Souza, A. P. (2011) , Is child labor harmful? The impact of working earlier in life on adult earnings. <i>Economic Development and Cultural Change</i> .	Brazil Rural/Urban	Adult earnings	Weak
Lambon-Quayefio, M. P., & Owoo, N. S. (2018) . Child labour, future earnings and occupation choice: evidence from Ghana. <i>International Journal of Social Economics</i> .	Ghana Rural/Urban	Adult earnings	Weak
Posso, A. (2017) . Child Labour's effect on long-run earnings: An analysis of cohorts. <i>Economic Modelling</i>	Ecuador Rural/Urban	Adult earnings	Weak

Physical health

Title	Context	Outcome	Quality
Health status			
O'Donnell, O., Rosati, F. C., & Van Doorslaer, E. (2005) . Health effects of child work: Evidence from rural Vietnam. <i>Journal of Population Economics</i>	Vietnam Rural	Injury	Solid
Ahmed, S., & Ray, R. (2014) . Health consequences of child labour in Bangladesh. <i>Demographic research</i>	Bangladesh Rural/Urban	Injury	Weak
Beegle, K., Dehejia, R., & Gatti, R. (2009) . Why should we care about child labor? The education, labor market, and health consequences of child labor. <i>Journal of Human Resources</i>	Vietnam Rural	Injury	Solid
Wolff, F. C. & Maliki (2008) . Evidence on the impact of child labor on child health in Indonesia, 1993–2000. <i>Economics & Human Biology</i>	Indonesia Rural/Urban	Health	Solid
Nicolella, A., & Kassouf, A. L. (2018) . The effect of child labour on children's health in Brazil. <i>International Journal of Social Economics</i> .	Brazil Rural/Urban	Injury	Weak
Posso, Alberto. (2019) . The health consequences of hazardous and nonhazardous child labor. <i>Review of Development Economics</i>	Peru Rural/Urban	Health concerns	Solid

Anthropometric indicators			
O'Donnell, O., Rosati, F. C., & Van Doorslaer, E. (2005). Health effects of child work: Evidence from rural Vietnam. <i>Journal of Population Economics</i>	Vietnam Rural	Height/Weight	Solid
Beegle, K., Dehejia, R., & Gatti, R. (2009). Why should we care about child labor? The education, labor market, and health consequences of child labor. <i>Journal of Human Resources</i>	Vietnam Rural	BMI	Solid
Adult health			
Lee, C., & Orazem, P. F. (2010). Lifetime health consequences of child labor in Brazil. <i>Emerald Group Publishing Limited.</i>	Brazil Rural/Urban	Chronic disease	Solid
Rosati, F., & Straub, R. (2007). Does work during childhood affect the health of Guatemalan adults?. <i>Review of Economics of the Household</i>	Guatemala Rural/Urban	Health status	Solid
Nishijima, M., Souza, A. P. F. D., & Sarti, F. M. (2015). Trends in child labor and the impact on health in adulthood in Brazil from 1998 to 2008. <i>Cadernos de saude publica</i>	Brazil Rural/Urban	Health status	Weak

Mental health

Title	Context	Outcome	Quality
Aransiola TJ, Justus M. (2018). Child Labor Hazard on Mental Health: Evidence from Brazil. <i>The Journal of Mental Health Policy and Economics.</i>	Brazil Rural/Urban	Depression	Weak
Baryshnikova, N.V., Cheng T.C. and Jayawardana D.G. (2020). The Long Shadow of Child Labour on Adolescent Mental Health. <i>Child wellbeing and economic development: Evidence from Indonesia</i>	Indonesia Rural/Urban	Depression/mental health Mental health	Weak
Feeny, S., Posso, A., Skali, A., Jyotishi, A., Nath, S., & Viswanathan, P. K. (2021). Child labor and psychosocial wellbeing: Findings from India. <i>Health Economics</i>	Tamil Nadu (rural India) Rural/Urban	Happiness Well being	Weak
Trinh, T. A. (2020). Mental health impacts of child labour: evidence from Vietnam and India. <i>The Journal of Development Studies.</i>	Vietnam and India Rural/Urban	Mental health	Solid

