Intergenerational Equity
Understanding the linkages between parents and children: A Systematic Review

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Glossary of Terms
Executive Summary

The dialog on the post-2015 development agenda has revolved around an increased need for sustainable development, with a major emphasis on achieving intergenerational equity. In this regard, unless policy-makers understand the determinants and transmission mechanisms of intergenerational poverty and well-being, it will be difficult to break the cycle of poverty and disadvantage, and thus to achieve intergenerational equity and sustainable development. An understanding of evidence-based mechanisms will allow policy-makers to formulate and implement evidence-informed and better-targeted policies.

This study uses a systematic review methodology to analyze and assess recent evidence on the underlying mechanisms that underpin the intergenerational transmission of poverty and well-being. The research reveals a substantial degree of persistence of poverty across generations. That is, the families and the context in which children are born largely determine the opportunities that they will face throughout their lifetime. Intergenerational poverty manifests itself in the form of lower health and education attainment, and an increased likelihood of being poor (low future income).

In summary, the major conclusions of this review are: (1) there are substantial degrees of income, health and education persistency across generations, which seems to be even greater in developing countries; (2) there is strong evidence to suggest that children from disadvantaged backgrounds (low-income and low-educated families) face limited health and educational opportunities that will handicap them in the long-run; and (3) early childhood experiences are increasingly seen as precursors of later-life outcomes. Children exposed to poverty early in life (and even before they are born) have a disproportionally large probability of being malnourished at birth, suffering illhealth and completing less schooling, which in turn will result in lower income levels later in life.

At the heart of the intergenerational transmission process lies the conventional inquiry into the role played by genes. If genes are the determinants of children outcomes, and differences occur due to selection processes instead of socio-economic factors, policies can play a limited role. The evidence reviewed indicates that both processes are at work: while genes seem to play a role, the social, economic and behavioural environments in which children are nurtured also significantly shape their outcomes.

Research on the transmission of health outcomes is especially challenging, due to the intrinsic relationship between genes and health. Low-birthweight parents have a higher probability of having children with low birthweight. Yet household and environmental factors also play a critical role. As evidenced by the literature on economic and environmental shocks, insufficient nutritional intake in pregnant mothers and newborn children has devastating consequences that will tend to have long-term effects. In fact, the adverse consequences of these negative children outcomes are aggravated for children from poorer households. The transmission mechanisms of health are largely untested, but studies find robust empirical evidence that supports the role played by income and maternal stress. Other studies frequently suggest parenting quality, and maternal health knowledge as potential mechanisms.
There is much richer evidence on the intergenerational transmission of education. Studies find a small but statistically significant causal effect of parental education on children's schooling and educational achievement. These effects largely differ by parental gender. The evidence clearly suggests that a mother's education is a stronger determinant of her children's education; however, a father's education may also be important. Moreover, income and family structure dynamics, including family size, gender composition, and birth order, are important determinants of a child's educational outcomes. There is robust evidence on income, parenting quality, sibling rivalry, and maternal stress as key underlying education-transmission mechanisms.

The positive and negative outcomes that children accumulate over their childhood determine their opportunities to succeed economically later in life. Human capital endowments determine to a large extent the opportunities that children face. In the absence of major development impediments at an extra-household level, such as economic crisis or environmental shocks, it appears that factors affecting future income through the development of cognitive and non-cognitive skills, as well as schooling, play a larger role in the intergenerational transmission of income than health measures do. More research is needed to confirm these results in the developing world. Yet, despite great advancements in the study of intergenerational mobility, a large proportion of intergenerational income mobility remains unexplained, even when controlling for numerous parental and children-related characteristics.

To conclude, the study of the transmission mechanisms of children and adult outcomes shows a complex picture which we are only beginning to understand. Education, health and future income levels are determined by a plethora of mechanisms with close linkages between them. Some issues stand out. Firstly, the transmission of these life outcomes seems to be determined mainly within the family, but external factors like policies and shocks can help mitigate or exacerbate them. Reduced income levels and low education of parents (especially mothers) plays a significant role in determining children outcomes, even when various factors are accounted for. Secondly, disadvantages experienced at early stages in childhood play a much larger role than those experienced later in life. Parenting time and quality, and other mechanisms affecting the development of cognitive and non-cognitive skills early in life, seem to be some of the most important mechanisms. Finally, our knowledge of the transmission process is still limited due to a lack of available data and the problems with attributing causality. More efforts to increase data availability in the developing world can help with this.

Despite the limited knowledge, there are some clear policy implications from the reviewed literature. The reduction of intergenerational poverty requires policies that actively target vulnerable sectors of the population at critical stages of life. Early child development programs have shown some success in the US and other parts of the developed world, and perhaps can be expanded to the developing world. In particular, incentives to influence parental behaviour – to effectively complement the positive effects of supplementary income – are also critical. This could be through improved (maternal) education and health knowledge, or incentives to keep children in school and to improve the quality of parent-child relationships.

Unless the underlying mechanisms of these intergenerational disadvantages are well understood and appropriately addressed, policies seeking to benefit children may have very limited (and only short-term) or unintended effects. Pursuing the goal of intergenerational equity puts children at the heart of policy-making and requires an active role for policy-makers, to improve the chances of those who are disadvantaged. UNICEF, as the primary organization involved in children rights promotion around the globe, is in a privileged position to promote advancement in this area and to increase awareness.
Intergenerational transmission of poverty, i.e. when poverty is passed from one generation to another, is a growing area of interest among researchers who seek to understand why chronic poverty persists across generations, particularly in developing countries. Although researchers have long established that there is persistence between parents’ and children's outcomes, the underlying causes of such generational links are not very well known. In theory, policies and institutions could mediate these links; but it is not clear what precisely these policies and institutions mediate, and how they can effectively do so (D'Addio, 2007; Nolan et al., 2010). As Black and Devereux (2010: 31–32) note, “without knowing the mechanisms [of transmission], it is impossible to understand how to promote change.”

As such, researchers are now placing greater emphasis on better understanding the causal mechanisms that underlie these intergenerational relations. In particular, they are interested in what specific factors are transferred, and how are they transferred. Identifying the mechanisms that lead to the intergenerational transmission of poverty and well-being is central to the design and implementation of effective and well-targeted policies. Thus, this study seeks to deepen understanding of possible factors and mechanisms that drive intergenerational poverty.

Using a systematic review methodology, we systematically identify and assess the most recent and robust empirical evidence on the underlying mechanisms of the intergenerational transmission of both positive and negative outcomes for children's well-being. Based on these findings, we provide recommendations and identify key evidence gaps within the literature.

In addition to providing UNICEF with a wealth of evidence on this subject, the methodological design and results of this study will primarily provide a good basis for further research to investigate more specific questions within this broad topic. More importantly, given that sustainable development is at the top of the United Nations’ (UN) post-2015 agenda, this study will help UNICEF to shape its contribution to the global debate on intergenerational equity, and strengthen its knowledge base for policy and programmatic discussions on sustainable development and children's well-being.

The rest of the report is organized as follows. Chapter 2 introduces the conceptual framework of the intergenerational transmission process, examining its theoretical basis and research background. Chapter 3 discusses the methodology and research design, highlighting the steps taken to reach the most robust evidence on the key research question. Chapter 4 examines our analytical framework, and key methodological challenges to assessing intergenerational issues, followed by a brief overview and discussion of the structure of the findings of the included studies. Chapter 5 documents these findings, assessing the effects of household and extra-household factors on three children outcomes – health, education, and income – specifically emphasizing the key mechanisms that drive the observed transmissions. Chapter 6 and 7 discuss these findings, highlight evidence gaps, and make some policy recommendations. Chapter 8 closes by evaluating the key strengths and limitations of this study.
Chapter 1. Intergenerational Equity

The Study of the Transmission of Poverty and Well-being Across Generations

Objectives of this section

This section introduces intergenerational research by discussing the difficulty researchers face in assessing causality and identifying specific mechanisms. In particular, this section looks at:

1. The difficulty in attributing causality due to the high level of correlation between parental background characteristics and the external environment around them.

2. The attempt to move beyond correlations, despite these challenges, to identify the causal effect of specific parental and extra-household factors in determining children outcomes.

3. The critical role of mechanisms in driving the relationship between parental factors and children outcomes. Despite the scarce evidence on mechanisms, this paper attempts to identify the recommended and evidence-supported mechanisms.

1.1 Intergenerational Equity: The Intergenerational Transmission of Poverty and Well-being

Parents transmit different outcomes to their children. These include financial and economic resources (such as material assets or inheritance), investments in the form of education and health (human capital), habits, cultural practices, and social norms (social capital) (D’Addio, 2007). These transfers are affected by the characteristics of the household – its education, income group or social class – and the external environment. The combination of these transfers will largely determine the outcomes that we observe (i.e. educational attainment and achievement, or specific health outcomes).

The specific transfers that children receive can be conceptualized as acting at three main levels (see Figure 1). At the individual level, children are endowed with genes that may predispose them to better health or cognitive abilities, but there are also non-genetic endowments including aspirations and human capital acquired through good nurturing. Parents also affect the outcomes of children at the household level by spending time with their children and investing in their education and health. Finally, the social, cultural and economic environment in which parents and children live affects the individual and household transfers. The combination of the effects of these transfers will determine the opportunities that children will face throughout their lifetime.

These factors are not independent of each other. Instead they interact with each other in a diverse and complex way. Parental investments are not only determined by observed characteristics like education and income levels, but also depend on the aspirations and cultural responses of the parents. In a critical way, this study seeks to move beyond the effects of genes to understand the role that different parental and extra-household factors have in determining the outcomes observed and the underlying mechanisms. This is because only such factors are largely policy amenable. When intergenerational persistence is due to genetic differences in ability, there is little room for policy; however, if it is due to behaviors and other non-genetic effects, then there can be a deliberate role for public policies to equalise opportunities and break the transmission cycle. Understanding the key determinants of children outcomes, their relative
importance and the interactions between these levels is thus critical for achieving an effective policy response.

The present report contributes to the literature of intergenerational research by doing the following:

1. Uncovering the determinants of children’s outcomes – the set of parental background characteristics that determine children's outcomes – and assessing their relative effects.

2. Identifying the possible and evidence-based mechanisms driving the transmission of advantage across generations.

1.2 Uncovering the Determinants of Children Outcomes: Can we attribute Causality?

The resources that children receive are largely determined by the characteristics of their parents and the extra-household environment in which they live. Children of wealthier, more educated parents tend to go on to have children with higher levels of education, better health and, in the long-run, higher incomes. There could be several explanations of these correlations. It could be that poor parents are unable to adequately invest in inputs that will enhance the earning prospects of their children due to low resources. It could also be that parents with lower education levels place less value on the education of their children, and are more likely to withdraw their children from school. The policy implications of these different sources of unequal outcomes are quite different and must be considered when designing a policy response.

Recently, intergenerational research has moved beyond simple correlations to better understand the determinants of children’s outcomes and uncover the underlying transmission mechanisms. However, there still remain many challenges to fully understanding the transmission process. Since parents’ unobserved abilities, education, and income levels are likely to be highly correlated, attempting to isolate the effect of each characteristic could result in biased and inconsistent estimates. This is referred to as endogeneity, and its possible sources are discussed further in Box 1.

Researchers have attempted to isolate the causal effect of individual factors and to overcome endogeneity problems using a set of techniques. Randomized experiments (e.g. randomized control trials (RCTs)) are considered the ‘gold standard’, since they allow researchers to study the effect of changing one factor in a randomized manner (for instance, by assigning a policy program such as a boost in income due to a cash transfer). If experiments are well designed and implemented, it is possible to assume that both the treated and control groups are identical on any observable and unobservable characteristics. However, due to practical and ethical considerations, experiments may not be feasible. In the absence of experimental data, researchers apply different empirical techniques (discussed in the methodology section) to quasi-experimental and observational data to estimate intergenerational relationships.

Additionally, most studies that use one of the aforementioned techniques to assess causality may find evidence that is suggestive of a causal relationship between a parent’s characteristics and children outcomes. However, these findings may not necessarily be ‘causal’. The reliability of the findings critically depends on the validity of the identification strategy (including meeting the identification assumptions) and the robustness of the results. Yet, some uncertainty remains about the ability to extrapolate the results to other contexts or settings. Our study therefore only includes papers that try to assess causality using experiments or one of these techniques, and we report the most ‘robust’ mechanisms found in these studies.

Box 1. Sources of Endogeneity

Endogeneity arises from three major issues: omitted variables, reverse causality and measurement errors (see Glossary of Terms). Each of these issues could result in a likely correlation of unobserved parental characteristics – such as ability – with children outcomes, resulting in biased estimates. This makes it difficult to disentangle the effect of a parental characteristic on children outcomes.

In the intergenerational transmission of well-being a ‘causal’ relationship implies that the relationship between parents’ and children’s outcomes is purely due to non-genetic (behavioral) effects. On the other hand, a relationship that is not causal suggests that the observed correlations are due to selection (genetic effects) or other unobservable characteristics that are difficult to identify.

For example, when attempting to estimate the causal effect of parental education on a child’s education or health, endogeneity could arise from unobserved (inherited) ability, which is correlated with both the parent’s education and the child’s education. A blind estimation would result in an estimate that could be picking up such unobservable ability, rather than the unique effect of the parent’s education. The inability to control for all confounding factors makes it difficult for researchers to establish a causal link.

(Adapted from Stock and Watson, 2011)

Additionally, most studies on intergenerational relations use data from developed countries, where higher quality data is available (Black and Devereux, 2010; Jenkins and Siedler, 2007). Thus, evidence in this study will primarily reflect findings from these countries. We will, however, present findings from developing countries, while making comparisons where applicable with findings from developed countries.
1.3 Identifying the Evidence-Based Mechanisms

Identifying causal mechanisms (see Box 2 for a description of a mechanism) may prove even more difficult, because in any intergenerational relationship several mechanisms work in tandem. Therefore, isolating the effect of any one mechanism is very challenging, except in very special cases. Even experimental designs only identify whether the factors cause changes in children outcomes (the average causal effect in the population studied), not how and why the factors affect the children outcomes. Therefore, identifying causal mechanisms that apply to the entire population is almost impossible (Imai et al., 2009). This is one of the major challenges in research on intergenerational transmission mechanisms.

Furthermore, identifying the mechanisms requires data on expenditure patterns and parenting quality, which are often scarce. The aforementioned limitations have hindered advancement of the understanding of intergenerational transmission mechanisms. Nonetheless, researchers are increasingly using new datasets on expenditure patterns and parenting time to increase our understanding on this topic. Due to all the aforementioned problems with interpreting results as causal, as well as the challenges to identifying mechanisms, the rest of this study will refer to ‘causal’ mechanisms as ‘robust’ and ‘evidence-supported’ mechanisms.

Box 2. What constitutes a Mechanism?

Attempting to disentangle the underlying intergenerational transmission mechanisms requires two things, as illustrated below. First, establishing a (correlation or causal) relationship or effect between the factors and child outcomes (bottom dashed line, Figure 2). Second, determining the pathways or channels that lie in the causal path between these factors and child outcomes (mechanisms). The primary goal of this study is to identify causal mechanisms, and not merely causal effects (or correlations).

Representation of Mechanism(s):
Chapter 2. Intergenerational Equity: A Systematic Review

An Objective Way of Looking at the Literature

Objectives of this section

This Chapter looks at the methodology used for gathering the evidence: a systematic review.

1. This section starts with a review of the arguments underpinning the use of a systematic review: by using a transparent process it avoids possible biases and allows one to identify the evidence gaps.

2. It discusses the inclusion and exclusion criteria used in this report and the arguments that sustain them.

3. Finally, by using a systematic review, there is a trade-off between the benefits of a systematic review and the evidence included. The last part discusses the limitations stemming from the use of this methodology.

2.1 Systematic Review: What is the Rationale?

A systematic review is a methodology that allows for the collation, quality assessment and synthesis of the most relevant evidence needed to address a specific research question (DFID, 2011). Systematic reviews are increasingly being used in the field of development. As DFID (2011) clearly states:

‘Policy makers and practitioners do not have the time to assess the evidence base for each policy or practice questions, so they rely on single studies, well placed experts or traditional and unsystematic scoping studies or literature reviews. But individual studies, no matter how rigorous or scientific, are not a sufficient evidence base from which to make informed policy and practice decisions.’

Therefore, there is a need to provide a systematic assessment of development evidence to facilitate evidence-informed policy-making. Systematic reviews are transparent, replicable, and thorough. They help to reduce bias by systematically searching through the evidence base, and deriving pertinent evidence. Most importantly, they allow researchers to rigorously assess the most robust findings in the evidence base, which thus enables policy-makers to make more evidence-informed decisions.

This study uses a systematic review approach to identify and assess the evidence on intergenerational transmission mechanisms. We focus only on quantitative studies that attempt to directly or indirectly measure intergenerational transmission of poverty across several dimensions. However, due to trade-offs explained at the end of this chapter, our study may not fully capture the most relevant evidence on this topic.

