Global_Data_Lab

Working Paper Series
Paper 25-102
June 2025

The effect of parental migration on children left behind: meta-analytical evidence on education and child labour

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Abstract: This study presents meta-analytical evidence of the effects of parental migration, either father or mother or both, on children left behind. To systematically analyse the existing empirical findings, we identified 37 papers with 706 estimates on education and child labour that were circulated between 2000 and March 12th, 2024. We complemented these with another 13 papers on educational aspirations that were systematically reviewed. Employing automated tools to increase the objectivity of our approach (*litsearchr, ASReview*), we identify no negative repercussions from parental migration when considering the simple average effect across studies. When zooming into multivariate analyses we identify that children experiencing parental migration are initially less likely to drop out of school or to engage in child labour probably because of the household's improved financial situation. However, children's educational performance worsens and their likelihood of dropping out ultimately increases again over time presumably due to the emotional distress of family disruption. Publication bias is a concern as it counteracts these findings. Overall, there is considerable heterogeneity. Children left behind in low-income countries show improved educational outcomes and less child labour, in upper-middle income countries it is the opposite. The consolidated evidence calls for policymakers of countries with high emigration and/or internal labour migration to be aware of the possible challenges left-behind children face and provide programs and safety nets for them.

1. Introduction

International migration rose from 153 million to 281 million individuals between 1990 and 2020 (UN, 2020). These figures do not include the largest movement of people, internal migrants, estimated to be 763 million people in 2013 (Bell & Charles-Edwards, 2013). Even though there are no recent estimates of internal migration, these migratory flows keep increasing due to urbanisation and the aspiration for better life elsewhere (McAuliffe & Oucho, 2024). Despite (humanitarian) crises being a migration trigger, most migrants move to improve their family's financial situation by being economically active in another geographical area (Stark & Bloom, 1985; UN, 2022; Zentgraf & Chinchilla, 2012). Accordingly, there has been a significant rise in remittances over the past years (UN, 2022).

Yet, a downside of economic migration is that families cannot necessarily migrate together and have to split up. Often, this implies that children are left behind in vulnerable conditions (Antia et al., 2022; UN, 2022). In countries as diverse as Georgia, Ghana, Moldova, China, the Philippines, Ecuador, and South Africa, about one-third of the children are estimated to be left behind by a migrating parent (Fellmeth et al., 2018). They stay in their original living environment whilst one or both parents migrate, often for work. Connecting them to essential services, such as education, might be difficult without parents being around because of financial instability immediately after parental departure, increased household obligations, and less parental attention, care and support (Bakker, 2009; UNICEF, 2021). Moreover, these left-behind children are more at risk of human rights violations, such as abuse and neglect (Bakker, 2009; UNICEF, 2021), implying new challenges for child protection (Fu et al., 2023). Therefore, it is crucial for policymakers to have systematic evidence of the impact of parental migration on their left-behind children.

To fill the gap, we conducted a meta-analysis and systematic review. We structurally analyse and synthesise the results of the existing literature to contribute to a more robust evidence base about the net effect of parental migration explicitly, as parents are key attachment figures (Grames et al., 2019; Wang et al., 2024; Xu, 2017). We exclusively focus on the migration of fathers, mothers or both of them; migration of another household member and its potential impact on household and children's wellbeing is excluded from our analysis. While meta-regression analyses are not uncommon in economics and development (Floridi et al., 2020), we lack systematic evidence regarding the effects of parental migration on educational and child labour outcomes of left-behind children in low-and middle-income countries (LMICs). Existing meta-analyses focus either on health outcomes or exclusively zoom in on China (M. Chen et al., 2020; Fellmeth et al., 2018; Wen et al., 2021). Moreover, to the best of our knowledge, no meta-analysis includes the effect of parental migration on child labour, although narrative reviews and primary studies are available (Asis & Ruiz-Marave, 2013; Yang, 2004). Consequently, we aim to answer the following research question: *"How does parental migration affect educational and child labour outcomes of the children left behind in LMICs?"*

We meta-analyse 706 estimates from 37 studies on education and child labour outcomes and systematically review another 13 papers on educational aspirations

circulated between 2000 and March 12th, 2024. We searched the following platforms: Scopus, Web of Science, and Google Scholar. We identify no negative repercussions from parental migration when considering the simple average effect across studies. When zooming into multivariate analyses we identify that children experiencing parental migration are less likely to drop out of school or to engage in child labour probably because of the household's improved financial situation. However, children's educational performance worsens, and their likelihood of dropping out ultimately increases over time presumably due to the emotional distress of family disruption. Publication bias is a concern as it counteracts these findings. We have not been able to identify any positive effect on children who are already working. They seem to be working even more hours once their parents migrated to help finance the migration. However, there is heterogeneity in effects. For low-income countries, financial gains from migration spur educational outcomes and decrease child labour. The effect of parental migration on educational aspirations remains unclear in the existing literature.

The study at hand contributes to the current literature along the following six dimensions. First, we broaden the focus on both educational and child labour outcomes for all LMICs, making our meta-analysis the most comprehensive study related to the topic to date. Partly, this is because the evidence base keeps growing due to ever-increasing migratory dynamics (UN, 2022), resulting in improved consistency and generalisability of the aggregate results (Dekkers et al., 2022). Second, aggregate, across-study outcomes are important since individual studies measuring parental migration on children's educational outcomes at a single point in time potentially suffer from bias related to the timing of the data collection (Wassink & Viera, 2021). Third, our meta-analysis benefits from employing tools such as *litsearchr* and *ASReview*. This increases the objectivity of our structural approach (Grames et al., 2019; Van De Schoot et al., 2021). Fourth, the meta-analysis also contributes to the literature by examining the heterogeneity of effects, as these are likely to depend on the context in which parental migration occurs (Fellmeth et al., 2018). Fifth, focusing on the effect of migration in the sending countries contributes to the geographical decentring of migration research away from the current focus on Western receiving countries. Sixth, the meta-analysis at hand further adds to the migration debate as it is one of a few studies analysing internal and international migration jointly.

The remainder of this article is structured as follows: Section 2 presents a brief literature review. Section 3 introduces the data and methodology. The results, including robustness and heterogeneity analyses, are presented in section 4, and section 5 concludes.

2. Literature review

Family-related migration topics are increasingly represented in migration journals, resulting in a growing evidence base on the consequences of parental migration on left-behind children (Pisarevskaya et al., 2020). Many studies have been conducted in China, where the phenomenon of left-behind children is widespread as a result of the household registration system known as Hukou. This system does not grant the same rights to rural-urban migrants as to urban-born citizens. Excluding the former from access to school and health care (Jingzhong & Lu, 2011; Lu, 2012).

Yet, studies have also been conducted in other countries where migration is relatively common, such as Mexico, India, and the Philippines (Pajaron et al., 2020; Song & Glick, 2022; Vikram, 2021). Despite the growing evidence base, inconclusive impacts of parental migration on the educational and labour outcomes of children left behind were identified in the primary studies. The three main channels discussed in the literature are the income, family disruption, and aspiration channels, which differ in their predicted effects of parental migration. To be explicit, key to the study at hand is that we consider these three channels not for family-related migration in general but exclusively in the context of a father, a mother or both parents migrating. We deliberately exclude the migration of any other family members as we want to study impacts stemming from the migration of the main caregivers.

Concerning channels, on the one hand, migrant parents send back remittances, which can be used to educate left-behind children (Bryan et al., 2014). This income effect – sometimes referred to as the economic pathway – increases schooling and decreases the probability of engaging in child labour (Gassmann et al., 2018; Roy et al., 2015; Zambrana Cruz & Rees, 2020). In a similar vein, the aspiration channel suggests increased educational aspiration due to parental migration. Migrating parents shift their children's educational aspirations upwards by exposing them to new conditions and environments (Beine et al., 2001; Böhme, 2015). Children know about the sacrifices that their parents make and consequently aspire more (Chen et al., 2013). Since children left behind are more likely to migrate themselves (Z. Chen, 2023), the prospect of future migration might increase the expected return to education and, thus, educational investments.

On the other hand, the family disruption or substitution channel suggests that the lack of parental care and attention might outweigh the improved financial means and negatively affect educational outcomes (Yao Lu, 2014; Raut & Tanaka, 2018; Wang et al., 2021). Fu et al. (2023) point out that remittances are mainly used to pay off debt and to fulfil basic needs, such as buying food. Moreover, the emotional distress or lack of a parental caregiver can lead to lower school performance. Related insights stem from the literature on the consequences of divorce on children's educational outcomes (Bernardi & Radl, 2014; Bussemakers et al., 2022; Havermans et al., 2014). The changes in parental time and practices, the increase in parental stress, and the child's emotional distress due to parental absence might apply similarly to parental migration. Resource dilution theory further suggests that if only one instead of two parents is available, parental social resources and support decrease due to less time and energy (Blake, 1981; Steelman & Powell, 1989). This leads to less cognitive stimulation of the child. However, children from divorced and migrant parents also differ from each other. Divorced parents often live closer to their children than migrant parents, while migrant parents can be more involved than recently divorced parents (Nobles, 2011; Yu, 2013). This can result in different (financial) contributions to the household and, accordingly, different educational outcomes (Nobles, 2011; Yu, 2013). Additionally, and along a different dimension, children might have to replace their missing parent in the household, which makes them particularly vulnerable to child labour (Chang et al., 2011; Kamei, 2018; Xu, 2017).

The aspirations of children can be affected by the family disruption as well. Since migration is experienced as an alternative option, children left behind are more likely to migrate themselves. Paradoxically, this might lower educational aspirations (Chen et al., 2013; Wassink & Viera, 2021). This is referred to as the 'culture of migration hypothesis',

which predicts that as many people in the community migrate irrespective of their educational achievements, children might not see the expected return to education (Dreby & Stutz, 2012). Taken together, the family disruption channel could mitigate the positive effects of the income channel.

Empirical assessments of these theoretical insights resulted in a wide array of evidence. In the case of Romania, Botezat and Pfeiffer (2020) show that children experiencing parental migration show a 2.4 higher grade point average on a 1-to-10-point scale compared to children living with both parents. Similarly, Vikram (2021) finds that Indian children left behind by their fathers have a 0.5 higher reading test score on a five-point scale compared to children living with both parents. The effect is particularly strong for boys. Regarding child labour outcomes, Pajaron et al. (2020) identified for the case of the Philippines that children left behind were less likely to work compared to children living with both parents. All these studies support the income channel.

However, there is also evidence for the opposite effect, suggesting that the family disruption channel dominates the relationship between parental migration and children's skills. Wang et al. (2021) show for the case of China that children experiencing maternal migration have two years less of schooling compared to children who do not experience any parental migration. Chang et al. (2011) look at child labour outcomes for Chinese children who are left behind. They identify that children left behind are more likely to participate in domestic and agricultural work. Daughters left behind by one parent increase their daily domestic work by an hour and sons by 20 minutes.

Next to educational outcomes, other studies focus on the aspirational effects (Dreby & Stutz, 2012; Kandel & Kao, 2001; Nobles, 2011; Wen et al., 2015). Nobles (2011) shows that Mexican children experiencing parental migration have lower aspirations to go to college as compared to children who do not experience migration. This supports the findings from earlier work of Kandel and Kao (2001), who similarly identified that Mexican children experiencing paternal or family migration have lower aspirations to go to university. In turn, Dreby and Stutz (2012) present evidence that Mexican children who experience maternal migration aim for a higher educational level. Similarly, Wen et al. (2015) demonstrate that paternal and parental migration increases children's educational aspirations in China.

To understand the heterogeneity in the observed effects, depending on the specific contexts in which parental migration takes place, we draw on attachment theory (Wang et al., 2023) and the transnational family literature (Haagsman & Mazzucato, 2014; Parreñas, 2005; Zentgraf & Chinchilla, 2012). Both theories observe differences in effects depending on the age of the child. According to attachment theory, parental migration at a younger age – during a critical period of attachment – leads to more adverse effects for the child (Wang et al., 2023). If attachment formation to a key caregiver is interrupted, separation, social anxiety and other mental health issues can appear, which can negatively influence educational attainments (Wang et al., 2024). According to Liu et al. (2009) critical attachment periods happen between 0 and 7 years of age. Others suggest that key attachment is completed by age 6 (Ling et al., 2015) or even age 3 (Altenhofen et al., 2013). Parental absence after these critical periods is less adverse since children can develop some resilience associated with successful attachment (Bender & Ingram, 2018). This way, children can better cope with parental migration and put it in a social

perspective, especially when they grow up in an environment where out-migration is prominent (Wang et al., 2023; Zentgraf & Chinchilla, 2012).

The role of a child's age at separation is less clear in the transnational family literature, which has been extensively reviewed by Haagsman and Mazzucato (2014). On the one hand, separation at a younger age might be traumatic because the child cannot fully comprehend the situation (Fan et al., 2010; Schmalzbauer, 2004). On the other hand, parental migration could be traumatic at older ages when shared memories have been made, and the child misses the parent more actively. Other mediating factors discussed by Haagsman and Mazzucato (2014) are the gender of the migrant parent, the contact between parent and child, remittances sent, the quality of the substitute caregiver, and the length of separation. The effects of parental migration are worse for maternal migration and if the relationship between the migrant parent and the caregiver is conflicted due to divorce or differences in caregiving approaches (Haagsman & Mazzucato, 2014; Jingzhong & Lu, 2011). Moreover, frequent contact and remittances seem to influence the parent-child relationship positively (Haagsman & Mazzucato, 2014). The role of separation length is unclear in the literature. Longer separation can emotionally distance the parent and child more (Carling et al., 2012; Fresnoza-Flot, 2009). However, there is also evidence that children value their parents more because of what they sacrificed for them (Schmalzbauer, 2008).

To identify commonalities in this vast literature, our meta-analysis systematically consolidates the existing studies to assess the overall impact of parental migration on children's education and labour activities, accounting for variations in effects, conditions, and methodologies. We also account for heterogeneities due to the timing of the primary study, the country under study, sample characteristics, gender, and publication traits.

3. Data & methodology

3.1 Data

For this systematic review and meta-analysis, three databases and two search rounds were used to examine the published literature: Scopus and Web of Science during the first search round and Google Scholar during the second search round. Articles in Scopus and Web of Science circulated between the year 2000 and February 24th, 2023, when the first search round was performed, were searched for. The year 2000 was chosen as a starting point because the ILO added the Worst Forms of Child Labour Convention in 1999 (ILO, n.d.). Since 2000, this definition has remained unaltered, and we expect that the convention has spurt research into the situation of children. A second search round was performed using Google Scholar, which was done on February 24th, 2024. The second search round was used to investigate the grey literature and whether an additional search round affects the results of our study, akin to the approach in previous research (Fellmeth et al., 2018; Floridi et al., 2020). The tailored search strings for each database can be found in Appendix 1. Keywords around three concepts were combined: 1) parental migration, 2) children left behind, and 3) child educational and labour outcomes. The search strings for Web of Science and Scopus were optimised using the *litsearchr* package in R, an automated approach using text mining and keyword co-occurrence networks to make the search strategy more reproducible, standardised, and less susceptible to biases (Grames et al., 2019).