Appendix B: Methodology and main results of selected studies

Education

Title	Outcome(s)	Definition (child, labour)	Survey and Methods	Main findings
Assaad, R., Levison, D., & Dang, H.-A. (2010) *	School attendance (dummy)	Age = 10-14 years old Work = average number of hours of work per week in the three-month reference period. Market and domestic work.	Egypt Labor Market Survey (ELMS) - 1998 Mixed probit-tobit model + IV [Instruments : 1) for market work = the prevalence in the local community of agriculture, craft, service and trade occupations. 2) for domestic work = access to basic public services]	Negative effect on school attendance at all levels of hours, for both boys and girls. The effect for boys (girls) is very weak up to about 14 hours (10 hours) of work per week. Girls do more hours of work (mainly household chores) than boys at any given level of school attendance, and the negative impact of work on schooling is larger for them.
Beegle, K., Dehejia, R., & Gatti, R. (2009)**	School attendance (dummy and highest grade attained). Wage	Age = 8-13 years old Work = number of hours income-generating work, including work on the family business or farm	Vietnam Living Standards Survey (VLSS) (Panel: Round 1 : 1992-1993, Round 2: 1997-1998) IV [Instruments : community-level rice prices and community disasters in 92-93].	Negative effect on school attendance. The mean level of child labor (7h/week) leads to about a 46 percent reduction in the proportion of children attending school. Children who worked in the baseline survey have a significantly lower level of educational attainment five years later. A mean level of child labor leads to a 1.6 year (21 percent) decrease in educational attainment.
Boozer, M. A., & Suri, T. K. (2001) **	School attendance (hours of schooling)	Age = 7-18 years Work = number of hours worked per week in a main or secondary job (household chores excluded)	Ghana Living Standards Survey - 1988/1989 IV [Instruments : 1) the month by region indicators, 2) current rainfall main effect]	Negative effect on school attendance. An hour of child labor reduces school attendance by approximately 0.38 hours. Differential effects by gender: for boys, there are big impacts of child labor on schooling in both the short-term as well as the long-term. These effects are also existent for girls, much stronger in the long-term and not as evident in the short-term.

<p>Beegle, K., Dehejia, R., & Gatti, R. (2009)**</p>	<p>School attendance (dummy and highest grade attained).</p> <p>Wage</p>	<p>Age= 8-13 years old</p> <p>Work = number of hours income-generating work, including work on the family business or farm</p>	<p>Vietnam Living Standards Survey (VLSS) (Panel: Round 1 : 1992-1993, Round 2: 1997-1998)</p> <p>IV [Instruments : community-level rice prices and community disasters in 92-93].</p>	<p>Negative effect on school attendance. The mean level of child labor (7h/week) leads to about a 46 percent reduction in the proportion of children attending school.</p> <p>Children who worked in the baseline survey have a significantly lower level of educational attainment five years later. A mean level of child labor leads to a 1.6 year (21 percent) decrease in educational attainment.</p>
<p>Boozer, M. A., & Suri, T. K. (2001)**</p>	<p>School attendance (hours of schooling)</p>	<p>Age= 7-18 years</p> <p>Work = number of hours worked per week in a main or secondary job (household chores excluded)</p>	<p>Ghana Living Standards Survey - 1988/1989</p> <p>IV [Instruments : 1) the month by region indicators, 2) current rainfall main effect]</p>	<p>Negative effect on school attendance. An hour of child labor reduces school attendance by approximately 0.38 hours. Differential effects by gender: for boys, there are big impacts of child labor on schooling in both the short-term as well as the long-term. These effects are also existent for girls, much stronger in the long-term and not as evident in the short-term.</p>
<p>Beegle, K., Dehejia, R. H., Gatti, R., & Krutikova, S. (2008)**</p>	<p>School enrollment (dummy), Years of schooling</p> <p>Likelihood of farming</p>	<p>Age= 7-15 years old</p> <p>Work = total hours of work in the previous week in economic activities and chores</p>	<p>Kagera Health and Development Survey (KHDS) - (1991-1994)</p> <p>IV [Instruments : crop shocks and rainfall shocks]</p>	<p>Negative impact on the number of years of schooling and the probability of completing primary school. Girls= no impact; Boys= a one standard deviation increase in child labor hours (5.7 hours) decreases more than a half year of schooling and an 14.1 pp reduction in the chance of completing primary school. For boys, child labor increases the probability of farming as an adult. A one standard deviation increase in child labor results in an 18 pp increase in the likelihood of farming in adulthood.</p>
<p>Sugiyanto, E., & Digdowiseiso, K. (2019)*</p>	<p>School enrollment (dummy), Years of schooling</p>	<p>Age= 12-15 years old</p> <p>Work= Market work (dummy, number of hours)</p>	<p>SAKERNAS dataset - 2016</p> <p>IV [Instruments : access to clean water, good sanitation and access to electricity]</p>	<p>Negative effect on enrolment. No effect on duration on schooling.</p>