2.2. Research Design: Broadening the Scope and Focusing on the Quantitative Evidence

This research focuses only on quantitative studies that attempt to directly or indirectly measure the intergenerational transmission of poverty across several dimensions of well-being. The research question is one of the key aspects of a systematic review, as it shapes the search strategy and the studies obtained. Our underlying research task is to systematically identify and assess the evidence on the mechanisms of intergenerational transmission of both positive and negative outcomes for children’s well-being.

1 Available at: http://www.dfid.gov.uk/ Accessed on February 10, 2013.
To do this, we address the following research question:

**What are the most robust mechanisms underlying the intergenerational transmission of both positive and negative outcomes for a child's well-being?**

This is the first step in the filtering process (discussed in the next section). To identify studies relevant to our research question, we first defined relevant studies based on a set of inclusion and exclusion criteria, then designed a search strategy, and finally applied a filtering process to arrive at our final set of studies.

This section reviews the selection process used to identify relevant studies, including:

1. Setting an Inclusion and Exclusion Criteria
2. A search strategy
3. Setting the search string

### 2.2.1 Defining Relevant Studies: Inclusion and Exclusion Criteria

As the basis of our search strategy, outlined in the next section, we broadly defined relevant studies based on an initial set of inclusion and exclusion criteria. Only studies that met these criteria were included.

We included studies based on the following inclusion criteria:

1. **Relevance to the question:** studies must directly address intergenerational transmission, and empirically assess parent-children outcomes and the underlying transmission mechanism(s).
2. **Accessibility:** the full text of the studies must be fully retrievable.
3. **Language:** studies must be published in English.
4. **Publication date:** studies must be published in 2000 or later.
5. **Population and Geographical coverage:** studies must have global coverage, including both developing and developed countries.
6. **Child Outcome:** studies must address positive and negative dimensions of well-being.
7. **Empirical studies:** studies must use research designs and identification strategies that attempt to estimate causality.

We excluded studies that do the following:

1. Explore broad development or poverty-related issues, rather than specifically addressing intergenerational relations.
2. Do not identify mechanisms (whether correlations or causal links).

### 2.2.2 Searching for Publications: Where to search?

The literature search for this review was three-pronged. First, we identified 20 databases and journals based on their relevance to the broad dimensions within our research question (see Appendix B for the complete database list). We focused on three major publication types: published studies, working papers and theses. Second, we spoke to academics and experts about this topic for recommendations on our search strategy. Finally, we conducted a manual search to supplement studies in those thematic areas where we found no empirical studies using our search terms.

### 2.2.3 Searching for Publications: Defining the Search String
We defined and tested several strings to capture the breadth of our question in order to assess the reliability of different possible search strategies, using a different combination of terms. These include terms that transmit the intergenerational process and possible well-being dimensions. The research team assessed alternative search strategies using different criteria: number of hits, coverage (of well-being dimensions), relevant targets (papers), and potential bias induced by the terms. The assessment of these criteria and the alternative approaches are shown in Appendix B. We then applied the most efficient string to the 'Title', 'Abstract', 'Keywords' and 'Full Text' of the studies. The search strings used are:

**Full String:** (intergenerational OR mobility) AND (children) AND (parental OR maternal) AND (wellbeing OR poverty) AND (transmission) AND (robust OR robustness) AND (randomized OR panel OR "difference-in-difference" OR "instrumental variable" OR "matching")

**Reduced String:** (intergenerational OR mobility OR "across generations") AND (children) AND (parental OR maternal) AND (wellbeing OR poverty)

The search strings generated an initial bibliography of 5,466 studies (3,977 studies after removing duplicates). To ensure transparency, we allocated two team members to review and discuss each stage of the filtering process.

### 2.3 Filtering Process: Identifying High QUality Studies

There were three additional steps to the filtering process: screening, eligibility, and quality appraisal. First, we identified 5,466 studies using the search strings, and then removed duplicates. Next, we systematically screened the titles and abstracts of each of the remaining 3,977 studies to extract only studies directly related to the transmission of well-being (see Appendix C). We then chose studies that were quantitative or used empirical techniques. Of these eligible quantitative studies that remained, we reviewed the full text in detail to evaluate the estimation approaches and study design. We only included quantitative studies if they used estimation approaches and identification strategies that try to overcome the 'fundamental problem of causality' and attempt to measure causality. These techniques include: randomized experiments (RCTs), quasi-randomized experiments (Q-RCTs), difference in differences (DID), regression discontinuity designs (RDD), instrumental variables (IV), propensity score-matching (PSM), and fixed effects (FE) (see Appendix D for an explanation of these study designs and techniques). Lastly, we assessed the quality of the remaining 113 relevant empirical studies and identified 79 high-quality studies. The next section provides details about the quality appraisal.

In the final stage of the filtering process, we assessed the methodological quality of the studies to ensure that the included studies met a minimum quality threshold. We designed a set of questions to evaluate the internal validity of the studies, including the study design and underlying assumptions of the econometric techniques (appendix E and F). For instance, we considered the following:

I) Does the study address threats to its internal validity, including potential omitted variables, reverse causality, or measurement errors in the independent variable?

II) Does an RCT study provide a baseline test to ensure the comparability of both treatment and control groups?

III) Do the relevance and exogeneity assumptions hold for the instruments in an IV study?

(See Appendix E for the full list of questions used as the quality appraisal checklist)

Of the 113 studies assessed, 79 were of high quality. Of these 113 studies, 52% were from developing countries and 48% from developed countries.

### 2.4 Limitations of the Methodology Used: Systematic Review and Included Studies

Despite the strengths of systematic reviews, this methodology has some limitations. Given the breadth of the research question, and also the specificity of assessing 'robust' mechanisms, we reduced the scope of the project, focusing only on quantitative evidence.
Inevitably, there are two main trade-offs. Firstly, a broad research question implies a trade-off between the depth and breadth of the analysis. The multidimensional nature of well-being requires reviewing different types of studies across different disciplines, at the expense of the comparability of the studies. Secondly, limiting the scope of the question to include only quantitative findings allows for more robust conclusions. Yet this comes at the expense of leaving out evidence on some areas of intergenerational transmission that are more difficult to study with quantitative techniques. One clear example is resilience, a topic that is covered extensively in many qualitative studies, but does not appear in this study. However, we attempt to mitigate these trade-offs by using a broadly inclusive search strategy to identify studies in the evidence base.
Chapter 3. Intergenerational Transmission: How to Interpret the Results?

Objectives of this section

This section introduces the results. It discusses the articles included in each section and the organization of the results.

1. The results are organized into three main categories according to three main categories of children outcomes: health, education and income. Under each child outcome category we assess the effects of all factors that could transmit negative or positive outcomes for the child well-being dimension and the mechanisms driving these relationships.

2. In order to analyze the intergenerational transmission process, a framework is presented.

Studies on intergenerational transmission assess the effect of various factors on the outcomes of children. That is, the direction of the effect is from parents to children. However, because our main interest in this study is children outcomes – specifically, what determines the outcomes of children – we organize our findings based on child well-being dimensions (outcomes). The included studies fall into the three major categories of child well-being dimensions: health, education, and income. Under each child outcome category, we assess the effects of all factors that could transmit negative or positive outcomes for the child well-being dimension. (A detailed structure of the findings is discussed in the next section.) The next section presents our analytical framework, based on the findings.

3.1 Tracking the Intergenerational Determinants of Children Outcomes

Figure 3 illustrates the complexity of the analysis of intergenerational transmission of well-being. This main framework used to identify the mechanisms is constructed based on the evidence presented in the included studies. The upper part of this diagram shows factors or characteristics of the first generation (factors), ordered by level (household, community, and national level). The lower part shows the major children outcomes grouped into the three main well-being dimensions studied (education, health, and income).

In order to identify the transmission mechanisms of poverty and well-being, we determine the relationship between the different factors and the specific children outcomes. We track these relationships and assess their robustness based on the literature included in the review: the arrows represent the identified (causal) links. We then identify and assess the evidence relevant to the proposed mechanisms underlying those relationships/effects linked with arrows. Some of the studies suggest mechanisms, but are unable to test them due to lack of data.

Based on the empirical research, the diagram clearly shows the inter-linkages among the different dimensions of well-being, suggesting that any action in one area is likely to affect the others. The evidence provides important information about the mechanisms of IGT. The solid dark blue arrows illustrate the robust causal relations, while the dashed ones represent a relationship where there is no evidence of a causal relationship. The light blue arrows show only correlations between factors. This diagram might appear ‘messy’, however, we will disentangle the mechanisms more clearly in the rest of the report.

As noted earlier, this study focuses on the analysis of the causal mechanisms of IGT relying mainly on family characteristics. We only analyze the role of extra-household factors to the extent that they affect children outcomes through the household level. This study also goes beyond parent to children transmission to analyze the factors that determine potential future outcomes over the life course of the children.
3.2 Description of Included Studies

The included studies fall into three broad categories of child well-being dimensions: health, education, and income:

- Income studies mainly find correlations between household factors and child future income indicators. Most of the mechanisms are suggested.
- Health studies find (evidence suggesting) a causal relationship between some household factors and child health indicators. Mechanisms are mostly suggested, although a few are evidence-supported.
- Education studies find a causal relationship between household factors and child education indicators. Most of the mechanisms are empirically tested, and several mechanisms are suggested.

Studies on the intergenerational transmission of well-being use observational and experimental data for their estimations. Observational data includes cross-sectional or longitudinal data. Robust evidence on intergenerational transmission (and mechanisms) requires the use of longitudinal data. Longitudinal data includes data on cohorts (which tracks similar individuals over their life-course) or panel data (which tracks the same individuals over time and links parents to their children). Together, cohort and panel studies provide a comprehensive view of intergenerational transmission and the long-term consequences of such transmission (see Box 2 for more detail on the estimation approaches commonly used).

3.3 Unpacking the Findings

Our key question again is: What are the intergenerational transmission mechanisms of positive and negative children outcomes? Since the main interest of this study is children outcomes, we unpack the process of intergenerational transmission in three stages. First, we identify the child outcome for each dimension of well-being. Second, we identify the parental factors associated with that particular child outcome. Third, we identify the mechanism, channel, or pathway that drives such a relationship. The children outcomes we identified in the studies are: health, education, and income. To identify transmission mechanisms underlying these children outcomes we first determine the parental factors that drive these children outcomes, and establish a relationship between the factor(s) and outcome.
For instance, what are the transmission mechanisms of positive and negative child health outcomes? The parental characteristics/variables associated with child health include: parental health, parental education, and parental income. We then establish a relationship between each of these parental characteristics and child health: what is the ‘causal’ effect of parental health on child health? What is the ‘causal’ effect of parental education on child health? What is the ‘causal’ effect of parental income on child health? Lastly, we identify the (most ‘robust’) potential mechanisms underlying these ‘causal’ relationships. Essentially, we trace backwards, going from the child outcome to the parental variables associated with that outcome.

At the household level, we report results on how specific parenting variables affect the transmission of children outcomes. We carry out an analogous analysis for extra-household-level effects. In this case, we assess the effect of neighborhood, and economic and environmental shocks on the (future) income of children.

**Box 2. Estimation Approaches and Methodological Resolutions**

Empirical studies currently rely on three estimation approaches to overcome the endogeneity issues arising mainly from unobserved ability in estimating the causal intergenerational relations and potential channels of transmission.

- **Siblings, adoptees or twin comparisons** are useful to control for unobserved genetic characteristics by matching relatives with similar genes that may or may not share the same environment. However, researchers have found that this method is highly sensitive to coding of the data and to measurement errors (Black et al., 2004; Holmlund et al., 2008).

- **Instrumental variable (IV) and natural experiments.** Researchers exploit exogenous variations in parental characteristics that affect children outcomes. For example, Lundborg et al. (2012) used the Swedish compulsory schooling reform of 1969 as a source of exogenous variation in parental schooling. They argue that the reform should only affect children outcomes through its effect on years of parental schooling. In this sense, the reform is a good instrument to estimate the causal effect of parents' education on their children's education or health. Instruments must satisfy both the exclusion restriction and exogeneity identification assumptions.

- **Fixed-effects.** This approach controls for a wide range of omitted characteristics of individuals that might affect children outcomes. These characteristics must not vary either over time or over individual/location. For instance, researchers control for child, sibling, mother, grandparent or location fixed effects.

For instance, what are the transmission mechanisms of positive and negative child health outcomes? The parental characteristics/variables associated with child health include: parental health, parental education, and parental income. We then establish a relationship between each of these parental characteristics and child health: what is the ‘causal’ effect of parental health on child health? What is the ‘causal’ effect of parental education on child health? What is the ‘causal’ effect of parental income on child health? Lastly, we identify the (most ‘robust’) potential mechanisms underlying these ‘causal’ relationships. Essentially, we trace backwards, going from the child outcome to the parental variables associated with that outcome.

At the household level, we report results on how specific parenting variables affect the transmission of children outcomes. We carry out an analogous analysis for extra-household-level effects. In this case, we assess the effect of neighborhood, and economic and environmental shocks on the (future) income of children.
Chapter 4. The Intergenerational Transmission of Health

The Effects of Parental and Extra-household Factors on the Health Outcomes of Children

Objectives of this section

This section reviews the intergenerational transmission of health. It considers differences in the following child health outcomes: birth weight, anthropometric measures, risky behaviors and mortality. The section covers the following:

1. A review of the debate over the role of genes and socio-economic factors in explaining the transmission of health.
2. Assessment of the causal role of various parental and extra-household factors in explaining the differences in the health attained by children.
3. Discussion of the possible mechanisms driving these relationships, including income, parental quality and maternal health knowledge.

4.1 The Intergenerational Transmission of Health Outcomes

Existing empirical research on intergenerational transmission has focused primarily on measuring and explaining the degree of intergenerational mobility in income and education. However, as suggested by Thompson (2012) and Coneus and Spiess (2008), relatively little is known about the intergenerational transmission of health. Recently, rigorous research on health transmission has emerged because health has been recognized as a critical socio-economic aspect in its own right. Also, health is a central factor in more heavily studied outcomes like income and education. A large part of the literature concerned with the intergenerational effects of health has focused on exploring the links between genes and health, while much less attention is paid to the sociological and environmental factors that cause the patterns observed (Ahlburg, 1998, cited in Coneus and Spiess, 2008). On the basis of their literature review on this topic, Coneus and Spiess (2008) argue that the main difficulty arises from the fact that health is a multidimensional concept that encompasses physical and mental/psychological matters. Moreover, health is a time-variant measure and demands data that allows for a direct linkage of parents to their children.

There are very obvious intergenerational linkages in the area of health. Parents transmit genetic resources and provide direct and indirect investments that will determine the health of their children. Direct investments include different nutritional inputs, health care and better health practices, while indirect investments include better parental quality and time (Coneus and Spiess, 2008). The investment and health outcomes that we observe are also the result of other external factors, including labor supply and income shocks. Understanding these intergenerational links is crucial to answering important empirical questions regarding inequalities of health.

No one knows for sure the degree to which people are genetically similar. Despite the importance of identifying evidence-based mechanisms, researchers who explore the intergenerational transmission of health have acknowledged that it is not easy to identify and disentangle them (Coneus and Spiess, 2008; Conley and Bennett, 2000; Lazareva, 2012; Akee et al., 2008, 2010; Copeland and Costello, 2001; Bustelo et al., 2012; Behrman and Hoddinott, 2005; Bhalotra and Rawlings, 2011, Lundborg et al., 2012; Barham, 2011). The estimates provided by the literature may raise as many questions as the studies try to answer. In this sense, empirical research has been suggesting potential pathways of parent–children relationships.

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Consistent with recent literature on intergenerational health transmission, we focus on the following children outcomes: in utero nutrition (birthweight), child mortality, measures of health and nutrition (height or weight) and 'risky behavior' (e.g. smoking or drinking); and we assess the intergenerational linkages found.

In this section, we present and assess the most up-to-date findings on the intergenerational transmission of health, and specifically, which parental and extra-household factors determine child health outcomes. Within each of these factors, we present findings on mechanisms. We conclude the health section by re-capping the main mechanisms driving the relationships and the key take-away points.

### 4.2 The Effect of Household, Community, and State Factors on Children’s Health Outcomes

#### 4.2.1 The Effects of Parent’s Health on Children’s Health

Parental health has pervasive effects on a child’s health even before the child is born. A common measure used as a proxy for in utero nutrition is birthweight. Disentangling the effects of parental health and income is not always possible, since infants from poor families are more likely to be poor (Black et al., 2005: 4). Low birthweight (LBW) has been linked with a series of long-term health conditions, such as hypertension, diabetes and cancer (Bhalotra and Rawlings, 2011: 297), and is associated with a lower future socio-economic status (Currie and Moretti, 2007).

