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'Child Development in a Changing World: Risks and Opportunities'

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Abstract

This review explores current understandings of child development and the consequences for children of risk exposure in low- and middle-income countries by infusing empirical evidence from development economics with insights from allied social-science disciplines. It provides a holistic perspective that highlights the synergies between children's developmental domains, drawing particular attention to dimensions such as agency and aspirations that to date have had only limited treatment in the economics literature, especially in developing countries. It goes on to explore the impact on children of dramatic socio-economic changes that have occurred in recent years with rapid growth and the expansion of public services across most developing countries and in so doing aims to consolidate emerging evidence on how risks and opportunities for child development may have changed in these very dynamic contexts.

Introduction

The last two decades have seen an unparalleled global interest in the survival and development of children. This interest reflects commitments made under the terms of the UN Convention on the Rights of the Child and the Millennium Development Goals recognizing improvement of children's life-chances and well-being as a legitimate goal of development in itself. Growing awareness that childhood experience is crucial to the adults that we become has further emphasized that enhancing children's condition is crucial for broader economic and societal development. Thus, investing in children is not simply the right thing to do for their survival and quality of life, but vital also for creating and sustaining broad-based

economic growth (Commission on Growth 2008). Moreover, there is mounting global consensus that economic growth facilitates, but is not sufficient for, the realization of this human potential.

With many children in low- and middle-income countries continuing to experience numerous threats to their well-being (e.g. see Engle et al., 2011; Walker et al., 2011), this review explores current understandings of child development and the developmental consequences of exposure to risk. It infuses empirical evidence from development economics with insights from allied social-science disciplines, where most evidence is overwhelmingly focused on European and North American contexts (Bornstein et. al., 2012). Recognising the long-term impacts of early deprivations, as well as the potential for significant change in developmental momentum in middle and late childhood, the review adopts a life-course perspective and reports on research covering early childhood to youth. It takes a broad view of child development covering the entire range from conception to early adulthood. This view is consonant with the UN Convention on the Rights of the Child which defines a 'child' as a person below the age of 18 years and with research evidence indicating that it is not just the early years of life but also adolescence and youth that can crucially influence functioning and adaptation in adulthood (Durkin 1995; Prentice et al 2013). Moreover, given that human capital formation in different periods of childhood builds upon investments in previous periods, this allows available evidence to be integrated into a more comprehensive framework. In doing so, this review stresses the importance of understanding the specific risks and protective factors and the developmental milestones and outcomes that are salient in each of the phases of childhood.

Integrating this body of evidence from low- and middle-income countries¹ in a single discussion informed by decades of research on child development, allows fresh insights into the dynamic and complex nature of child development. First, it provides a holistic perspective that highlights the synergies between children's developmental domains, drawing particular attention to dimensions such as agency and aspirations that to date have had only limited treatment in the economics literature, especially in developing countries. In this, the

¹ The challenges of delivering basic services such as health and education and the volume and severity of threats to children's wellbeing in developing countries have in recent years given growing momentum to research on selected aspects of child development within development economics (e.g. Edmonds, 2008; Glewwe and Miguel, 2007; Glewwe and Kremer, 2006; Ferreira and Schady, 2009; Almond and Currie, 2011).

aim is to provide a coherent framework that draws on a long literature on child development to situate the many relevant empirical studies in development economics. Relatedly, the review hopes to broaden the discussion of risks and protective factors as usually undertaken in the child development literature on high-income countries by integrating the empirical evidence from developing countries within the same conceptual framework.

The review attempts to be forward-looking and engages directly with the impact on children of dramatic socio-economic changes that have occurred in recent years with rapid growth and the expansion of public services across most developing countries. Specifically, it aims to consolidate emerging evidence on how risks and opportunities for child development may have changed in these very dynamic contexts. There has been a concerted push in several of the areas of services that most affect children, for example primary education and immunization, and in many countries there has been increasing attention to social safety nets, sometimes with an explicit focus on the young. At the same time, dramatic social change presents the possibility of new risks to children that have as yet been little researched or acknowledged. These developments have coincided with a sharp rise in rigorous empirical research on changes in and the impact of interventions on child well-being within economics and other social sciences, allowing discussion of policy and practice. The emergence of these new opportunities and risks pose important challenges for both policy and scholarship on child well-being; this review consolidates this emerging evidence on selected dimensions, situating it within the context of previous literature across disciplines and also signposts areas where knowledge remains patchy.

The article is structured as follows: Section 1 discusses the current state of knowledge about child development from a variety of disciplines, focusing specifically on the malleability of childhood development and the environmental² risks confronted by children; Section 2 discusses changes to the socio-economic and policy contexts that have taken place in developing countries in recent years and the implications for the welfare of children; Section 3 concludes by discussing the links between public policy and children's wellbeing and areas for further research.

² In this paper 'environment' includes the physical, institutional, social and cultural factors that are external to the individual.

Section 1: What do we know about children's development?

1.1. The importance of environmental influences

Child development is, by definition, about the changes that take place during childhood, the factors that shape these changes and the outcomes for children in both the short and the longer term. Recognising the high prevalence of environmental risks and the scarcity of empirical evidence on the outcomes of risk exposure during childhood in low- and middle-income countries, this review is particularly concerned with the external, contextual, influences that are brought to bear in children's development. It follows others (Aber, et al.1997:47, quoted in Dawes and Donald 2005:8) in delineating child development as "the acquisition and growth of the physical, cognitive, social and emotional competencies required to engage fully in family and society". This definition highlights how development entails adaptation to specific social and cultural contexts and is comprised of multiple functional domains each of which comprises an array of states and competencies. These domains exist in a synergistic relationship, the operation of one affecting performance in the other(s) and the influences traveling in all directions, such that, for example, neurological shocks can affect social functioning, as much as emotional well-being can impact physical growth.

Though the diverse developmental domains are both malleable and interacting, they are not all equally liable to change under external influence. Thus, for example, social and emotional competencies are far more responsive to external forces than are sensory and motor functions, which tend to remain relatively stable regardless of experience (Schaffer 1996: 392). Accordingly, children's feelings about identity, self-worth, and personal well-being, are highly dependent on how they understand their relative social position, relative competence, and potential to access opportunities for personal, social, and economic advancement. These are not for the most part individualised processes, but experienced as part of a family group, peer group and community (Ridge 2002). In this way, children who experience approval, acceptance, and opportunities for skill development are far more likely to be resourceful and resilient than those who have been subjected to humiliation, rejection, or failure (Boyden and Mann 2005).

While contemporary thinking is noted for the diversity of its conceptualisations of child development, there is broad agreement that the process involves a complex transaction between genotypic, biological, and maturational processes that are shaped by children's experiences, actions, and interactions, as well as by wider environmental influences (Wachs

and Rahman, 2013; Walker et al. 2011), including the values of their caregivers, which in turn are embedded in diverse cultural contexts (Rogoff 2003; Sameroff 2009). As such, individual characteristics (for instance, personality) and biological forces (including genetics, epigenetics, and neurobiological factors) work together with family dynamics (for example, family functioning), and broader historical, socio-cultural, and environmental factors (such as socio-economic status) in influencing children's growth and adaptation.

Uri Bronfenbrenner's (1979) ecological systems theory has been particularly persuasive in bringing external contextual influences to the fore in child development research and also in specifying what the nature of these influences might be.³ One of Bronfenbrenner's key contributions has been the idea that, "what matters for behaviour and development is the environment as it is *perceived* rather than as it may exist in 'objective' reality" (Bronfenbrenner 1979: 4, italics in original). In other words, he drew attention not simply to material conditions but also to context-specific values and meanings as crucial in children's development. In all contexts there are different types and amounts of material and psychosocial resources to support children's development, as well as different levels and kinds of knowledge and beliefs about how best to raise them. These beliefs fundamentally affect children's everyday lives, including the things that they are taught or encouraged to do, and to whom they turn for guidance—all of which produces great variety in the developmental challenges and opportunities that boys and girls experience (Rogoff 2003).