<p>Zabaleta, M. B. (2011) *</p>	<p>Educational attainment 1) years of education, 2) grade-for-age 3) completion of primary school (dummy) 4) completion of one year or more of secondary school (dummy)</p>	<p>Age= 6-14 years old Work = market work and household chores (number of hours the day prior to the survey)</p>	<p>Nicaraguan Living Standards Measurement Survey (Panel: 1998 & 2001) IV [Instruments: natural shock, adult wage, school fees, school characteristics, households' assets, and access to infrastructure]</p>	<p>Positive effect on educational attainment up to 3 hours of work/day. Negative effect on educational attainment beyond 3 hours of work/day. One additional hour of work in 1998 is associated with a reduction of 0.4 years of education 3 years later, and with a reduction of the grade-for-age measure and the likelihood of completing primary school of 2 percentage points. Heterogeneity by type of work: children working in market production have lower educational achievement than children doing household chores.</p>
<p>Ray, R., & Lancaster, G. (2005) *</p>	<p>School attendance and performance 1) years of schooling. 2) Schooling for age (variable that measures schooling attainment relative to age). 3) Current school attendance.</p>	<p>Age= 12-14 years old Work= working hours</p>	<p>SIMPOC (2000) 3SLS with IV [Instruments : household measures of income, assets and infrastructure]</p>	<p>Negative effect on school attendance and performance. From the first hours of work for all countries in the study (except for Sri Lanka) The impact of child labor on school performance is generally greater for girls than boys.</p>
<p>Bezerra, M. E. G., Kassouf, A. L., & Arends-Kuenning, M. (2009) *</p>	<p>Academic achievement (Portuguese and Mathematics test scores)</p>	<p>Age= 13-14 years old Work = work at home and outside the home (dummy, number of hours)</p>	<p>SAEB (2003) 2SLS + IV [Instrument : low-skilled wages]</p>	<p>Negative effect on adolescent labor and school performance. Each additional hour of work has a negative impact on school achievement, but up to 2 hours of work per day (14 hours per week), the impact is minimal. The extent of the negative impact also depends on the working conditions. Thus, adolescents who work only outside the home or those who work both at home and outside the home have the greatest impact on their school performance, compared to adolescents who work only at home.</p>

<p>Cardoso, A. R., & Verner, D. (2006) *</p>	<p>School dropout (dummy whether the child is still attending school or not)</p>	<p>Age= 12-18 years old Work = any type of work (dummy, past 12 months)</p>	<p>World Bank Fortaleza Survey (2003) IV [Instrument: declared reservation wage]</p>	<p>Negative effect of working the previous years on school attendance</p>
<p>Delprato, M., & Akyeampomg, K. (2019)*</p>	<p>Learning achievement (math and reading scores)</p>	<p>Age= 11-12 years old Work = Work outside and in the household (paid and non-paid)</p>	<p>Third Regional Comparative and Explanatory Study (TERCE) (2013) Propensity score matching</p>	<p>Negative effect on school performance. Work leads to 9 (math) and 13 (reading) points less in achievement. The group of students more affected are those engaged in paid employment outside the household and of low ability.</p>
<p>Dumas, C. (2012)*</p>	<p>Learning achievement (life skills, math, French tests scores)</p>	<p>Age= 14 to 18 years old Work = Years of work in economic activity, including work for family businesses or farms (exclude unpaid household services)</p>	<p>EBMS & PASAC databases (Panel: 2003, 1995-1996) IV [Instrument : movements in rainfall over the past 8 years]</p>	<p>Positive effects on oral and mathematics scores. No significant effect on written scores for French and life skills tests (but positive sign)</p>
<p>Emerson, P. M., Ponczek, V., & Souza, A. P. (2017)*</p>	<p>Learning achievement (maths and portuguese test scores)</p>	<p>Age=10-17 years old Work = work outside the home, household chores</p>	<p>Data from an exam called the Sao Paulo Exam (Unbalanced panel 2007-2010) Diff-in-diff + IV [Instrument : variable that indicates whether the individual is legally allowed to work (older than 192 months old)]</p>	<p>Negative effects on test scores for both boys and girls. The effects range from 3 to 8 % of a standard deviation decline in test score = about a quarter to a half of a year of learning on average. Each additional year of work results in a 3.1 pp decrease in test scores</p>