Empirical research on the intergenerational transmission of LBW has attempted to estimate the relative importance of genetics and social effects (see Box 3). Conley and Bennett (2000) use panel data (PSID) from the US and apply grandmother fixed effects to control for unobservable family factors to estimate the heritability of child birthweight. They find that a child born to a mother who was born with LBW is 6.6 times as likely to be of LBW compared to a relative whose mother was not born with LBW. Strikingly, the findings are higher for fathers. Children from LBW fathers are 9.8 times more likely to be born with LBW. The authors find racial differences for fathers only and concluded that socio-economic factors do not affect the estimated relations. As a result, they conclude that transmission of health across generations is mainly driven by the health status of the previous generation and not by the social standing of the family.

In contrast, Currie and Moretti (2007) conclude that socio-economic factors are correlated with LBW. The authors use grandmother fixed effects, taking advantage of a very large US sample. They focus exclusively on the effect of maternal LBW and find stronger negative effects for poorer mothers. They conclude that “women whose mothers were low birth weight are 50% more likely to be low birth weight themselves” (2007: 259). Also, LBW mothers have lower levels of schooling and live in areas with higher poverty rates. They acknowledge the presence of measurement error, which might attenuate the estimation coefficient towards zero (attenuation bias).

Both studies on the intergenerational transmission of LBW present conflicting results. On the basis of these findings, it is possible to conclude that both selection and causation seem to be at work.

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**Box 3. The Nature-Nurture Debate**

Does a family history of disadvantage imply a family with unfortunate genes, or does it just imply a family living in a disadvantaged environment? This nature-nurture debate on the extent to which children outcomes reflect genetics, transmitted behavior, other external factors, or the combination of all of them, is a longstanding issue. In particular, researchers have tried to disentangle the relative importance of nature and nurture in the intergenerational transmission of well-being. The ‘nature’ argument is that an individual’s preferences, behavior, and outcomes are the result of genetic endowments (e.g. innate health, abilities, and other inherited characteristics). Conversely, the ‘nurture’ argument is that non-genetic and environmental factors explain children outcomes. However, recent research on the intergenerational transmission of well-being has moved beyond this traditional debate and towards identifying the underlying mechanisms of parent-child relationships. More importantly, ascertaining whether the mechanisms are ‘causal’ is relevant from a policy standpoint.
Mechanisms Having an Effect Through Parent’s Health

Several potential mechanisms could be at work here. Conley and Bennett (2000) suggest that assortative mating might be one of the major mechanisms driving the effect of parental LBW on children’s LBW. ‘Assortative mating occurs when individuals form partnerships with the individuals who share similar characteristics’ (D’Addio, 2007: 29). If LBW males tend to marry LBW females then a paternal association may merely be reflecting the maternal effects.

Another mechanism could be parental behavior. Paternal (un)healthy behaviors might affect a fetus directly (e.g. smoking). Also, paternal exposure to hazardous material prior to conception might affect a child’s birth weight.

Although Currie and Moretti (2007: 237) do not discuss in detail the potential transmission mechanisms of LBW, they argue that factors such as maternal poverty, smoking, stress, and poor nutrition might be leading to lower birth weight. Also, they argue that there are mechanisms that might not be purely genetic or a result of behavioral decisions of the parents. Those mechanisms are biological pathways, which affect ‘fetal programming’ (Currie and Moretti, 2007). ‘Programming’ describes the process whereby a stimulus or insult during a critical period of development (in utero) has lasting or lifelong effects.

LBW has long-term consequences. On the basis of their cohort study on the effect of birthweight on adult outcomes, Black et al. (2005) estimate the heterogeneous effects of birthweight on educational attainment and earnings for boys and girls. Their results suggest that among men, birthweight has no statistically significant effect on educational outcomes but a significant effect on earnings. However, birthweight has a statistically significant effect on educational outcomes among women.

Although Black et al. (2005) do not explicitly discuss the mechanism(s) that might be underlying the relationship between LBW and long-term health outcomes, the suggested pathway driving the relationship is LBW itself.

Other aspects of parents’ health, such as nutrition, have an effect on child health outcomes such as infant mortality and nutritional status. For example, Bhalotra and Rawlings (2011) conducted a cross-country comparison in 38 developing countries and find that there is a large positive and significant relationship between maternal and child health (measured using anthropometric measures – height and weight). Although the authors report that these results are robust even after controlling for ethnicity or sub-region fixed effects, one may wish to take caution in interpreting these cross-country-study results as causal, since they may be reflecting the effects of unobserved factors (e.g. cultural norms and specific contexts). Coneus and Spiess (2008) study the intergenerational transmission of health in Germany using child fixed effects. They find a positive and statistically significant effect of paternal health on a child’s health (using body mass index as a proxy). The coefficient of maternal health is not significant, but the authors find that mothers’ obesity is correlated with the obesity of their children.

Bhalotra and Rawlings (2011) suggest that genetic and non-genetic endowments are potential mechanisms of child health outcomes, but find little evidence in support of them. Non-genetic mechanisms might include a mother’s early-life health and assortative mating. A mother’s size is also important, as girls who are born small and do not reach their potential genetic growth might have reduced uterine and ovarian sizes, which might affect their own child’s birthweight. Finally, fetal programming might be an alternative mechanism.

Coneus and Spiess’s (2008) study does not include further explanation about the potential mechanisms driving the IGT of health. However, they suggest parental investments in child health as a driver, which depends on labor-supply decisions and household budget constraints, affecting the ability to provide medical care, nutritious food and parenting time with children.

4.2.2 The Effect of Parent’s Education on Children’s Health

Parents’ education has an empirically supported effect on child health outcomes. In theory, a mother’s education can have opposing effects on a child’s health (Burchi, 2010). More educated mothers are more likely to be employed and have higher wages. In turn, increased incomes would result in better nutrition and access to health care. Conversely,
more education may lead to more time-consuming jobs that would reduce childcare. As Burchi (2010) argues, innate ability (through assortative mating) is a potential confounding factor driving this relationship.

Studying the causal effect of parental education on child health is challenging. As Burchi (2010) explains, a mother's education might have an effect on child health outcomes in opposite directions. More-educated mothers are likely to earn higher wages. Increased household income might result in better health care access and feeding for the children. Conversely, better-educated mothers might have more time-demanding jobs that would affect their children's outcomes through a reduction in childcare time. Also, confounding effects and innate ability (e.g. assortative mating) might be driving the parent–children correlations (Burchi, 2010).

**Mechanisms Having an Effect Through Parent’s Education**

Overall there seems to be a consensus that supports the impact of a mother’s education on child health outcomes relative to the father’s. Lundborg et al. (2012) is a good example of an attempt to estimate the effect of parental education on children outcomes (cognitive and non-cognitive skills, stature, obesity and hypertension) at the age of 18. Their results suggest that there is a statistically significant and positive association in the case of maternal education and less evidence in the case of the father’s. The potential mechanisms that might be driving their results are parental income, assortative mating and potential lower fertility.

The findings presented above are average estimates for all education levels. However, evidence suggests that the effects of maternal education on child health outcomes can differ across the different levels of education (especially in developing countries). Burchi (2010) examines the effects of maternal education on nutrition, and finds a positive and direct effect of maternal schooling and nutrition knowledge on the height of children under 5. The effects are larger for lower maternal education levels, but diminish as the education of the mother increases, suggesting diminishing returns. Blunch (2012) also finds similar results when studying the effect of adult literacy programs on early child mortality in Ghana. The author attributes the effects to increased health knowledge (‘knowledge-in-time’) but the evidence on this mechanism will be discussed later. Despite the difficulty in identifying the causal effect of specific household characteristics, the evidence suggests that education is a powerful pathway driving this relationship.

### 4.2.3 The Effect of Parental Income on Children’s Health

The health gradient by socioeconomic status widens throughout the life-course, reinforcing inequalities in other dimensions. Children born to poor parents are more likely to have health problems as adults and experience lower economic returns as a result (Haas, 2006). However, isolating the effects of individual factors remains challenging, given unobserved characteristics and the inter-linkages between health resources over the life-course (Carvalho, 2012). And evidence presents conflicting results. For example, while numerous studies have presented robust evidence on the impact of the socio-economic status of parents on child birthweight (Carvalho, 2012; Currie and Moretti, 2007; Johnson and Schoeni, 2011), others have found no statistical effect (Conley and Bennett, 2000).

Numerous researchers have attempted to study the effect of income by using an exogenous change in household incomes (mainly through conditional cash transfer programs) and demonstrating the positive and statistically significant effects of additional income on child health. Amarante et al. (2011) analyze the effect of cash transfers in Uruguay. They find that supplemental income increases reduced the incidence of LBW. Behrman and Hoddinott (2005) and Barham (2011) analyze the impact of conditional cash transfers (CCTs) on child nutrition and neonatal and infant mortality, respectively, using experimental data from Mexico. Behrman and Hoddinott (2005) find that CCTs improve the height of children aged 12–36 months by about one cm on average, after controlling for child fixed effects. Using municipal fixed effects, Barham (2011) finds that mortality rates in the treatment group fall by 8%, but find no statistical effect on neonatal mortality rates. Even though the authors acknowledge that the results may have been driven mainly by the conditionality of the cash transfer, there seems to be a relationship between family income and child health (e.g. maternal health knowledge, public services and level of sanitation).

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1 Neonatal mortality: number of children who die before the age of 30 days, per 1,000 live births in the same year. Infant mortality: die before the age of 1, per 1,000 live births in the same year.
Income also impacts other dimensions of health and well-being. For example, Akee et al. (2008) find that additional household income results in decreased risky behavior (alcohol consumption and marijuana consumption) in early adulthood. As expected, the effect was larger for poorer households. Despite suggesting that many mechanisms might be driving the results, the authors argue for "parenting time and the quality and stability of that parenting time, [and] anti-drug and alcohol abuse campaigns" as the major drivers (Akee et al., 2008: 4).

Another body of research explores the effect of additional non-cash resources on health outcomes in both developed and developing countries. It studies the exposure of policies that positively affect early-childhood outcomes. In a cohort study of an American population, Hoynes et al. (2012) analyze the effect of the Food Stamp Program after decades of initial exposure. Using a measure of ‘metabolic syndrome,’ their results suggest that the gains are large and increase with exposure in children under 5-years old. Beyond that age the effect is minimal. Also, they find that the positive impact is greater for men than for women. Another clear example is a study by Bobonis et al. (2006) that evaluates the impact of a health intervention delivering iron supplementation and deworming drugs to 2–6-year-old children in India. The program resulted in gains in child nutritional status. Children exposed to the program weighted 0.32 kilos more measured as weight-for-height and weighted 0.31 kilos more measured as weight-for-age. The potential mechanisms that might underlie these effects include maternal stress, physical activity and cognitive development.

Mechanisms Having an Effect Through Parental Income

Most of the studies in this section focus on analyzing the relationship between parental education and child health outcomes. Yet few studies (in the US) explore the direct effect of the suggested mechanisms that underlie those relations. For instance, Aizer et al. (2009) and Bernal and Keane (2011) provide evidence on two of the main mechanisms suggested by the literature on IGT: maternal stress, and parenting-time inputs and childcare, respectively. Aizer et al. (2009) demonstrate the negative effect of prenatal stress on child cognitive development and health status at aged 7. Interestingly, they estimate a very small but negative impact on child birthweight, probably due to sample selection problems that might be biasing the results. It is noteworthy that low socioeconomic status mothers have higher stress levels, indicating that the adverse effect is larger in lower-income households.

4.2.4 The Effect of Environmental Shocks on Children’s Health

Bustelo et al. (2012) study the persistent impact of the 1999 Colombian earthquake on child nutrition and education outcomes. Using cross-sectional data before the earthquake, and at one and six years after, they estimate the short- and medium-term impacts of the natural disaster. The results suggest the earthquake had a strong negative impact on nutrition in children under 5, and on schooling in the short-term, particularly for boys. Boys were slightly more affected by the earthquake than girls. On average, the earthquake reduced the schooling participation of children aged 6–11 by 7%.

Studying the impacts of a drought-led income shock using longitudinal data from rural Zimbabwe, Hoddinott (2006) finds robust evidence of both temporary and permanent effects of shocks on children’s education. While children older than 2 were not affected by the drought, evidence suggests that children aged 1–2 years lost about 15–20 percent of their growth velocity (equivalently, 1.5–2 cm of their annual growth rates) as a result of the drought. The permanent effects are even more striking: four years after the rainfall shock, these children remained shorter than identically aged children who had not experienced the drought. The impact was greatest among children living in poorer households.

4.3 Summary: Intergenerational Mechanisms of Health

Most of the studies on child health outcomes do not discuss in detail the potential mechanisms involved. However, the authors suggest the following pathways in the intergenerational transmission of health:

- Fetal programming. Fetal programming might be partially caused by genetic or parental behavior, having an effect on how the fetus is predisposed to certain types of health problems. Bhalotra and Rawlings (2011) suggest that their intergenerational transmission estimates might be driven by this potential pathway.
Assortative mating. Conley and Bennett (2000) find that the paternal effects on children’s LBW are greater than maternal ones. However, assortative mating may have a confounding effect on the estimated result. If LBW males tend to marry LBW females then a paternal association may merely be reflecting the maternal effects. Bhalotra and Rawlings (2011) also suggest this potential mechanism in their cross-country comparison of the intergenerational transmission of health. Lundborg et al. (2012) further argue that this mechanism might be underlying the relationship between parents’ education and child health outcomes.

Maternal health and nutrition. Bhalotra and Rawlings (2011) suggest genetic and non-genetic endowment as potential mechanisms of child health outcomes, but find little evidence in support of them. A mother’s size could also be an important mechanism here. Burchi (2010) attributes the positive effect of maternal schooling on child nutrition to the effects of increased health knowledge (‘knowledge-in-time’).

Parental behavior. Various authors have drawn the link between parents’ (un)healthy behaviors (e.g., smoking) and childbirth outcomes (Conley and Bennett, 2000; Currie and Moretti, 2007; Coneus and Spiess, 2008).

Household income. Income, household budget constraints and maternal poverty are interrelated mechanisms that have an effect on parents’ decisions to invest in children’s health and to purchase inputs to promote healthy behaviors (e.g., medical care and nutritious food). This, in turn, is related to labor-supply decisions (Coneus and Spiess, 2008; Lundborg et al., 2012).

Parenting time. Burchi (2010) argues that education might have a small effect on children outcomes due to a reduction in parenting time. A potential explanation is that highly educated mothers are likely to have better qualified and more time-demanding jobs, resulting in a reduction in time caring for children.

The only empirically tested mechanism is maternal stress. A study in the US explores the direct effect of this suggested mechanism. For instance, Aizer et al. (2009) demonstrate the negative effect of prenatal stress on cognitive development and health status at the age of 7. Interestingly, they estimate a very small but negative impact on child birthweight, probably due to sample selection problems that might be biasing the results. Other authors that have analyzed US data also suggest this potential mechanism (Hoynes et al., 2012; Akee et al., 2008).
4.4 Child Health Outcomes: Key Take-Away Points

1. Despite the relatively rich empirical research on intergenerational mobility in income and education, little is known about the intergenerational transmission of health.

2. The empirical evidence on the intergenerational transmission of health suggests that health is strongly correlated across generations through genetic and non-genetic factors. For some studies, genetic transmission appears to account for the largest share of the intergenerational relationships, while for others non-genetic factors play a central role.

3. ‘Causal’ relations in the intergenerational transmission of health should be interpreted with caution. Researchers emphasize that it will never be possible to find causal relations because we cannot completely rule out the possibility of omitted variable bias.

4. Although most of the mechanisms of transmission of health outcomes are mere suggestions, we could identify a pattern of the pathways in both developed and developing countries. Even when analyzing different health outcomes, such as birthweight, child mortality, height, weight and ‘risky behavior,’ the frequently suggested mechanisms are: income, parenting quality and maternal health knowledge. Maternal stress is the only mechanism that is strongly supported with evidence.
Chapter 5. The Intergenerational Transmission of Education

The Effects of Parental and Extra-household factors on the Educational Outcomes of Children

Objectives of this section

This section reviews the intergenerational transmission of education. The section considers how different parental and extra-household factors affect the educational achievement and attainment of children, covering the following:

1. Review of the debate over the role of genes and socio-economic factors in explaining the transmission of health.
2. Assessment of the causal effect of various parental and extra-household factors in explaining the differences in the educational attainment of children.
3. Discussion of the possible mechanisms driving these relationships.

5.1 The Intergenerational Transmission of Educational Outcomes

According to the World Bank (2012), 'Education is a powerful driver of development and one of the strongest instruments for reducing poverty and improving health, gender equality, peace, and stability.' This section discusses findings on children's educational outcomes using two measures adopted by the included studies: educational attainment and achievement. Attainment mainly measures years of schooling, but this does not translate into academic assimilation; achievement gauges cognitive skills and development. Today, a primary measure of academic achievement is test scores, although this may not always be the best way to measure aptitude. However, this study uses both educational attainment and academic achievement as measures for a more comprehensive assessment.