Bronfenbrenner envisioned the environment as a series of nested and interdependent structures, the most significant for child development being micro-systems such as the family and/or peer group. These comprise the most proximal environments for the young, exercising a direct impact on their development through routine interactions and participation in close relationships and recurring activities. Concerned to highlight how micro-systems also influence children's development through their interaction, as for example when family poverty impairs children's school performance, Bronfenbrenner labelled this interaction

³ Bronfenbrenner critiqued theories prevalent in the 1970s in which environmental factors were "limited to a few crude and undifferentiated categories that do little more than locate people in terms of their social address" (1979: 17), listing family size, single- versus two-parent households as well as variation by social class or ethnic background as examples of factors used typically in studies to describe contexts. He further criticised models which limit environmental influences on behaviour and development to interpersonal processes, such as modelling, identification and social learning. He argued that these do not sufficiently account for non-social aspects of the environment, including the substantive nature of activities engaged in, and they delimited the concept of environment to a single immediate setting containing the subject. His concern with the latter was that it could distort attribution of determinants, processes and potential of human development, since it does not consider a larger scope of potential effects.

‘meso-systems’. His concept of exo-systems refers to the settings that affect those people who are in proximal relationships with the child, while not directly influencing that child, as when caregivers are members of community associations that moderate the impacts of adversity. Bronfenbrenner’s macro-system refers to the broader political-economic and socio-cultural contexts that shape all other systems, while the chronosystem indicates the evolution of the other systems over time.

In the transactional model outlined by Sameroff and Chandler (1975), changes in the child and in his/her environment are dynamic and mutually-constitutive and, as such, the child-context interface may have very different effects on a child’s development at different ages (see also Sameroff and Fiese 2000). It has been argued that it is the recurrent, lasting and reciprocal interactions between an active child and his/her environment that have the most significant effects on developing characteristics at different points in the life cycle (Rogoff 2003). Consequently, the time spent in poverty or prosperity makes a significant difference.

Not only do developmental requirements and outcomes change as children mature, but there are periods during which children’s responses to external stimuli are heightened (Shonkoff et al. 2009; Shonkoff and Levitt 2010). This leads to greater vulnerability to long-term harm arising from risk exposure in these periods, but also offers a window for focusing on policy interventions that will be most potent. Early childhood is generally recognised as the most crucial life-phase in terms of developmental malleability, for this is when change is accelerated and genotypic milestones emerge. Importantly, the time sensitivity of early childhood is also socially structured by influences that include the institutions of education, as early cultural learning selects and reinforces specific cognitive and psychosocial competencies. Unequal participation in early-childhood and primary education further determines long-term trajectories, in the sense that institutions, teachers, and assessment systems all tend to promote some children over others, depending on their perceptions of children’s characteristics and potential (Woodhead et al. 2009).

That child–environment influences operate in both directions calls attention to the fact that children do not simply absorb and react to external forces, but are instrumental in shaping their own environment by ‘selecting and even creating those settings that are compatible with their individual characteristics’ (Schaffer 1996: 394). In other words, the young are seldom the passive victims of overwhelming circumstances but social agents whose aspirations, sense of self and actions affect their own destinies. Even among boys and girls at heightened risk of poor outcomes due to extreme adversity there is considerable variation in individual capacity

to achieve developmental tasks; some children thrive despite experiencing multiple developmental threats (Cicchetti, D. and N. Garmezy.1993; Masten and Obradović 2006; Obradović and Boyce 2009).

Different children, households, communities, and societies experience different levels of hazard and risk at various points in the human and family life cycle. Some contexts, for example those involving high levels of exposure to toxic substances, chronically inadequate nutrition, or routinely unresponsive social stimulation, are liable to be deleterious to all children and have thus been labelled 'chaotic environments' (Weisner 2008). This points to the possibility of risk exposure having cumulative and/or compound effects, whereby varying causal, moderating and/or mediating influences at the individual, family, and societal levels interact and intersect and bear down on and overwhelm children (Burchinal et al. 2008; Stevens 2006). The burden of risk varies widely in accordance with children's social attributes, in that different social groups, distinguished for example by ethnicity, religion or caste, are subject to very different levels and forms of structural constraint and challenges. Gender is frequently emphasised as the most significant marker of social difference in childhood, with girls consistently and substantially disadvantaged as compared to boys. Gender disparities are generally interpreted as evidence of deep-rooted prejudice and discrimination that is associated with lower levels of parental and societal investments in females as well as their heightened exposure to harmful practices such as sexual violence.

Appreciating that the effects of adversity on children are contingent upon both supportive and detrimental elements in the wider environment, some researchers have focused on identifying and examining the promotive or protective processes and mechanisms that operate at multiple levels to shield children from various forms of adversity (Rutter 1987). This research has even shown that under certain circumstances, exposure to stress may be associated with an increased resistance to later stress, termed a 'steeling effect' (Rutter 2012). Diverse personal and collective resources that shape both the strategies children use for overcoming misfortune and their opportunities for mastery are brought to the fore. The characteristics of individual children may be especially salient, as may the quality of relationships in the family and school and among peers. The availability of wider formal and informal mechanisms of support, such as the extended family, self-help groups, social protection programmes, health services, and education, is also understood as a central part of this complex environment of protection.

1.2 Empirical Evidence from development economics

The growing evidence from empirical studies in low- and middle-income countries is offering a more detailed understanding of some of the key ways in which external factors influence child development, consistent with the framework in the previous section. In this section, we explore these links directly, making explicit how several streams of research in development economics are of immediate relevance to the findings from allied social sciences.

Complementary domains of child development

As discussed, one of the key insights of the developmental sciences literature is that child development is multidimensional and that its many domains interact with each other over time.

Intuitively, of course, this has also been recognized in economics for a long time, a large body of work having examined the links between nutrition and learning in children.⁴ For example, an influential study by Glewwe, Jacoby and King (2001) found that Filipino children who are better nourished in early childhood perform significantly better in school later, both because they enter school earlier and because of greater productivity per year of schooling. Recent research, however, has considerably broadened the empirical evidence on cross-productivity and dynamic complementarities between domains of child development. In particular, in papers based on longitudinal data from the United States, Cunha, Heckman and co-authors have focused the attention of economists on the importance of ‘non-cognitive skills’⁵ and how they interact with ‘cognitive skills’, measured conventionally by test scores, throughout childhood and how they continue to shape labour market outcomes and academic achievement in later life (e.g. Cunha and Heckman 2008, 2009; Cunha, Heckman and Schennach, 2010). Comparative quantitative evidence from developing countries is very scarce. The only peer-reviewed study of which we are aware is Helmers and Patnam (2011) which builds on the methodology in Cunha et. al. (2008) and applies a Linear Structural Relations (LISREL) model to data collected in 2002 and 2007 in the state of Andhra Pradesh

⁴ See Glewwe and Miguel (2007) for an authoritative review of several studies documenting a link between the health and educational outcomes of children.

⁵ Referred to in this paper as ‘psycho-social competencies’, to emphasise that this is an important area of child development in its own right, containing several distinct domains, with associated skills and states, and not merely an umbrella for everything that is not cognition. These are also sometimes referred to in some disciplines as socio-emotional skills.

in India by the Young Lives study⁶. For the younger cohort of children, born in 2001/2, they highlight strong evidence of dynamic relationships between risk factors at the age of 1, health in early childhood, and early cognitive achievement (at the age of 5). For the older cohort, born in 1994/95, they find strong evidence of cognitive skills at the age of eight leading to a greater stock of both cognitive skills and psycho-social competencies at age 12. While they document the cross-productivity of cognitive skills on future psycho-social competencies, in contrast to Cunha and Heckman (2008), they do not find any significant evidence in the opposite direction (i.e. higher psycho-social competencies producing higher cognitive skills in the future).

Dercon and Sanchez (2013) look at the links between nutritional status at 7-8 years of age and three psychosocial traits, self-efficacy, self-esteem and aspirations⁷, measured at the age of 12 in the four Young Lives countries. They document that lower height-for-age at 8 years of age is strongly predictive of future psychosocial traits; this association remains significant statistically and in magnitude even upon inclusion of controls for current household expenditure, maternal psychosocial traits, past cognitive achievement, current body mass index of the child and community fixed effects. This evidence cannot necessarily be taken as causal as omitted variable bias may persist even after including the control variables. However, the strong pattern of correlations, even when the most common sources of omitted variable bias are controlled for, is suggestive of the type of causal pathways in skill formation that are indicated by the child development literature and the work of Cunha, Heckman and colleagues in economics. Using the same dataset, Dercon and Singh (2013) find that agency and aspirations may be a channel through which inequalities between sexes is reproduced over time. They show that parents in India have significantly higher educational aspirations for their sons than their daughters when the children are aged 8. This pattern in parental aspirations is transmitted (albeit not perfectly) to children's aspirations at the age of 12; which, in turn, is associated with lower sense of self-efficacy, lower test scores and lower school enrolment among girls at the age of 15.