<p>Gunnarsson, V., Orazem, P. F., & Sánchez, M. A. (2006)*</p>	<p>Learning achievement (maths, Spanish/portugese test scores)</p>	<p>Age= 8-15 years old</p> <p>Work =paid work outside the home (dummy)</p>	<p>First Comparative International Study on Language, Mathematics and Associated Factors (1997)</p> <p>IV [Instruments: cross-country variation in schooling ages and truancy laws]</p>	<p>Negative effects on test scores.</p> <p>Children engaged in work, even occasionally, have a 7% lower language score and a 7.5% lower math score than children who do not work.</p>
<p>Kassouf, A. L., Tiberti, L., & Garcias, M. (2020)*</p>	<p>Learning achievement (Portuguese and math test scores)</p>	<p>Age= 10-11 years old and 14-15 years old</p> <p>Work = market work (outside the household) and household chores (categorical variable : 0=don't work, 1=work only at home, 2=work only in the market, 3=work in both)</p>	<p>Prova Brasil databases (Panel: 2013 & 2017)</p> <p>IV [Lewbel approach]</p>	<p>Negative relationship on academic performance, regardless of the type of work performed.</p> <p>Larger effect for children working outside the home and those working at home and outside the home.</p>
<p>Lee, J., Kim, H., & Rhee, D.-E. (2021)*</p>	<p>Learning achievement (readings and math scores)</p>	<p>Age= 8-12 and 13-14 years</p> <p>Work = Farm work, petty commerce, physical labor (mining).</p> <p>Children's self-reports on how often they usually work outside the household.</p>	<p>PASEC database (2014)</p> <p>2SLS with IV [Instrument = variations in annual tuition fees across schools]</p>	<p>Negative effect on academic achievement, regardless of subject, gender, and age.</p> <p>Working while attending school leads to a reduction in sd. Dev. of about 3.78 and 5.26 for reading and mathematics scores, respectively.</p> <p>Greater effect in boys, and in younger children (8-12 years).</p>
<p>Mavrokonstantis, P. (2011) *</p>	<p>Educational attainment (maths scores)</p>	<p>Age= 12 years old</p> <p>Work = Number of hours in paid work outside the household, unpaid work for the household, domestic chores</p>	<p>Young Lives Longitudinal Survey Vietnam (Panel: 2002, 2007, 2009)</p> <p>IV [Instruments for "hours worked" : community-level rice prices, interaction of rice prices with the log per capita asset value]</p>	<p>Negative effect on educational attainment in urban areas; a one sd dev. increase in hours worked reduces mathematics test scores by 12.45 points out of 100, or 67.85% of one sd dev. of the test score.</p> <p>No effect in rural areas (but poor instrumentation of rural child labor).</p>

<p>Sim, A., Suryadarma, D., & Suryahadi, A. (2017)*</p>	<p>Learning achievement (Maths and cognitive scores) and years of education.</p>	<p>Age=10-14 years old</p> <p>Work = Market work both inside and out- side the household during the past month (dummy)</p>	<p>Indonesia Family Life Survey (IFLS) (Panel: 2000 & 2007 waves)</p> <p>2SLS with IV [Instrument : the provincial legislated minimum wage levels]</p>	<p>Negative relationship effect on mathematics skills but no effect on educational attainment and cognitive skills.</p> <p>Higher effect for children in market work (0.37 st. dev lower growth in mathematics skills 7 years later). Working outside the family business generally have 1.5 fewer years of education than those working for the family business</p> <p>No heterogeneity by gender.</p>
<p>Woldehanna, T., Gebremedhin, A., & Araya, M. W. (2017)*</p>	<p>Learning achievement (PPVT scores, highest grade completed)</p>	<p>Age= 12-15 years ols</p> <p>Work = number of hours spent last week in domestic tasks, household farm activities, paid activities.</p>	<p>Older Cohort data from the survey undertaken by Young Lives in Ethiopia (Panel: 2006 & 2009)</p> <p>IV [Instruments : locality (proxy for local wage rates) and household's experience of drought, crop failure increases in the price of foods in the last four years</p>	<p>Negative effect on child learning achievement.</p> <p>An increase in the number of hours worked per day by 1 will result in a reduction in the raw Peabody Picture Vocabulary Test scores of a child by 6.2 %.</p>
<p>Lee, J. C., & Staff, J. (2007) *</p>	<p>High school dropout (dummy if the student left high school between the 10th and 12th grades and did not return)</p>	<p>Age= 14-16 years old</p> <p>Work = paid job (dummy for working more than 20h per week)</p>	<p>National Education Longitudinal Study (1988)</p> <p>Propensity score matching</p>	<p>Negative effect of working more than 20 hours per week on the probability of dropping out of school.</p> <p>The odds for students who work more than 20 hours per week of dropping out of high school are more than 1.5 times higher than what they would have been if the students had worked moderately. For intensive workers, working fewer than 20 hours per week during the school year lowers the risk of dropping out of high school.</p>