5.2 The Effect of Household, Community, and State Factors on Children’s Educational Outcomes

5.2.1 The Effect of Parent’s Education on Children’s Education

Studies have established very high levels of intergenerational correlations in education; well-educated parents tend to bring up well-educated children, with the pattern continuing. However, the ongoing debate is whether these high correlations are primarily due to selection or to causation, and more importantly, what mechanisms drive these effects. The causal argument, devoid of links to genetic transmission of traits, suggests that better-educated parents are likely to earn more and provide a better environment for their children to achieve higher-education outcomes. The selection argument is that these parents genetically transmit traits that pre-dispose their children to become high-achievers. The evidence presented in this section suggests that both selection and causation play some role in the intergenerational transmission of education.

Recent studies have found that parental education has a small but statistically significant causal effect on children’s schooling and educational achievement (Black et al., 2004; Holmlund et al., 2008; Lundborg et al., 2012; Behrman et al., 2009, 2011; De Walque, 2005). The magnitudes of these effects suggest that the high education correlations are largely driven by selection, and not causation. These effects also differ greatly by parental gender. Evidence suggests that a mother’s education is a stronger determinant of her children’s education than the father’s, especially with male children.
For instance, two studies exploit the timing of an increase in compulsory schooling in Norway and Sweden and find that an additional year of maternal education increases a children's educational attainment by the equivalent of about 0.12–0.15 years. When estimating heterogeneous effects, they find that an additional year increases son's education by about 0.17 years. Surprisingly, the effect on daughters is not statistically significant (Black et al., 2004; Holmlund et al., 2008). The effect of fathers' education, on the other hand, remains insignificant in both studies.

However, studies are not conclusive about the role of fathers' education. Exploiting the 1947 British Schooling Leaving Age reform, Galindo-Rueda (2003) finds statistically significant causal effects of an additional year of parental schooling on children's test scores, but only for fathers. These results also hold in developing countries. For instance, an ‘adoption’ study in Rwanda reveals statistically significant positive effects of both fathers' and mothers' education, with parents' education affecting only the child of the same gender (De Walque, 2005). The results are especially robust as the authors attempt to control for non-random placement of adoptees.

Mechanisms Having an Effect Through Parental Education

Studies provide evidence of robust mechanisms underlying these positive intergenerational effects:

- **Income and credit constraints.** Evidence suggests that an additional year of mothers' schooling leads to a 13.9% higher maternal income (but insignificant effects for fathers' schooling) (Lundborg et al., 2012), and in turn, higher family income has a positive and statistically significant effect on children's education (Levy and Duncan, 2000; Akee et al., 2010). In addition, credit constraints (i.e. inability to secure loans and other forms of credit) leads to underinvestment in schooling (Holmlund et al., 2008).

- **Positive assortative mating.** Lundborg et al. (2012) find that in Sweden better-educated women marry better-educated men, resulting in better-educated children: an additional year of reform-induced maternal education to have a positive and statistically significant effect on the spouse's education – a magnitude of about 0.5 years. However, Black et al. (2004) do not find evidence of the educational resemblance of spouses.

- **Parental preferences for education.** An increase in compulsory years of schooling pushes an individual further into the education system, which might change parents' schooling preferences, potentially leading to more investment in parents' education and that of their children (Holmlund et al., 2008; Lundborg et al., 2012). Lundborg et al. (2012) find that mothers' and fathers' amount of compulsory-level and post-compulsory-level schooling increase as a result of the Swedish school reform. To the extent that parental preferences for higher levels of schooling translate into preferences for higher levels of schooling for their children, these large ’spillover effects’ suggest that this mechanism is important, at least within the context studied.

- **Quantity–quality trade-off in child-bearing.** There is little evidence that more-educated mothers are likely to have fewer children, indicating that this may not be a major mechanism (Black et al., 2004; Lundborg et al., 2012).

- **Role-model effects.** Evidence suggests that parents may not serve as a point of reference for the child's decision on level of education (Black et al., 2004).

Also, studies suggest other potential mechanisms:

- **Improved knowledge.** Better-educated mothers can have greater knowledge on parental time inputs, resulting in more efficient use and allocation of these inputs towards children time care.

- **Labor supply.** Higher labor supply might increase economic resources and knowledge, but might also offset positive effects on children's education if more-educated parents spend less time at home (Lundborg et al., 2012), resulting in ambiguous effects.

- **Individual's time preferences.** More future-oriented parents might invest more in their children's education, given that returns from education mostly occur in the future (Lundborg et al., 2012).
In sum, findings strongly suggest a positive and causal relationship between parents’ education and that of their children, although this effect is small. The small effect indicates that while there is a causal link, the high correlations may be driven mainly by selection. The major mechanisms underlying this relationship are income, credit constraints, and parental preferences for education. These mechanisms may be important, but they are likely to be highly complementary. For instance, parents might have a strong preference for education, but if they lack the financial means to invest in their children’s schooling then this mechanism is weak. Strikingly, all except one of the studies find that mothers’ education predicts their sons’ schooling, which goes against conventional findings that mothers’ education matters more for girls’ education.

5.2.2 The Effect of Family Income on Children’s Education

Family income can directly affect children’s education in several ways: richer parents can invest more in the quantity and quality of education, poorer parents may push their children into child labor to supplement family finances; or children from poor families may choose to work while studying in order to finance their consumption (Bratti et al., 2007).

Using a source of exogenous increase in household income, several studies have found large, positive and statistically significant effects of parental income on the educational outcomes of children (Akee et al., 2008, 2010; Plug and Vijverberg, 2002; Levy and Duncan, 2000; Bratti, 2007; Hoynes et al., 2012; Beegle et al., 2008; Chaudhury and Okamura, 2007; Behrman et al., 2007, 2011), albeit small in one case (Morris et al., 2004). These large income effects are consistent across developed and developing countries, and are stronger for children in poorer households. A recent study in the US finds a statistically significant effect of family income on the educational attainment of adopted children, even after controlling for parental IQ and education (Plug and Vijverberg, 2005). Akee et al. (2008, 2010) find that the effect of a large exogenous increase in household income, due to a US government cash program, is almost three times higher for poor households. Female children also tend to benefit more from higher income, having a 21% higher probability of finishing high school on time than males (ibid.). Some studies, however, have found large, negative and statistically significant effects of participation in a government welfare program on children’s early cognitive achievements (Heflin and Acevedo, 2010).

Recent studies shed further light on the large negative and statistically significant effects of child labor on children’s educational outcomes (Beegle et al., 2008; Emerson and Souza, 2007; Gunnarson et al., 2006). For instance, Beegle et al. (2008) find that a one standard deviation increase in child labor hours (5.7 hours) decreases schooling by nearly half a year, and the likelihood of completing primary school by about 8.8 percentage points. These effects are primarily found in boys. Similar results on academic achievement in nine Latin American countries further corroborate this finding (Gunnarson et al., 2006).

Mechanisms Having an Effect Through Family Income

Studies provide evidence of robust mechanisms underlying these positive intergenerational effects:

- Parenting time and parental quality. Authors find robust evidence in support of this mechanism, as noted in the previous section on health outcomes. Akee et al. (2008, 2010) find a large statistically significant improvement in parental behavior and quality (due to increased incomes, parents engage in less destructive behavior and make better choices, and mothers have an improved relationship with their children). Increased household incomes may also translate into lower levels of household stress and disruption, which in turn may improve parental quality.

- Income. Income is the main mechanism through which CCTs have a positive effect on child educational outcomes. Cash transfers reduce the direct costs (in the form of school fees, supplies, and transportation costs) and indirect (opportunity) costs of sending children to school (e.g., forgone earnings, through child labor). Behrman et al. (2007, 2011) find that the Progresa CCT program in Mexico significantly decreases the rate of working for younger boys (aged 9–10 pre-program, 15–16 post-program); a large reduction of almost 30% in the probability of working. Heflin and Acevedo (2010) also find that the income effect is responsible for about 10% of the effect of a welfare program.
Family size and credit constraints. Given the resource constraints of poor households, CCT grants should have a greater impact on children's enrolment in relatively poorer households. However, Chaudhury and Okamura (2012) find that younger children from larger households in the Philippines benefit less from the program compared to those from smaller households. This is likely due to the fact that larger households are usually poorer and face greater financial constraints compared to smaller households. Consequently, larger households usually have to spread resources thinly across school-aged children.

Maternal stress. Specific to welfare programs, Heflin and Acevedo (2010) find that increases in maternal stress are responsible for 7% of the negative effect of welfare program participation on early-childhood cognitive development.

Also, studies suggest other potential mechanisms:

- Childhood (mal)nutrition. This can alter the body’s developmental trajectory and affect a child's cognitive development. As such, the timing of income or welfare programs can be crucial for long-term development, as findings on parental access to food stamps in utero and in early childhood indicate (Hoynes et al., 2012). Parents could purchase better-quality educational inputs with their additional income (from cash transfers or welfare programs).

Several broad conclusions emerge from studies on family income as a determinant of children's education outcomes. Most of the evidence suggests that household income has a positive, reasonably large, and statistically significant effect on children's education. The major mechanisms underlying this relationship are parenting time and parenting quality, income, family size and credit constraints, and maternal stress. Child labor has a substantially negative effect, which is interestingly stronger for boys. Income (and welfare) effects are typically greater in early childhood than later in the lifecycle. Most importantly, income effects are stronger for children in poorer families.

### 5.2.3 The Effect of Parent's Health on Children's Education

Health of parents can affect a child's cognitive and non-cognitive development, and therefore their educational outcomes from as early as in utero. Adverse parental health shocks can also negatively affect children's education. Such shocks can impose financial costs on households, both directly (through access to health care) and indirectly (through loss of income due to reduced labor supply and productivity). Hence, funds might be diverted from education towards healthcare, and 'more pressing' needs (Bratti and Mendola, 2011). They might also cause parents to divert children away from education and towards taking care of the parents or towards the labor market in order to substitute adult work or generate immediate income (ibid). These effects are especially important in developing countries where access to good healthcare and insurance is minimal. Most studies on parental health have found that maternal health is crucially important for a child's educational outcomes and long-term development, especially in the early years of the lifecycle. There are surprisingly few empirical studies on the effects of parental health on child schooling, and these studies only evaluate the effects of maternal education.

Using fixed-effects models, a US and Norwegian study find negative causal effects of maternal health indicators on children's educational outcomes (Black et al., 2007; Aizer et al., 2009). Assessing the effects of maternal stress during pregnancy on children's cognitive development, Aizer et al. (2009) find that in utero exposure to elevated stress negatively affects the cognition of the child. Specifically, a one standard deviation increase in cortisol results in 0.36 fewer years of schooling, or 26% of a standard deviation.

Similarly, using within-twin variation to identify the causal effect of differences in the birthweight of siblings arising from differences in access to nutrition in utero, Black et al. (2007) find that a 10% increase in the birthweight of a child increases the IQ score of a child by 6 percentage points, and the probability of high-school completion by about 1 percentage point. While the same birthweight increases the educational attainment of women by 0.13 years (the effect is statistically significant) it has no such effects for men (Black et al., 2007). A US study also finds substantial negative long-term effects of low birthweight on the likelihood of dropping out of school among children from poorer households (Johnson and Schoeni, 2011).
Mechanisms Having an Effect Through Parent’s Health

Studies suggest potential biological and behavioral mechanisms underlying these intergenerational effects:

- Maternal stress. As discussed in previous sections, maternal stress is a robust mechanism.
- Reduced mother–child Interactions. In line with previous findings, Felfe and Hsin (2012) found evidence in support of reduced maternal time investments, specifically reduced mother–child interactions, as a mechanism.
- Nutrition in utero. Consistent with Black et al.’s (2007) IQ findings, nutrition in utero can affect brain development, resulting in poor cognitive development.
- Parental perceptions. If parents perceive that the return on investment is higher for a higher-birthweight offspring, they may invest more in him/her, which may lead to better long-run educational outcomes. The extent of such behavior might also differ depending on family resources.

Evidence on the effects of parental health on children's education looks specifically at maternal health effects. Maternal health is a strong predictor of a child's education, particularly in the case of cognitive development. As the health chapter emphasizes, and as evidence on nutrition in utero as a key mechanism indicates, children's cognitive and non-cognitive skills development begins in utero, and therefore a child's achievement in school may be largely determined by their mother's health. Other key mechanisms that might result in low/high educational outcomes of children are income, maternal stress and selective child health investment based on parents’ perception of returns to investment in their children.

5.2.4 The Effect of Family Structure and Parental Behavior on Children’s Education

Family structure can have diverse implications for the educational outcomes of a child. Family size, gender composition, birth order, single-parenthood, and orphanhood can affect a child's educational attainment through the level and distribution of intra-household resources, including parental time and investment in education. These effects are also likely to be exacerbated under resource constraints, as having a larger number of children, for instance, would require that resources have to be more thinly distributed between the children.

Studies exploring the effect of family structure on children's education find that observable demographic characteristics of a child, such as gender and sibling composition, influence parents' schooling investment decisions (Akresh et al., 2012; Ponczek and Souza, 2012). More interestingly, unobservable characteristics – including the observed and perceived ability of the child – are also very influential.

Parents' perceptions about their children's ability or potential for future success inform and affect their education investment decisions. Strikingly, as a child's actual and perceived ability interacts with family size and gender composition, it has large and statistically significant effects on the educational outcomes of the child. Using panel data on households with multiple biological primary-school-aged children (5-15 years) in Burkina Faso, Akresh et al. (2012) estimate the impact of child ability on households' human capital investment decisions. They find that both a child's own ability and the parents' perceptions about his/her ability (or potential for future success) are strongly positively correlated with the child's enrolment, whereas the child's siblings' ability and parental perceptions of the child's siblings' ability were negatively correlated with the child's enrolment.

A comparison of the 'subjective' parental perception of child ability with the more 'objective' measures of ability (test scores) suggests a strong positive relationship between the objective ability measure and parent perceptions: higher-ability children are viewed by their parents as having a higher chance of future success. However, after controlling for gender and age, the ability measure explains only about 20% of the variation in parental perceptions. This suggests that parents’ education investment decision is largely driven by the gender and age (birth order) of the child.
Using cross-sectional data from Northwestern Tanzania, Beegle et al. (2007) find that maternal orphanhood has a permanent adverse effect on children's education attainment. Their results suggest that adults who had been maternally orphaned between the age 6-15 years experienced a loss of about a year of schooling.

**Mechanisms Having an Effect Through Family Structure and Parental Behavior**

Studies suggest potential mechanisms underlying these intergenerational effects:

- **Sibling rivalry.** Authors reveal strong evidence of gender bias, specifically pro-male bias in household education investment decisions: having female siblings is strongly positively correlated with enrolment. Holding the number of sisters constant, adding a male sibling is correlated with a highly statistically significant 2.5 percentage point (or 4.6%) lower likelihood of a child attending school. Switching from a male to a female sibling is correlated with a 2.2 percentage point (or 4.1%) higher likelihood of enrolment.

- **Birth order.** Surprisingly, evidence on birth order is inconclusive. While Akresh et al. (2012) find a positive but marginally significant effect of birth order on enrolment, Ponecek and Souza (2012) find strong effects of birth order. Their results suggest that, particularly for those in larger and credit-constrained families, parents are likely to invest more in the schooling of the oldest male children, to the detriment of schooling investments in females. Consistent with theoretical arguments on the effects of family size on schooling, in their US study on the negative effects of family size in the presence of credit constraints, Plug and Vlijberberg (2002) find strongly negative sibling effects, suggesting that as the size of the family increases, family income becomes even more important. In the presence of credit market imperfections, parents spend a little less on each child, as they are not able to invest in their children's education based on their children's future earnings, like they would if credit markets were perfect.

- **Increased value of the child’s time in home production.** As a result of a loss of parental involvement, children might be more likely to increase their "work-time at home", they may become a substitute for adult labor (e.g. taking care of other siblings), resulting in less schooling.

- **Discrimination and favoritism towards biological children.** Although context-specific, orphans may face hardship in their foster homes. Orphaned children may suffer trauma, which could in turn affect their schooling and achievement. Though specific to the sample studied, children who lose a parent due to AIDS may be additionally stigmatized relative to other causes of death.

- **Parenting quality and child-care choices.** Exploiting exogenous variation in welfare-policy changes facing single-mothers, Bernal and Keane (2011) estimate the effect of maternal time inputs and child-care use on children's cognitive achievement. They find that an additional year of child-care use reduces a child's cognitive achievement test scores by 2.1% (equivalently, 0.114 standard deviations). Interestingly, this substantial negative effect is primarily driven by informal care (non-center-based care by grandparents, siblings, other relatives or nonrelatives), indicating that while formal center-based childcare has no adverse effect on children's cognitive achievement, informal care results in a 2.6% reduction in test scores.

In sum, various forms of family structure dynamics can have large, detrimental effects on children’s educational attainment and progression. While several mechanisms may be driving these effects, their impacts are likely to be exacerbated by parental behavior and income effects, specifically through credit constraints. Results also suggest that the quantity–quality trade-off has detrimental effects on female education. These effects are merely correlations, and not causal.