⁶ Young Lives is a longitudinal study of childhood poverty in Ethiopia, India (Andhra Pradesh state), Peru and Vietnam. It is following nearly 12,000 children in two age cohorts. Currently three rounds of household-based data have been collected and are available for public use.

⁷ The authors take self-esteem to refer to an individual's feelings of his or her own merit and competence and follow Albert Bandura's definition of self-efficacy as 'belief in one's capabilities to organize and execute the courses of action required to produce given attainments' (1997:31). Aspirations refer to an individual's desired goals or objectives. The hypothesis is that individuals who perceive themselves to be more worthy and efficacious and with higher aspirations are more motivated and likely to achieve desired goals.

The results in these studies are highly suggestive and indicate that there may be important gains in the engagement of economists with the child development literature on skill formation, the role of aspirations in determining investments in children, and the nature of different domains of functioning that develop over the course of childhood⁸.

Critical periods in child development

We have argued that the child development literature emphasises the critical periods during childhood when some aspects of children's development are especially susceptible to influence. In particular, deprivations and shocks during early childhood are known to have profound and lasting effect across distinct developmental domains; the implication is that recovery is unlikely.

Recognition of these critical phases has perhaps been most evident in the field of nutrition: it is now widely accepted that early nutrition deficits have significant impacts on later life outcomes. The literature in this sub-field has increased very rapidly in recent years (see Currie and Almond, 2011 for an authoritative review of the current state of knowledge concerning the long-run impact of shocks in-utero and early childhood). This literature is overwhelmingly focused on studies from OECD countries, for which the evidence base is now particularly rich, though there is a growing body of evidence from developing countries. For instance, in an influential study of a sample of women in Indonesia, Maccini and Yang (2009) report that higher rainfall in their birth year leads to a lower incidence of (self-reported) poor health, greater terminal height, a greater number of grades completed in school and larger accumulation of assets at 25 to 50 years of age⁹.

A more open question is the extent to which children show resilience through recovery from early deprivations and shocks, or whether deficits in early childhood can be compensated for by remedial measures in later life. One domain for which remediation has been thought to be doubtful is nutritional deficits in early childhood which lead to stunting (linear growth retardation): there is extensive evidence that early growth deficits persist into adult height and it is commonly thought that stunting is irremediable after the first two years

⁸ Such an interaction between allied social science disciplines can be of advantage for both theoretical and empirical work in economics. While this review is overwhelmingly focused on recent empirical evidence, Mookherjee, Napel and Ray (2010) provide an interesting theoretical contribution where they model how parental aspirations influence investments in children and how these aspirations are themselves affected by social interactions with peers.

⁹ Other studies from developing countries that look at long-term impacts of early childhood shocks include Alderman et al. (2001), Glewwe and King (2001), Glewwe, Jacoby, and King (2001) and Maluccio et al. (2009).

of life. Nonetheless, a small body of research is now questioning the premise that lifelong height impairment is, in fact, inevitable and asserting that ‘catch-up growth’ may be possible. The Cebu longitudinal study provided some of the first developing-country evidence on this, with Adair (1999) reporting that almost a third of the children in the sample who were stunted at 2 years of age experienced catch-up growth by the time they reached 8.5 years. Similarly, using data from Peru, Crookston et. al. (2010) found that a large proportion of the children who were stunted at 6-18 months years of age had caught up by the age of 5. In both studies the magnitude of recovery in those children who do catch-up is very large (in excess of 1 standard deviation of the height-for-age z-score). Coly et.al.(2006) document a similar magnitude in Senegal, with large changes for those children who were stunted at preschool¹⁰. In a recent contribution, using panel data from Brazil, Guatemala, India, Philippines, South Africa and the Gambia, Prentice et. al. (2013) similarly document substantial catch-up in height between the age of 24 months and mid-childhood and again between mid-childhood and adulthood.

The potential for catch-up has important implications for public policy: while prevention of nutritional deprivation in early childhood remains the key priority and the most efficient form of intervention, it raises the possibility that there may be a role for remedial action for children who have suffered early nutritional deprivation. Currie and Almond (2011) survey a large literature on remedial welfare measures, including cash transfers, food stamps, tax credits, health insurance and home visits by social workers and medical staff. While the presence and magnitude of gains differs across interventions and evaluations, there does seem to be clear evidence that low endowments at the time of birth can be at least partially compensated for through improved environments and investments in later childhood. As they note in their conclusion: “... *evidence for long term effects of early insults should not be a cause of pessimism. While children can be permanently damaged at this age, the damage can be remediated. The picture that emerges is one of vulnerability but also of resilience.*”¹¹”

¹⁰ The phenomenon of catch-up growth and older available evidence is reviewed in Golden (1994) and Boersma and Wit (1997).

¹¹ There are two important points to note about the Currie and Almond (2011) review: it relies mostly on evidence from OECD countries; and the primary focus is on remediation in cognitive skills and behavioural outcomes. Their insight on the possibility of remediation in these outcomes is shared by the child development literature (Rutter 2012).

Recent evidence from Young Lives is consistent with this possibility. Singh, Park and Dercon (2014) investigate whether a large universal nationally-mandated school feeding programme in India, the Midday Meal Scheme, which operates in all government primary and upper primary schools, could help ameliorate the impacts of severe droughts in early childhood on children who were aged about 5 years at the time of the intervention. They compare children who attend schools (and have access to the Scheme) with those who have still to enrol. They use a non-linearity in the effect of age on enrolment as an instrumental variable to correct for self-selection into the Scheme, while controlling linearly for age, various socio-economic characteristics and anthropometric status when the children were aged about one year. They find that while drought in early childhood did have large and significant negative impacts on children's height-for-age and weight-for-age z scores, the school meals entirely compensated for this effect through catch-up growth among the children in the Scheme.¹²

Crookston et. al. (2010) document further that the Peruvian children who were stunted at age one but were no longer stunted at age 5 demonstrated similar levels of cognitive functioning, measured by testing receptive vocabulary and grasp of quantitative concepts, as children who were never stunted.¹³ This raises the possibility that, not only may catch-up be possible for a longer period than was previously thought likely, but it may even ameliorate the well-documented deleterious impact of nutritional deprivation on cognition. However, that said, the evidence on recovery in cognitive outcomes is mixed. Explicitly testing the existence of a critical window around the first 1000 days, Barham, Macours and Maluccio (2013) find that there is catch-up in the height of children whose households (experimentally) received conditional cash transfers in later childhood as compared to children whose households received these transfers starting in-utero and during the first two years of life. But there remains a significant difference in the cognitive outcomes of the two groups, indicating that any catch-up in cognitive functioning is only partial at best.

¹² See also Schott et. al. (2013) who present factors at the household and community level that are associated with catch-up in the four Young Lives countries. Although this evidence is correlational, it may hold valuable information for designing possible interventions to aid recovery from stunting.

¹³ See also several related contributions based on Young Lives data; in particular, Lundeen et. al. (2013) who document that the incidence of recovery from stunting between 5-8 years ranged between 27% in the Vietnamese sample to 53% in the Ethiopian sample; Crookston et. al. (2013) who document that changes in growth after infancy are significantly associated with test scores and being in the right grade-for-age at the age of 8 years; and Fink and Rockers (2014) who, similarly to Crookston et. al. (2010), document that children who recover from stunting show smaller cognitive deficits compared to persistently stunted children.

Vulnerability to household shocks

We have noted that a significant proportion of children in low- and middle-income countries continue to face a multitude of risks of many forms, and that exposure to multiple risks can have cumulative effect. In a discussion of risks to child development, it is vital to understand how micro-systems factors such as family and/or household dynamics and conditions affect children, and how children negotiate these dynamics, insofar as they have agency to do so. It is widely accepted that the care environment, generally constituted by a child's activities and relationships within the home-based family, is the most salient external influence in children's lives, especially during the earliest years of life. Unsurprisingly then, shocks to the care regime have been shown to have significant impact on children's outcomes across several domains.