° Correlation *Weak causal identification studies. ** Solid causal identification studies

Adult's earnings

Title	Outcome(s)	Definition (child, labour)	Survey and Methods	Main findings
Emerson, P. M., & Souza, A. P. (2011)*	Adult earnings (log)	Work = Age at which respondent started working in market work and domestic work.	PNAD (1988 & 1996) GMM IV [Instruments : number of schools per children in the individual's state, number of teachers per school in the individual's state in the year, and the individual's state's GDP per capita when the individual was 12 years old.]	Negative effect on the individuals' adult earnings, if the respondent started working before 13-14 years old (even if he attended school regularly). Positive effect on adult earnings from adolescent labor (after 13-14 y.o.)
Lambon-Quayefio, M. P., & Owoo, N. S. (2018)*	Adult earnings (log)	Work= dummy (having began to work before 12 y.o., all type of work)	Ghana Living Standards Survey rounds (2012-2013) Propensity score matching	Negative effect of early labour market entry on future earnings. Children who started working before age 12 experience a 14.3% drop in adult earnings (on average) compared to those who did not. They also have a higher odd of being in low-skilled jobs once adults (compared to being in technical and professional jobs). Positive effects on their skill acquisition: it lowered their odds of having an unskilled job compared to people who started working after age 12.
Posso, A. (2017)*	Adult earnings (log)	Work: All type of work 1) Dummy with 0=no child labor before 18, 1= child labor before 18. 2) Categorical variable with : 0= no child labor, 1= child labor before 13, 3) child labor before 18.	Ecuador's 2015 national labour market survey IV [Lewbel approach]	Negative effect on adults' earnings: Individual who started working during their childhood have a lower salary than those who entered the labor market after 18: they earn on average 17% less. The negative impact of child labor on adult wages appears to increase with age as an adult. Individual who started working before 18 and in their 20s earn approximately 13 per cent less than other workers, while former child workers in their 40s earn 21 per cent less than other workers.

° Correlation *Weak causal identification studies, ** Solid causal identification studies

Physical health

Title	Outcome(s)	Definition (child, labour)	Survey and Methods	Main findings
<p align="center">Health status</p>				
<p>O'Donnell, O., Rosati, F. C., & Van Doorslaer, E. (2005)**</p>	<p>Reported illness: whether the individual had any illness in the previous four weeks, ranging from headaches and cough to fever, diarrhea, and infection.</p> <p>Reported health: number of days the individual suffered from any of these illnesses in the previous four weeks if sick</p>	<p>Age = 6–15 years old</p> <p>Work = Unpaid work on the household farm or business and/or paid work outside of the household at any time in the past 12 months</p>	<p>Panel Vietnam Living Standards Survey, 1992–93 and 1997–98.</p> <p>Panel + IV [Instruments: household land holdings and indicators of community-level labour market and schooling opportunities].</p> <p>Separate estimation for short-term/long-term</p>	<p>No effect of child agricultural work on self-reported health: unpaid agricultural work for the household appears to have no short-term impact on health while the paid work may even be beneficial to nutrition and health</p>
<p>Ahmed, S., & Ray, R. (2014)*</p>	<p>Reported illness: whether a child reports any work-related injury or illness</p> <p>Variant reported illness: whether a child reports any work-related symptoms of injury or illness.</p>	<p>Age= 5-17 years old</p> <p>Work= Had worked at least one hour during the week preceding the survey as paid employees (paid in cash or in kind), who were self-employed, or who worked as unpaid employees (family farm or business)</p> <p>Participation and working hours</p>	<p>Bangladesh National Child Labour Survey 2002-2003</p> <p>Recursive bivariate probit with IV [Instrument= migration status of the household and school quality]</p>	<p>Negative effect on self-reported child health, in both urban and rural areas.</p> <p>Younger children were more likely to suffer from backaches and other health problems (infection, burns, and lung diseases) than were older children, while the probability of reporting tiredness/exhaustion was greater in the oldest age group.</p> <p>The intensity of injury or illness is significantly higher in construction and manufacturing than in other sectors.</p>