We explicitly focused on quantitative English-language studies on parental migration, children left behind, and educational and child labour outcomes in LMICs based on the PICOC protocol by Petticrew and Roberts (2008). The *population* concerns children aged 5-17 who experienced parental absence of at least one migrant parent. We hereby explicitly focus on parental migration, excluding the migration of other household members (see discussion, Appendix 2). The age range is based on the minimum working age defined by the ILO, the Convention on the Rights of the Child, and reports of international organisations like UNICEF (ILO & UNICEF, 2021; Unicef, 1989). Parental absence due to parental internal or international migration of at least one parent for at least 6 months is taken as the *intervention* for educational outcomes since this is considered problematic by the international community (Antia et al., 2020; Fellmeth et al., 2018). Papers for which the mean duration or cumulative parental absence was above 6 months are also included. For child labour outcomes, the *intervention* is parental internal or international migration without the 6-month rule, since a child often fills up an immediate gap in household chores when a parent leaves (Chen, 2013). An extensive discussion on the 6-month rule can be found in Appendix 3. Following previous research, the population of children with at least one migrant parent is *compared* to children from non-migrant households (Antia et al., 2020; Fellmeth et al., 2018). The study focuses on educational and child labour *outcomes*, ranging from educational attainment to school dropout and from child labour as incidence to hours and days worked, in the *context* of LMICs. Appendix 4 shows the complete list of outcomes considered in this study. In line with previous studies by Fellmeth et al. (2018) and Floridi et al. (2020), studies that were not written in English, not accessible without paying a fee, qualitative, using ANOVA only, and/or did not have sufficient data to perform the needed calculations were excluded.

After each search round, the review proceeded in two stages. In stage one, articles were marked as relevant or irrelevant based on the information in their titles and abstracts. In stage two, the articles marked as relevant were read entirely and inspected more intensively by looking at the data and methods. Two researchers (ALE & EB) identified relevant and irrelevant articles in this study. The researchers reviewed the titles, abstracts, and papers independently and discussed potential differences resulting in reconciliation. The first search round resulted in 421 papers in Web of Science and 372 in Scopus, leading to a total of 793 papers to be screened in the selection process. Duplicates were removed, leaving 637 articles to be reviewed in stage one. These papers were reviewed using *ASReview*, a machine learning technique that applies active learning to make screening more effective, transparent, and less susceptible to biases (Van De Schoot et al., 2021). The program ran based on 7 key papers identified by the authors, 5 relevant and 2 irrelevant articles, that were used as prior knowledge to train the algorithm and to create the order in which papers are shown to the users (Van De Schoot et al.,

2021). [1] Afterwards, the researchers actively (re)trained the algorithm by selecting relevant studies based on the title and abstract provided (Van De Schoot et al., 2021).

This process continued until the previously determined stopping rule was reached (see Appendix 5 for more detailed information about the stopping rule), for which the main criterion is the adequacy of including all relevant papers and excluding all irrelevant papers (Van De Schoot et al., 2021). The gold standard for this process is human reviewers, who tend to have an average error rate of around 10% (Wang et al., 2020). Following previous research using *ASReview*, a combination of two rules is used: (1) stop when the estimated number of relevant papers in the dataset is reached, based on the formula by van Haastrecht et al. (2021), (2) stop when 50 papers in a row are labelled irrelevant (Ros et al., 2017; van Dee et al., 2023; van Haastrecht et al., 2021). The latter prevents overestimating the number of relevant papers and screening inefficiently and is widely applied (Loheide-Niesmann et al., 2022; Ros et al., 2017; van Dee et al., 2023). After reviewing 474 abstracts and titles, 50 papers in a row were deemed irrelevant, and screening was stopped (see Appendix 6). At this point, 74.41% of the articles were screened. According to Van De Schoot et al. (2021, p. 130) in their assessment of *ASReview*, "95% of the eligible studies will be found after screening between only 8% to 33% of the studies", which means we reached the gold standard. The remaining 194 relevant articles were thoroughly investigated during stage two. During this stage, 45 additional duplicates were removed, which had not been removed before because of formatting or spelling differences. Ultimately, we extracted data from 25 eligible papers in this first search round for the analysis.

The Google Scholar search round resulted in 396 additional articles to be screened. Since the data needed for *ASReview* could not be exported, the articles from Google Scholar were reviewed manually. To determine when to stop screening during the first stage, the knee method was applied as implemented in the KneeArrower package in Rstudio since it is reliable, performs well regarding recall, and is efficient (Cormack & Grossman, 2016; Tseng, 2020). The knee point of inflexion is calculated by the slope ratio before and after a critical inflexion point on the gain curve, which is based on the articles screened and the number of relevant articles out of those articles (König et al., 2023). To determine when to stop, both the derivative cutoff and the maximum curvature cutoff points have been used (Tseng, 2020). See Appendix 7 for detailed results from the knee method for both child labour and educational outcomes. This resulted in 46 additional non-duplicate articles to be reviewed in depth by looking at the full texts in stage two. In the end, 9 additional papers were included in the analysis.

Two final complementary searches were performed using hand searching and backward snowballing. Hand searching was used to ensure that we have not missed out

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[1] In principle, one relevant and one irrelevant paper are sufficient for the algorithm to run, but we included several articles related to the PICOC strategy to improve efficiency and effectiveness (Van De Schoot et al., 2021).

on the grey literature, such as reports by international organisations, which are harder to find through the databases used in this paper (Dekkers et al., 2022). The databases of the World Bank, UNICEF, NBER, ILO, IOM, IMF, the Asian Development Bank, UNESCO, OECD, and the African Development Bank were checked. No additional quantitative reports/articles using regression analysis were found. After having the complete set of initial articles, backward snowballing was performed to include related research found in the initial set of relevant articles (Dekkers et al., 2022; Floridi et al., 2020). The backward snowballing resulted in 3 additional relevant articles, for which data was extracted.

The various search rounds and stages have led to the extraction of 706 estimates from 37 papers. Appendix 8 shows the selection process using the PRISMA diagram. None of the estimates includes odds ratios or relative risk ratios, as only 6 of the 80 odds ratio estimates reported the needed standard errors. Most studies were excluded because they were qualitative, used a different control group, investigated children left behind for less than 6 months or migration by household members in general. 13 additional papers on educational aspirations were systematically reviewed to explore the aspiration channel in addition to the quantitative meta-analysis. These studies resulted from the systematic search in Scopus, Web of Science, and Google Scholar, but were excluded from the meta-analysis because they did not fulfil the inclusion criteria outlined in the PICOC strategy. See Appendices 9 and 10 for the lists of included and excluded studies in this paper.

3.2   The meta-dataset

After the final selection of articles, the data was extracted. In particular, data on the outcomes (see Appendix 4), the intervention, the years for which data were obtained, the geographical region, the income level of the country based on the World Bank Analytical Classifications (World Bank, 2023), the number of observations, whether the data comes from primary or secondary sources, the study design, and publication characteristics. The heterogeneity in the data was handled as follows. First, the outcome variables were divided into positive education variables (such as test scores), negative education variables (such as dropout), and child labour outcome variables. The child labour outcomes are also divided into 4 groups for subsample analysis: (1) unpaid domestic work, (2) unpaid farmwork, (3) paid work, (4) family business work. All four categories were classified as child labour in the original studies. The intervention variables were divided into binary and continuous left-behind variables.

Variables on the study design included whether the analysis measures a marginal effect, whether the coefficient comes from a linear, log-lin, or lin-log regression, whether the regression was weighted, whether an interaction term was included, and the number of explanatory variables. Regarding the estimation technique used, we used the following categories: (1) ordinary least squares, (2) instrumental variable analysis/two-stage least squares, (3) fixed effects, (4) structural equation modelling, and (5) other techniques, such as random effects, etcetera. A variable was created to show whether or not a quasi-experimental method was used. Regarding fixed effects, we collected data for year-fixed

effects, household and individual fixed effects, as well as regional and district fixed effects. Next, gender, age, education level, the number of children in the household, wealth, and remittances were coded as variables the original study controlled for in the estimation. Finally, specific subsamples of the original papers were coded: (1) boy or girl samples, (2) mother or father migrant samples, (3) international or internal migration samples, (4) one or two migrant parent samples, (5) various age samples, (6) samples indicating whether the effect is long-term, short-term, or not specified, and (7) whether the sample comes from a rural/undeveloped or from an urban/developed area.

Next to the study design, publication characteristics were retrieved from the studies. In particular, the year and month of publication, whether the publication was reviewed or not, Google Scholar citations, the 5-year impact factor as specified in the Journal Citation Reports of Clarivate, and the Recursive Discounted Impact Factors for Journals from IDEAS RePEc. The publication age was calculated based on the year and month of the publication. Lastly, the search round was also coded. Search round 1 indicates the search done in Web of Science and Scopus, and search round 2 indicates the search done in Google Scholar and the backward snowballing. Table 1 shows the definition and descriptive statistics of the variables used in the meta-analysis.

We include estimates from 18 countries. Most estimates included in this meta-analysis focus on positive educational outcomes, namely 59%. The largest group of studies looks at test scores as the dependent variable, followed by the years of education, school enrolment, and hours spent on school-related work. 31% of the estimates address child labour outcomes. The variable hours worked was used as the dependent variable in most of these studies, followed by child labour dummies (working/not working).

Only 9% of the estimates focus on negative educational outcomes. These studies look mostly into lagging behind in school, followed by an about equally frequent investigation into disruption and dropout. Most estimates concern the binary left-behind identifier (79%). Left-behind children are mainly studied in Asia, representing 88% of the estimates, while only 1% focuses on Africa, 5% on Europe, and 6% on North America. The majority of the Asian studies analyse Chinese data as internal rural-urban migrants have to leave their children behind due to the complex residential system (Dollar, 2014; Li, 2023; Zhang, 2023). Additional estimates come from India and Vietnam, among others. Studies about Africa are equally distributed between Burkina Faso, Kenya, and Senegal. All studies on Europe come from Albania and Romania. Mexico and El Salvador are the countries from Northern America. No studies have been identified for South America.

The income levels (low, lower-middle, and upper-middle) of the investigated countries are quite evenly spread out. Many studies do not specify which type of migration they look at; we know explicitly that 11% of the estimates consider international migration and 38% internal migration. The dominance of Chinese studies on rural-urban migration is likely to drive this. Most estimates derive from fixed effects estimations, but ordinary least squares and the instrumental variable approach are also common. About two-thirds of the estimates resulted from search round one, and the other one-third were from search round two. About 75% of the estimates come from peer-reviewed studies. The data used in the original studies mainly stem from the 1990s and the 2000s. The first

publication year was 2006, and the most recent publication year was 2024. Interest in the topic seems to be emerging recently, with the average year of publication being 2017. The coefficients reported per study vary between 1 and 104, with each study reporting 19 estimates on average.

Table 1: Descriptive statistics

Definition	Mean	St. Dev.	Min	Max	N
Outcome characteristics					
Effect size (regression coefficient)	0.92	10.45	-25.40	230.34	706
Standard error of the effect size	0.96	6.74	-4.42	167.12	706
T-statistic	0.41	2.16	-9.84	7.17	706
Winsorised PCC	0.01	0.04	-0.09	0.08	706
Standard error of the winsorised PCC	0.02	0.01	0.01	0.05	706
# of explanatory variables	13.09	6.67	0	35	706
Positive education variables	0.59	0.49	0	1	706
Negative education variables	0.09	0.29	0	1	706
Child labour variables	0.31	0.46	0	1	706
Intervention dummies					
Left behind	0.79	0.40	0	1	706
Left behind measured as a continuous variable	0.21	0.40	0	1	706
Data characteristics of the studies					
Data collection started in the 1980s	0.10	0.30	0	1	706
Data collection started in the 1990s	0.29	0.45	0	1	706
Data collection started in the 2000s	0.37	0.48	0	1	706
Data collection started in the 2010s	0.24	0.43	0	1	706
# of observations	76,743.14	568,444.40	112	5,696,236	706
Low-income countries	0.28	0.45	0	1	706
Low-middle income countries	0.39	0.49	0	1	706
Upper-middle income countries	0.33	0.47	0	1	706
Data from Asia	0.88	0.33	0	1	706
Data from Africa	0.01	0.11	0	1	706
Data from Europe	0.05	0.23	0	1	706
Data from North America	0.06	0.23	0	1	706
Secondary data	0.86	0.35	0	1	706
Estimation characteristics					
Instrumental variable approach	0.22	0.41	0	1	706
Fixed effects regression	0.44	0.50	0	1	706
Structural equation modelling	0.05	0.21	0	1	706
Other estimation techniques	0.34	0.47	0	1	706
Quasi-experimental method	0.12	0.32	0	1	706
Interaction	0.12	0.32	0	1	706
Controlled for in specification					
Education of household head	0.12	0.33	0	1	706
Number of children in the household	0.74	0.44	0	1	706

Income or assets of the household	0.51	0.50	0	1	706
Regional-or district-fixed effects	0.32	0.47	0	1	706
Subsamples in studies					
Girl sample	0.15	0.36	0	1	706
Boy sample	0.14	0.34	0	1	706
Mother migrant sample	0.17	0.37	0	1	706
Father migrant sample	0.47	0.50	0	1	706
Internal migration sample	0.38	0.49	0	1	706
International migration sample	0.11	0.31	0	1	706
Age sample (yes/no)	0.92	0.27	0	1	706
Immediate effect	0.25	0.44	0	1	706
Long-term effect	0.12	0.33	0	1	706
Publication characteristics					
Year of publication	2017	4.33	2006	2024	706
Reviewed publication	0.75	0.43	0	1	706
Google Scholar citations	62.15	83.33	0	452	706
Search round 2	0.37	0.48	0	1	706

Note: Discrepancies in the means summing to one are due to rounding.

3.3   Methodology

Following previous meta-analyses by Demena et al. (2022) and Floridi et al. (2020), with various economic outcome and predictor indicators, a standardisation approach is used to make the effect sizes comparable. As suggested by the Reporting Guidelines for Meta-Regression Analyses in Economics of Stanley et al. (2013), the partial correlation coefficient is used as follows (Stanley and Doucouliagos (2012, p. 25):

$$PCC = \frac{t}{\sqrt{t^2+df}} \tag{1}$$

with *t* denoting the t-statistic of the multiple regression coefficient and *df* the degrees of freedom of the t-statistic. The PCC shows the relationship between the intervention and the educational or child labour outcome, holding other variables constant (Stanley & Doucouliagos, 2012).

In addition, we checked for outliers in our dataset using two different approaches. With the minimum covariance determinant, we determined a mean based on 75% of the sample. Based on this mean, outliers were identified using the Mahalanobis distance for each data point. The threshold determining data points as outliers is based on the chi-squared distribution. This led to an exclusion of 55 observations, which is 7.8% of the sample. As a second approach, we winsorised the data, cutting off 5% on each side. This way, 10% of the sample was winsorised (replaced with less extreme values). The latter is thus the more conservative approach, which we will continue to use in the ensuing analyses.