Bhalotra (2010) uses individual data on infant mortality for about 150,000 children born in 1970–1997 across 15 major Indian states, merged by cohort and state of birth with a state panel containing information on aggregate income, to investigate child mortality and its relation to aggregate income shocks. Specifically, she compares the effects of annual deviations from general trends in income on the mortality risks of children born at different times to the same mother, conditional upon a number of state-time-specific covariates, including rainfall shocks and state social expenditure. She finds that rural infant mortality is counter-cyclical, in that a negative income shock of a median size (4.4%) leads to a rise in infant mortality by 0.136 percentage points, this being almost half of the total annual decline in mortality in India in 1970–99. Bhalotra documents that these effects are probably mediated by changes in health-seeking behaviour and maternal labour supply in response to the income shock. Thus, in a downturn, rural Indian mothers are significantly less likely to give birth outside the home or to seek antenatal care and more likely to work outside the home; they are also far less likely to obtain immunization or treatment for their children. In a similar vein, Baird, Friedman and Schady (2011), in the most geographically-comprehensive investigation undertaken on the subject, which uses data on 1.7 million births in 59 developing countries, record a large, negative association between per capita GDP and infant mortality ¹⁴.

¹⁴ These recent explorations of the effects of aggregate economic shocks on infant mortality highlight the importance of not uncritically generalizing findings from research on childhood in OECD countries. The relationship between economic cycles in OECD countries has been shown to be the opposite of the relationship documented in these papers; recent longitudinal research on the US, for example, finds that child mortality is *lower* in recessions and *higher* during periods of growth. This may reflect substitution of time away from the labour market into health preserving activities by mothers during recession (see Dehejia and Lleras-

The death of parents or other caregivers is a direct shock to the care environment of children and often also to household income. Beegle, De Weerd and Dercon (2006) examine a sample of 718 non-orphaned children in AIDS-afflicted areas of Tanzania who were surveyed in 1991-9 and then traced and re-interviewed as adults in 2004. Nearly a fifth of the sample had lost one or more parents by the age of 15, allowing for an assessment of permanent health and education impacts of orphanhood during childhood. The authors control for a wide range of child and adult characteristics before orphanhood, as well as community fixed effects and find that maternal orphaning has a permanent adverse impact of 2 cm of final height attainment and one year of educational attainment. Expressing welfare in terms of consumption expenditure, they find a gap of 8.5 percent compared to similar children whose mothers had survived until at least their fifteenth birthday¹⁵.

Not everyone is equally vulnerable

Both the development economics literature and the child development literature emphasise that some households are significantly more vulnerable to adversity than others, whether because of their location, social status, or economic factors. Typically, the burden of risk is greatest for poor households, which are also, by and large, the least able to smooth income shocks (Dercon 2002). Moreover, household poverty is a key indicator for multiple developmental risks in children, including, among others, malnutrition, environmental toxins, low maternal education level, and family conflict (Wachs and Rahman, 2013).

We have noted that a child's social characteristics can be a significant indicator of the burden of risk they bear. In poor households it is the children who are disadvantaged by gender, birth order or other characteristics who are likely to suffer most from shortfalls and incomplete protection, since limited resources are frequently distributed unevenly among household members. Bhalotra (2010) shows that not only are the income effect on child mortality is significantly larger for children with uneducated mothers (or fathers) and mothers who became pregnant before the age of 18, but, comparing brothers and sisters, the impact of income shocks is much larger in girls; indeed, boys are fully protected. Baird, Friedman and

Muney, 2004). Note though that this does not negate the possibly important role of heterogeneity between developing countries: Miller and Urdinola (2011) find that the relationship between global coffee prices and infant mortality in Colombia (a major coffee exporter) is similar to the results of economic shocks in the US – infant mortality is lower when coffee prices are low and higher when coffee prices are high, a result in stark contrast to those of Bhalotra (2010) and Baird, Friedman and Schady (2011).

¹⁵ These studies highlight that shocks, even in middle childhood, can have large negative impacts and vulnerability on many key domains remains even beyond early childhood.

Schady (2011) also report that infant mortality in females is more sensitive to negative income shocks than males, and Maccini and Yang (2009) establish that the links between rainfall shocks in the birth year and adverse later life outcomes in Indonesia are apparent only in women.

Households are not, in most cases, powerless against shocks; nor do they passively suffer their consequences. Attempts to reduce vulnerability and/or ameliorate impact include diversification of income sources and crops, informal group-based risk sharing, and increasing labour supply. Coping strategies may result in children moving (temporarily or permanently) into the home of relatives who are better off or in need of more labour, and this can be a source of either developmental risk or learning and social support (Boyden and Howard, 2013). This practice of fostering has been documented quantitatively using data from Burkina Faso by Akresh (2009). He shows that households experiencing negative idiosyncratic income shocks, with gender imbalances among children, located further from primary schools, or with more ‘good’ quality network members (fewer subsistence farmers and unmarried individuals and more educated individuals) are significantly more likely to send a child away.

Children commonly share responsibility for household maintenance, very often making significant contributions by undertaking domestic chores, unpaid work in a family enterprise, or paid employment, or by caring for younger siblings or incapacitated adults (Bourdillon et al. 2010; Heissler and Porter 2013). For many boys and girls, playing an active part in the household economy is vital to their social inclusion and hence an important source of identity, pride, and self-efficacy; it also enables them to gradually learn life skills appropriate to their gendered adult roles. Nevertheless, these risk-coping mechanisms can be damaging for the young. For example, Beegle, Dehejia and Gatti (2006) document a rise in child work in response to shocks to crop income in rural Tanzania¹⁶. Jacoby and Skoufias (1997) similarly report a reduction in children’s school attendance following shocks in agricultural income in rural India.

¹⁶ Child work is not inherently damaging to children, but can be harmful under certain conditions and may detract from their schooling. Beegle, Dehejia and Gatti (2009) show that child work at around 10 years of age in Vietnam, arising in response to changes in rice prices, resulted in significantly lower educational attainment, a lower probability of being enrolled in school and a much greater probability of taking up wage labour five years later.

Even when individual and household coping mechanisms provide a shield during crises, they do not always offer complete insurance against the effects of shocks or enduring hardship. Often this is most evident with adversities that affect entire communities, insofar as these commonly limit the ability of households to share risks. Even within households risk sharing may not be complete. Dercon and Krishnan (2000) test for perfect risk sharing in households confronting adverse shocks, examining whether individuals are able to smooth consumption over time and within households, and establish that poorer households are not able to do so. They find that in southern Ethiopian villages the brunt of adverse shocks and of incomplete risk sharing in the household is borne by women.

This discussion of environmental risks is not exhaustive. It is merely intended to illustrate that children, households, communities and population groups may be prey to a multitude of risks, some bearing a far higher risk burden than others, and that such risks may have severe consequences for children that can persist throughout their lives. An understanding of the nature and extent of such risks is therefore crucial for appreciating the potential loss of developmental potential among children in low- and middle-income countries.

2. Changing contexts in developing countries and their effects on children

Many parts of the developing world have undergone rapid socio-economic transformations in the last two decades. In this section we highlight the impact on children. We identify four significant trends, as follows: an (uneven) fall in absolute poverty; increased access to services, especially education; changing household incentives for investing in children; and changing social and cultural values.

Fall in absolute poverty

One of the most notable trends in recent decades has been the steady decline in absolute poverty, as measured by the ability to meet the cost of 'basic needs', across most parts of the developing world. Chen and Ravallion (2010) analyse 675 representative household surveys from 115 countries, together with internationally comparable price data, examining the trends in global poverty between 1981 and 2005. They report that whereas 52 percent of the population of the developing world was below a poverty line of \$1.25 per day in 1981, the comparable figure was 25 percent in 2005. The rate of decline in poverty over this period was

1 percent per year, the decline being far more significant in Asia (especially China) than in sub-Saharan Africa, where gains have been more modest. Also, as importantly, gains have been unequal within countries. For example, while India has experienced rapid economic growth and impressive rates of poverty reduction it remains home to the largest number of poor people in the world.

These trends have direct relevance for children's well-being in low and middle-income countries, with three important implications. First, given that poverty is a significant risk factor for children, any reduction in poverty is certainly good news, in and of itself¹⁷. Second, however, there are important grounds for caution. Chen and Ravallion's analysis (2010) reveals a large 'bunching' of people between the poverty line of \$1.25 per day and \$2 per day. In other words, whereas much of the developing world may now have escaped poverty, many populations remain significantly vulnerable to income shocks. As shown in the previous section, even temporary income shocks can directly prejudice children's outcomes, with long-term consequences. Thus, in households that are close to the poverty line any gains from a reduction in poverty are likely to be significantly lessened by vulnerability to shocks, especially in the absence of supplementary social protection measures. Finally, the trends outlined by Chen and Ravallion (2010) imply that, increasingly, poor households, and by extension, children in poor households, will be in middle-income countries, highlighting the importance of measures that address inequalities and cater to children in particularly disadvantaged groups.