<p>Beegle, K., Dehejia, R., & Gatti, R. (2009)**</p>	<p>Reported illness: whether the individual had any illness in the previous four weeks, ranging from headaches and cough to fever, diarrhea, and infection.</p> <p>Variante reported illness: number of days the individual suffered from any of these illnesses in the previous four weeks if sick</p>	<p>Age= 8-13 years old</p> <p>Work = number of hours income-generating work, including work on the family business or farm</p> <p>Work= total hours the child was engaged in income-generating work, including work on the family business or farm</p>	<p>Vietnam Living Standards Survey (VLSS) (Panel: Round 1 : 1992-1993, Round 2: 1997-1998)</p> <p>IV [Instruments : community-level rice prices and community disasters in 92-93].</p>	<p>No effect on the probability of illness.</p>
<p>Wolff, F. C. & Maliki (2008)**</p>	<p>Health complaints during the previous month (10 items)</p> <p>Dummy if the child suffers from at least one of these ailments (and equals 0 otherwise)</p> <p>If children had a positive answer for the above questions, they were asked whether their health complaint disrupted their activities, such as school or work.</p>	<p>Age= 10-15 years old still in school</p> <p>Work= activity to seek earnings or an economic activity that produces goods or services for market purposes at least 1 h per week, while those who produce goods or services for their own consumption are not considered working (Participation and hours)</p>	<p>Indonesian Socio-Economic Surveys</p> <p>For participation: bivariate Probit model</p> <p>For working hours: IV Probit model [Instrument: Adult employment rate at sub-district level and number of school buildings from primary to senior high school level]</p>	<p>Negative effect on health complaints. Robust to various measures of health and econometric specification, and all years are generally significant.</p> <p>Difference by gender: significant effect for boys, no significant effects for girls</p> <p>Differences urban/rural: In both areas, the binary working variable is positively correlated both with cough and health complaints, while the effect is insignificant for fever and disruption of activities. The positive effect of working on sickness is only significant among the rural subsamples.</p>

<p>Nicolella, A., & Kassouf, A. L. (2018)*</p>	<p>Reported illness/injury (scale 1-5)</p>	<p>Age= Cohort: children 0 to 10 years old, following the cohort in 2003, we consider children from 5 to 15 years old, and in 2008, those from 10 to 20 years old Work= employed in the week previous to the interview, either producing their own food or working in construction for their own use, or if they usually worked but were not working that week due to vacation or health problems (alt.: number of daily work)</p>	<p>PNAD 98-03-08</p> <p>Pseudo-panel</p>	<p>Negative effect on reported health: A 0.1 increase in the proportion of children working results in a decrease of 0.4 percentage point in the proportion of children with a very good health status.</p> <p>The greater the number of hours of work performed by children, the worse is their health status.</p> <p>Children working in the agricultural sector had no significant effect</p>
<p>Posso, Alberto. (2019)**</p>	<p>Self-reported health concerns (over the last 12 months)</p>	<p>Age= 10-17 years old</p> <p>Work=Number of hours worked in activities performed by children as either hazardous or nonhazardous</p>	<p>IV [Instruments: network variable]</p>	<p>Negative effect on health concerns (+ 1.7% more likely to have health concerns)</p> <p>Non-hazardous activities : 7% less likely to exhibit health concerns than those that do not work. Hazardous activities 2.4% more likely of having health concerns than children that do not work. Older children are more likely to experience negative health outcomes. Location matters: children in urban and peri-urban centers were significantly less likely to report having health problems than children in rural regions.</p>