To summarise the meta-analysis data, we follow the Reporting Guidelines for Meta-Regression Analysis in Economics (Stanley & Doucouliagos, 2012; Stanley et al., 2013). First, the effect sizes are summarised by simple and weighted average effect sizes. The weighted average of this effect size is calculated using the inverse of the variance as outlined by van Aert and Goos (2023). Since studies and estimates can suffer from publication bias, we also look at funnel plots and perform a regression test for funnel plot

asymmetry to estimate whether publication bias is present. Next, the Funnel-Asymmetry Test (FAT) and Precision-Effect Testing (PET) are used to determine the size of the publication bias and the genuine effect size of parental migration on economic and child labour outcomes (Dekkers et al., 2022; Stanley & Doucouliagos, 2012). The FAT and PET tests are represented as follows (Stanley & Doucouliagos, 2012, pp. 60-61):

$$PCC_i = \beta_0 + \beta_1 SE_i + \varepsilon_i, \tag{2}$$

where PCC_i is an individual PCC estimate and SE_i is the associated standard error. β_1 represents the FAT and β_0 the PET (Stanley & Doucouliagos, 2012). Since this equation can suffer from heteroskedasticity and within-study dependence, we use Weighted Least Squares, dividing equation (2) by its standard error SE_i (Floridi et al., 2020; Stanley & Doucouliagos, 2012):

$$t_i = \beta_0 \left(\frac{1}{SE_i}\right) + \beta_1 + v_i, \tag{3}$$

where t_i is the t-statistic of each PCC estimate, which is obtained by PCC_i/SE_i, β_0 is the PET, β_1 the FAT, and v_i is ε_i/SE_i (Floridi et al., 2020; Stanley & Doucouliagos, 2012).

As a baseline model, we use OLS with study-level clustered standard errors. Additionally, we check for study-level effects using a Breusch Pagan Lagrange Multiplier Test (Stanley & Doucouliagos, 2012). The results can be found in Appendix 11, which show no study-level effects for negative educational outcomes. Yet, there are study-level effects for the positive educational outcomes and child labour. We, therefore, also show a mixed-effects-multilevel (MEM) model. Since the Hausman test to decide between the fixed- or random-effects model (Stanley & Doucouliagos, 2012; Wooldridge, 2010) cannot be performed for our data as the underlying assumption of $se(\beta_{1FE}) > se(\beta_{1RE})$ is violated (Wooldridge, 2010), we opted for the fixed effect (FE) model, which is also a better predictor under publication bias (Stanley & Doucouliagos, 2012). Note that the random effects assumption of no correlation between unobserved characteristics and the predictor variables is also often violated in meta-analyses (Stanley & Doucouliagos, 2012).

To account for country-specific time-varying factors such as emigration rates, we also perform the OLS and MEM models with country- and decade-fixed effects. Finally, following previous research by Floridi et al. (2020), a Jack-knife experiment is performed to investigate whether particular individual studies influence the results. This is done by excluding one study at a time and re-estimating the genuine effect using the remaining studies.

Last, heterogeneity analyses are performed by adding moderator variables, such as publication, methodological, and empirical characteristics of the studies, to disentangle the effect of these variables from the genuine effect and assess their impact on the estimates (Dekkers et al., 2022; Floridi et al., 2020; Stanley & Doucouliagos, 2012). We employ the following model:

$$t_i = \beta_0 \left(\frac{1}{SE_i}\right) + \beta_1 + \frac{a_k X_k}{SE_i} + v_i, \tag{4}$$

where t_i is the t-statistic of each PCC estimate, β_0 is the PET, β_1 is the FAT, a_k is the vector of estimated parameters, X_k represents the category of a particular moderator and v_i is ε_i/SE_i. In line with previous research, the general-to-specific approach has been used to construct the final model for each outcome category (positive educational outcomes, negative educational outcomes, and child labour outcomes) (Floridi et al., 2020; Stanley et al., 2013). Only moderators without multicollinearity were included, and the most

*in*significant moderators were removed (based on *p*-values). This leads to a unique model for every outcome category. For positive educational outcomes, 15 of the 28 potential moderators were used in addition to the inverse of the standard error. The joint F-test for these moderator variables is $F(16, 349) = 33.33$ (*p*-value = 0.000), supporting the joint significance of the moderators used. The model using all potential 28 moderators has an $F(29, 330) = 1.316$ (*p*-value = 0.207), showing no joint effect. For negative educational outcomes, only 4 of the 13 additional moderators were used. The joint F-test for these moderators is $F(5,61) = 12.439$ (*p*-value = 0.000), suggesting that they are not only individually but also jointly significantly different from zero. The model using all potential moderators had the following F-statistic: $F(14,52) = 1.315$ (*p*-value = 0.252). For child labour outcomes, we used 5 additional moderators out of 15 potential moderators. The 5 moderators used have an $F(6,130)$ statistic of 8.538 (*p*-value = 0.000). The model using all potential moderators does not have explanatory power: $F(16,120) = 0.838$ (*p*-value = 0.594).

The I^2 statistic shows that significant between-study heterogeneity remains (see Appendix 12; Fellmeth et al., 2018; Harrer et al., 2021; Higgins & Thompson, 2002). The between-study variation is quantified as the percentage of variability in the effect sizes that is not caused by sampling error and is considered as substantial if larger than 75%. To determine why heterogeneity in the results is observed (Harrer et al., 2021), subgroup analyses are performed for each search round and for the publication status (peer-reviewed or not). Next, China vs. other countries and country-income categories are examined. Moreover, subgroup analyses are performed on immediate and long-term effects, for different kinds of child labour, and intensive vs. extensive margins.

4. Results

4.1 Average effects

The average effect sizes suggest that parental migration has no practical effect on educational and child labour outcomes. Table 2 first shows summary statistics of the overall impact of parental migration on positive educational outcomes. The *weighted* average effect is 0.0088. This is statistically significant at the 1% level. It does, however, not imply any practical relevance. A meta-regression coefficient of less than 0.07 is considered small, according to Doucouliagos (2011). Moreover, the *unweighted* coefficient has the opposite sign; it is negative, albeit insignificant and again very, very small (-0.0009).

For negative educational outcomes and child labour outcomes, the found effects are equally small in absolute terms, but both are positive and statistically significant at conventional levels. In sum, these overall results do not point towards any practical impact of parental migration on left-behind children's education and labour outcomes. If at all, there is an extremely moderate indication of negative repercussions (positive average effects for negative educational and child labour outcomes suggest that parental migration would reinforce these outcomes).

Table 2: Estimates of the overall impact on every outcome category

	Effect size	S.E.	95% Confidence Interval	
Positive educational outcomes				
Simple average effect	-0.0009	0.0022	-0.0053	0.0036
Weighted average effect	0.0088***	0.0018	0.0054	0.0122

Negative educational outcomes				
Simple average effect	0.0236***	0.0050	0.0136	0.0336
Weighted average effect	0.0086*	0.0052	-0.0017	0.0189
Child labour outcomes				
Simple average effect	0.0125***	0.0027	0.0073	0.0177
Weighted average effect	0.0062**	0.0026	0.0011	0.0113

*Note: *** p<0.001, ** p<0.05, * p<0.1*

4.2   Genuine effects and publication bias

Next, we study whether publication bias, implying that not all results are published or distributed to a similar extent, influences the results (Stanley & Doucouliagos, 2012). First, we use funnel plots and regression tests. In Figure 1, the vertical dotted line shows the average weighted effect size. From eyeballing the figures, asymmetry can be observed in all three plots, suggesting the presence of publication bias (Floridi et al., 2020; Harrer et al., 2021). For the positive educational outcomes, studies with larger standard errors and negative estimates seem scarce compared to those with small standard errors. This is confirmed by the regression test for funnel plot asymmetry, which can be found in Appendix 13. The test is significant at the 1% level and has a coefficient of 0.024, meaning that the expected observed effect of a study with a standard error of 0 would be 0.024.

Regarding the negative educational outcomes, studies with more precision/larger studies seem to report larger negative effects. Yet, the regression test for funnel plot asymmetry cannot be interpreted as only 6 studies look at negative educational outcomes, which results in too little power for the test (Harrer et al., 2021). The funnel plot for child labour is also asymmetrical. There seem to be fewer smaller studies/studies with less precision. There also seems to be some clustering of studies with smaller standard errors that report more positive outcomes. The regression test for funnel plot asymmetry shows that asymmetry is significant. The limit coefficient shows that the expected genuine effect of a study with a standard error of 0 would be -0.013. Overall, based on this initial visual analysis, there is some indication of publication bias, but the extent is rather low.

Figure 1: Funnel plots for educational and child labour outcomes
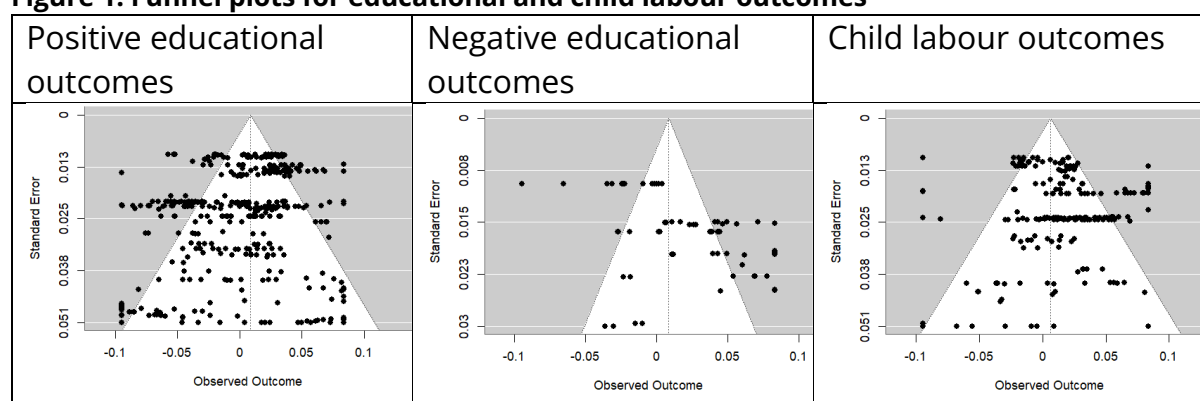
Yet, the interpretation of the graphical funnel plot is subjective. Therefore, we performed the FAT and PET analyses in addition (Harrer et al., 2021; Stanley & Doucouliagos, 2012). FAT estimates the publication bias and PET the related genuine effect. Results with clustered standard errors are presented in Table 3. For positive

educational outcomes (e.g. test scores), our largest sample of observations, the Breusch-Pagan Lagrange Multiplier test showed that the MEM is most suitable for this data. Therefore, our analysis of the results for this outcome will focus on this model, taking the other models into account as robustness checks. Across the three models, there is no evidence of publication bias in studies looking at positive educational outcomes. The publication bias coefficient of our preferred MEM is 0.651 and is statistically insignificant. The genuine effect according to the MEM is negative and very small in magnitude (-0.011). In addition, it is not statistically significant suggesting that children left behind do not show worse educational outcomes compared to children living with both parents. Note also that the other two models even identify a positive genuine effect suggesting inconsistency across the three models.

Table 3: Genuine effect and publication bias for every outcome category

	Dependent variable: t value		
	OLS (Clustered SE) (1)	Fixed Effects (Clustered SE) (2)	Mixed-Effects-Multilevel (Clustered SE) (3)
Positive educational outcomes			
Genuine effect (PET)	0.024 (0.610)	0.015 (0.014)	-0.011 (0.015)
Bias (FAT)	-0.955 (0.013)	-0.322 (0.858)	0.651 (0.658)
Observations		418	
Studies		22	
Negative educational outcomes			
Genuine effect (PET)	-0.065** (0.027)	-0.089*** (0.015)	-0.010 (0.025)
Bias (FAT)	5.246*** (1.770)	7.085*** (1.032)	1.652 (1.228)
Observations		67	
Studies		6	
Child labour outcomes			
Genuine effect (PET)	-0.013 (0.017)	-0.041 (0.033)	-0.047 (0.050)
Bias (FAT)	1.237 (0.946)	3.224 (2.064)	3.118 (2.842)
Observations		221	
Studies		15	

Note: *p<0.1; **p<0.05; ***p<0.01

The evidence for the effects of parental migration on negative educational outcomes (e.g. dropout) is more consistent across the three models. For this outcome variable, the most appropriate model is the fixed effect model; it suggests improved educational outcomes for children left behind with a statistically significant coefficient of -0.089, i.e. a reduction of drop-out. Yet, there is consistent evidence for publication bias across the three models. The FE estimate suggests that reported coefficients are more positive as reflected in a statistically significant positive publication bias coefficient of 7.085.

Lastly, the child labour studies display consistent PET and FAT coefficients across all three models as well. The consolidated evidence shows that children left behind are less likely to work, yet the effect is insignificant. The genuine effect from the MEM identifies a non-significant coefficient of -0.047. Moreover, the FAT coefficient suggests a slight upward publication bias of 3.118; however, it is equally statistically insignificant.

Results without clustered standard errors can be found in Appendix 14 and are more likely to identify significant effects. We attribute the lack of statistical significance with the clustered standard errors to the increased rigour and consider these more conservative findings as more reliable. Thus, overall we largely identify a null effect of parental migration on child educational and labour outcomes except for the category that considers negative educational outcomes. There we find a reduction in negative events such as dropouts due to parental migration. This is interesting, as concomitantly we identify positive publication bias suggesting that positive effects are more likely to get published, which might imply that reductions in negative outcomes are not comprehensively covered by the literature.

In order to account for time-varying country-specific factors, such as emigration rates, we also show the estimation results with country and decade-fixed effects for positive educational and child labour outcomes in Appendix 15. These fixed effects models could not be estimated for negative educational outcomes because there were not enough observations for each category. For positive educational and child labour outcomes, the results remain comparable. Thus, overall, we cannot identify strong evidence for negative repercussions of parental migration on children left behind in terms of educational and labour outcomes.

Before proceeding to the multivariate analysis, we examine the impact of excluding each study individually from the analysis. We perform a Jack-knife experiment for our main regression specifications, the MEM with clustered standard errors for positive educational outcomes and child labour, and FE with clustered standard errors for negative educational outcomes. Table 4 displays these findings. For positive educational outcomes, the results from these tests are mostly consistent with our main findings in Table 3, suggesting a very small negative, albeit insignificant effect on educational outcomes with a small, insignificant, positive publication bias. Thus, it does not seem that a single study drives the identified overall effects. For negative educational outcomes, the results are also consistent with Table 3, with a small negative genuine effect and a positive publication bias. For child labour outcomes, the Jack-knife experiment confirms that there is no statistically significant effect of parental migration.

4.3   Accounting for heterogeneity across studies: multivariate analysis

The inconclusiveness of the findings presented so far might be explained by the remaining unexplained heterogeneity in effects (Floridi et al., 2020). To account for this, we employ a multivariate analysis. For positive educational outcomes, there is some evidence that parental migration affects children's educational outcomes negatively once controlled for the moderators (Appendix 16). The size of this effect is, however, very small for all three multivariate models and only significant for the OLS model. Regarding publication bias, a substantial downward bias is found for positive educational outcomes; it is statistically significant at conventional levels, again only when relying on the OLS model. It is concerning that negative findings, i.e. potentially those supporting initial priors, are more likely to get published.

Studies that measure negative educational outcomes indicate, similar to the Table 3, a reduction in educational outcomes such as dropout due to parental migration (Appendix 17). All employed models show that negative educational outcomes, such as school dropout, are less observed for children left behind than for children not experiencing parental migration. Again, we identify a significant positive publication bias.