Access to services and inequality in outcomes

Another force for change that crucially affects children in developing countries has been the expansion of public infrastructure and services, particularly those services that are aimed at the young, such as education and immunization. This expansion is significant in at least three respects: it affects the absolute level of child wellbeing; it can change the level of inequality in the distribution of child outcomes as well as the nature and relative importance of different dimensions in inequality; and finally, it changes the focus of policy debates around public services and of interventions.

¹⁷ Whether income growth translates into improvement of outcomes for children depends crucially, of course, on questions of intra-household allocation of resources. As our previous discussion highlights, it is not obvious that all children will benefit from these gains (for example, there may be important intra-household differences based on gender or birth order) but, on aggregate, the rise in incomes is a cause for optimism.

It is not *a priori* clear that access to social services will affect equality between children over time inasmuch as increased access does not necessarily have a monotonic relationship to societal inequalities. Oster (2009) presents a theoretical model which predicts that when starting at lower initial levels of access an expansion of services will lead to higher inequality, whereas, when starting at a high level of access, service expansion will reduce inequality. She tests this theory using data on vaccinations for children in India, with the location of health camps as identification. She is able to rigorously document that while initially an increase in the number of health camps led to a rise in gendered inequality in vaccinations, further increases led to its decline. This trend maps into mortality directly: in areas that start with high levels of vaccination, excess female mortality decreases over time.

Perhaps the starkest illustration of how increased service access shifts the nature and level of inequalities among children, as well as the boundaries of public discourse, is to be found in recent advances in primary education in developing countries. Following the push for Education for All and the Millennium Development Goals, primary school enrolment has risen sharply across the developing world and ever-enrolment into primary schooling is near-universal in most places (Grant and Behrman, 2010; World Bank, 2012). This expansion has been accompanied by important changes in inequalities in educational investments. In India, for example, data from the mid-1990s reflect that the primary channel for gender bias in education was through enrolment, with boys significantly more likely to be enrolled than girls, but that, conditional on enrolment, there were no significant biases in spending on education (Kingdon, 2005). However, that pattern has almost entirely reversed since then. Using data from 2005, and replicating the methodology of Kingdon (2005), Azam and Kingdon (2012) report that fewer states present evidence of gender bias in 2005 compared to 1993, and that there is little evidence of any gender bias in enrolment in the 5-9 year age group (although there is some such evidence for later years). Maitra, Pal and Sharma (2011) use the same data to document further that the gender gap in private school enrolment is double that in enrolment overall and has increased over time in rural areas¹⁸.

Given the above, it should not be surprising to find that the relative importance of diverse axes of inequality turns out to be very different from the received wisdom, gender differences being the most obvious example. Dercon and Singh (2013) systematically

¹⁸ A similar pattern has been documented by Woodhead, Frost and James (2013) using Young Lives data from Andhra Pradesh.

investigate gender bias at the age of 8 years, 12 years and 15 years for children in the four Young Lives countries¹⁹. They show that gender preferences are often specific to age, contexts and indicators, and are not always as expected: not only are the gaps associated with other socio-economic factors often larger, but gender gaps may be absent across most outcomes (in Peru) and may even reveal a pro-girl bias (in Vietnam). Using DHS data from 38 countries, Grant and Behrman (2010) also document considerable heterogeneity in gender bias across regions of the developing world and phases of childhood. Interestingly, they find that conditional on ever enrolment, girls seem to have a consistent *advantage* in school progression, leading them to conclude that “developing countries are becoming more like developed countries with gender gaps that increasingly favor, rather than discriminate against, females.” (p.71)

The rise in school availability has also changed the academic and policy discourses about education. The focus is shifting from access, which dominated policy discussions until the 1990s (embodied, for example, in several enrolment-related targets in the MDGs), to quality and relevance. As much work has documented, education quality remains poor and problems of school accountability, endemic in many low- and middle-income countries. In an influential study, Chaudhury et. al. (2006) found that in six developing countries up to a quarter of teachers were absent at the time of unscheduled visits to schools. In India, half the teachers who were present were not teaching. Moreover, many children complete primary school without being able to perform basic tasks, such as reading a simple sentence, or resolving a simple division problem (Pratham 2012).

Recently, there has been a marked rise in private schooling in many low- and middle-income countries, reflecting, at least in part, the poor quality of education in government schools²⁰. Though causality is debated, several studies have now documented the higher

¹⁹ Dercon and Singh (2013) investigate gender biases across thirteen different indicators relating to: nutrition (height-for-age, weight-for-age and BMI-for-age z-scores); education and achievement (enrolment but also test scores in arithmetic and the Peabody Picture Vocabulary Test); educational aspirations (reported by children and by parents); subjective well-being (reported by children, using the ‘ladder of life’, a measure of life satisfaction); and on four psychosocial competencies (agency and efficacy, trust, pride and self-esteem, and sense of inclusion).

²⁰ In India, for example, even in rural areas where private schooling accounted for only 10% of the enrolment in 1993 (Kingdon, 2007), by 2011 its share had risen to about 25% of total enrolment (Pratham, 2012) The availability of private schools is considerably higher in urban areas; as data from the India Human Development Survey (2005) document, in many populous states such as Andhra Pradesh, Uttar Pradesh,

median achievement of children in these schools, even though average expenditure per child tends to be far lower than in government facilities. For example, using yearly child-level panel data on private and state school pupils, this pattern has been documented for rural areas of Pakistan by Andrabi et. al. (2011). Bold et. al. (2011) report similar findings from Kenya, using several years of data from an exam administered to primary school students throughout the country. Muralidharan et. al. (2013) and Singh (2013) both report much greater productivity of private schools and causally greater absolute effects on some aspects of learning (notably English) in India.

This remarkable transformation in the educational landscape, with high enrolment (at the primary level at least), shifting inequalities, and a burgeoning private sector, presents both opportunities and potential risks for children's development, some of which are only now being explored in depth. The important consideration here is not to definitively pronounce on aggregate implications of such changes, indeed, that is perhaps not possible given significant gaps in our knowledge, but rather to note that an understanding of child development in low- and middle-income countries must necessarily take recent policy developments into account

Changing household incentives for investing in children

Inequalities, and differential investments in and opportunities presented to different children, are also affected by broader economic trends in developing countries. To emphasise these links, this sub-section highlights two studies that show how even the most entrenched inequalities may be affected. We focus on gender discrimination in India which has been very widely documented in the literature and builds on our previous discussion.

Concentrating on educational access, Munshi and Rosenzweig (2006) document how patterns of enrolment across public and private schools altered in a part of urban Bombay (Mumbai) between 1980 and 2000 in response to a transformation in the labour market returns to English-medium education. In stark contrast with results from the rest of the country, they find that while gaps in the proportion of children studying in English-medium schools have declined considerably between different caste groups in this period, the decline has been mostly caused by a rapid increase in the proportion of enrolment among girls from lower castes. They explain this finding as due to caste networks in employment that provide

Punjab, Haryana and Madhya Pradesh, the share of private schooling is considerably higher than the share of state schools in the enrolment of 6-14 year old children in urban areas.

lower caste boys with blue-collar jobs in manufacturing which have not traditionally required familiarity with English²¹. Clearly an understanding of trends in inequality needs to account for the changing incentives experienced by households in the context of economic growth.

Robert Jensen (2012a) presents striking evidence on how transformations in economic opportunities in developing countries can affect investments in children and youth at different ages. He uses an innovative experimental research design to examine the impact of expanding labour market opportunities for women in India. Women in randomly selected villages were connected to recruiters for the Business Process Outsourcing (BPO) industry. He evaluated the effect of this (by design) exogenous change in labour market outcomes on outcomes for girls and young women in these villages. Using panel data spanning a three-year period, he finds that women aged 15 to 21 at baseline from villages exposed to the intervention were 4.6 percentage points more likely to work in a BPO job than women in control villages and 2.4 percentage points more likely to work at all for pay outside the home. Additionally, these young women expressed a greater interest in working throughout their lives, even after marriage and childbirth, indicating shifting aspirations toward paid work as a career. The higher educational requirements and greater returns to human capital in the BPO sector also led to increased investments for women. The cohort of 15–21-year-old women from treatment villages was significantly more likely to enrol in computer or English-language courses at private, for-fee training institutes, indicating a willingness to invest in getting a job or building a career when suitable opportunities are available. Significantly, even younger, school-aged girls had increased school enrolment and greater body mass index (BMI), this reflecting better nutrition and/or health investments.