Anthropometric indicators				
<p>O'Donnell, O., Rosati, F. C., & Van Doorslaer, E. (2005)**</p>	<p>Weight-for-age Z-score Height</p>	<p>Age= 6–15 years old Work = Unpaid work on the household farm or business and/or paid work outside of the household at any time in the past 12 months</p>	<p>Panel Vietnam Living Standards Survey, 1992–93 and 1997–98. Panel + IV [Instruments: household land holdings and indicators of community-level labour market and schooling opportunities]. Separate estimation for short-term/long-term</p>	<p>No effect of child agricultural work on height and weight</p>
<p>Beegle, K., Dehejia, R., & Gatti, R. (2009)**</p>	<p>BMI</p>	<p>Age= 8-13 years old Work = number of hours income-generating work, including work on the family business or farm Work= total hours the child was engaged in income-generating work, including work on the family business or farm</p>	<p>Vietnam Living Standards Survey (VLSS) (Panel: Round 1 : 1992-1993, Round 2: 1997-1998) IV [Instruments : community-level rice prices and community disasters in 92-93].</p>	<p>No effect on BMI</p>

Adult health				
Lee, C., & Orazem, P. F. (2010)**	Adult health (incidence of chronic diseases and by functional limitations in performing activities)	Child labour = enter in labour market before 15 y.o.	PNAD (1998) IV [Instruments: variation in the supply and quality of local schools, average household incomes, and low skill wages in the state the adult was born at the time the adult]	Detrimental effect = Child labor is positively correlated to with a higher incidence of adult chronic diseases and functional limitations.
Rosati, F., & Straub, R. (2007)**	Self-reported health indicator (1 if the person reported having bad health status in the last month and 0 otherwise)	Child labour = if respondents have declared that they begun to work between 6 and 14 years old	Panel with conditional fixed effects logit Use sample of siblings for variation	Negative and large effect on long-term health effects: having worked as a child increases by about 40% the probability of having bad health as an adult.
Nishijima, M., Souza, A. P. F. D., & Sarti, F. M. (2015)*	Self-rated health status: good/less than good physical limitation (self-reported difficulty with mobility: yes/no), chronic disease	Work =dummy if began to work before 18	PNAD (98-2003-2008) Two-stage GMM models	Negative effect on long-term health effects

° Correlation *Weak causal identification studies, ** Solid causal identification studies

Mental health

Title	Outcome(s)	Definition (child, labour)	Survey and Methods	Main findings
Aransiola TJ, Justus M. (2018)*	Depression (1 if individuals affirmed to be diagnosed by a doctor or medical practitioner with mental depression and 0 if otherwise)	Work: Dummy if the respondent has worked before 16 years old	PNAD 2008 Probit models with covariate discussion to control for omitted variable bias	Detrimental effect on depression: Positive relationship between child labor and probability of depression .
Baryshnikova, N.V., Cheng T.C. and Jayawardana D.G. (2020)*	Mental health using one of the commonly used measures of 10-item Centre for Epidemiological Studies Depression Scale (CES-D-10)	Age= 5 to 14 years old in 2007 Work= participation in both wage work and unpaid work as part of a family business	Indonesia FLS IV [Instruments: minimum wage and the number of family-owned businesses by the household.]	Detrimental effect on depression Larger effect for wages work
Feeny, S., Posso, A., Skali, A., Jyotishi, A., Nath, S., & Viswanathan, P. K. (2021)*	Measures of happiness, hope, emotional wellbeing, self-efficacy, being scared and being stressed	Age= Cohorts: two groups of children are followed from 2001–2002 to 2016–2017: 2,000 children born during 2001–2002 (the Young cohort) and 1,000 children born during 1994–1995 (the Old cohort) Work= undertaken any activity in the last 2 weeks to earn money for themselves and/or their family	Within-family estimates, randomization inference and IV	Detrimental effect on psychosocial wellbeing: On average, working children display statistically significant lower levels of happiness, emotional wellbeing, self-efficacy and hopefulness. Working children are more stressed than nonworking children, although differences are not statistically significant. Large effect: on average, work is associated with declines in psychosocial wellbeing of approximately 0.29–0.50 standard deviations

<p>Trinh, T. A. (2020)**</p>	<p>Strengths and Difficulties Questionnaire (SDQ)</p>	<p>Age= 12–18 years old</p> <p>Work= undertaken any activity in the last 2 weeks to earn money for themselves and/or their family</p>	<p>IV [Instrument: rainfall]</p>	<p>Detrimental effect on mental health</p> <p>In India, mental health is affected differently depending on the gender of the child. Boys are negatively affected by child labour on most scales of the SDQ, while girls reduced emotional symptoms are associated with child labour.</p>
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Ernest MIGUELEZ is the scientific coordinators of the Bordeaux Economics Working Papers.
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