Yet, these results should be interpreted with a grain of caution since they are derived from a small sample with only 67 observations.

Table 4: Jack-knife experiment – educational outcomes

Study	Genuine effect	Bias	Dropped observations	Total observations
Positive educational outcomes - MEM				
1	-0.0100	0.6967	4	414
2	-0.0113	0.6129	4	414
3	-0.0136	0.7605	70	348
4	-0.0117	0.7796	40	378
5	-0.0118	0.7090	29	389
6	0.0076	-0.2008	16	402
7	-0.0112	0.6228	6	412
8	-0.0116	0.6124	3	415
9	-0.0110	0.5693	7	411
10	-0.0118	0.7589	6	412
11	-0.0126	0.6121	48	370
12	-0.0112	0.6711	6	412
13	-0.0114	0.6982	4	414
14	-0.0114	0.6852	1	417
15	-0.0144	0.5398	6	412
16	-0.0104	0.6078	52	366
17	-0.0115	0.6704	6	412
18	-0.0117	0.6413	2	416
19	-0.0129	0.7959	52	366
20	-0.0094	0.7098	6	412
21	-0.0168	0.7944	48	370
22	-0.0114	0.6844	2	416
Negative educational outcomes - FE				
1	-0.0872****	6.8877***	7	60
2	-0.0134	2.7831*	12	55
3	-0.0953***	7.6506***	4	63
4	-0.0860***	6.6760***	23	44
5	-0.0892***	7.0943***	2	65
6	-0.0958***	7.4732***	19	48
Child labour outcomes - MEM				
1	-0.0509	3.2278	1	220
2	-0.0766	4.5311	28	193
3	-0.0470	3.2578	4	217
4	-0.0511	3.3880	4	217
5	-0.0462	2.9569	3	218

6	-0.0836	5.2290	52	169
7	-0.0509	3.3574	3	218
8	-0.0632	3.7349	12	209
9	0.0101	-0.0386	30	191
10	-0.0500	3.4292	2	219
11	-0.0434	2.9431	40	181
12	-0.0480	3.3320	16	205
13	-0.0489	3.1389	9	212
14	-0.0487	3.2627	1	220
15	-0.0533	3.3134	16	205

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Lastly, all multivariate specifications for child labour outcomes show that children left behind are less likely to work (Appendix 18). The child labour papers also show a significant upward publication bias across all three multivariate models. Again, the publication bias apparent in the multivariate analysis is not to be trifled with as it runs opposite the identified average effect and might dilute the findings from this strand of the literature. Across the three outcomes studied, the multivariate analysis reinforces the need to carefully review sampling and empirical approaches when deriving policy conclusions. Moreover, for two of the three categories of outcomes, we identify considerable publication bias that counteracts the average effects. In turn, there is not a single dominating channel that explains differences in results across the three outcome categories.

Heterogeneity, as seen in the I^2 statistics in Appendix 12, can explain the differences across primary studies. The moderator analysis shows that the effect of being left behind on positive educational outcomes depends on various methodological choices and the sample used. The results are consistent across models (see Appendix 16). Importantly, studies employing quasi-experimental methods tend to identify more negative effects, suggesting that observational studies might be suffering from attenuation bias. In addition, the multivariate analysis points to the importance of individual-level control variables. The education level of the household head seems key here, and studies controlling for it tend to report less negative effects. Similarly, studies controlling for age tend to report less negative effects. Controlling for regional or district fixed effects is similarly associated with less negative results. Studies using secondary data report larger effect sizes. Finally, studies that are cited more often report larger effect sizes. This suggest that study rigor and sample selection are key ingredients driving study findings.

Looking at negative educational outcomes, gender disaggregated analyses point towards more nuanced findings with larger impacts (Appendix 17). If the study specifies whether girls or boys left behind are considered, the magnitude of the effect of parental migration is larger. Similarly, studies that measure educational outcomes, such as drop-out, in the same year as parental migration takes place, report larger negative effect sizes, implying that children left behind report fewer dropouts immediately following their parents' migration. Yet, these effects vanish over time.

Regarding child labour outcomes, the empirical approach used in the original study is consistently associated with the effect of parental migration on left-behind children (Appendix 18). The instrumental variable approach leads to smaller effects, whereas quasi-experimental studies lead to effects larger in magnitude. In line with the findings for negative educational outcomes, if the original study specifies whether it looks at boys or girls, the estimated effect is larger in magnitude, although across models, these effects do not consistently show up as a significant difference. Similar to positive educational outcomes, the estimated effect also depends on the quality of the study as reflected by the Google Scholar citations. Studies that are cited more report smaller impacts on child labour. Thus again, methodological rigor is a non-negligible aspect to shaping the study findings.

4.4   Sub-sample analysis

Appendices 19-24 show the results for different sub-sample analyses. Taking into account the moderators used in section 4.3, we further explore the heterogeneity in results. Yet, only the results for positive educational outcomes, referred to as educational activity in this section, and child labour outcomes are shown because there are too few observations in the sample of negative educational outcomes. Related to this, for the FE and MEM regressions, it was impossible to compute cluster-robust standard errors in the sub-samples due to the small number of observations.

We first discuss the findings for short versus long-term effects which are only available for positive educational outcomes (Appendix 19). The sub-sample analysis shows no consistent evidence that the results found in the previous section vary over time. However, studies reporting the long-term educational effects of parental migration show an upward publication bias, i.e. they seem to underestimate the underlying negative effect of parental migration.

We also clearly see that the relationship between parental migration and the educational activity of children left behind is context-dependent. Appendix 20 shows the results for China versus other countries, since most of the research is done for children left behind in China. The results on child labour outcomes seem to be different for China. We find evidence that parental migration increases the likelihood of children left behind to work. The estimates are statistically significant at conventional levels for the OLS and FE models but not for our preferred MEM model. Moreover, unlike for our whole sample and for other countries, the publication bias is negative for China, implying that actual increases in child labour are underreported. The findings suggest that the family disruption channel is the driving force in China, whilst for other countries it is the positive income effect.

Another sub-sample analysis was performed for low-, lower-middle-, and upper-middle-income countries to see whether a country's income level plays a role in the impact of parental migration on left-behind children (Appendix 21). Indeed, this seems to be the case. For educational activity, we identify negative effects for every income level except the low-income countries. These effects are statistically significantly different from zero for the OLS and FE models for the low-income and upper-middle income countries and for the FE models for the lower-middle income countries. For child labour, we find negative and often significant effects for low- and lower-middle-income countries, while a significantly positive effect has been found for upper-middle-income countries. Yet, all estimates of the child labour sample for upper-middle-income countries come from

China, implying that the results represent China's unique situation. We further observe some publication bias in all of the income-separated sub-samples. These are mostly in line with the whole sample, but for studies reporting educational activities in upper-middle-income countries, we find a positive publication bias for the OLS and FE model, i.e. an overestimation of the positive educational effect. Overall, for upper-middle-income countries, the disruptive effect seems to dominate, whereas the income effect seems to be decisive for low-income countries. The main take-away from this sub-sample analysis is that children left behind in low-income countries show improved educational outcomes and less child labour, whereas children from upper-middle-income countries experience negative impacts on education and positive impacts on labour participation.

Results disaggregated by the different types of child labour can be found in Appendix 22. Children left behind seem to conduct more paid work, as we can observe a significantly positive effect in both the OLS and FE model. We also find positive effects for unpaid farmwork, but this is only significant for the FE estimation. The coefficients for unpaid domestic and unspecified work are significantly negative.

The intensive versus extensive margin findings seem related. Children left behind are less likely to take up work (Appendix 23). If they, however, worked before they work more hours once their parents migrate. Arguably, the latter children are not in school and might increase their working hours to help finance their parents' migration. This is in line with educational outcomes, since left-behind children are less likely to enrol in school but report more years of schooling and higher test scores if already enrolled. Across most types of work and intensity specifications, we identify publication bias. Child labour is overestimated for all types of work, except for paid work, where we find a downward publication bias. The sign of the publication bias is less consistent for the intensive/extensive analyses.

Finally, we checked whether the peer-review process had an impact on the findings. Unsurprisingly, Appendix 24 shows that publication bias seems to be bigger for peer-reviewed articles. The sign of the publication bias is mostly the same for the peer and not-peer reviewed samples, with a downward bias for educational outcomes and an upward bias for child labour, suggesting that the skewness of the literature about the impact of parental migration on children left behind is a major concern for deriving credible policy conclusions.

4.5   Systematic review of the aspiration channel

In addition to the income and family disruption channel, this study examines the aspiration channel. Since few aspirational studies were deemed relevant for inclusion in the meta-analysis according to our PICOC definitions and some were qualitative, we opted for systematically reviewing the studies on aspirations; 13 of the 15 relevant studies were included because 2 were inaccessible. All studies make conclusions about the effect of parental migration on the educational aspirations of children left behind; however, they measure aspirations in many different ways. In one-third of the studies, aspirations are measured by a variable indicating the highest level of education that the child would wish to achieve (Dreby & Stutz, 2012; Hu, 2019; Wen et al., 2015; Xu et al., 2018). The study by Chen and Hesketh (2021) takes the same approach but compares it to educational expectations (measured in the same way but asked as a reflection on what the children think they will achieve) to measure the aspiration-expectation gap. Yu (2013) and Mao et al. (2020) take the same approach but turn it into a dichotomous variable reflecting

whether or not the child aspired to study until college or higher. Another 2 papers measure aspirations as a continuous variable in years of schooling that the children would wish to obtain (Chen et al., 2013; Lu et al., 2023). Case studies and interviews with either teachers or children were used 5 times; 3 studies asked teachers specifically (Ayala, 2017; Hu, 2019; Ullah et al., 2024) and 2 studies observed and asked the children themselves (Hu, 2019; Jingzhong & Lu, 2011). The research by Wassink and Viera (2021) takes an entirely different approach, comparing the educational attainment of children left behind in high-migration communities to communities with low migration rates to test the 'culture of migration hypothesis'.

The 13 papers examine 3 countries and 2 regions: Asia and North America. 8 papers examine the case of China, 1 focuses on Pakistan, and another 4 studies examine the Mexican situation. Thus, the studies are largely conducted in upper-middle-income countries. Almost all of these studies have been published in peer-reviewed journals except for 2, which are Master's theses. The first publication year was 2011, and the most recent year was 2024. Compared to the educational and child labour papers, this is 5 years later, suggesting that the focus in the literature was first on the income- and family disruption channel. About half of the studies use primary data, and the other half use secondary data. 8 papers use quantitative methods, 3 papers use qualitative methods, and 2 papers use mixed methods. Propensity score matching was used 3 times as was (ordered) logistic regression. Other popular methods were interviews, ANOVA, and OLS regressions.

Zooming in on the results, there is no clear effect of parental migration on the educational aspirations of children left behind. A summary can be found in Table 5; 3 studies point toward a negative relationship, 1 toward a positive effect, and the rest finds mixed results. The results differ between the main analysis and sub-group analyses focusing on a specific parent migrating. There is no clear relationship between which parent migrates and the direction of the effect. Similarly, the method does not seem to influence the results. Overall, a clear relationship between parental migration and educational aspirations has yet to be established.

Table 5: Frequency table of the aspirational papers*

	Insignificant impact	Significant negative impact	Significant positive impact	Qualitative: positive impact	Qualitative: negative impact
China					
Main analysis	5	2		1	
Sub-sample: mom migrant	2				
Sub-sample: father migrant	1		1		
Sub-sample: both migrants	1		2		
Sub-sample: one migrant parent			1[1]		
Pakistan					
Sub-sample: father migrant					1
Mexico					
Main analysis	1	1[2]			1
Sub-sample: mom migrant			1		
Sub-sample: father migrant	2	1			
Sub-sample: both migrants		1			

Note: *Only categories for which data is available are shown. [1]The outcome variable measured the aspiration-expectation gap. [2]The treatment variable refers to living in a low- or high-migration-prevalence community.

5. Conclusion and discussion

As migration is creating challenges for child protection, this study performs a meta-analysis to synthesise current evidence on children left behind with regard to educational and child labour outcomes (Botezat & Pfeiffer, 2020; Chang et al., 2011; Fu et al., 2023; Marchetta & Sim, 2021). Studies on educational and child labour outcomes were gathered according to the PICOC strategy and analysed according to the Reporting Guidelines for Meta-Regression Analysis in Economics (Petticrew & Roberts, 2008; Stanley et al., 2013). We systematically retrieved 706 estimates from 37 papers and another 13 papers for a systematic review on educational aspirations. All studies were circulated between 2000 and March 12th, 2024, and are available in Scopus, Web of Science, and Google Scholar. Of the 37 papers, most of them (22) focus on positive educational outcomes, 6 on negative educational outcomes, and 15 on child labour outcomes.[2] 88% of the estimates are for Asian countries. The first publication year was 2006, and the most recent publication year was 2024, with an increasing trend in studies over time indicating that being left behind due to parental migration is a contemporary problem and reinforcing the need for synthesising the existing findings.

The simple average and weighted effects did not suggest any practically significant effect of parental migration on children's educational and labour outcomes. Similarly, we do not find strong evidence of a statistically significant publication bias. Once we control for study characteristics in the multivariate analyses, publication bias seems to be present in all models and tends to favour studies suggesting negative implications of parental migration.

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[2] Some papers look at multiple categories of outcomes.

In turn, publication characteristics do not consistently influence the effect of parental migration on children left behind. Only the Google Scholar citations, corrected by the age of the publication, have explanatory power for the educational activity and child labour. In turn, the original study samples and the empirical approach taken are the most important sources of heterogeneity. Similarly, heterogeneity is non-negligibly influenced by gender disaggregation. Most importantly, the multivariate analyses reveal that parental migration of at least 6 months is associated with a lower likelihood of negative school outcomes such as dropout, likely due to improved household finances. However, school performance (e.g. test scores) tends to decline, potentially due to the emotional distress caused by parental absence. Notably, the initially decreased likelihood of school dropout diminishes over time, possibly as psychological burdens outweigh financial benefits. This is in line with research by Fellmeth et al. (2018), who find that children left behind experience worse mental health outcomes than children of non-migrant parents. Overall, left-behind children are less likely to engage in child labour, again suggesting an income effect. These findings imply that both the disruption and income channels are at play, though effect sizes are generally modest. No concrete conclusions can be made about the aspiration channel based on a systematic review of 13 relevant papers since the results are inconsistent. This relationship needs more attention in future research.