Changing social and cultural values

In many developing countries, economic growth and the expansion of infrastructure and social policy has taken place alongside the spread of information and communications

²¹ Our discussion above should not be taken to imply that rapid changes in the incentives to invest in education have not been documented previously—for example, Foster and Rosenzweig (1996) using panel data on Indian households in 17 states document that the Green Revolution raised the returns to education which increased the private investments in education. The change from the pattern demonstrated there and the pattern documented in Munshi and Rosenzweig (2006) is that in the latter returns to a particular type of education (English-medium education) have grown much faster post-liberalization than the returns to vernacular education; furthermore there are documented heterogeneities in the rates of return for different types of children (boys and girls); these results, and indeed the previous results of Foster and Rosenzweig (1996) highlight that in order to understand the impact of aggregate economy-wide changes on educational investments (or investments into childhood more broadly), we need to focus on heterogeneous impacts across children in different categories.

technology and the media, all of which can have dramatic and lasting effects on material conditions, norms, values and practices. In this section we highlight recent evidence of social changes that have led to important differences in individual and community outcomes; while the link has not been made explicitly, the implications for children's development are likely to be significant.

LaFerrara et. al. (2012) study how fertility choices in Brazil shifted significantly between 1970 and 1991 in response to the introduction of television, specifically soap operas. They identify the effect by through the variation in the timing of the introduction of the main television network in different areas and show that their results are robust to possible concerns of selection bias. The decline in fertility occurs not through delayed commencement of childbearing but by stopping childbearing earlier²². Similarly, Jensen and Oster (2009) study the impact of the introduction of cable television on women's status in India using a three year individual-level panel dataset and find that it led to a decline in female fertility. Equally important, they also report evidence of a decline in the acceptability of violence against women and an increase in school enrolment among younger children, which they hypothesize as arising from an increase in women's participation in decision making²³.

Not all of the outcomes of new information and communications technology and entertainment sources are beneficial. Olken (2009) uses the variation in television and radio reception across 600 different Indonesian villages to investigate impact on social capital. Using arguably exogenous variation induced by differences in terrain and in the timing of introduction of private television and radio²⁴, he is able to demonstrate that increased signal reception leads to less participation in social organizations and lower self-reported trust.

²² While not explicitly evaluating the effect of television availability on children's welfare, it is quite plausible that the rapid decline in fertility documented in the paper have direct implications for the welfare of children in these households: the general literature on the relationship between family size and investments in children (the 'quality-quantity trade-off') is vast and has used several strategies to look at this effect, including unanticipated shocks to fertility from twin births (Rosenzweig and Wolpin, 1980) and the sex composition of the first two children (Angrist and Evans, 1998). For example, Jensen (2012b) demonstrates a direct link between higher fertility and child malnutrition, using secondary infertility as an instrument to correct for endogenous fertility choices.

²³ A central concern in their identification strategy is whether the results merely reflect differential trends across communities that received cable TV and those that did not. They are able to argue convincingly that there is no evidence of pre-existing trend differences between communities that received access to cable TV during the period of their study and other communities and that the results are causal.

²⁴ Olken does not differentiate between the effect of radio and television reception in this study but rather reports the combined effect; in his data, television and radio reception are very strongly correlated even within districts.

Though his analysis did not include child outcomes, it is likely that these kinds of changes will have had indirect effects on children growing up in these communities.

The rapid recent expansion of television availability is only one of many changes that may affect the social values that shape children's lives, an example selected here mostly because of the availability of peer-reviewed evidence. Our key point is that such changes need to be studied explicitly if we want to understand trends in child wellbeing in the fast changing contexts of many developing countries.

3. Conclusions and future directions

The broad spread of our discussion precludes us from offering very specific directions for either research or policy. What it does allow, though, is for us to draw out commonalities between the strands of research which have proved most fruitful and to frame how the effect of changing environments on children may best be understood.

The first lesson we draw from reviewing current evidence is the importance of cohort studies which encompass diverse dimensions of child well-being. We would argue that data of this kind are extremely important for at least two crucial reasons. First, child development is a sequential process involving dynamic complementarities, and thereby the long-term consequences of external influences at different stages of childhood and adolescence, can only be convincingly studied if data are available for the same individuals over time. While some questions, such as the impact of shocks in early childhood, may be examined by matching previous external data sources to existing cross-sectional studies like the DHS and LSMS surveys, others (such as the possibility of catch-up growth in later childhood) cannot be persuasively researched without access to high quality panel data. It seems to us that it is precisely in the latter type of questions that our empirical evidence may be most effectively augmented. The second reason is more specific to developing countries. The rapid change in the socio-economic contexts has ambiguous effects on the welfare of children and their long-term prospects. Significant changes may occur even in a very short period of time and may not be foreseen; the outcomes for children may be unknown. However, such understanding will be critical for designing timely and effective policy responses to changing circumstances in order to safeguard children's wellbeing and an existing system of longitudinal surveys is perhaps the best means for evaluating change as and when it occurs.

More specifically, we would like to highlight two particular strands of research around child development that could benefit from much greater attention. The first seeks to understand which are the critical periods for different domains of child development, whether deprivations or abuses to children in these critical periods are irreversible, what are the relative costs of later remediation, and finally, if it is possible, how remediation may best be achieved. The answers to these questions are of first-order importance for policy; even if prevention remains the most cost-effective form of intervention, it is vital to be able to offer effective support to recovery if this is possible. Our knowledge in this area remains patchy.

The second area of research involves seeking a better understanding of the interdependence and complementarities across domains of children's development. The recent focus in the economics literature on outcomes beyond nutrition and cognition is to be welcomed. However, as we have highlighted, evidence on developing countries remains sparse and it cannot be presumed that relationships documented in OECD countries, for example in the interaction between cognitive and psycho-social skills, would necessarily be generalizable for developing countries. Children's development is not merely driven by biological imperatives but is also shaped by social and other environmental factors that differ greatly both across and within developing countries; it is vital that this complex process be studied in specific socio-economic contexts. As well, the synergies between developmental domains calls for the need to employ an integrated approach to policy across different sectors and levels of government and in international agencies.

We end by highlighting that policies aimed at supporting households can have major impact on children. While this point may seem rather obvious, and indeed has been recognized frequently in previous work, very often such policies work from assumptions rather than evidence of the challenges children face, their needs and the impacts of interventions on them. Supporting households without attending to the specific conditions and circumstances of children may be inefficient at best and detrimental to the young at worst. Children merit consideration not merely on ethical grounds but also because even temporary setbacks can have significant long-term impacts on their lives.

References

Aber, J.L., M. Gephart, J. Brooks-Gunn, J. and J. Connell. 1997. Development in context: Implications for studying neighborhood effects. In Brooks-Gunn, J., Duncan, G.J.. & Aber,

J.L. (Eds.), *Neighborhood poverty. Volume 1 Context and consequences for children* (pp. 44-61). New York: Russell Sage Foundation.

Adair, L. S. 1999. Filipino children exhibit catch-up growth from age 2 to 12 years. *The Journal of nutrition*, 129(6), 1140-1148.

Akresh, R. 2009. Flexibility of household structure child fostering decisions in Burkina Faso. *Journal of Human Resources*, 44(4), 976-997.

Alderman, H., Behrman, J. R., Lavy, V., & Menon, R. 2001. Child health and school enrollment: A longitudinal analysis. *Journal of Human Resources*, 185-205.

Andrabi, T., Das, J., Khwaja, A. I., & Zajonc, T. 2011. Do value-Added estimates add value? Accounting for learning dynamics. *American Economic Journal: Applied Economics*, 3(3), 29-54.

Angrist, J. D., & Evans, W. N. 1998. Children and Their Parents' Labor Supply: Evidence from Exogenous Variation in Family Size. *American Economic Review*, 88(3), 450-477.

Azam, M., & Kingdon, G. G. 2012. Are girls the fairer sex in India? Revisiting intra-household allocation of education expenditure. *World Development*, Volume 42, February 2013, Pages 143–164

Baird, S., Friedman, J., & Schady, N. 2011. Aggregate income shocks and infant mortality in the developing world. *Review of Economics and Statistics*, 93(3), 847-856.

Bandura, A. 1997. *Self-efficacy: The exercise of control*. New York: Freeman

Barham, T., Macours, K., & Maluccio, J. A. 2013. Boys' Cognitive Skill Formation and Physical Growth: Long-Term Experimental Evidence on Critical Ages for Early Childhood Interventions. *American Economic Review Papers and Proceedings* 103(3), 467-71.