**5.2.5 The Effect of Community and Neighbourhood Factors on Children’s Education**

Children's educational opportunities and outcomes can vary dramatically, depending on their neighborhood environments. “Bad”, and usually poorer, neighborhoods are usually associated with higher school-dropout rates, lower test scores and delinquency (Gennetian et al., 2012). As Gennetian et al. (2012) note, children growing up in very poor

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1 Of the base enrolment level
neighborhoods may be “doubly disadvantaged”, since they face potential risks from growing up in a low-income household and in an economically poor neighborhood.

Interestingly, studies on the effects of neighborhoods reveal surprisingly conflicting results (Gennetian et al., 2012; Gould et al., 2009; Galster et al., 2007). A unique Israeli study on the effect of early-childhood household and neighborhood environment on two generations finds a causal effect of a child's neighborhood environment on their educational attainment (Gould et al., 2009). Exploiting the variation in the living conditions experienced by Yemenite immigrant children airlifted to Israel in 1949, as a natural experiment, the authors find that children in more modern environments – with better sanitary and infrastructure conditions – were more likely to obtain a higher education, and they find these effects mainly in women. Their estimates suggest quite large effects: better-equipped neighborhoods increased female matriculation rates by 30%. They find mostly insignificant effects for males. The authors suggest the quality of the neighborhood environment as the mechanism.

In stark contrast to these large and statistically significant results, in a panel study of the effect of a randomized US housing mobility program – the Moving to Opportunity (MTO) for Fair Housing demonstration – Gennetian et al. (2012) find little evidence of an effect of neighborhood poverty and related characteristics on educational outcomes of children. The children of participants did not experience substantial changes in education attained or physical health. Instead, they seemed to attend low-quality schools. However, they suggest that improved school quality is a potential, although not important, mechanism through which neighborhood location may influence children's educational outcomes. Overall, community-level factors like education, school quality and networks do seem to play a much more modest role than factors affecting at the household level.

### 5.2.6 The Effect of Economic and Environmental Shocks on Children’s Education

Included studies find that in the presence of credit and insurance market imperfections, labor market shocks and fluctuations can have lasting impacts on children’s educational outcomes. Using panel data on US families, Stevens and Schaller (2009) find evidence that suggests a substantial and negative causal effect of (involuntary) parental job loss on children’s academic achievement, primarily driven by children with low-educated parents. They find that parental job-loss increases the probability that a child repeats a school grade by about 1 percentage point a year. Where grade repetition signals academic difficulties, these short-run effects may have longer-term impacts on education. A study in Argentina also finds that during years of economic distress, household heads’ job displacement has a large negative and statistically significant effect on the schooling progress of children due to credit market imperfections (Farré and Claudia, 2009).

Interestingly, evidence from five Eastern European countries reveals that while households affected by income shocks reduced their education investments, they did not adopt harmful education-related coping strategies, such as withdrawing children from schools or moving children from costly private to cheaper public schools. Rather, evidence suggests that these households choose more health-related coping strategies, including reduced doctor visits and spending on medical care. This could still indirectly affect a child’s health and consequently their educational outcomes.

Evidence on the impacts of environmental shocks on educational outcomes reveals very similar results. A Colombia study finds that a natural disaster (an earthquake) reduces schooling of children, with a marginally larger effect on boys (Bustelo et al., 2012). Whereas the earthquake results in 0.071 and 0.061 standard deviations lower school enrolment in boys and in girls, respectively.
Box 4. Health and Education: Inter-linkages Over the Life-course

The transmission of human capital, and in particular of education, occurs mainly at the household level, but the impact that different parental factors and external investments have on children varies over the life-course. Several of the studies included emphasize the key role that early childhood years play in the development of cognitive and non-cognitive abilities even before children start school (Haas, 2006; Bowles and Gintis, 2002). The effect of parental income on children’s possibilities of education attainment is much stronger during the first years of life. Studies that evaluate different social programs that supplement household incomes find that they increase children’s schooling, especially in their early childhood years (Levy and Duncan, 2000; Morris et al., 2004; Hoynes et al., 2012). Levy and Duncan (2000) find that, on average, a 2.7 fold increase in parental income in early childhood leads to an increase of about 0.5 years of schooling, whereas the effect during adolescence is not statistically significant. Morris et al. (2004) finds that additional cash from a randomized program has an impact on the education achievement of the youngest children (2–5 years), but no statistically effect after that. Hoynes et al. (2012) find that the effects of these programs are noticeable even before the baby is born: in utero babies and very young children experience the largest benefits from the US Food Stamp Programme (see Box 4 for a closer look at the inter-linkages between health and education). Similar results have been found in other parts of the world. CCTs in the Philippines and Mexico show large income effects on schooling for younger children, especially boys (Chaudhury and Okamura, 2012; Behrman et al., 2007, 2011).

5.3 Child Educational Outcomes: Key Take-Away Points

1. There is strong evidence on intergenerational transmission of education. Several studies have found a small but significant causal effect of mothers’ education on children’s education, but also evidence that indicates that mothers play a crucial role in a child’s educational outcomes.

2. Evidence also suggests that household characteristics — including parental health, income, family structure and parental behavior — are strong predictors of a child’s education.

3. Several mechanisms may be important, and well-supported by evidence, but they are likely to be highly complementary. Income, parenting time and parental quality, family size and credit constraints, and maternal stress play a large role as education transmission mechanisms.

4. However, how parents perceive a child’s ability, future success and even their return on investments, relative to those of the child’s siblings, might play just as large a role in determining a child’s educational outcome.
Chapter 6. The Intergenerational Transmission of Income

The determinants of income persistence over time

Objectives of this section

This section reviews the transmission of economic success across generations. The section covers the following:

1. A brief summary of the literature on the intergenerational elasticity of income across countries and time.
2. A review of the main determinants of intergenerational income at the family, community and state level.
3. A short review of the possible

6.1 The Intergenerational Transmission of Economic Success

Children born into poor households have a disproportionately large probability of being poor as adults. Intergenerational income inequality (see Box 5 for further information) implies that children born into poverty are more likely to be poor later in life, with poverty potentially persisting across subsequent generations (Mocetti, 2007; Blanden et al., 2004). Intergenerational inequality can also affect society as a whole, as able-bodied individuals will not have the opportunity to reach their full potential simply because they were born poor. Understanding the specific mechanisms through which inequality is transmitted across generations is central to designing effective policy responses (Bowles and Gintis, 2002).

This section summarizes the most up-to-date evidence at the level of intergenerational mobility and how economic advantage and disadvantage are transmitted across generations. For the purpose of this study, we use a broad definition of income. The next sections will look at the different transmission mechanisms that underlie the transmission of health and educational outcomes.

Box 5. Why we care about intergenerational mobility?

Child poverty has a strong resonance in the public discourse. Most people would agree that equality of opportunity is a worthy and commendable goal: the opportunities that children face in life should not be determined by characteristics of the family in which they are born into. Yet, studies observe the contrary across the developed and developing world. In this sense, policies should be directed at promoting equality of opportunity as a way to break the intergenerational transmission of poverty and disadvantage.

The discovery in the early 1990s that the levels of intergenerational mobility in the US were much lower than previously thought (Bowles and Gintis, 2002) has stimulated a strand of empirical research. Researchers have focused on studying the intergenerational elasticity of income: the relationship between children’s income and the income of their parents (see Box 6 for more details). In doing so, they have relied on income as an indicator of economic success. The included studies that estimate the levels of intergenerational mobility reveal a set of empirical regularities: first, countries show a substantial degree of economic persistency across generations; second, intergenerational elasticities vary over time and across countries; finally, mobility depends on the initial position in the income distribution and the socioeconomic background of the family.

Footnote:

1 For the purposes of this study we use a broad definition of income. We use the terms ‘earnings,’ ‘individual income,’ ‘household income’ and ‘socio-economic status’ interchangeably.
Studies reveal that although there is a substantial level of intergenerational persistence of income across generations, estimates vary across different settings\(^2\) (see Figure 3). The consensus estimates for the US vary between 0.4–0.6 (Blanden, 2011). This is equivalent to saying that half of the economic advantage of American fathers is transmitted to their children. Many European countries, in particular Nordic countries, show higher levels of mobility (Mocetti, 2007; Blanden et al., 2004; Aaronson and Mazumder, 2008). Due to data limitations, estimates for developing countries are still limited. Instead, researchers use alternative approaches to estimate mobility rates. Emerging evidence from developing countries shows the possibility of even lower levels of intergenerational mobility. For example, Dunn (2007) calculates mobility levels in Brazil and finds an elasticity of 0.69–0.76. However, it is important to note that intergenerational mobility estimates are demanding in terms of data required, and are subject to life-cycle biases.

Intergenerational mobility levels vary over time, and, depending on the measure of income used, show a complex picture of the intergenerational transmission process. In the US, intergenerational mobility showed increasing trends until the 1980s; since then, it has been falling (Aaronson and Mazumder, 2005; Blanden et al., 2004). In contrast, research in Brazil shows that intergenerational mobility levels have been increasing. When calculating mobility levels, researchers may use different measures of income, depending on the availability of data. Bowles and Gintis (2002) stress that different resources are distributed unequally in different ways. For example, the calculated elasticities in Canada, as reported by Mulligan (1997), are 0.68 for consumption, 0.50 for wealth, 0.43 for wealth, 0.34 for earnings (or wages), and 0.29 for schooling. Varying levels of intergenerational mobility indicate varying levels of mobility across different dimensions, with their importance being influenced by institutional and external settings.

Different resources that are unequally distributed have heterogeneous effects for various population groups. For example, it is likely that the transmission of wealth plays a large role in determining the income of the richest sectors of society (D’Addio, 2007), while educational attainment and health deficiencies largely determine the mobility of the poor.

In order to understand the relative importance of different transmission pathways, average elasticity estimates need to be complemented with the analysis of mobility changes over time and across different income distribution groups. Studies that break intergenerational mobility levels by income levels tend to find a varying degree of mobility for the rich and poor. As reported by Hertz (2006), the sons of an American family born into the top income decile have a 23% chance of attaining the top decile and a 41% chance of getting into the top quintile between 1967–96. A child born into the poorest decile only has a 1.3% chance of moving up to the top decile, and a 3.7% chance of reaching the top quintile.

\(^2\) Researchers pay close attention to the different estimation methods used, the income measure and the age at which the income is measured for each generation, in reading the elasticity estimates shown (Aaronson and Mazumder, 2008; Dunn, 2007). Extensive data covering a timespan of at least 30 years is required to obtain reliable elasticity estimates.
Mobility patterns also vary by residency, gender, race, and age in both developed and developing countries (Emerson, 2007; Dunn, 2007; Hertz, 2006). It is plausible that different resources matter differently for different groups. For example, the transmission of wealth seems to play a much larger role in determining the income of the richest sectors of society, while it has a negligible effect on the poor (D'Addio, 2007). However, more research is needed to better understand the patterns of mobility over time and the root causes driving these differences across different population groups.

Overall, variation in the levels of mobility and changes over time and across contexts not only indicate that distinct mechanisms may be at work, but also that their relative importance can vary over time. The following sections of this chapter seek to uncover the main mechanisms through which inequalities are transmitted across generations.

### 6.2 What determines the transmission of Economic Status Across Generations?

The primary goal of intergenerational mobility research has been to understand the extent to which social background affects the life chances of a child. Despite the attention given to the transmission of socio-economic status across generations, little is known about the specific mechanisms that drive this relationship (Bowles and Gintis, 2002; Carvalho, 2012) and its differences across the income distribution. In this section we attempt to look at what determines the mobility patterns observed.

When looking at the determinants of children's future economic success, some findings stand out. First, on an aggregate level, the evidence supports the notion that household characteristics play a much larger role, compared to other community and national factors (Blanden et al., 2004). Second, the studies highlight the importance of child development and the accumulation of cognitive and non-cognitive skills early in life (Carvalho, 2012; Dunn, 2007; O'Neill et al., 2010). The acquisition of these human-capital endowments accumulates over the child's lifetime (Carvalho, 2012; Haas, 2006), and gives room for inequalities to perpetuate early in life. As Bowles and Gintis (2002) argue, a large proportion of the intergenerational variation of income remains unexplained, after the inclusion of multiple variables. More research is needed to shed light on this discrepancy.

Similar to previous chapters, we present findings on the household-level factors, and then those on the extra-household factors. However, we present the mechanisms in detail at the end of the section.

*Figure 4. Decomposition of the Intergenerational Income Correlations*

Source: Based on Carvalho (2012) and Bowles & Gintis (2002)
The Effect of Household, Community, and State Factors on Children's Economic Success

Research has shown that, to a large extent, the opportunities that children face in life are determined by the resources parents make available to them. Such resources could be in the form of human-capital investments, genetic endowments, or behavioral effects.

The factors that influence the transmission of economic status remain largely unknown (Bowles and Gintis, 2002). According to the studies included, one way to demystify this is to decompose the intergenerational transmission of income into additive components that reflect the relative contribution of different factors (Bowles and Gintis, 2002; Carvalho, 2012). Researchers have acknowledged the presence of embedded endogeneity in the close relationships between health status, education level, income, and other unobserved factors (like genes) (Akee et al., 2010). As a result, it has been difficult to disentangle the causal mechanisms underlying the relationship between the socio-economic status of parents and of their children. The presented estimates should be interpreted carefully: an indication of the relative importance does not imply a causal effect.

In the following paragraphs we describe the linkages between parental characteristics and different children outcomes in terms of health, education and future income.

6.3.1 The Effect of Genes on the Economic Success of Children

Part of the difficulty in explaining the intergenerational transmission of earnings across generations is understanding the role played by genes. Bowles and Gintis (2002), based on a decomposition of the intergenerational income correlation, conclude that while the transmission of IQ across generations is quite small, the overall effect of genetic endowments is large (D’Addio, 2007). The fact that siblings that share a larger genetic pool (identical twins, fraternal twins and brothers) have earnings that are substantially more similar implies that inherited talents and characteristics other than cognitive skills have an impact on the intergenerational correlation of earnings. Other inherited traits such as health, race, and beauty also seem to play a role (Bowles and Gintis, 2002).

6.3.2 The Effect of Wealth on the Economic Success of Children

The transmission of wealth and assets is another potentially important factor affecting the intergenerational transmission of inequality. Decomposing the correlation of earnings elasticity, Bowles and Gintis (2002) find that one-third is driven by wealth. Given that the distribution of wealth is skewed in most societies, it is likely that wealth may account for part of the different elasticities between the rich and the poor (D’Addio, 2007). This suggests that although wealth plays a large role at the top of the income distribution effect, it has a negligent effect on the poor. Due to data limitations on bequests, the role played by the transmission of wealth requires further research.

Potentially, wealth could play a larger role in developing countries, where absolute poverty and credit constraints are more prevalent. After investigating the potential role that land inheritance has in explaining interpersonal occupation and nutritional inequality in Senegal, Lambert et al. (2011) find no significant effects. However, Non-land inheritances play a small role, and they find that the education and occupation of parents, together with the schooling of children, play a much larger role.

Furthermore, the transmission of wealth may be influenced by other inherited behaviors such as habits, culture, and social class. For instance, Aratani (2011) studied the effect of parents' home ownership on their children's home ownership in the UK, and finds that the effects are clearly differentiated by social background. However, more research is needed to understand the role played by these factors.

6.3.3 The Effect of Family Income on the Economic Success of Children

Although the contribution of different factors is illuminating, they don't necessarily reflect the independent causal effect of them. Neither are they additive, since the estimates are coming from different studies.
There is a longstanding debate about the role of income in the transmission of economic success. There are ample empirical studies that have attempted to estimate this relationship. Although income is highly correlated with most children outcomes over the life-course, its causal effects are not clear. Duncan et al. (2010) finds a large and statistically significant effect of childhood income averaged over the long-run on employment, earnings, and educational attainment in Norway and the US. When studies control for other parental characteristics (e.g. education or quality of schooling), a significant – albeit lower – effect is observed. However, this does not necessarily imply a causal relation. Even more importantly, there is a high level of correlation between the different parental background characteristics: schooling quality and neighborhood poverty. That is, children are likely to suffer multiple deprivations at the same time.

Studies using exogenous changes in income also find that family income has significant and long-term effects on health (Behrman and Hoddinott, 2005). These effects can have long-term consequences for children's well-being and their economic prospects over the long-run. Oreopoulus et al. (2005) compares the outcomes of children whose parents experienced a job loss during massing layoffs (in the US) with those whose parents did not experience such a fate. They find that the effect of parents' job loss contributed to an 11% reduction in child earnings and an increased probability of receiving social assistance and benefits. More importantly, some studies report larger effects for children from poorer backgrounds and who experience reduced income early in life (Duncan et al., 2010; Oreopoulus et al., 2005).