The sub-sample analysis for short-term versus long-term effects supports the negative effect of parental migration on children's educational activity over time. The overall negative effect of parental migration on children's human capital are also confirmed when looking at long-run labour market outcomes of left-behind children (Liu et al., 2020). Individuals who were left behind as children earn lower wages and are in less stable adulthood employment conditions. Moreover, the sub-sample analyses clearly show that the relationship between parental migration and the educational and labour outcomes of children left behind is largely context-dependent. Studies from China and upper-middle-income countries show negative impacts on education and positive impacts on labour participation, suggesting a dominant disruption effect. In low-income countries, however, educational outcomes improve and child labour declines – indicating a prevailing income effect. In poorer countries, the positive impact of increased household income tends to outweigh the negative emotional consequences of parental migration; however, as living conditions improve, this income effect becomes less influential and is eventually outweighed by the emotional distress caused by parental absence. In addition, we find evidence that children left behind engage in less unpaid but more paid work. Taken together with the effect at the intensive and extensive margin, it suggests that children who already work, work more hours if their parents migrate to finance the migration. These children are, thus, also less likely to enrol in school. Children who are, however, already enrolled in school improve their school outcomes, possibly because their family's income situation has improved. For enrolled children, parental migration might be driven by parents' wish to (keep) affording educational expenses, whereas parental migration might be more driven by sustaining basic family income for working children. Lastly, the results for peer-reviewed versus non-peer-reviewed articles suggest that publication bias is bigger for peer-reviewed studies.

These results have important implications for policymaking. Various studies have demonstrated that institutional barriers tend to prevent migrant parents from bringing

their children along (Li, 2023; Zhang, 2023). This situation can have long-term (educational) consequences on the affected children and, in turn, on the economic growth of a country as well (Hanushek & Woessmann, 2010; Shen et al., 2021; UNICEF, 2021). Moreover, since the family disruption channel dominates the income channel, at least in the upper-middle income countries, it is important to uphold the rights of children when their parents migrate. To counteract the negative effects of parental migration, governments could promote substitutes for parental attention, e.g. in the form of an increased number of social workers or specialised assistance to the substitute caregiver in the extended family.

Since parental migration does not necessarily have to have a negative effect on educational outcomes or a positive effect on the child labour outcomes of children left behind, as shown by the sub-sample analysis of low-income countries, further research seems warranted to identify the possibilities and pitfalls in more detail.

Moreover, there are still considerable gaps in the literature. First, data collected on narrower age ranges, the amount of contact between the child left behind and the migrating parent, the distance between the place of origin and destination, and the characteristics of the substitute caregiver would have further enriched the analysis at hand. These factors are shown to play a key role in the relationship between migrant parents and children but are hardly collected (Haagsman & Mazzucato, 2014). Second, only 6 studies examine negative educational outcomes. More research should investigate both these negative educational outcomes (such as drop out) and aspirational educational outcomes to fully understand the family disruption, income, and aspiration channels. Third, only 1% of the studies in this meta-analysis focus on the African continent, and no studies have been found for South America. Yet, the latest World Migration report of the IOM (2024) shows that migration on these two continents has increased tremendously since the 1990s. Accordingly, it is important to look at the consequences of parental migration on educational and child labour outcomes for children left behind in Africa and South America as well. Fourth, future studies should clearly specify whether they look at internal or international migration, whether one or two parents are migrating, and how long they migrate for. Fifth, the adverse effects of parental migration on children left behind might have further worsened during the COVID-19 pandemic. Remittances dropped worldwide during this period, but migrant families were often excluded from social protection programmes and slipped through the social security net as the "new poor" (Zambrana Cruz & Rees, 2020). Thus, further research on the effect of parental migration during the global pandemic is warranted to understand the role of large shocks. Sixth, using non-migrant families as a control group does not allow for perfect identification of the effect of parental migration on educational outcomes. Caarls et al. (2018) show that transnational families differ from non-transnational families in observable characteristics such as age of childbirth and the number of relationships from which children result. Arguably, migrant families also differ from non-migrant families in terms of non-observed characteristics, which might affect children's educational and child labour outcomes. Moreover, Houmark et al. (2024) show that failing to control for children's genes and giftedness, the effect of parental investment in education is often overestimated since parents tend to invest more in more gifted children. In our context, this implies that parents of gifted children might decide to migrate to afford educational expenses. Therefore, the negative effect of parental migration on average children's

educational outcomes might be misleading. Accordingly, more research considering the use of different control groups is needed. Last, once we control for study characteristics in the multivariate analyses, publication bias is detected in all models and tends to favour studies suggesting negative implications of parental migration, biasing not only the literature but also evidence-based policy-making that would derive from this literature. Our findings advise against attributing too much of a positive or negative effect to parental migration on children left behind, and instead highlight the need to carefully consider the context.

Overall, the collected systematic evidence calls policymakers of countries with high emigration and/or internal labour migration to be aware of the possible challenges faced by left behind children and to provide safety nets for children in the absence of their parents to counteract any negative implications from family disruption.

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Appendices

Appendix 1: Search strings

Search in Web of Science:

Concept 1: parental migration	((Parent* OR paternal OR maternal) NEAR/4 (migra* OR emigration)) OR (absen* NEAR/4 (mother* OR father* OR parent*)) OR "transnational migra" OR "internal migra*" OR "labo?r migra*" OR "migrant worker*" OR "international migra*" OR "stayer youth"
Concept 2: children left behind	((child* OR girl* OR boy* OR adolescent* OR youth OR family) NEAR/4 ("left behind" OR " left-behind")) OR "transnational famil*" OR "transnational household*"
Concept 3: educational and child labour outcomes	"child labo?r" OR "child* employ*" OR "years of education" OR "years of schooling" OR "school enrollment" OR "educational attainment" OR "educational trajectories" OR "level of education" OR "educational level" OR "learning outcomes "OR "educational outcomes" OR "child* development" OR "children's development" OR "child's development" OR "school performance" OR "academic achievement" OR "academic performance" OR "education" OR "academic engagement" OR "school engagement" OR "educational functioning" OR "educational problems" OR "school satisfaction" OR "in-school outcomes" OR "educational achievement" OR "school adjustment" OR ((academic) NEAR/4 (trajectories)) OR ((academic) NEAR/4 (well-being)) OR "secondary school" OR "pre-school" OR "children's cognitive development" OR "remittances" OR "human capital" OR "parental care"

Search in Scopus:

Concept 1: parental migration	((Parent* OR paternal OR maternal) w/4 (migra* OR emigration)) OR (absen* w/4 (mother* OR father* OR parent*)) OR "transnational migra" OR "internal migra*" OR "labo?r migra*" OR "migrant worker*" OR "international migra*" OR "stayer youth"
Concept 2: children left behind	((child* OR girl* OR boy* OR adolescent* OR youth OR family) w/4 ("left behind" OR " left-behind")) OR "transnational famil*" OR "transnational household*"
Concept 3: educational and child labour outcomes	"child labo?r" OR "child* employ*" OR "years of education" OR "years of schooling" OR "school enrollment" OR "educational attainment" OR "educational trajectories" OR "level of education" OR "educational level" OR "learning outcomes "OR

	"educational outcomes" OR "child* development" OR OR "children's development" OR "child's development" OR "school performance" OR "academic achievement" OR "academic performance" OR "education" OR "academic engagement" OR "school engagement" OR "educational functioning" OR "educational problems" OR "school satisfaction" OR "in-school outcome" OR "educational achievement" OR "school adjustment" OR ((academic) w/4 (trajectories)) OR ((academic) w/4 (well-being)) OR "secondary school" OR "pre-school" OR "children's cognitive development" OR "human capital " OR "remittances" OR "parental care"

Search in Google Scholar[3]:

Search for educational outcomes	allintext: "migration" AND "child" AND "left behind" AND "education*" OR "school*" OR "aspir*"
Search for child labour outcomes	allintext: "migration" AND "children left behind" OR "left behind children" AND "child labour" OR "child labor" OR "time allocation" OR "time use pattern"

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[3] In Google Scholar, there is a character limit so the search string was adapted.

Appendix 2: Motivation for the focus on parental migration

Our meta-analysis deliberately focuses on the effects of *parental* migration only, excluding papers that study the migration of other household members. We are aware that, especially in a developing context, families often go beyond the Western conceptualisation of a nuclear family consisting of two parents. However, as discussed in the literature review, emotional and attachment distortion is a possible underlying mechanism in the relationship between parental migration and children's development (Y. Lu, 2014; Raut & Tanaka, 2018; Wang et al., 2024). We argue that despite living in a wider family network, parents are still the key attachment figures (Wang et al., 2023; Wang et al., 2024). We believe that the disruptive effects of migration of other household members, such as uncles or older siblings, are less severe for children left behind than parental migration. The income effects of wider family migration might be comparable to parental migration, but the emotional disruption effects are not. We, therefore, exclude studies on broader household migration and focus on parental migration only to ensure the comparability of the studies included in our analysis.

Appendix 3: Motivation for the six-month exclusion restriction for educational outcomes

We include only studies considering parental migration of a minimum duration of at least six months for educational outcomes to enhance comparability and ensure that the intervention variable captures a significant disruption to children's daily lives. We argue that surveys that do not specify migration duration but define parental migrants as absent during the time of the survey might capture short-term absences, such as business trips. These cases are not comparable to truly left-behind children. A prolonged absence fundamentally alters family dynamics (Blake, 1981; Kamei, 2018; Steelman & Powell, 1989). Parental migration interferes with active participation in a family's daily life despite the rise of communication technologies in recent years (Blake, 1981; Steelman & Powell, 1989). Previous literature finds evidence of heterogeneity in effects based on separation length, despite the direction of the effect being ambiguous (Carling et al., 2012; Fresnoza-Flot, 2009; Schmalzbauer, 2008). On the one hand, longer separation is associated with more emotional distress and prolonged periods of decreased parental care. On the other hand, positive income effects via remittances might be more pronounced. To improve comparability between studies, it is, therefore, crucial to clearly define the length of parental absence for which children are considered left behind. The six-month threshold aligns with established definitions of left-behind children used in existing, similar meta-analyses (Antia et al., 2020; Fellmeth et al., 2018) and is supported by prior research (Beh, 2014; Duan & Zhou, 2006).

Appendix 4: All outcome variables considered in this study

Educational outcomes	Years of education, education expenditures, test scores (grades, math, English, Chinese, etc.), educational degree, educational disruption (lagging behind or dropped out), lagging behind, years lagging behind, drop out, cognitive test score, entered college, school progression, below average school performance, above average school performance, school achievement (positive class position, positive report), number of hours spent on school (like homework, additional reading) outside school hours
Child labour outcomes	Child labour dummy, hours worked, days worked per week, weeks worked

Appendix 5: Detailed explanation of the stopping rule

A stopping rule for *ASReview* was determined beforehand. When deciding a stopping rule for reviewing articles in the *ASReview* environment, the main criterion is the adequacy of including all relevant papers and excluding all irrelevant papers. The gold standard for this process is human reviewers, who tend to have an average error rate of around 10% (Wang et al., 2020). This relates to both false negatives and false positives. Therefore, with the help of *ASReview*, we should identify at least 90% of all relevant papers correctly while saving time and resources as compared to reviewing manually. The most simplistic and commonly used stopping rule is to stop after a predefined number of irrelevant articles in a row, e.g. 50 (Ros et al., 2017). However, this approach is not considered best practice when used alone (van Haastrecht et al., 2021; Yu & Menzies, 2019). According to van Haastrecht et al. (2021, p. 5) the stopping rule can be based on the following formula instead, estimating the number of relevant papers based on the total number of papers to be screened:

$$R \approx N \times \frac{r}{r + i}$$

with *N* being the total number of papers, *r* the number of papers labelled as relevant, *i* the number of papers labelled as irrelevant and *R* the total number of relevant papers, which is unknown. The proposed stopping rule is then to stop once a pre-defined percentage *p* of the estimated number of relevant papers *R* has been marked relevant (van Haastrecht et al., 2021).

Following previous research using *ASReview*, a combination of these two methods is used in our study (Ros et al., 2017; van Dee et al., 2023; van Haastrecht et al., 2021). First, the formula by van Haastrecht et al. (2021) is used to estimate the number of relevant papers in our set of artticles. According to the assessment of *ASReview* by Van De Schoot et al. (2021, p. 130), "95% of the eligible studies will be found after screening between only 8% to 33% of the studies." Since our search resulted in 637 studies, 95% of the relevant studies should be found after screening 210 articles. Accordingly, we apply the formula of van Haastrecht et al. (2021) at this point, resulting in a total of 448.9 (637 X 148/(148+62)) estimated relevant articles. Following the reasoning of van Haastrecht (2022) and previous research by van Dee et al. (2023) and Bourke et al. (2023), screening is also stopped when 50 papers in a row are labelled irrelevant to prevent overestimating the number of relevant papers and screening inefficiently. It is common to stop screening after 50 consecutive irrelevant papers (Loheide-Niesmann et al., 2022; Ros et al., 2017; van Dee et al., 2023). After reviewing 474 abstracts and titles, 50 papers in a row were deemed irrelevant, and screening was stopped (see Appendix 6). At this point, 74.41% of the total articles were screened.

Appendix 6: ASReview analytics

Total records
637
● Labeled ● Relevant

Labeled records
474

Relevant records
189

Irrelevant records since last relevant
50

Progress ⑦

Recall

● Relevant by ASReview LAB   ● Random relevant
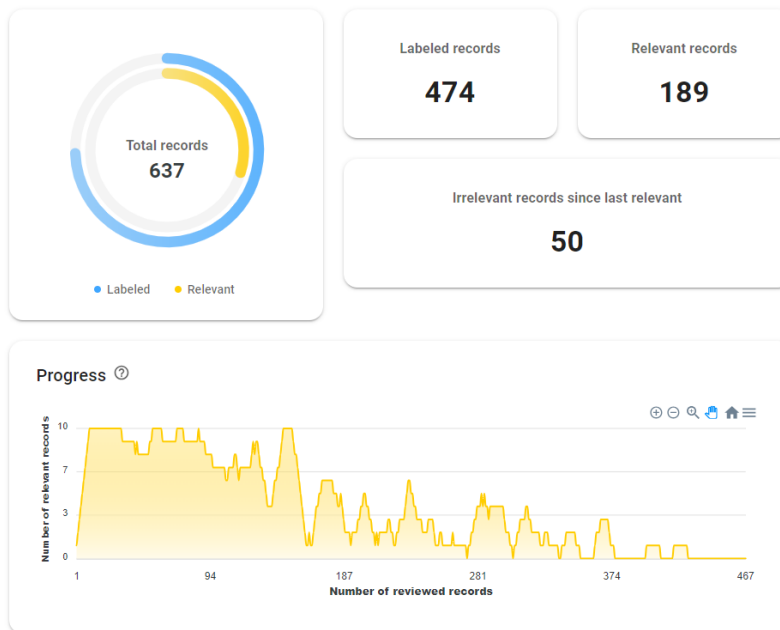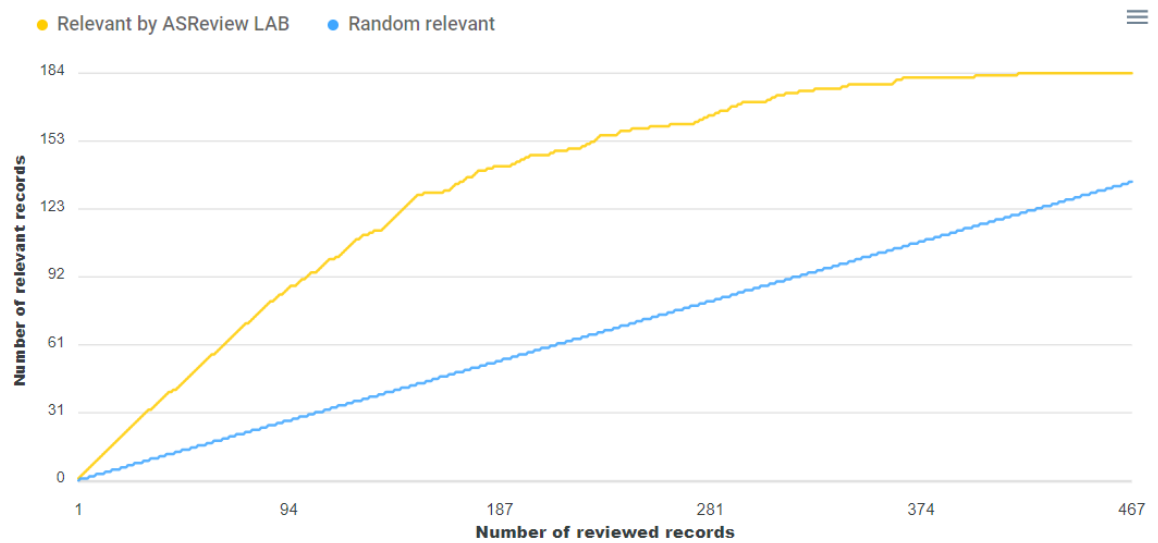
Appendix 7: Knee Method for Google Scholar