Beegle, K., Dehejia, R. H., & Gatti, R. 2006. Child labor and agricultural shocks. *Journal of Development Economics*, 81(1), 80-96.

Beegle, K., Dehejia, R., & Gatti, R. 2009. Why should we care about child labor? The education, labor market, and health consequences of child labor. *Journal of Human Resources*, 44(4), 871-889.

Beegle, K., J. De Weerd, and S. Dercon . 2006. Orphanhood and the Long-run Impact on Children, *American Journal of Agricultural Economics* 88(5): 1266–72.

Bhalotra, S. 2010. Fatal fluctuations? Cyclicalities in infant mortality in India. *Journal of Development Economics*, 93(1), 7-19.

Boersma, B., & Wit, J. M. (1997). Catch-up growth. *Endocrine Reviews*, 18(5), 646-661.

Bold, T., M. Kimenyi, G. Mwabu and J. Sandefur. 2011. *Why Did Abolishing Fees Not Increase Public School Enrollment in Kenya?*, Working Paper 271, Washington DC: Center for Global Development.

Bornstein, M. P. Rebello Britto, Y. Nonoyama-Tarumi, Yumiko Ota, Oliver Petrovic, and Diane L. Putnick .2012. Child Development in Developing Countries. *Child Development* 83(1): 16–31

Bourdillon, M., D. Levison, W. Myers and B. White. 2010. *Rights and Wrongs of Children's Work*, New Brunswick, NJ: Rutgers University Press.

Boyden, J. and Howard, N. 2013. Why does child trafficking policy need to be reformed? The moral economy of children's movement in Benin and Ethiopia. *Children's Geographies*, 11(3), 354-368.

Boyden, J. and G. Mann. 2005. Children's Risk, Resilience and Coping in Extreme Situations, in Michael Ungar (ed.) *Handbook for Working with Children and Youth: Pathways to Resilience across Cultures and Contexts*, Thousand Oaks CA: Sage Publications.

Bronfenbrenner, U. 1979. *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press

Burchinal, M.R., J.E. Roberts, S.A. Zeisel and S.J. Rowley.2008. Social Risk and Protective Factors for African American Children's Academic Achievement and Adjustment during the Transition to Middle School, *Developmental Psychology* 44(1): 286–92.

Chaudhury, N, J Hammer, M Kremer, K Muralidharan and F. Halsey Rogers. 2006. Missing in Action: Teacher and Health Worker Absence in Developing Countries', *Journal of Economic Perspectives* 20(1): 91–116.

Chen, S., & Ravallion, M. 2010. The developing world is poorer than we thought, but no less successful in the fight against poverty. *The Quarterly Journal of Economics*, 125(4), 1577-1625.

Cicchetti, D. and N. Garmezy.1993. Milestones in the Development of Resilience, *Development and Psychopathology* 5(4): 497–502.

Coly, A. N., Milet, J., Diallo, A., Ndiaye, T., Bénéfice, E., Simondon, F, Wade, S., and Simondon, K. B. 2006. Preschool stunting, adolescent migration, catch-up growth, and adult height in young Senegalese men and women of rural origin.*The Journal of Nutrition*, 136(9), 2412-2420.

Commission on Growth and Development. 2008. *The Growth Report: Strategies for Sustained and Inclusive Development*, Washington DC: World Bank.

Crookston, B.T., M.E. Penny, S.C. Alder, T.T. Dickerson, R.M. Merrill, J.B. Stanford, C.A. Porucznik and K.A. Dearden. 2010. Children Who Recover from Early Stunting and Children Who Are Not Stunted Demonstrate Similar Levels of Cognition, *Journal of Nutrition* 140(11): 1996–2011.

Crookston, B.T., W. Schott, S. Cueto, K.A. Dearden, P. Engle, A. Georgiadis, E. Lundeen, M. Penny, A.D. Stein, J.R. Behrman, and The Young Lives Determinants and Consequences

- of Child Growth Project Team. 2013. "[Postinfancy Growth, Schooling, and Cognitive Achievement: Young Lives](#)." *American Journal of Clinical Nutrition*. 98:1555-1563.
- Cueto, S., J. Escobal, M. Penny and P. Ames. 2011. *Tracking Disparities: Who Gets Left Behind? Initial Findings from Peru*, Round 3 Survey Report, Oxford: Young Lives
- Cunha, F. and J. Heckman. 2008. Formulating, Identifying and Estimating the Technology of Cognitive and Non-cognitive Skill Formation', *Journal of Human Resources* 43(4): 738–82.
- Cunha, F. and J. Heckman. 2009. The Economics and Psychology of Inequality and Human Development', *Journal of the European Economic Association* 7(2-3): 320–64.
- Cunha, F., J. Heckman and S. Schennach. 2010. Estimating the Technology of Cognitive and Non-cognitive Skill Formation, *Econometrica* 78(3): 883–93.
- Currie, J., and D. Almond. 2011. Human capital development before age five. *Handbook of labor economics*, 4, 1315-1486.
- Dawes, A., and D. Donald. 2005. *Improving Children's Chances: Linking Developmental Theory and Practice*. Christian Childrens Fund (CCF).
- Dehejia, R., and A. Lleras-Muney. 2004. Booms, busts, and babies' health. *The Quarterly Journal of Economics*, 119(3), 1091-1130.
- Dercon, S. 2002. Income Risk, Coping Strategies, and Safety Nets, *World Bank Research Observer* 17(2): 141–66.
- Dercon, S. and P. Krishnan 2000. In Sickness and in Health: Risk Sharing within Households in Rural Ethiopia, *Journal of Political Economy* 108(4): 688–727.
- Dercon, S., and A. Sánchez 2013. Height in mid childhood and psychosocial competencies in late childhood: evidence from four developing countries, *Economics & Human Biology*, <http://dx.doi.org/10.1016/j.ehb.2013.04.001>
- Dercon, S., & Singh, A. 2013. From nutrition to aspirations and self-efficacy: gender bias over time among children in four countries. *World Development*, Volume 45, May : 31-50
- Durkin, K. 1995. *Developmental social psychology: From infancy to old age*. Malden: Blackwell Publishing
- Edmonds, E. V. 2007. Child labor. *Handbook of Development Economics*, 4, 3607-3709.
- Engle, P.L., L.C.H. Fernald, H. Alderman, J. Behrman, C. O'Gara, A. Yousafzai, M. Cabral de Mello, M. Hidrobo, N. Ulkuer, I. Ertem, S. Iltus, the Global Child Development Steering Group. 2011. Strategies for reducing inequalities and improving developmental outcomes for young children in low-income and middle-income countries, *The Lancet* 378(9799): 1339-1353.
- Ferreira, F. H., & Schady, N. 2009. Aggregate economic shocks, child schooling, and child health. *The World Bank Research Observer*, 24(2), 147-181.

Fink, G., & Rockers, P. C. 2014. Childhood growth, schooling, and cognitive development: further evidence from the Young Lives study. *The American Journal of Clinical Nutrition*, doi: 10.3945/ajcn.113.080960

Foster, A and M. Rosenzweig. 1996. Technical Change and Human-Capital Returns and Investments: Evidence from the Green Revolution, *American Economic Review* 86(4): 931–53.

Glewwe, P., Jacoby, H. G., and King, E. M. 2001. Early childhood nutrition and academic achievement: a longitudinal analysis. *Journal of Public Economics*, 81(3), 345-368.

Glewwe, P., and King, E. M. 2001. The impact of early childhood nutritional status on cognitive development: Does the timing of malnutrition matter?. *The World Bank Economic Review*, 15(1), 81-113.

Glewwe, P., and Kremer, M. 2006. Schools, teachers, and education outcomes in developing countries. *Handbook of the Economics of Education*, 2, 945-1017.

Glewwe, P., and Miguel, E. A. 2007. The impact of child health and nutrition on education in less developed countries. *Handbook of development economics*, 4, 3561-3606.

Golden, M. H. 1994. Is complete catch-up possible for stunted malnourished children?." *European Journal of Clinical Nutrition* 48: S58-70.

Grant, M. J., and Behrman, J. R. 2010. Gender gaps in educational attainment in less developed countries. *Population and Development Review*, 36(1), 71-89.

Grantham-McGregor, S., Y. Cheung, S. Cueto, P. Glewwe, L. Richter, B. Strupp and the International Child Development Steering Group. 2007. Developmental Potential in the First 5 Years for Children in Developing Countries, *The Lancet* 369 (9555): 60–70.

Heissler, K., and Porter, C. 2013. Know Your Place: Ethiopian Children's Contributions to the Household Economy. *European Journal of Development Research*, 25(4), 600-620.