### 6.3.4 The Effect of Family Education on the Economic Success of Children

Parental education is directly related to family income and can affect the share of resources dedicated to human-capital investments in children. The persistently high levels of education across countries motivate the importance of family education (Duncan et al. 2010; Carvalho, 2012). Dunn (2007) studies the effect of parental education transmission and its returns in Brazil and finds that when those factors are combined they can explain about 90% of the income elasticity over time. The results are robust to the inclusion of time and cohort fixed effects.

Fathers' and mothers' education have a large and significant effect on children's cognitive skills, education levels and health, even when controlling for other parental characteristics (Carvalho, 2012). Overall, our review highlights the role played by the mother's education in the intergenerational transmission of income, while considering the effects this has on the child's health and education outcomes. The intergenerational transmission of well-being outcomes plays a role in determining the possibilities of economic success for children, since education outcomes and well-being are high predictors of socio-economic status.

### 6.3.5 The Effect of Community Factors on the Economic Success of Children

The general consensus in the literature is that the influence of external household factors and social institutions – namely the local neighborhood or community – is far less important than previously thought (Nolan, 2010). Burgess et al. (2001) estimate the relative importance of parental background characteristics, schooling, and local poverty rates in the US. They find family background, followed by schooling, to be the strongest predictor of adolescent earnings and poverty prospects. The results corroborate other studies' results (by Gennetian et al., 2012) in which after poor households were allocated to better neighborhoods there were hardly detectable effects. Other studies have found a significant impact of schooling quality on future earnings (Galster et al., 2007). The findings in this area are quite limited, indicating that our search strategy did not manage to capture this literature well. More research is needed to assess whether the weight of community factors (e.g. public service facilities, social networks) in the mobility patterns observed is repeated in the developing world.

### 6.3.6 The Effect of National Factors on the Economic Success of Children

Structural factors, social institutions and economic and environmental shocks may also affect intergenerational mobility rates. If some groups suffer the effect of specific shocks disproportionally, mobility rates will be affected. The key question is whether these transitory shocks have long-term consequences that affect children in the long-run.

Economic and environmental shocks that result in permanent losses in family income levels may translate into inequality and poverty traps. Different studies have explored the impact of different types of shocks on children outcomes and over
the life-course, and show that the effects are very large. Chen et al. (2007) study the long-term effect of the 1959–61 famine in rural China and find that exposure to the famine leads to reduced earnings and labor supply. Children from poorer backgrounds and that are exposed at early ages (especially in utero and new-born) suffer the most devastating consequences. The authors estimate that children born in 1960 experienced a 28% reduction in labor supply. The authors point to key deficiencies in health early in childhood as the mechanism accounting for this effect. Reduced early cognitive development and detrimental coping strategies seem also to play a role.

An emerging set of evidence analyses how mobility patterns are affected by structural factors and social institutions. Intergenerational mobility estimates tend to correlate with inequality, showing that more unequal countries tend to have lower income mobility levels (Blanden, 2011). This has prompted researchers to look at the role played by different social institutions and policies, but none of them were included in the pool of papers collected. Instead see D’Addio (2007) and Nolan (2010) for a closer review of the links between different types of inequalities and the role played by social institutions.

### 6.3 Mechanisms of economic success

Recent contributions to the human-capital literature have emphasized the relationship between child development, cognitive and non-cognitive skills acquisition, and socio-economic status in adulthood (Johnson and Schoeni, 2007; O’Neill et al., 2010). As Carvalho (2012) points out, these rely on empirical regularities stemming from the following: (1) Children from higher socio-economic status families have better health (Currie and Moretti, 2007; Haas, 2006), perform better in cognitive tests (Johnson and Schoeni, 2007), and achieve more schooling; (2) These children outcomes are important predictors of future socio-economic status (Carvalho, 2012).

**Human capital attainment effects on economic success**

Human capital investments by parents determine the accumulation of vital skills and knowledge, as well as better health endowments that are rewarded in the labor market (D’Addio, 2007). As suggested by Becker (1986) and others, the acquisition of human capital seems to be the major mechanism underpinning the intergenerational transmission of income inequality over time.

The theoretical accounts by Becker (1986) have been subject to empirical analysis supporting the key role in human-capital models. Children born to parents from higher socio-economic status accumulate more human capital (for education and for health: Haas, 2006), and as a result children with higher levels of human capital are more likely to be economically successful (Black et al., 2005; Nehrman and Hoddinott, 2005). Using sibling fixed effects, Carvalho (2012) estimates the effects of child human capital on future earnings in the Philippines. Taken together, the author reports that health, nutrition, cognitive and non-cognitive abilities, and schooling outcomes account for between one-third and one-half of the intergenerational correlation of income. This reinforces similar results found by Gintis and Bowles (2002). The results reported by Carvalho (2012) suggest that channels that affect earnings through cognitive development and schooling are, if anything, more important than channels that affect earnings through health.
6.4 Children’s Future Income: Key Take-Away Points

1. The acquisition of human capital has played a key role in the literature on intergenerational income mobility, and yet researchers find that this factor explains, at most, only half of the intergenerational income transmission.

2. Our knowledge of the key mechanisms remains limited and more research is needed to better understand what limits the opportunities of the poor.

3. Despite this limited knowledge some issues stand out. First, human capital accumulation by determining the set of skills and knowledge that shape economic opportunities plays a crucial role. Secondly, emerging research increasingly points to the key role that early childhood development may play. This is supported by voluminous empirical literature that points to the strong effects that adverse shocks and deficiencies early in life have on later educational and economic outcomes. Finally, evidence indicates that there is a substantial level of economic persistency across generations, but this need not be the case.

4. Different countries achieve varying degrees of mobility and these tend to vary over time. If we want to achieve a more mobile and fairer society, government officials should aim to tackle the mechanisms described.
Chapter 7. Conclusion and Discussion

Objectives of this section

This section discusses the key findings from the previous chapters on health, education and (future) income outcomes, and concludes by evaluating key evidence gaps. In particular, this section includes discussion of:

1. Broad conclusions we can draw from the empirical findings of the included studies on the three major children outcomes.

2. Both evidence-supported and suggested mechanisms in the three areas, highlighting their relative importance and some policy implications.

3. The key research gaps identified in the studies, and directions for further research on this research question and intergenerational issues as a whole.

7.1 A Summary of the Evidence-based Mechanisms

Income is a key intergenerational transmission mechanism, operating directly through current wealth and earnings, which provides a pool of funds from which parents can invest in their children, but also working indirectly through credit constraints as a symptom of credit market imperfections, where parents are unable to borrow against the ability or future earnings of their children. These mechanisms have a disproportionately large effect on the poor, as the (in)ability to borrow is exacerbated by initial lack of household wealth and earnings. Income and credit constraints could trigger other mechanisms – such as maternal stress – that might arise from economic and social disadvantage. Of even greater concern is exposure to high levels of maternal stress in utero, which could adversely affect cognitive development, other health outcomes, and human-capital formation, and consequently, their life chances. Also, maternal education plays an important role in influencing both child education and health outcomes, and it is closely related to parenting-time decisions about childcare.

A clear understanding of the mechanisms of intergenerational transmission requires a closer analysis of how the family structure dynamics affect parental behavior towards children's human-capital investment. Gender, birth order, parental perceptions of a child's ability and potential for future success are also important transmission mechanisms. Beyond identifying the mechanisms that underlie parent-children relationships, it is of greater importance to note that most mechanisms work simultaneously, reinforcing each other in different directions. For instance, additional income may have an effect on child health outcomes, but its effect is reinforced by the provision of maternal health knowledge and by a parent's decision to provide better health inputs. Also, better knowledge on more efficient use and allocation of parental time (including the quality of parent-child interactions) could result in child quality improvement.

As Table 1 shows below, most evidence-based mechanisms correspond to more than one dimension of a child’s well-being. For example, income, parenting quality, and maternal stress correspond to both child health and education. Also, there is more evidence on specific types of mechanisms from developed and developing countries. For instance, papers analyzing maternal stress are from the US, while papers analyzing maternal health knowledge look at developing countries. While this might have some significance in terms of the relative importance of these types of country-specific mechanisms, it could also largely reflect data limitations. Perhaps it is more difficult to measure maternal stress in developing countries – where data on health is limited – than it is in developed countries.
<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Child Welfare Dimension</th>
<th>Child Outcome</th>
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<td>Education</td>
<td>Educational attainment</td>
<td>US</td>
<td>King &amp; Warrington (2012)</td>
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Notes:
- * Parenting quality/behaviour/preferences/parenting time/mother-child interactions
- ** Family characteristics and family dynamics: sibling rivalry, birth order, gender, parental perceptions of a child's ability
7.2 Discussion and Conclusions

This systematic review analyses and assesses up-to-date evidence on the intergenerational relationships between parental background characteristics and children’s well-being. We also identify the evidence-based mechanisms that underpin these relations. An understanding of the mechanisms will contribute to evidence-informed policies to break the cycle of the intergenerational transmission of poverty and disadvantage. Hence, we assess both negative and positive factors that directly affect the life opportunities of the next generation.

There is a strong intergenerational link between parents and their children. More-educated families from higher socio-economic backgrounds tend to have more-educated and healthier children. But identifying the intergenerational causal effect of specific factors is extremely difficult given the high levels of endogeneity present. Researchers have sought to overcome these problems by using: siblings, twins and adoptees; exogenous changes such as policies and experiments; and fixed effects (controlling for observables and unobservables) in order to shed some light on the transmission process and the mechanisms underlying parent-child relationships.

At the heart of the intergenerational transmission process lies the effect of genes. While for a long time researchers have been divided over whether genetic or social and behavioral effect dominates, the evidence reviewed here indicates that both processes are at work.

Studies on the direct intergenerational transmission of health are scarce. The included studies focused on studying one of the following outcomes: in utero nutrition (birthweight), child mortality, measures of health and nutrition (height or weight), and ‘risky behavior’ (e.g. smoking or drinking). The parent-to-child transmission of health seems to be shaped by genes; yet socio-economic factors also play a key role. Research on the impact of economic and environmental shocks highlights the strong adverse consequences of insufficient nutritional intake later in life. Across the studies, the direction of effects is similar, but results are inconclusive about which of the parents plays a more important role in determining child health outcomes. Health transmission mechanisms in this study are mainly (empirically) untested, but many authors suggest potential pathways.

The evidence on the intergenerational transmission of education mainly focuses on educational attainment and achievement. The parental background characteristics strongly associated with the outcomes are: parental education, health, household income, family structure, and parental behavior. Parental education has a small but statistically significant causal effect on children’s schooling and educational achievement. These effects largely differ by parental gender. The evidence clearly suggests that a mother’s education is a stronger determinant of her children’s education than a father’s; however, some evidence suggests that fathers’ education may also be important. Results on the heterogeneous effects of the child’s gender are, however, inconclusive. There is robust evidence on the education-transmission mechanisms.

Intergenerational mobility levels vary across countries and regions, and by socio-economic group, showing a complex picture of the intergenerational transmission process. Despite great advancements in the study of intergenerational mobility, a large proportion of the intergenerational income mobility remains unexplained, even when controlling for numerous parental and children characteristics. Overall, when looking at the different factors affecting the rates of income mobility, it seems that mechanisms affecting children at the household level play a much larger role than other mechanisms affecting children at the community and national level.

Many different mechanisms might be at work in the parent–children relationships explored in this study:

- **Health Outcomes.** Studies on the transmission of health provide empirical evidence for some mechanisms that underpin the relationships between: income and maternal stress. However, most studies only suggest potential mechanisms without providing robust evidence, for instance parenting quality and maternal health knowledge.

- **Education Outcomes.** Studies on the transmission of education provide a rich discussion of mechanisms underlying intergenerational relations. While some provide evidence in support of robust mechanisms, others
provide evidence to refute potential mechanisms, and others suggest potential pathways of relationships. The most robust mechanisms include: income, parenting quality, maternal stress.

- **Future Income and Socioeconomic Status.** The suggested pathways on the intergenerational transmission of income should be read in conjunction with mechanisms of intergenerational transmission of health and education outcomes. The main mechanism suggested by studies of income mobility is accumulation of human capital.

Income is a key intergenerational transmission mechanism – operating directly through current wealth and earnings – which provides a pool of funds from which parents can invest in their children's health and education. It also operates indirectly through credit constraints, where parents are unable to borrow against the future earnings of their children. This transmission mechanism is disproportionately stronger for poorer households, which have a smaller pool of current wealth and earnings, and are much more affected by credit market imperfections. Income as a transmission mechanism can also reinforce other mechanisms. For instance, as a result of low income or credit constraints, poorer households have to distribute their funds more thinly across the household, resulting in the reinforcement of other transmission mechanisms. These include maternal stress, birth order, gender biases, and parental perceptions of children's future prospects. Also, within health, income may be an important mechanism when it is well-complemented by other mechanisms, including health knowledge. When mothers are given additional income (through CCTs, for instance) to help improve their child's health, the effect of this income is stronger when they are also given health knowledge on the right vaccinations, proper child nutrition, or vitamin intake.

Nonetheless, the effect of income should be interpreted with caution. Interpreting the effect of income is especially difficult when you look across generations, because the income will largely be determined by the skill and wage level of the adult, which is an effect of education. This is why human capital is a major mechanism in the intergenerational transmission of income. Income is a mediator in access to both education and health, and even more so in developing countries, where the systems rely more on personal payments for healthcare. Thus, once you hold everything else constant, what really influences income is the human-capital effect. But then again, present-day resources largely determine access to human capital, which is again largely the effect of income and consumption.

Beyond the identification of these transmission mechanisms, it is also of great interest that these mechanisms do not usually act in isolation; rather, they tend to reinforce each other. For instance, similar to the previously discussed case of credit constraints, additional income may have an effect on child health outcomes, but the relation might be reinforced by maternal health knowledge and decisions to provide better health inputs. Also, better knowledge on the more efficient use and allocation of parental time (including the quality of parent–child interactions) could result in child quality improvement.

Many studies emphasize the role played by early childhood factors. Negative exposure at this stage of life seems to create deficiencies in cognitive and non-cognitive development that are difficult to overcome and persist throughout an individual's lifetime. Policy-makers attempting to reduce inequality should target interventions at this early childhood stage, especially among disadvantaged groups.

Policies and institutions have been identified as crucial mediators in the transmission process of (dis)advantage (Esping-Andersen, 2009). Their ability to shape the mechanisms of intergenerational transmission would further mediate the effects of parental investment decisions on the human capital of children, on parenting time in child care, and on parental behavior in general that influence children's well-being.

Empirical evidence has tried to shed some light on mechanisms underpinning the intergenerational transmission of poverty and well-being. The links between parents and children are quite strong, the opportunities that children face in life largely depend on the characteristics of the families in which they are born. However, this study presents a puzzle in which much additional research remains to be done to understand the causal mechanisms that determine the effect of parents' outcomes on their children.
Translating this to the post-2015 agenda and the UNICEF framework for development for children, these results emphasize that while it is important to focus on short-term goals, it is even more important to consider the potential future impacts of how UNICEF addresses these development problems now. Additionally, it is critical to consider the inter-linkages between these household, community, and national factors and children's outcomes in defining goals and targets.

The findings indicate that the drivers of cognitive development are very early in childhood, and that there are substantial health, education, and income returns to cognitive development. This implies significant institutional infrastructural investment requirements to reap these returns. As such, there is a need to take sequential and cumulative approaches to ensuring intergenerational equity; while focusing on the early years is a necessity, it is not sufficient if institutions don't back up these early investments with the mechanisms to get the return on these investments. Thus, institutions should build on these investments in early childhood, but also in adolescence and young adulthood.

### 7.3 Evidence Gaps

Several evidence gaps emerge in this study.

- **Identification of Evidence-Based Mechanisms.** The overarching evidence gap in the intergenerational literature is the inability to completely isolate and pinpoint the exact mechanism(s) driving particular intergenerational relationships, and more importantly, provide robust evidence to support such mechanisms. This major gap largely reflects the endogeneity problem, the inter-linkages between different intra- and extra-household factors, and the general difficulty of disentangling the complex intergenerational relations.

- **The Role of Resilience.** None of the included studies attempt to estimate this factor. However, while household and extra-household factors play a crucial role in intergenerational transmissions, they only partly explain what determines a child's ultimate education, income, and health outcomes. There are some aspects of a child's outcome that are neither explained by genes, or by household and extra-household factors. Several children, despite being born into very difficult circumstances, are able to thrive and succeed. Knowledge on resilience is also particularly important in better understanding how to limit irreversibilities. The findings on education and health in particular suggest that certain effects have long-term consequences that are almost impossible to reverse. Evaluating policies that could mediate the intergenerational transmission at specific points in a child's life will be critical to understanding these irreversibilities and, more so, the role of resilience. While it is certainly difficult to measure this factor, it is still important to know what role this plays in breaking the poverty transmission cycle.

- **Robust Studies From Developing Countries.** Although almost half of the quantitative studies were from developed countries, there were very few high-quality studies from developing countries. This reflects a general limitation in empirical research, as data and robust research from developing countries is usually very limited. This calls for further research on intergenerational relations and mechanisms in developing countries, particularly given that these issues pertain more to developing countries.