Knee method for educational outcomes

First derivative cutoff — Maximum curvature cutoff
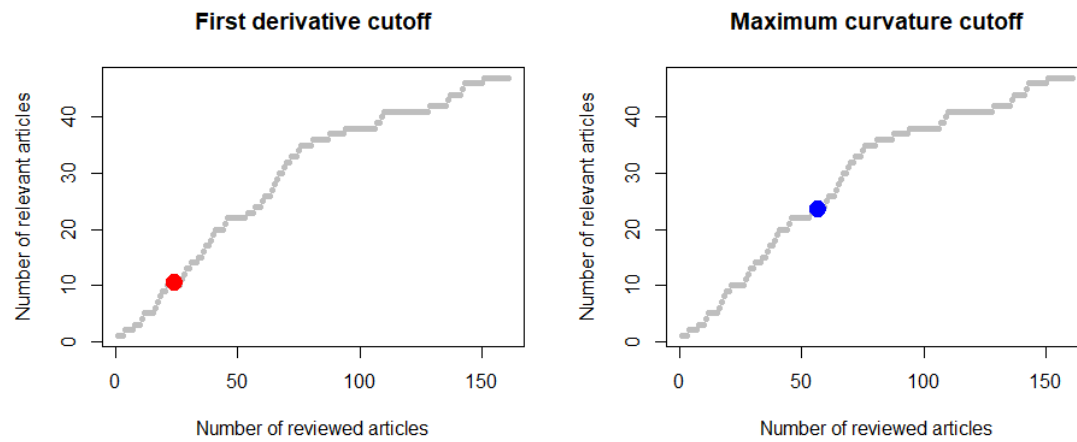
Knee method for child labour outcomes

First derivative cutoff

Maximum curvature cutoff
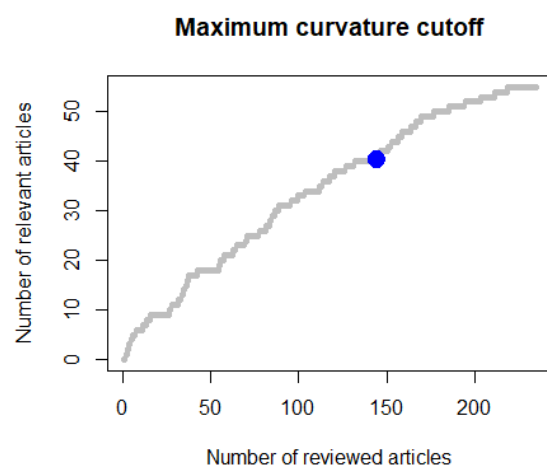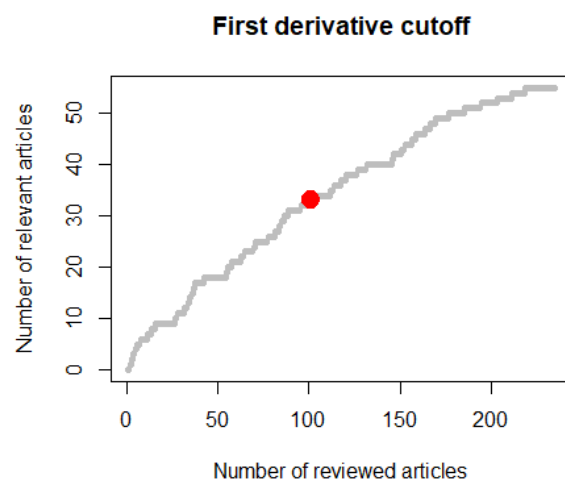
Appendix 8: PRISMA diagram

```
┌─────────────────────────────────────────┐
│ Records identified through database      │
│ searching:                               │
│                                          │
│ Scopus (round 1): 372                    │
│ Web of Science (round 1): 421            │
│ Google Scholar (round 2): 396            │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│ Duplicates removed:                      │
│                                          │
│ Round 1: 156                             │
│ Round 2: 21                              │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│ Abstracts screened during stage 1        │
│ Round 1 (ASReview): 637                  │
│ Round 2 (by hand): 375                   │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│ Excluded articles:                       │
│ Stopping rule (round 1): 163             │
│ Irrelevant (round 1): 285                │
│ Duplicates (round 1): 49                 │
│ Not accessible (round 1): 7              │
│ Irrelevant (round 2): 273                │
│ Duplicates (round 2): 63                 │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│ Records screened during stage 2          │
│ Round 1: 138 (incl. 5 key papers         │
│ ASReview)                                │
│ Round 2: 42 (incl. 3 papers snowballing) │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│ Additional records:                      │
│ Key papers ASReview: 5                   │
│ Snowballing: 3                           │
└─────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────┐
│ Papers used in the meta-analysis: 37     │
└─────────────────────────────────────────┘
```