Helmets, C. and M. Patnam. 2011. The Formation and Evolution of Childhood Skill Acquisition: Evidence from India, *Journal of Development Economics* 95(2): 252–66.

Jacoby, H. G., and Skoufias, E. 1997. Risk, financial markets, and human capital in a developing country. *The Review of Economic Studies*, 64(3), 311-335.

Jensen, R. 2012a. Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India. *The Quarterly Journal of Economics*, 127(2), 753-792.

Jensen, R. 2012b. Another mouth to feed? The effects of (in) fertility on malnutrition. *CESifo Economic Studies*, 58(2), 322-347.

Jensen, R., and Oster, E. 2009. The power of TV: Cable television and women's status in India. *The Quarterly Journal of Economics*, 124(3), 1057-1094.

- Kingdon, G. 2005. 'Where Has All the Bias Gone? Detecting Gender Bias in the Intrahousehold Allocation of Educational Expenditure', *Economic Development and Cultural Change* 53(2): 409–51.
- Kingdon, G. 2007. The progress of school education in India. *Oxford Review of Economic Policy*, 23(2), 168-195.
- La Ferrara, E., Chong, A., and Duryea, S. 2012. Soap Operas and Fertility: Evidence from Brazil. *American Economic Journal: Applied Economics*, 4(4), 1-31.
- Lundeen, E. A., Behrman, J. R., Crookston, B. T., Dearden, K. A., Engle, P., Georgiadis, A., ... & Stein, A. D. 2013. Growth faltering and recovery in children aged 1–8 years in four low- and middle-income countries: Young Lives. *Public health nutrition*, 1-7.
- Maccini, S. and D. Yang. 2009. 'Under the Weather: Health, Schooling, and Economic Consequences of Early-Life Rainfall', *American Economic Review* 99(3): 1006–26.
- Maitra, P., Pal, S., and Sharma, A. 2011. Reforms, Growth and Persistence of Gender Gap: Recent Evidence from Private School Enrolment in India, IZA Discussion Paper 6135
- Maluccio, J., J. Hodinott, J. Behrman, R., Martorell, Reynaldo, A. Quisumbing, and A. Stein .2009. The Impact of Improving Nutrition During Early Childhood on Education among Guatemalan Adults, *Economic Journal*, 119, issue 537, p. 734-763
- Masten, A.S. and J. Obradović . 2006. Competence and Resilience in Development, *Annals New York Academy of Sciences* 1094: 13–27.
- Miller, G., and Urdinola, B. P. (2010). Cyclicalit, Mortality, and the Value of Time: The Case of Coffee Price Fluctuations and Child Survival in Colombia. *Journal of Political Economy*, 118(1), 113-155.
- Mookherjee, D., Ray, D., and Napel, S. 2010. Aspirations, segregation, and occupational choice. *Journal of the European Economic Association*, 8(1), 139-168.
- Munshi, K. and M. Rosenzweig. 2006. 'Traditional Institutions Meet the Modern World: Caste, Gender, and Schooling Choice in a Globalising Economy. *American Economic Review*, 96(4): 1225–52.
- Muralidharan, K. and V. Sundararaman. 2011. Teacher Performance Pay: Experimental Evidence from India', *Journal of Political Economy* 119(1): 39–77.
- Muralidharan, K., and Sundararaman, V. 2013. *The Aggregate Effect of School Choice: Evidence from a two-stage experiment in India* NBER Working Paper 19441, National Bureau of Economic Research.
- Obradović, J. and Thomas W. Boyce. 2009. Individual Difference in Behavioural, Physiological, and Genetic Sensitivities to Contexts: Implications for Development and Adaptation, *Developmental Neuroscience* 31: 300–08.

- Olken, B. A. 2009. Do television and radio destroy social capital? Evidence from Indonesian villages. *American Economic Journal: Applied Economics*, 1-33.
- Oster, E. 2009. Does increased access increase equality? Gender and child health investments in India. *Journal of Development Economics*, 89(1), 62-76.
- Pratham .2013. Annual Survey of Education Report 2012, Pratham, New Delhi
- Prentice, A. M., Ward, K. A., Goldberg, G. R., Jarjou, L. M., Moore, S. E., Fulford, A. J., & Prentice, A. (2013). Critical windows for nutritional interventions against stunting. *The American Journal of Clinical Nutrition*, 97(5), 911-918.
- Ridge, T. 2002. *Childhood Poverty and Social Exclusion: From a Child's Perspective*, Bristol: Policy Press.
- Rogoff, B.2003. *The Cultural Nature of Human Development*, Oxford: Oxford University Press.
- Rosenzweig, M. R., and Wolpin, K. I. 1980. Testing the quantity-quality fertility model: the use of twins as a natural experiment. *Econometrica*, 48(1), 227.
- Rutter, M. 1987. Psychosocial Resilience and Protective Mechanisms. *American Journal of Orthopsychiatry*. 57(3): 316–331
- Rutter, M. 2012. Resilience as a dynamic concept. *Development and Psychopathology* 24 (2012), 335–344
- Sameroff, A. 2009. *The Transactional Model of Development: How Children and Contexts Shape Each Other*, Washington DC: American Psychological Association.
- Sameroff A, Chandler MJ. 1975. Reproductive risk and the continuum of caretaking casualty. In: Horowitz FD, Hetherington EM, Scarr-Salapatek S, Siegel GM, editors. Review of child development research. 4. Chicago: University of Chicago Press; 187–244.
- Sameroff, A. J. and Fiese, B. H. 2000. Transactional regulation: The developmental ecology of early intervention. In Shonkoff, J.P., and Meisels, S.J., (Eds.), *Handbook of early childhood intervention (2nd ed.)* (pp. 135-159). New York: Cambridge University Press.
- Schaffer, R. 1996 *Social Development*, Oxford: Blackwell
- Schott, W.B., B.T. Crookston, E.A. Lundeen, A.D. Stein, J.R. Behrman, and the Young Lives Determinants and Consequences of Child Growth Project Team. 2013. "Periods of Child Growth up to Age 8 Years in Ethiopia, India, Peru and Vietnam: Key Distal Household and Community Factors." *Social Science & Medicine* 97:278-287.
- Shonkoff, J, W.Boyce and B. McEwen 2009 'Neuroscience, Molecular Biology and the Childhood Roots of Health Disparities: Building a New Framework for Health Promotion and Disease Prevention', *Journal of the American Medical Association* 301: 2252–59.

Shonkoff, J and P. Levitt .2010. ‘Neuroscience and the Future of Early Childhood Policy: Moving from Why to What and How’, *Neuron* 67: 689–91.

Singh, A., A. Park, and S. Dercon 2014.. School Meals as a Safety Net: An evaluation of the Midday Meal Scheme in India. *Economic Development and Cultural Change*, 62(2) : 275-306

Singh, A. 2013. Size and Sources of the Private School Premium in Test Scores in India, Young Lives Working Paper 98, University of Oxford

Stevens, G.D. 2006. ‘Gradients in the Health Status and Developmental Risks of Young Children: The Combined Influences of Multiple Social Risk Factors’, *Maternal and Child Health Journal* 10(2): 187–99.

Wachs, T. D., and Rahman, A. 2013. The Nature and Impact of Risk and Protective Influences on Children’s Development in Low-Income Countries. *Handbook of Early Childhood Development Research and Its Impact on Global Policy*, 85.

Walker, S.P., T.D. Wachs, S. Grantham-McGregor, M.M. Black, C.A. Nelson, S.L. Huffman, H. Baker-Henningham, S.M.Chang, J.D.Hamadani, B.Lozaoff, J.M.M. Gardner, C.A.Powell, A.Rahman, and L.Richter. 2011. Inequality in early childhood: risk and protective factors for early child development. *The Lancet* 378 (9799): 1325-1338.

Weisner, T. 2008. Well-being, chaos, and culture: Sustaining a meaningful daily routine. In G.W. Evans and T.D. Wachs, eds. *Chaos and children's development: Levels of analysis and mechanisms*. Washington, D.C.: American Psychological Association, 211-224.

Woodhead, M, Ames, P, Vennan, U, Abebe, W and Streuli, N. 2009. Equity and Quality? Challenges for Early Childhood and Primary Education in Ethiopia, India and Peru’ Studies in Early Childhood Transitions Working Paper 55. The Hague: Bernard Van Leer Foundation.

World Bank (ed.) 2012 *World Development Indicators 2012*. World Bank Publications.