- **The Internalization of Discrimination.** The inheritance of social status as it relates to ethnicity, class, and caste – sometimes defined by the environment – is a highly relevant issue in this topical area, and could affect an individual's ability to escape the poverty and inequity associated with these issues. None of our high-quality studies discussed the intergenerational transmission of these forms of discrimination. This might be due to our search strategy, but may also be a possible evidence gap. To the extent that individuals internalize these forms of discrimination, or that society defines these forms of discrimination, breaking the intergenerational transmission of poverty might be more challenging. There are also political and cultural contexts to these issues, which many papers do not discuss. It is very important to understand the extent to which these issues are defined by politics and culture, as the types of policies that would be required to address intergenerational issues within these contexts might be very different.
Chapter 8. Strengths and Limitations

Objectives of this section

This section outlines the strengths and limitations of the study as a whole, and those of the methodology in more detail. In particular, this section looks at:

1. The strengths and limitations of systematic reviews in general, and possible limitations that arise from using specific search strategies and filtering processes.

2. The strengths and limitations of this particular systematic review, its key results, and the generalizability of these results.

3. The strengths and limitations of the studies, including the type of data used to study this issue, and the empirical techniques used.

8.1 Systematic review

As previously discussed, one of the many strengths of a systematic review is that it is an objective, transparent, and innovative methodology to identify relevant literature and avoid research biases. Using this methodology, we have been able to extract very robust evidence in a largely unbiased way.

However, there are some limitations to using this methodology for this particular type of study. Systematic reviews are usually used to address a specific, narrow question. This project addresses a very broad question that covers a very wide range of disciplines that rely on different estimation techniques for providing evidence. While studies in both the biological sciences and social sciences might rely a lot on RCT’s, studies in the former might not apply techniques such as IV or DID to assess robust effects. Thus, it may be difficult to address a multidisciplinary research question due to the very systematic search that these reviews require. This will also make comparisons of studies across different disciplines particularly challenging.

Perhaps the inability to capture and extract relevant evidence is also driven by our search terms. While using specific search terms helped to limit the scope of the study (focusing on only quantitative studies), the effectiveness of the search terms we used largely determined the pool of studies from which we could draw evidence. For instance, the keywords may have been too restrictive (synonyms are non-exhaustive), resulting in possible omission of relevant evidence.

More so, one of the strengths of our inclusion and exclusion criteria is that only the most robust and up-to-date studies were selected. However, it is possible that we missed very robust evidence in studies that were written in other languages, and that the selection of our empirical techniques could have biased the types of studies we gathered (more social science studies compared to studies in the biological sciences). There is also the chance that less robust but informative papers could have been missed, particularly since several studies only suggested potential mechanisms, which remained untested due to data limitations, among other reasons.
8.2 Methodological Techniques (Internal Validity)

One of our major strengths is that the study uses methodologies that address the problem of endogeneity, which provides technical rigor that may not be present in similar reviews. Most of our studies also used currently evolving estimation-approach techniques to analyze robust transmission mechanisms, including adoption techniques, twin studies, and natural experiments. However, since the included studies used different identification strategies, this limits the comparability of results. For instance, some authors (e.g., Holmlund et al., 2008) who reviewed several studies on the intergenerational transmission of education found that the conflicting results of these studies is due to the different techniques and estimation approaches that the authors used.

Moreover, particularly due to the difficulty of fully controlling for unobservable variables (such as inability), several of these studies may still have some biases even after controlling for multiple variables. This calls into question the validity of their estimates.

8.3 Data

A major strength of the studies included is that most of them relied on longitudinal data to assess the extent of intergenerational transmission, and to test the underlying mechanisms. Nonetheless, a major limitation is that these studies also relied heavily on survey data, which can be problematic, particularly due to measurement error. There might also be potential problems with attrition and data quality, which we may not have discovered. There are also potential issues with comparability of data (e.g., urban vs. rural and developing vs. developed countries). Even so, as is the case for most empirical studies, the data used in our included studies may not be representative of a country or region's population.

8.4 External Validity of the Results

One of the major strengths of this study is its reliance on quantitative evidence, which allows one to draw evidence-supported conclusions on the populations studied. However, the empirical techniques are applied to data from specific countries, and from very different contexts, and in some cases to particular groups of the population that may not be representative of an average individual. This therefore means it is difficult to draw inferences from these populations and contexts to other populations and contexts. Perhaps it makes it even more challenging to compare results across different outcomes and child well-being dimensions. As a result, the evidence presented may not be generalizable.

Also, due to the longitudinal data requirements for studying intergenerational issues, most of these studies rely on data from the mid-to-late twentieth century; very few studies use data from the twenty-first century. Several things have changed since then. Female labor participation has increased tremendously since that period, which might affect several of the mechanisms presented, including parenting time, maternal stress, and other factors. Consequently, although studies find that mothers play a very large role in determining a child's educational outcomes, this might merely be reflecting the context in which these studies were done, i.e. the fact that mothers were full-time homemakers and spent more time with children. Furthermore, there have also been changes in technology over time, which could affect healthcare provision and quality, or even educational achievement. Thus, some of the results found in these studies might be driven by the data limitations. In addition, several of the mechanisms may also be very specific to these contexts studied, and might rely on the type of data used.

This does not mean, however, that we cannot draw any reasonable conclusions based on these results. It just implies that when drawing on these results we have to keep in mind both the context from which these results were derived and the context in which they are being applied.


Baye, F. M. & Epo, B. N. Impact of Human Capital Endowments on Inequality of Outcomes in Cameroon.


De Cao, E. (2010). ‘The height production function from birth to early adulthood’.


Johnson, R. C. (2010). ‘The role of schools as a vehicle to intergenerational mobility’. University of California, Berkeley.


outcomes over the life course. The BE journal of economic analysis & policy, 11(3).


Mahatmya, D. (2011). 'Pathways to positive youth development: Identifying family, school, and neighborhood influences on civic involvement in emerging adulthood'.


Van Ijzendoorn, M. H. (1992). 'Intergenerational transmission of family size on child quality in a developing country'.


Appendices
Appendix A: Terms of Reference

CAPSTONE BY THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE FOR UNICEF

INTERGENERATIONAL EQUITY AND CHILDREN’S WELL-BEING

CONCEPT NOTE AND TIMELINE

BACKGROUND

Why study “Intergenerational Equity and Children’s Well-Being” now? Sustainable development is at the top of the United Nations (UN) agenda. Intergenerational equity is a theme that connects the outcome of the Rio+20 Conference and the debate on the Post-2015 development agenda. In Rio, Governments agreed to “consider the need for promoting intergenerational solidarity for the achievement of sustainable development, taking into account the needs of future generations, including by inviting the Secretary-General to present a report on the issue.”

Against this background, the proposed study will help UNICEF in shaping its contribution to the global debate on intergenerational equity and it will inform its internal policy and programmatic discussions on sustainable development and children.

RESEARCH QUESTION1

What are the effective policy and programmatic instruments that have demonstrated effects in increasing the intergenerational transmission of well-being that can be applied to today’s children?

SCOPE AND DEFINITIONS

For the purpose of the study, the following definitions are considered: (1) intergenerational equity, (2) children’s well-being, (3) intergenerational transmission mechanisms of well-being.

(1) Intergenerational equity. Defined as ensuring the well-being of today’s children to optimally transmit positive outcomes to their children. Intergenerational equity is to be considered in relation to the concept of sustainable development. The study will thus look at the economic, social and environmental dimensions of well-being outcomes and drivers.

(2) Children’s well-being. Given that there is no uniform and all-encompassing definition of well-being, this study will consider well-being as a multidimensional concept. According to the OECD (2009) report on child well-being, (OECD, 2009, “Doing Better for Children”: 24) “there is no unique, universally accepted way of actually measuring child well-being that emerges from the academic literature”. Following Columbo (1986), well-being is “a multidimensional construct incorporating mental/ psychological, physical, and social dimensions”, (Columbo, cited in Pollard and Lee, 2003:65). Other authors such as Weisner (1998), Schor (1995) Keith and Schalock (1994) and Martinez and Dukes (1997) also note that well-being is directly affected by social and cultural factors (e.g. cultural community, familial relationships, self-esteem and purpose of life, and self-concept of academic ability). More recently, Ben-Arieh and Frones (2007:1) have argued that “[c]hild well-being encompasses quality of life in a broad sense. It refers to a child’s economic conditions, peer relations, political rights, and opportunities for development.”

(3) Intergenerational transmission mechanisms. Intergenerational transfers consist of economic, social, and environmental assets and resources that are transferred from one generation to another (Bird, 2011). It involves public and private investment in supporting the capital formation as well as the capability of a younger generation to ensure its future (Collard, 2000). The intergenerational transmission of well-being can be defined as the private and public transfers of quality life from one generation to another.

Well-being is transferred through a set of negative and positive factors that directly affect the life opportunities of the next generation to experience well-being. (Bird, 2011). Black and Devereux (2010) define a causal mechanism as the force driving the observed intergenerational correlations or elasticity relationships. Mechanisms are the underlying causes or determinants of the (observed) intergenerational correlations” (p.3). Mechanisms could however, work at the household, community, and national levels, and can be affected by a host of intra-household factors and extra-household factors.

In this report the intergenerational transmission mechanisms of children’s well-being will be analysed within the following thematic areas:

1. Productive assets, income, inequality
2. Health
3. Education
4. Familial relationships
5. Discrimination, culture and social norms
6. Environment
7. Conflict

These thematic areas may be modified depending on the empirical evidence available.

MAIN RESEARCH TASKS2

The proposed research relates to the specified definitions and is based on UNICEF’s mandate to “advocate for the protection of children’s rights, to help meet their basic needs and to expand their opportunities to reach their full potential” (UNICEF, 2012). The underlying research task, which will have both quantitative and qualitative aspects, is twofold:

Following a discussion with the client, this project will only focus on the first Research Task. Thus, the main research task is: “To systematically identify and assess the evidence on the mechanisms of intergenerational transmission of both positive and negative outcomes for children’s well-being.”

1 Revised. See Footnote 2 below

2 Following a discussion with the client, this project will only focus on the first Research Task. Thus, the main research task is: “To systematically identify and assess the evidence on the mechanisms of intergenerational transmission of both positive and negative outcomes for children’s well-being.”
1. To systematically identify and assess the evidence on the mechanisms of intergenerational transmission of both positive and negative outcomes for children’s well-being.

2. To assess the evidence on successful policy interventions that address threats to the mechanisms of intergenerational transmission for children’s well-being.

In its conclusion, the study will provide concrete recommendations and identify appropriate research and policy developments to fill gaps in the existing evidence base.

**METHODOLOGY**

1. Conduct extensive research and in-depth analysis of proven (evidence-based) intergenerational transmission mechanisms of poverty and well-being in both developed and less developed countries.

2. Develop a general framework for understanding the transmission of equity and well-being between generations, including key mechanisms, risk factors and successful policy solutions. Special attention will be paid to the inter-linkages between the mechanisms.

3. Propose areas for future research, policies and programmes.

**PROPOSED WORK PLAN**

**Stage 1**

1. Identification of prospective studies and search strategy: identify potential studies through a broad and comprehensive search using keywords in main electronic databases, grey literature, working papers, dissertations (see Appendix I), leveraging on academic networks and experts.

2. Pre-selection of studies based on a general review of the title and abstract.

3. Inclusion and Exclusion criteria: screen studies based on pre-defined inclusion and exclusion criteria to reduce the pool to only the included studies.

4. Quality appraisal: assess the quality of the final selection of studies based on the technical rigourosity and robustness of the findings.

5. Identification, Selection and classification of evidence-based mechanisms based on thematic areas and potential interlinkages. Identification of critical evidence gaps.

**Stage 2**

6. Identification of successful policy-responses to key mechanisms.

7. Quality appraisal: critically assess the quality of such policy interventions.

8. Recommendation of course of action and areas for further research.

**SPECIFIC OUTPUTS AND PRODUCTS**

1. Methodology and Initial Findings: specification of search strategy and selection criteria, and quality assessment process.

2. Conceptual framework.

3. Desk review: including a taxonomy of studies reviewed and a quality appraisal of main articles.


**REFERENCES**


Black, S.E. and Devereux, P.J., (2010), Recent Developments in Intergenerational Mobility, NBER Working Paper No. 15889, April 2010, JEL No. I20, J62


UNICEF (2012), Available at: [http://www.unicef.org](http://www.unicef.org)


Appendix B: Identification of the Studies

Main sources included:

1. Electronic databases (e.g. Taylor and Francis (A Journal of Demography), JSTOR, Social Science Research Network, EconLit, Wiley Interscience, PubMed).
3. Working paper series from major research organizations (e.g. Research4DFID, Chronic Poverty Research Centre (CPRC), IDEAS, Overseas Development Institute (ODI), International Food Policy Research Institute (IFPRI), Centre for Global Development (CGD), Poverty Action Research Lab (PARL), International Policy Centre for Inclusive Growth (IPC-IG), World Bank, Inter-American Development Bank (IDB), UNICEF).
4. Scholarly search engines (e.g. Google Scholar)
5. Experts on intergenerational issues at LSE include Stephen Jenkins, Professor of Economic and Social Policy, Oriana Bandiera, Professor of Economics; Robin Burgess, Professor of Economics; Michael Murphy, Professor of Demography

Appendix C: Filtering Process

<table>
<thead>
<tr>
<th>Table I: Databases and Scholarly Engines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Database</strong></td>
</tr>
<tr>
<td>EconLit</td>
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<tr>
<td>IDEAS</td>
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<tr>
<td>Scopus</td>
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<tr>
<td>JSTOR</td>
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<tr>
<td>PubMed</td>
</tr>
<tr>
<td>Cochrane</td>
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<tr>
<td>Francis</td>
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<tr>
<td>Medline</td>
</tr>
<tr>
<td>Citeulike</td>
</tr>
<tr>
<td>Web of Science</td>
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<tr>
<td>ScELO</td>
</tr>
<tr>
<td>EBSCO</td>
</tr>
<tr>
<td>PsychLit</td>
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<tr>
<td>UNICEF</td>
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<tr>
<td>OECD</td>
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<tr>
<td>ODI</td>
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<tr>
<td>World Bank</td>
</tr>
<tr>
<td>Jals</td>
</tr>
<tr>
<td>IDB</td>
</tr>
<tr>
<td>Google Scholar</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

* Full string

<table>
<thead>
<tr>
<th>Table II: Filtering Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Included studies</strong></td>
</tr>
<tr>
<td>Databases</td>
</tr>
<tr>
<td>Title</td>
</tr>
<tr>
<td>Abstract</td>
</tr>
<tr>
<td>Quant Evidence</td>
</tr>
<tr>
<td>Causality</td>
</tr>
<tr>
<td>Quality Appraisal:</td>
</tr>
<tr>
<td><strong>Identification</strong></td>
</tr>
</tbody>
</table>
Appendix D: Approaches of Included Studies

From our 113 studies (see Table III) we identified the following quantitative methods used:

1. **Randomized Control Trials (RCT):** Participants in an RCT are randomly assigned to a treatment and a control group. By randomly assigning a treatment we can ensure that it is uncorrelated with other determinants of the outcome. This method minimizes selection bias and other threats to internal validity. RCTs have some drawbacks: they are expensive, and may have limited external validity, as they are usually carried out on specific populations and contexts. If conducted well, we can interpret results of RCTs as causal.

2. **Quasi-Randomized Control Trials (Q-RCTs):** Quasi experiments are similar to RCTs, except that they lack the randomized assignment to treatment and control groups. Treatment is not truly random; rather a researcher is able to control who gets assigned to the treatment group. Rather, by controlling the assignment of the treatment, RCTs allow a researcher to estimate the causal impact of the intervention on the target population (an intention to treat estimate). There is usually a larger risk of selection bias in this design.

3. **Instrumental Variables (IV):** IV regression is a way to obtain consistent estimates when the explanatory variable is correlated with the error term of a regression relationship. The IV regression uses an instrument to isolate the exogenous portion of the explanatory variable (X) that is uncorrelated with the error term, and disregards the variations in X that would otherwise bias the estimates. An instrument must meet two conditions to be valid: it must be correlated with the explanatory variables (relevance), but must not be correlated with the error term in the regression equation (exogeneity). It is more difficult to assess the exogeneity criteria than the relevance criteria, as the former cannot be directly tested.

4. **Difference-in-Differences (DID):** DID is a quasi-experimental approach that measures the effect of receiving a treatment. The DID estimator measures the gains of the treatment group, relative to the control group. The key identifying assumption of DID estimation is the “parallel trends assumption”: in the absence of treatment, the treatment group would have developed in the same way as the control group. The validity of the DID estimate relies on this underlying assumption holding.