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┌─────────────────────────────────────────┐
│ Full-text articles excluded:             │
│ Round 1 (stage 2): 106                   │
│ Round 1 (extraction): 7                  │
│ Round 2 (stage 2): 29                    │
│ Round 2 (extraction): 1                  │
└─────────────────────────────────────────┘
```

Appendix 9: List of included studies

	Author	Year	Title
Education and child labour papers			
1	Antman, F.M.	2011	The intergenerational effects of paternal migration on schooling and work: What can we learn from children's time allocations?
2	Asis, M. M., & Ruiz-Marave, C.	2013	Leaving A Legacy: Parental Migration and School Outcomes Among Young Children in the Philippines
3	Bai, Y., Neubauer, M., Ru, T., Shi, Y., Kenny, K., & Rozelle, S.	2020	Impact of Second-Parent Migration on Student Academic Performance in Northwest China and its Implications
4	Bai, Y., Zhang, L., Liu, C., Shi, Y., Mo, D., & Rozelle, S.	2018	Effect of Parental Migration on the Academic Performance of Left Behind Children in North Western China
5	Bennett, R., Clifford, D., & Falkingham, J.	2013	Household Members' Migration and the Education of Children 'Left Behind': Empirical Findings from Tajikistan and Reflections for Research Practice
6	Booth, A. L., & Tamura, Y.	2009	Impact of paternal temporary absence on children left behind
7	Botezat, A., & Pfeiffer, F.	2014	The impact of parents migration on the well-being of children left behind–initial evidence from Romania.
8	Botezat, A., & Pfeiffer, F.	2020	The impact of parental labour migration on left-behind children's educational and psychosocial outcomes: Evidence from Romania
9	Cebotari, V.	2018	Transnational migration, gender and educational development of children in Tajikistan
10	Chae, S., & Glick, J.E.	2019	Educational Selectivity of Migrants and Current School Enrollment of Children Left behind: Analyses in Three African Countries
11	Chang, H., Dong, X. Y., & MacPhail, F.	2011	Labor Migration and Time Use Patterns of the Left-behind Children and Elderly in Rural China
12	Chen, J. J.	2013	Identifying non-cooperative behavior among spouses: Child outcomes in migrant-sending households
13	Cortes, P.	2015	The Feminization of International Migration and its Effects on the Children Left Behind: Evidence from the Philippines
14	Dong, Y., Wang, W., Li, S., & Zhang, L.	2021	The cumulative impact of parental migration on schooling of left-behind children in rural China
15	Giannelli, G.C. & Mangiavacchi, L.	2010	Children's Schooling and Parental Migration: Empirical Evidence on the 'Left-behind' Generation in Albania
16	Intemann, Z.	2013	Migration and Children's Schooling and Labor: Evidence from El Salvador
17	Intemann, Z., & Katz, E.	2014	Migration and children's schooling and time allocation: Evidence from El Salvador

18	Jamil, N.	2017	The Impact of Remittances Versus Parental Absence on Children's Wellbeing: Evidence from Rural Punjab
19	Jin, X., Chen, W., Sun, I. Y., & Liu, L.	2020	Physical health, school performance and delinquency: A comparative study of left-behind and non-left-behind children in rural China
20	Kuhn R.	2006	The effects of fathers' and siblings' migration on children's pace of schooling in rural Bangladesh
21	Li, Y.	2021	Parental Labor Migration and Time Use of Children Left Behind in Rural China
22	Mao, M.Z., Zang, L.J., & Zhang, H.F.	2020	The Effects of Parental Absence on Children Development: Evidence from Left-Behind Children in China
23	Marchetta, F., & Sim, S.	2021	The effect of parental migration on the schooling of children left behind in rural Cambodia
24	Meng, X., & Yamauchi, C.	2017	Children of Migrants: The Cumulative Impact of Parental Migration on Children's Education and Health Outcomes in China
25	Pajaron, M., Latinazo, C. T., & Trinidad, E. G.	2020	The children are alright: Revisiting the impact of parental migration in the Philippines
26	Powers, E. T., & Wang, Q.	2014	U.S. Migration of a Family Member: Impacts on the Activities of Adolescent Boys and Girls Left Behind in Mexico
27	Qiu, H., Liang, X., & Sun, D.	2024	Parental migration, sibling migration, and the educational outcomes of children left behind in rural China
28	Raut, N. K., & Tanaka, R.	2018	Parental absence, remittances and educational investment in children left behind: Evidence from Nepal
29	Shen, W., Hu, L. C., & Hannum, E.	2021	Effect pathways of informal family separation on children's outcomes: Paternal labor migration and long-term educational attainment of left-behind children in rural China.
30	Shen, W.S., & Hannum, E.	2023	Context-relevant risk and protective factors for children in rural communities: Long-term implications for adulthood educational and mental health outcomes
31	Tang, Z., & Wang, N.	2021	School disruption of children in China: The influence of parents' rural–urban migration
32	Vikram, K.	2021	Fathers' Migration and Academic Achievement among Left-behind Children in India: Evidence of Continuity and Change in Gender Preferences
33	Wang, S.X.	2019	Timing and duration of paternal migration and the educational attainment of left-behind children: Evidence from rural China
34	Wang, S.X.	2014	The Effect of Parental Migration on the Educational Attainment of Their Left-Behind Children in Rural China
35	Xu, H.	2017	The time use pattern and labour supply of the left behind spouse and children in rural China
36	Xu, H., & Xie, Y.	2015	The causal effects of rural-to-urban migration on children's well-being in China
37	Zheng, X., Fang, Z., Wang, Y., & Fang, X.	2022	When left-behind children become adults and parents: The long-term human capital consequences of parental absence in China
	Aspirations papers		
1	Ayala, T.	2017	Children "Left Behind": Exploring the Nexus of Migration and Formal Education in Mexico.

2	Chen, S., Adams, J. & Qu, Z., Wang, X., & Chen, L.	2013	Parental migration and children's academic engagement: The case of China
3	Chen, X.D., & Hesketh, T.	2021	Educational Aspirations and Expectations of Adolescents in Rural China: Determinants, Mental Health, and Academic Outcomes
4	Dreby, J., & Stutz, L.	2012	Making something of the sacrifice: gender, migration and Mexican children's educational aspirations
5	Hu, S.	2019	"It's for our education": Perception of parental migration and resilience among left-behind children in rural China.
6	Jingzhong, Y., & Lu, P.	2011	Differentiated childhoods: impacts of rural labor migration on left-behind children in China
7	Lu, N., Lu, W., Chen, R., & Tang, W	2023	The Causal Effects of Urban-to-Urban Migration on Left-behind Children's Well-Being in China
8	Mao, M., Zang, L., & Zhang, H	2020	The effects of parental absence on children development: evidence from left-behind children in China
9	Ullah, R., Naz, A., & Wadood, A.	2024	International Migration of Father and Academic Performance of Children Left Behind: A Case Study of Dir Lower.
10	Wassink, J.T., & Viera, J.A.	2021	Does parental migration during childhood affect children's lifetime educational attainment? Evidence from Mexico
11	Wen, M., Su, S., Li, X., & Lin, D.	2015	Positive youth development in rural China: The role of parental migration
12	Xu, D.D., Wu, X.G., Zhang, Z.N., & Dronkers, J.	2018	Not a zero-sum game: Migration and child well-being in contemporary China
13	Yu, X.	2013	migration, family types, children's education and work participation in Mexico: who leaves, who stays, and does it matter?.

Appendix 10: List of excluded studies

	Author	Year	Title	Reason for exclusion
Papers excluded during ASReview stage 2				
1	Anas, Y., Alisjahbana, A., Purnagunawan, R. M., & Fahmi, M.	2022	The Effect of Parental Internal Migration on Children's Education: Evidence from Indonesia	Control group is not according to our PICOC
2	Antman, F.M.	2012	Gender, educational attainment, and the impact of parental migration on children left behind	Control group is not according to our PICOC
3	Arlini, S. M., Yeoh, B. S., Yen, K. C., & Graham, E.	2019	Parental migration and the educational enrolment of left-behind children: evidence from rural Ponorogo, Indonesia	Parental migration duration is not specified according to our PICOC
4	Bala, M., Jali, M. R. B. M., & Razak, N. A. A.	2019	Determinants of academic performance of left-behind children in rural Nigeria: quantile evidence from Niger State	Parental migration duration is not specified according to our PICOC
5	Berulava, G.	2019	Migration and labor supply in Georgia: an empirical study	Treatment group (left behind family members aged between 16 and 65) is not according to our PICOC
6	Biavaschi, C., Giulietti, C., & Zimmermann, K. F	2015	Sibling influence on the human capital of the left-behind	Parental migration duration is not specified according to our PICOC
7	Booth, A., & Tamura, Y.	2022	What Happens To The Labor Supply And Schooling Of The Children Left Behind By Temporary Migrants?	Parental migration duration is not specified according to our PICOC
8	ÇAĞATAY, S., Mert, M., Koska, O., & Artal-Tur, A.	2019	Remittances impacts on schooling in Jordan: analyses with respect to migrant destination	Control group is not according to our PICOC
9	Cameron, L., Meng, X., & Zhang, D.	2022	Does being "left–behind" in childhood lead to criminality in adulthood? Evidence from data on rural-urban migrants	Treatment group (left behind children aged between 0 and 16) is not according to our PICOC

			and prison inmates in China	
10	Cebotari, V., & Mazzucato, V.	2016	Educational performance of children of migrant parents in Ghana, Nigeria and Angola	Parental migration duration is not specified according to our PICOC
11	Cebotari, V., Siegel, M., & Mazzucato, V.	2016	Migration and the education of children who stay behind in Moldova and Georgia	Parental migration duration is not specified according to our PICOC
12	Chang, F., Jiang, Y., Loyalka, P., Chu, J., Shi, Y., Osborn, A., & Rozelle, S.	2019	Parental migration, educational achievement, and mental health of junior high school students in rural China	Parental migration duration is not specified according to our PICOC
13	Chang, F., Shi, Y., Shen, A., Kohrman, A., Li, K., Wan, Q., … & Rozelle, S.	2019	Understanding the Situation of China's Left-Behind Children: A Mixed-Methods Analysis	Cannot be used for the meta-analysis since no coefficients and standard errors are reported
14	Chang, L., & Lu, HJ.	2018	Resource and extrinsic risk in defining fast life histories of rural Chinese left-behind children	Cannot be used for the meta-analysis since the overall path coefficients are not provided. No other regression tables were provided either.
15	Chea, V., & Wongboonsin, P.	2020	Children of Internal Migrants: Does Moving with Parent(s) Affect Schooling Progression?	Control group is not according to our PICOC
16	Chen, C.	2023	Left-Behind Children's Cognitive Development in China: Gain in Financial Capital Versus Loss in Parental Capital	Treatment group (left behind children from age 3 onwards) is not according to our PICOC
17	Chen, L., Wulczyn, F., & Huhr, S.	2023	Parental absence, early reading, and human capital formation for rural children in China	Treatment group (left behind children from age 3 onwards) is not according to our PICOC
18	Chen, L.J., Qi, D., & Yang, D.L.	2020	The Urbanization Paradox: Parental Absence and Child Development in China-an Empirical Analysis Based on the China	Control group is not according to our PICOC

			Family Panel Studies Survey	
19[a]	Chen, X., & Hesketh, T.	2021	Educational aspirations and expectations of adolescents in rural China: Determinants, mental health, and academic outcomes	Outcome variable is not according to our PICOC
20	Chen, X., Huang, Q., Rozelle, S., Shi, Y., & Zhang, L	2014	Effect of migration on children's educational performance in rural China	Control group is not according to our PICOC
21	Coffey, D.	2013	Children's Welfare and Short-term Migration from Rural India	Control group is not according to our PICOC
22	Das, P., Saha, J., & Chouhan, P.	2020	Effects of labor out-migration on socio-economic set-up at the place of origin: Evidence from rural India	Cannot be used for the meta-analysis because no regression coefficients are reported and the control group is also not according to our PICOC
23	Dávalos, J., Karymshakov, K., Sulaimanova, B., & Abdieva, R.'	2017	Remittances and labor supply of the left-behind youth: Evidence from Kyrgyzstan	Treatment group (children left behind aged between 15-28) is not in accordance with out PICOC
24	Davis, J.	2018	School enrollment effects in a South-South migration context	Parental migration duration is not specified according to our PICOC
25	Davis, J., & Brazil, N.	2016	Disentangling fathers' absences from household remittances in international migration: The case of educational attainment in Guatemala	Parental migration duration is not specified according to our PICOC
26[a]	Dreby, J., & Stutz, L.	2012	Making something of the sacrifice: gender, migration and Mexican children's educational aspirations	Outcome variable is not according to our PICOC
27	Feng, Q.D., He, Q.Y., & Loh, C.P.A.	2022	The effect of childhood left-behind experience on individual's income: evidence from China	Treatment group (left behind children aged between 0 and 18) is not according to our PICOC

28	Fiore, S.	2022	Schooling choices and parental migration. Evidence from Mexico	Control group is not according to our PICOC
29	Gassmann, F., Siegel, M., Vanore, M., & Waidler, J.	2018	Unpacking the Relationship between Parental Migration and Child well-Being: Evidence from Moldova and Georgia	Parental migration duration is not specified according to our PICOC
30	Gong, J., & Rao, N.	2023	Early learning opportunities of preschool children affected by migration in China	Treatment group (left behind children aged between 3 and 5) is not according to our PICOC
31	Hatos, A.	2010	The (little) effect that parents' labour emigration has on their children's school performance: A study of secondary school students in Oradea (Romania)	Parental migration duration is not specified according to our PICOC
32	He, X., Wang, H., Friesen, D., Shi, Y., Chang, F., & Liu, H.	2022	Cognitive ability and academic performance among left-behind children: evidence from rural China	Control group is not according to our PICOC
33	Hou, W. P., Tan, T. X., Wen, Y. J., Wang, X. Q., Li, X. B., & Wang, C. Y	2020	The effect of increased family finance and dual-parental absence since infancy on Children's cognitive Abilities	Treatment group (left behind children aged up until 6 months) is not according to our PICOC
34	Hu, B. Y., Wu, H., Winsler, A., Fan, X., & Song, Z.	2020	Parent migration and rural preschool children's early academic and social skill trajectories in China: Are left-behind' children really left behind?	Parental migration duration is not specified according to our PICOC
35	Hu, F.	2013	Does migration benefit the schooling of children left behind? Evidence from rural northwest China	Control group is not according to our PICOC
36	Hu, S.	2018	Parents' migration and adolescents' transition to high school in rural China: the role of parental divorce.	Parental migration duration is not specified according to our PICOC

37[a]	Hu, S.	2019	"It's for Our Education": Perception of Parental Migration and Resilience Among Left-behind Children in Rural China	Cannot be included in our meta-analysis because it is qualitative and ANOVA evidence
38	Huang, Y., & Gong, H.	2022	Educational Expectations of Left-behind Children in China: Determinants and Gender Differences	Control group is not according to our PICOC
39	Huang, Y., Liang, Z., Song, Q., & Tao, R.	2020	Family arrangements and children's education among migrants: A case study of China.	Control group is not according to our PICOC
40	Jampaklay, A.	2006	Parental absence and children's school enrolment: Evidence from a longitudinal study in Kanchanaburi, Thailand	Control group is not according to our PICOC
41	Jaupart, P.	2019	No country for young men: International migration and left-behind children in Tajikistan	The treatment (having a migratory household member) is not according to out PICOC
42	Jia, Z. H. O. U., Fang, H. U., Jing, W. U., Zhi Yong, Z. O. U., Yi Xin, W. A. N. G., Hua Can, P. E. N. G., ... & Ying Hua, M. A.	2018	Subjective Well-being and Family Functioning among Adolescents Left Behind by Migrating Parents in Jiangxi Province, China	Treatment group (left behind children up to age 19) is not according to our PICOC
43[a]	Jingzhong, Y., & Lu, P.	2011	Differentiated childhoods: Impacts of rural labor migration on left-behind children in China	Control group is not according to our PICOC
44	Khalid, S., Tadesse, E., Lianyu, C., & Gao, C.	2023	Do Migrant Parents' Income or Relationships With Their Left-Behind Children Compensate for Their Physical Absence?	Control group is not according to our PICOC
45	Kuépié, M.	2018	Is International Migration Always Good for Left Behind Households Members? Evidence from Children Education in Cameroon	Treatment (housheold member migration) is not according to out PICOC
46	Lahiri, S.	2020	Impact of internal migration on left behind	Treatment (housheold member

			youth's labour force participation in India	migration) is not according to out PICOC
47	Li, L., Wang, L., & Nie, J.	2017	Effect of Parental Migration on the Academic Performance of Left-behind Middle School Students in Rural China	Parental migration duration is not specified according to our PICOC
48	Li, M., Li, J., Yasin, M. A. I., Osman, M. N., Hashim, N. B., Ang, L. H., & Xue, Y.	2022	Analysis on the Cognitive Impact of Social Mobile Games on Left-Behind Children in the Era of Big Data	Parental migration duration is not specified according to our PICOC
49	Li, X., & Sun, X.	2020	Child development in rural China: Does parental migration matter?	Parental migration duration is not specified according to our PICOC
50	Liang, W., Hou, L., & Chen, W.	2008	Left-Behind Children in Rural Primary Schools The Case of Sichuan Province	Parental migration duration is not specified according to our PICOC
51	Liang, Z., & Sun, F.	2020	The lasting impact of parental migration on children's education and health outcomes: The case of China	Parental migration duration is not specified according to our PICOC
52	Liu, M., & Villa, K.M.	2020	Solution or isolation: Is boarding school a good solution for left-behind children in rural China?	Parental migration duration is not specified according to our PICOC
53	LIU, S. Z., & JOHNSON, J. A.	2016	Population Mobility and Children's Education	Cannot be included in the meta-analysis because it reports qualitative evidence
54	Liu, Y., Deng, Z., & Katz, I.	2022	Transmission of Educational Outcomes Across Three Generations: Evidence From Migrant Workers' Children in China	Treatment (the socioeconomic status of the parents and grandparents) is not according to out PICOC
55	Liu, Z., Yu, L., & Zheng, X.	2018	No longer left-behind: The impact of return migrant parents on children's performance	Parental migration duration is not specified according to our PICOC
56	Lu, S., Lin, Y. T., Vikse, J. H., & Huang, C. C.	2016	Well-being of migrant and left-behind children in C hina: Education, health, parenting, and personal values	Control group is not according to our PICOC

57	Lu, Y.	2014	Parental migration and education of left-behind children: A comparison of two settings	Parental migration duration is not specified according to our PICOC
58	Lu, Y.	2012	Education of Children Left Behind in Rural China	Parental migration duration is not specified according to our PICOC
59	Lu, Y., Yeung, J. W. J., Liu, J., & Treiman, D. J.	2019	Migration and children's psychosocial development in China: When and why migration matters.	Outcome variable is not according to our PICOC
60	Lu, Y., Yeung, W. J. J., & Treiman, D. J.	2020	Parental Migration and Children's Psychological and Cognitive Development in China: Differences and Mediating Mechanisms	Parental migration duration is not specified according to our PICOC