5. **Regression Discontinuity (RDD):** The regression discontinuity design (RDD) exploits natural experiments generated by arbitrary rules, where receipt of treatment (an intervention) is based on a cut-off. RDD essentially compares people just above or below the cut-off, thus, estimating the average treatment effect. This is based on the assumption that the two groups (on either side of the cut-off) are similar, and therefore, those below the threshold form a valid counterfactual for those above the threshold.

6. **Propensity Score Matching (PSM):** Where observational data is available, PSM attempts to replicate randomization. PSM involves matching individuals based on observables characteristics, by matching a treated person with an untreated person identical in relevant observable characteristics. That is, the someone as similar as possible in determinants of potential outcomes. Among the drawbacks of this method is the fact that we can only use observable control variables, PSM requires large samples, and it is difficult to find an exact match, which leaves room for omitted variable bias.

7. **Fixed Effects (FE):** In a panel data analysis, this prevents omitted variable bias from variables that do not change over time (time fixed effects) or variable that affect all individuals or locations in the same way (i.e. does not vary across individuals or location) (person or state fixed effects).
## Appendix E: Quality Appraisal Criteria

<table>
<thead>
<tr>
<th><strong>Study and Survey description</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
</tr>
<tr>
<td>** Aim of the Study:**</td>
<td>What questions is the study aiming to answer?</td>
</tr>
<tr>
<td><strong>Level of analysis:</strong></td>
<td>Household (Community, neighborhood, state)</td>
</tr>
<tr>
<td><strong>Instrument:</strong></td>
<td>What is the direct effect of the independent variable on the child outcome?</td>
</tr>
<tr>
<td><strong>Variables:</strong></td>
<td></td>
</tr>
<tr>
<td>Parenting variable (independent variable)</td>
<td>What is the direct effect of the independent variable on the child outcome?</td>
</tr>
<tr>
<td>Note: In some cases, a child characteristic can also act as an independent variable (e.g., gender, years of education, etc.)</td>
<td></td>
</tr>
<tr>
<td><strong>Child Outcome (dependent variable):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Controls:</strong></td>
<td></td>
</tr>
<tr>
<td>Key results: Specify the direction and size of the effect (significance with a).</td>
<td></td>
</tr>
<tr>
<td><strong>Index description of the study:</strong></td>
<td>Max. 2-3 lines</td>
</tr>
<tr>
<td><strong>Sample Size:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Country:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Data and Sample:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Time Period:</strong></td>
<td>e.g. 1878 - 2003</td>
</tr>
<tr>
<td><strong>Population:</strong></td>
<td>Subgroup of population (e.g., African-American immigrants, etc.)</td>
</tr>
<tr>
<td><strong>Life Cycle Stage of Children:</strong></td>
<td></td>
</tr>
<tr>
<td>1. Pre-natal</td>
<td></td>
</tr>
<tr>
<td>2. Pre-schooling (0-5 years old)</td>
<td></td>
</tr>
<tr>
<td>3. School age and youth (6-18)</td>
<td></td>
</tr>
<tr>
<td><strong>Estimation Method(s):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Is it worth continuing?</strong></td>
<td>Yes/No</td>
</tr>
<tr>
<td><strong>Reason:</strong></td>
<td></td>
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</tbody>
</table>

## Quality appraisal

<table>
<thead>
<tr>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Type: Please describe the type of data used.</td>
</tr>
<tr>
<td>Data description: Briefly describe the survey data used (type of data, number of respondents).</td>
</tr>
<tr>
<td>Population: Is the population in the data clearly described?</td>
</tr>
<tr>
<td><strong>Representativeness:</strong></td>
</tr>
<tr>
<td><strong>Data linkage:</strong></td>
</tr>
</tbody>
</table>

## Internal validity appraisal

<table>
<thead>
<tr>
<th>Study design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methodology: Is survey data used appropriate for answering the research question?</td>
</tr>
<tr>
<td>Internal validity consideration: Is there an assessment of the internal validity of the study?</td>
</tr>
<tr>
<td><strong>Selection bias:</strong></td>
</tr>
</tbody>
</table>

## Measurement

| Variables measurement: | Were the independent and dependent variable adequately measured and described? |
| Reliability: | Was the measure likely to be valid and reliable? |
| Measurement error: | Does the author address the limitation of potential measurement error (e.g., high measurement error in consumption expenditure, income or earnings as measured in many developing countries)? |

## Identification strategy

| Group equivalence: | Does the allocation mechanism generate equivalent and comparable groups? |
| Robustness checks: | Does the author provide any robustness check? |
| **Identification strategy:** | Robustness checks can be considered by adding new variables or using another identification strategy. |

## By econometric techniques

<table>
<thead>
<tr>
<th>RCT and Q-RCT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Described as Randomized:</strong></td>
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<tr>
<td>Attrition:</td>
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<tr>
<td><strong>Groups are comparable:</strong></td>
</tr>
<tr>
<td><strong>Heterogeneity:</strong></td>
</tr>
<tr>
<td><strong>IV:</strong></td>
</tr>
<tr>
<td>2SLS:</td>
</tr>
<tr>
<td>Exogeneity:</td>
</tr>
<tr>
<td><strong>DID:</strong></td>
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<tr>
<td><strong>Previous Trends:</strong></td>
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<tr>
<td><strong>RDD:</strong></td>
</tr>
<tr>
<td><strong>Continuity:</strong></td>
</tr>
<tr>
<td><strong>PE:</strong></td>
</tr>
<tr>
<td><strong>Type:</strong></td>
</tr>
<tr>
<td><strong>Combination with IV:</strong></td>
</tr>
</tbody>
</table>

## Results

| **Results reported:** |  |
| **Standard error:** | Are the coefficients and standard errors shown in the same circumstances? |
| **Clustered SE:** | Are they clustered? |
| **External validity:** | IV Considerations |

## Quality Appraisal

| High/ Low Quality: |  |
# Appendix F: Quality Appraisal

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Estimation method</th>
<th>Quality (High/Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aaronson, D., &amp; Mazumder, B. (2008)</td>
<td>US</td>
<td>IV</td>
</tr>
<tr>
<td>3</td>
<td>Aizer (2007)</td>
<td>US</td>
<td>IV</td>
</tr>
<tr>
<td>4</td>
<td>Aizer et al. (2009)</td>
<td>US</td>
<td>FE</td>
</tr>
<tr>
<td>12</td>
<td>Azevedo et al. (2012)</td>
<td>Mexico</td>
<td>FE</td>
</tr>
<tr>
<td>13</td>
<td>Barham (2011)</td>
<td>Mexico</td>
<td>FE</td>
</tr>
<tr>
<td>15</td>
<td>Barham, T. C., L. (2008)</td>
<td>Bangladesh</td>
<td>FE / DID</td>
</tr>
<tr>
<td>16</td>
<td>Beegle (2007)</td>
<td>Tanzania (Northwestern-rural setting)</td>
<td>IV/FE</td>
</tr>
<tr>
<td>17</td>
<td>Beegle, K. (2005)</td>
<td>Tanzania</td>
<td>FE</td>
</tr>
<tr>
<td>18</td>
<td>Beegle, K. D. W., J.; Dercon, S. (2011)</td>
<td>Tanzania</td>
<td>DID</td>
</tr>
<tr>
<td>20</td>
<td>Behrman et al. (2005)</td>
<td>Mexico</td>
<td>RCT- Child specific FE</td>
</tr>
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<td>21</td>
<td>Behrman, J. R. M., Alexis; Quisumbing, Agnes R.; Youn, Kathryn (2009)</td>
<td>Guatemala</td>
<td>IV</td>
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<td>24</td>
<td>Behrman, J. R., Parker, S. W., &amp; Todd, P. E. (2011)</td>
<td>Mexico</td>
<td>DID</td>
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<td>26</td>
<td>Bernal (2011)</td>
<td>US</td>
<td>IV</td>
</tr>
<tr>
<td>#</td>
<td>Author(s) (Year)</td>
<td>Country/Design</td>
<td>Method</td>
</tr>
<tr>
<td>----</td>
<td>-----------------------------------------------------</td>
<td>-------------------------</td>
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</tr>
<tr>
<td>28</td>
<td>Bhalotra (2011)</td>
<td>Cross-sectional</td>
<td>FE</td>
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<tr>
<td>30</td>
<td>Binagwaho et al. (2012)</td>
<td>Rwanda</td>
<td>IV</td>
</tr>
<tr>
<td>31</td>
<td>Binelli, C. (2003)</td>
<td>Sixty three countries</td>
<td>FE</td>
</tr>
<tr>
<td>32</td>
<td>Black et al. (2007)</td>
<td>Norway</td>
<td>FE</td>
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<td>Blunch (2012)</td>
<td>Ghana</td>
<td>IV</td>
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<td>Bobonis et al. (2004)</td>
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<td>India</td>
<td>RCT</td>
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<td>IV</td>
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<td>Burchi (2010)</td>
<td>Mozambique</td>
<td>IV</td>
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<td>41</td>
<td>Carvalho, L. (2012)</td>
<td>Philippines</td>
<td>FE</td>
</tr>
<tr>
<td>43</td>
<td>Chapuis, O. C. C. (2010)</td>
<td>across OECD countries</td>
<td>FE</td>
</tr>
<tr>
<td>44</td>
<td>Chaudhury, N. O., Yoko (2012)</td>
<td>Philippines</td>
<td>DID /RDD</td>
</tr>
<tr>
<td>47</td>
<td>Coneus (2008)</td>
<td>Germany</td>
<td>FE</td>
</tr>
<tr>
<td>48</td>
<td>Coneus (2012)</td>
<td>Germany</td>
<td>FE</td>
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<td>Corley (2000)</td>
<td>US</td>
<td>FE</td>
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<td>Córdova, K. (2009)</td>
<td>Mexico</td>
<td>IV</td>
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<td>Currie et al. (2005)</td>
<td>US</td>
<td>FE</td>
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<tr>
<td>55</td>
<td>Dasgupta (2011)</td>
<td>Armenia, Bulgaria, Montenegro, Romania, and Turkey</td>
<td>FE</td>
</tr>
<tr>
<td>56</td>
<td>Daude, C. (2011)</td>
<td>LAN</td>
<td>FE</td>
</tr>
<tr>
<td></td>
<td>Authors</td>
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Note 1: Estimation Method: Estimation methodology to assess the robustness of the findings: Randomized Controlled Experiment (RCT); Quasi-Randomized-Experiment: Policy Change with quasi randomized assignation process (Q-RCT); Instrumental Variables (IV); Fixed Effects: controlling for unobservables (FE)  
Note 2: Quality Appraisal: Veracity of the estimation technique to isolate the effect: High; Low
## Appendix G: Summary of Included Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Methodology</th>
<th>Outcomes</th>
<th>Participants</th>
<th>Findings</th>
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<tr>
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<td>Case Study</td>
<td>Improvement in patient satisfaction</td>
<td>Adult patients receiving cancer treatment</td>
<td>Significant improvement in satisfaction scores</td>
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<tr>
<td>Study 2</td>
<td>Randomized Controlled Trial</td>
<td>Reduction in adverse effects</td>
<td>Elderly patients post-surgery</td>
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<td>Study 3</td>
<td>Systematic Review</td>
<td>Meta-analysis of outcomes</td>
<td>Various populations</td>
<td>Consistent improvement in health outcomes across studies</td>
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<td>Study 4</td>
<td>Pilot Study</td>
<td>Pilot testing of new intervention</td>
<td>Young adults</td>
<td>Preliminary evidence of feasibility and acceptability</td>
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<tr>
<td>Study 5</td>
<td>Quasi-Experimental Design</td>
<td>Comparison of outcomes</td>
<td>High-risk travelers</td>
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Note: Table continues with additional studies and findings.
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**Notes:**
- N/A indicates information not available.
- The table contains a mix of historical events, policies, and other significant developments.
- Specific details about each event or policy are not provided in the table.
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<td>Indonesia</td>
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</table>
Glossary of Terms

Attrition: The loss of subjects from a study after assignment to the treatment or control.

Average Causal effect: The population average of the individual causal effects in a heterogeneous population. Also called the average treatment effect.

Bias: It arises when an estimation is systematically different from its true value.

Causal effect: The expected effect of a given intervention or treatment as measured in an ideal randomized controlled experiment.

Causation: means that a specific action leads to a specific, measurable consequence. A correlation does not imply causation.

Clustered standard errors: A method of computing standard errors that is appropriate for panel data. Clustered standard errors assume that the error terms within a cluster can be arbitrarily correlated, but that there is no correlation of the error terms across clusters.

Children's well-being: Stemming from its multidimensional construct, this study specifically focuses on the health, education, and income indicators of the well-being of children. This includes both positive and negative child outcomes within these indicators. The study will however not consider life-satisfaction and happiness as indicators of well-being. We use well-being and poverty interchangeably, where the latter refers to negative aspects of well-being.

Control group: The group that does not receive the treatment or intervention in an experiment.

Control variable: A regressor that controls for an omitted factor that determines the dependent variable.

Correlation: The extent to which two variables move, or vary, together.

Cross-sectional data: Data collected for different entities in a single time period.

Differences-in-differences estimator: The average change in the outcome variable for those in the treatment group minus the average change in the outcome variable for those in the control group.

Endogeneity: In econometric models, endogeneity is problem mainly caused by omitted variables, reverse causality or measurement error.

Endogenous: in econometric models, an endogenous variable is said to be endogenous when there is a correlation between the parameter and the error term.

Estimate: The numerical value of an estimator computed from data in a specific sample.

Experimental data: Data obtained from experiments designed to evaluate a treatment or policy or to investigate a causal effect.

External validity: Inferences and conclusions from a statistical study are externally valid if they can be generalized from the population and setting studied to other populations and settings.

Instrumental variable: A variable that is correlated with an endogenous regressor (instrumental relevance) and is uncorrelated with the regression error (instrument exogeneity).
Intergenerational equity: This entails meeting the needs of the present without compromising the ability of future generations to meet their own needs’ (the Brundtland Commission Report, 1987). It also pertains to the level of ‘social mobility’ between generations in absolute terms (whether children are richer or poorer, healthier, or more educated than their parents), or in relative terms (whether children are higher or lower on the social ladder than their parents). This can be measured by the share of inequality coming from factors over which people have no control, such as race, gender, birthplace, or parents’ education (Brundtland, 2012).

Intergenerational transmission: According to Lochner (2008:1), “intergenerational transmission refers to the transfer of individual abilities, traits, behaviors, and outcomes from parents to their children.” It consists of not only economic, social, and environmental assets and resources that transfer from one generation to another (Bird, 2011), but also public and private investments to support the capabilities of the younger generation and ensure its future (Collard, 2000). Well-being is transferred through a set of negative and positive household, or extra-household (community and national-level) factors that directly affect the opportunities of the next generation (Bird, 2011).

Internal validity: When inferences about causal effects in a statistical study are valid for the population being studied.

Measurement error: this is the difference between the measured value of a variable and its true value.

Mechanisms: These are the channels through which transmission of poverty and well-being occurs. Transmission mechanisms are “the underlying causes or determinants of the [observed] intergenerational correlations or elasticity relationships” (Black and Devereux, 2010:3). These mechanisms could work through (and may be affected by) household and extra-household factors.

Observational data: Data based on observing, or measuring, actual behavior outside an experimental setting.

Omitted variable (bias): Since one cannot observe all the factors affecting the outcome variable, omitting this “unobservable” variable will bias the estimation results if the omitted variable(s) there is correlated with the explanatory and the unobserved variable has an effect/is a determinant of the dependent/outcome variable.

Panel data: Panel data are datasets for multiple units or entities in which each unit (e.g., people) or entity is observed for several time periods. In the absence of experimental data, the use of panel data is an important approach to reduce the problem of omitted variable bias.

Population: The group of entities – such as people, companies, or school districts – being studied.

Quasi-experiment: A circumstance in which randomness is introduced by variations in individual circumstances that make it appear as if the treatment is randomly assigned.

Randomized controlled experiment: An experiment in which participants are randomly assigned to a control group, which receives no treatment, or to a treatment group, which receives a treatment.

Regressor: A variable appearing on the right-hand side or a regression; an independent variable in a regression.

Reverse Causality/Simultaneity: It is a problem arising in econometric models when two variables are jointly determined.

reverse causality (a set of variables that is jointly determined), measurement error (the difference between a measured or reported value and its true value).

Significance level: The pre-specified rejection probability of a statistical hypothesis test when the null hypothesis is true.

Simultaneous causality: When, in addition to the causal link of interest from the X to Y, there is a causal link from Y to X. Simultaneous causality makes X correlated with the error term in the population regression of interest.
Standard deviation: The square root of the variance. The standard deviation of the random variable $Y$, denoted $\sigma_Y$, has the units of $Y$ and is a measure of the spread of the distribution of $Y$ around its mean.

Statistically significant: The null hypothesis (typically, that a regression coefficient is zero) is rejected at a given significance level.

Time effect: Binary variables indicating the time period in a panel data regression.

Treatment effect: The causal effect in an experiment or a quasi-experiment.

Treatment group: The group that receives the treatment or intervention in an experiment.