61	Lu, Z..; Pang, X.	2022	The Impact of Parental Migration on Offspring's Education Investment: Evidence from Left-Behind Children in China.	Parental migration duration is not specified according to our PICOC
62	Lyu, L., & Chen, Y.	2019	Parental migration and young migrants' wages in urban China: An exploratory analysis	Treatment group (left behind children's age is not specified) is not according to our PICOC
63	Manyeruke, G., Çerkez, Y., Kiraz, A., & Çakıcı, E	2021	Attachment, Psychological Wellbeing, and Educational Development among Child Members of Transnational Families	Parental migration duration is not specified according to our PICOC
64	Morooka, H., & Liang, Z.	2009	International migration and the education of left-behind children in Fujian, China	Parental migration duration is not specified according to our PICOC
65	Nobles, J.	2011	Parenting from abroad: Migration, nonresident father involvement, and children's education in Mexico	Control group is not according to our PICOC
66	Oliveira, G.	2017	Between Mexico and New York City: Mexican Maternal Migration's Influences on Separated	Cannot be included in the meta-analysis because it reports qualitative evidence

			Siblings' Social and Educational Lives	
67	Pan, W., Bai, R., Li, C., & Wu, L.	2020	The Impacts of Parents' Migration on Study Achievements of Chinese Rural Left-behind Children	Parental migration duration and outcome variable is not according to our PICOC
68	Popa, N.L.	2011	Romanian High-School Students "Left Behind" in the Context of Circular Migration: Some Determinants of School Achievement	Parental migration duration and outcome variable is not according to our PICOC
69	Popa, N.L.	2012	Academic attributions and school achievement among Romanian children left behind by migrant parents	Parental migration duration and outcome variable is not according to our PICOC
70	Rafique Wassan, M., Hussain, Z., Ali Shah, M., & Amin, S. N.	2017	International labor migration and social change in rural Sindh, Pakistan	Qualitative study
71	Roy, A. K., Singh, P., & Roy, U. N.	2015	Impact of rural-urban labour migration on education of children: A case study of left behind and accompanied migrant children in India	Parental migration duration and outcome variable is not according to our PICOC
72	Salas, V.B.	2014	International remittances and human capital formation	Parental migration duration and outcome variable is not according to our PICOC
73	Sarma, V. J., & Parinduri, R. A.	2016	What happens to children's education when their parents emigrate? Evidence from Sri Lanka.	Parental migration duration and outcome variable is not according to our PICOC
74	Sengupta, S., & Guchhait, S. K.	2022	Seasonal Migration and Child's Schooling: A Survival Approach	Parental migration duration is not specified according to our PICOC
75[a]	Shen, W., Hu, L. C., & Hannum, E.	2021	Effect pathways of informal family separation on children's outcomes: Paternal labor migration and long-term educational attainment of left-	Parental migration duration is not specified according to our PICOC

			behind children in rural China	
76	Song, S., Chen, C., & Zhang, A.	2018	Effects of parental migration on life satisfaction and academic achievement of left-behind children in rural China—a case study in Hubei province	Parental migration duration is not specified according to our PICOC
77	Sun, W.K., & Wenkai,S.	2022	The interaction between rural labor mobility and the schooling of left-behind children	We cannot access the paper
78	Sun, X., Tian, Y., Zhang, Y., Xie, X., Heath, M. A., & Zhou, Z.	2015	Psychological development and educational problems of left-behind children in rural China	Outcome variable is not according to out PICOC
79	Teerawichitchainan, B., & Knodel, J.	2022	Parental migration and care for left-behind children in Myanmar's Dry Zone	Outcome variable is not according to our PICOC
80	Tong, Y., Luo, W., & Piotrowski, M.	2015	The Association Between Parental Migration and Childhood Illness in Rural China	Outcome variable is not according to our PICOC
81	Udrea, G., & Guiu, G.	2022	The Impact of Parents' Work Migration on the Social, Communication and Educational Experiences of Left-Behind Adolescents	Cannot be included in our meta-analysis because it is qualitative evidence
82	Vincze, B., & Emese, A.	2016	SCHOOL PERFORMANCE, BEHAVIOR AND EDUCATIONAL PLANS OF LEFT BEHIND ROMANIAN ADOLESCENTS	We cannot access the paper
83	Wang, H., Cheng, Z., Wang, B. Z., & Chen, Y.	2021	Childhood left-behind experience and labour market outcomes in China	Treatment group (left behind children aged between 4 and 12) is not according to our PICOC
84	Wang, L., & Mesman, J.	2015	Child development in the face of rural-to-urban migration in China: A meta-analytic review.	Parental migration duration and outcome variable is not according to our PICOC

85	Wang, L., Zheng, Y., Li, G., Li, Y., Fang, Z., Abbey, C., & Rozelle, S.	2019	Academic achievement and mental health of left-behind children in rural China: A causal study on parental migration	Parental migration duration is not specified according to our PICOC
86	Wang, X., Bai, Y., Zhang, L., & Rozelle, S.	2017	Migration, Schooling Choice, and Student Outcomes in China	Parental migration duration is not specified according to our PICOC
87[a]	Wassink, J. T., & Viera, J. A.	2021	Does Parental Migration During Childhood Affect Children's Lifetime Educational Attainment? Evidence From Mexico	Control group is not according to our PICOC
88	Wei, L., Yang, Y., Zhang, J., & Si, L.	2023	Rural-urban migration, family arrangement, and children's welfare: Evidence from China's rural areas	Parental migration duration and outcome variable is not according to our PICOC
89	Wen, M., & Lin, D.	2012	Child development in rural China: Children left behind by their migrant parents and children of nonmigrant families.	Outcome variable is not according to our PICOC
90[a]	Wen, M., Su, S., Li, X., & Lin, D.	2015	Positive youth development in rural China: The role of parental migration	Parental migration duration is not specified according to our PICOC
91	Wu, H.Z., & Zhou, W.	2020	English Learning Motivation and Anxiety Regarding the Left-Behind Children in Rural China	Parental migration duration is not according to our PICOC
92	Wu, J., & Zhang, J.	2017	The Effect of Parental Absence on Child Development in Rural China	Parental migration duration is not according to our PICOC
93	Wu, X., & Zhang, Z.	2015	Population migration and children's school enrollments in China, 1990-2005	Control group is not according to our PICOC
94	Xia, Z., Yang, F., Praschan, K., & Xu, Q	2021	The formation and influence mechanism of mathematics self-concept of left-behind children in mainland China	Parental migration duration and outcome variable is not according to our PICOC
95	Xiaofeng, M., Wenhui, D., & Aibao, Z.	2018	The Link Between Parental Absence and	Cannot be used for the meta-analysis

			Poor Reading Comprehension: Evidence From the Left-Behind Children in Rural China	because no regression results are reported, just ANOVA
96	Xie, W., Sandberg, J., Uretsky, E., Hao, Y., & Huang, C.	2022	Parental Migration and Children's Early Childhood Development: A Prospective Cohort Study of Chinese Children	Treatment group (left behind children aged between 0 and 5) is not according to our PICOC
97	Xu, Y., Xu, D., Simpkins, S., & Warschauer, M.	2019	Does It Matter Which Parent is Absent? Labor Migration, Parenting, and Adolescent Development in China	Parental migration duration and outcome variable is not according to our PICOC
98	Yang, G., & Bansak, C.	2020	Does wealth matter? An assessment of China's rural-urban migration on the education of left-behind children	Parental migration duration is not specified according to our PICOC
99	Yeung, W. J. J., & Gu, X.	2016	Left behind by parents in China: Internal migration and adolescents' well-being	Control group is not according to our PICOC
100	Zhang, H., & Deng, C.	2022	The Impact of Parent–Child Attachment on School Adjustment in Left-behind Children Due to Transnational Parenting: The Mediating Role of Peer Relationships	Outcome variable is not according to our PICOC
101	Zhang, H., Behrman, J. R., Fan, C. S., Wei, X., & Zhang, J.	2014	Does parental absence reduce cognitive achievements? Evidence from rural China	Control group is not according to our PICOC
102	Zhao, J., Li, Q., Wang, L., Lin, L., & Zhang, W.	2019	Latent Profile Analysis of Left-behind Adolescents' Psychosocial3Adaptation in Rural China	Cannot be included in the meta-analysis because it reports ANOVA results only
103	Zhao, J., Sun, P., Wang, M., & Zhang, W.	2018	Left-behind adolescents' hopes and fears for the future in rural China	Parental migration duration and outcome variable is not according to our PICOC
104	Zhao, Q., Yu, X., Wang, X., & Glauben, T.	2014	The impact of parental migration on children's school performance in rural China	Parental migration duration is not specified according to our PICOC

105	Zheng, X., Zhang, Y., & Jiang, W.	2022	Migrating with parents or left-behind: Associations of internal migration with cognitive and noncognitive outcomes among chinese children	Control group is not according to our PICOC
106	Zhou, C., Sylvia, S., Zhang, L., Luo, R., Yi, H., Liu, C., ... & Rozelle, S.	2015	China's left-behind children: Impact of parental migration on health, nutrition, and educational outcomes	Parental migration duration and outcome variable is not according to our PICOC
Papers excluded during Google Scholar screening stage 2				
1	Adunts, D., & Afunts, G.	2019	Seasonal Migration and Education of Children Left Behind: Evidence from Armenia	Parental migration duration is not according to our PICOC
2	Agasty, M.P.	2016	Migration of Labour and its Impact on Education of Left behind Children: A case study of rural Odisha	Parental migration duration is not according to our PICOC
3	Alvarez, N.P.S.	2021	The voice of those absent-An empirical analysis of the impact of migration on child labor in Ecuador in 2017-2019.	Treatment group (migratory children) is not according to out PICOC
4	Aman, S., Mahmood, F., & Ahmed, A.	2024	Are Migrant Children at Risk of Child Labour? Empirical Evidence from Pakistan	Treatment group (migratory children) is not according to out PICOC
5	BINH, M.L.T.T.	2016	IMPACT OF INTERNAL MIGRATION ON CHILDREN'S SCHOOLING AND CHILD LABOR: THE CASE OF VIETNAM.	Parental migration duration is not according to our PICOC
6	El Alaoui, A., & Ahbala, S.	2024	Effect of Parent's International Migration on the Educational Performances of Left-Behind Children in Morocco.	Parental migration duration is not according to our PICOC
7	Fatou, C., & Yiriyibin, B.	2016	Effects of migration and remittances on child's time allocation: evidence from Burkina Faso, Nigeria, and Senegal.	Treatment (any form of migration) is not according to our PICOC

8	Gassmann, F., Siegel, M., Vanore, M., & Waidler, J.	2013	The impact of migration on children left behind in Moldova	Parental migration duration is not according to our PICOC
9	Jabbar, J.B.	2022	Effects of parental migration on the education of left-behind children.	Control group is not according to our PICOC
10	Kusumawardhani, N., & Warda, N.	2013	Migration and the Incidence of Child Labor: Evidence From Indonesia.	Control group is not according to our PICOC
11	Lee, M.H.	2011	Migration and children's welfare in China: The schooling and health of children left behind	Parental migration duration is not according to our PICOC
12	Liao, F.	2023	Essays in Parental Migration, Children's Wellbeing, and Labor Economics	We cannot access this
13[a]	Lu, N., Lu, W., Chen, R., & Tang, W.	2023	The Causal Effects of Urban-to-Urban Migration on Left-behind Children's Well-Being in China.	Parental migration duration is not according to our PICOC
14	Luo, X.		Does Parental Out-migration Benefit Left-behind Children's Schooling Outcomes?	Parental migration duration is not according to our PICOC
15	Luo, X.	2020	How Does Parental Out-migration Affect Left-behind Children's Schooling Outcomes?	Parental migration duration is not according to our PICOC
16	Luo, X.	2020	How Does Parental Out-migration Affect Left-behind Children's Schooling Outcomes?– Effect Sizes and Mechanisms.	Parental migration duration is not according to our PICOC
17	Maldonadoa, N.		Migration, Strategic Behavior and Children's Human Capital in Mexico	Treatment (any form of migration) is not according to our PICOC
18	Murakami, E.	2019	International migration and remittance effects on the school enrollment of children staying behind: The evidence from Tajikistan	Parental migration duration is not according to our PICOC

19	Murakami, E.	2021	International migration and remittance effects on school enrolment of children staying behind: The evidence from Tajikistan.	Parental migration duration is not according to our PICOC
20	Phon, S.	2019	Effects of migration and remittances on educational attainment and working hours of children in Cambodia	Treatment (household member migration) is not according to our PICOC
21	Raut, N.K., & Tanaka, R.	2016	Migrant heterogeneity and education of children left behind in Nepal.	Parental migration duration is not according to our PICOC – not defined in the working paper version.
22	Saleemi, S.	2021	Children in left-behind migrant households: education and gender equality.	Treatment (household member migration) is not according to our PICOC
23	Sharma, H., & Gibson, J. K.	2020	Effects of International Migration on Child Schooling and Child Labour: Evidence from Nepal.	Treatment (any form of migration) is not according to our PICOC
24	Sun, X., Zhou, M., & Huang, L.	2024	The Long-Time Consequences of Parental Early Left-Behind Event on the Human Capital of Rural Children in China.	Treatment group (children left behind aged between 0 and 12) is not according to our PICOC
25	Tesfaw, G., & Minaye, A.	2022	Impact of Parental Migration on Education and Behavioural Outcomes of Children Left Behind in Southern Wollo	Cannot be included in the meta-analysis because qualitative evidence
26	Xie, W.	2019	Left-Behind Villages, Left-Behind Children: Migration and Child Health and Development in Rural China	Parental migration duration is not according to our PICOC
27	Yu, H.	2022	Effects of parental labor migration on education of children left behind	Quality (master thesis)
28[a]	Yu, X.	2013	migration, family types, children's education and	Treatment (household member

			work participation in Mexico: who leaves, who stays, and does it matter?.	migration) is not according to our PICOC
29	Zhong, Z.K.	2020	The Study of Parental Educational Investment in Left-behind Children in China	Quality
Papers excluded during the extraction phase				
1	Chen, X., Li, D., Liu, J., Fu, R., & Liu, S.	2019	Father Migration and Mother Migration: Different Implications for Social, School, and Psychological Adjustment of Left-Behind Children in Rural China	Excluded from the meta-analysis because number of observations are missing
2	Fu, M., Bo, W. V., Xue, Y., & Yuan, T. F.	2017	Parental Absence Accompanies Worse Academic Achievements: Evidence Based upon a Sample of Left-Behind Children in Rural China	Excluded from the meta-analysis because number of observations and standard errors are missing
3	Guo, L.	2012	Migration and the well-being of left-behind children in China.	Excluded from the meta-analysis because standard error is missing
4	Jordan, L. P., & Graham, E.	2012	Resilience and Well-Being Among Children of Migrant Parents in South-East Asia	Excluded from the meta-analysis because standard error is missing
5	Meyerhoefer, C. D., & Chen, C. J.	2011	The effect of parental labor migration on children's educational progress in rural China	Excluded from the meta-analysis because number of observations are missing
6	Song, Q., & Glick, J.	2022	Paternal migration and children's educational attainment and work activity: the case of Mexico	Excluded from the meta-analysis because number of observations are missing
7	Yabiku, S. T., & Agadjanian, V.	2013	Men's labor migration and schooling of children left behind in rural Mozambique.	Excluded from the meta-analysis because results are reported as odds ratios
8	Zhou, M., Murphy, R., & Tao, R.	2014	Effects of Parents' Migration on the Education of Children	Excluded from the meta-analysis because number of

			Left Behind in Rural China	observations are missing

a Excluded for the meta-regression, but included for the systematic review on educational aspirations.

Appendix 11: Breusch-Pagan test

p-value	Conclusion
Positive educational outcomes	
0.000	There may be study-level effects present, suggesting the need for a multilevel model
Negative educational outcomes	
0.257	No strong evidence for study-level effects based on this test
Child labour outcomes	
0.000	There may be study-level effects present, suggesting the need for a multilevel model

Appendix 12: I2 statistics for every model specification including moderators

	Dependent variable: t value	
	Fixed Effects	Multilevel Random Effects
	(2)	(3)
Positive educational outcomes		
I^2	99.99%	99.99%
Negative educational outcomes		
I^2	100%	99.99%
Child labour outcomes		
I^2	99.99%	99.98%

Appendix 13: Regression test for funnel plot asymmetry

	b	p-value
Positive educational outcomes - REML		
	0.0242	<0.0001
Negative educational outcomes - FE		
	-0.0645	<0.0001
Child labour outcomes - REML		
	-0.0128	<0.0001

Appendix 14: Genuine effect and publication bias without clustered standard errors for every outcome category

	Dependent variable: t value		
	(1) OLS (SE)	(2) Fixed Effects (SE)	(3) Multilevel Random Effects (SE)
Positive educational outcomes			
Genuine effect (PET)	0.024*** (0.004)	0.015*** (0.000)	-0.011* (0.007)
Bias (FAT)	-0.955*** (0.206)	-0.322*** (0.003)	0.651 (0.537)
Observations		418	
Studies		22	
Negative educational outcomes			
Genuine effect (PET)	-0.065** (0.014)	-0.089*** (0.000)	-0.010 (0.024)
Bias (FAT)	5.246*** (0.894)	7.085*** (0.006)	1.652 (1.720)
Observations		67	
Studies		6	
Child labour outcomes			
Genuine effect (PET)	-0.013** (0.006)	-0.041*** (0.000)	-0.047*** (0.011)
Bias (FAT)	1.237*** (0.347)	3.224*** (0.004)	3.118*** (0.725)
Observations		221	
Studies		15	

*Note: *p<0.1; **p<0.05; ***p<0.01*

Appendix 15: Genuine effect and publication bias with country and decade-fixed effects

	Dependent variable: t-value	
	OLS (Clustered SE)	Multilevel Random Effects (Clustered SE)
	(1)	(2)
Positive educational outcome		
Genuine effect	0.011 (0.017)	-0.011 (0.031)
Bias	-1.680*** (0.522)	-0.325 (1.768)
Albania	-3.753*** (0.316)	-2.615** (1.085)
Burkina Faso	6.696*** (0.888)	7.252*** (1.895)
El Salvador	0.483 (0.631)	1.302 (0.765)
India	1.168 (1.067)	2.164 (2.029)
Kenya	3.844*** (0.442)	3.618*** (0.922)
Nepal	-3.682*** (1.352)	-1.892 (1.779)
Philippines	1.392*** (0.467)	0.620 (0.587)
Romania	1.526** (0.684)	0.750 (1.099)
Senegal	5.994*** (0.745)	6.339*** (1.619)
Tajikistan	1.069 (0.728)	1.388 (1.583)
1990	1.747*** (0.095)	0.386 (1.376)
2000	0.981** (0.412)	0.881 (1.343)
2010	0.735*** (0.416)	0.575 (1.213)
Observations	418	
Child labour outcomes		
Genuine effect	-0.095 (0.070)	-0.099 (0.153)
Bias	8.915 (6.551)	9.246 (14.314)
Cambodia	-1.338*** (0.400)	-0.736 (1.770)
El Salvador	-0.579 (1.009)	-0.029 (2.233)
Mexico	1.124 (0.702)	1.549 (2.174)
Nepal	5.729* (3.194)	6.486 (7.592)
Pakistan	4.419 (2.706)	5.096 (6.535)
Philippines	4.482 (4.178)	5.288 (9.716)
Vietnam	-3.083 (2.207)	-3.053 (4.146)
1990	-0.934 (1.497)	-1.152 (3.954)
2000	-6.762 (4.931)	-7.553 (11.356)
2010	-4.727 (3.855)	-5.517 (9.017)
Observations	221	

*Note: *p<0.1; **p<0.05; ***p<0.01. The reference country is China and the reference decade is 1980.*

Appendix 16: Multivariate analysis for positive educational outcomes

	Dependent variable: t-value		
	OLS (Clustered SE)	Fixed Effects (Clustered SE)	Multilevel Random Effects (Clustered SE)
	(1)	(2)	(3)
Positive educational outcomes			
Genuine effect	-0.045** (0.022)	-0.069 (0.098)	-0.035 (0.057)
Bias	-6.098*** (2.326)	-10.702 (13.546)	-4.589 (4.795)
Other method	-0.804*** (0.239)	-1.031 (0.549)	-0.876 (0.555)
Fixed effects regression	-0.708*** (0.193)	-0.808 (0.555)	-1.019 (0.820)
SEM	-0.908* (0.541)	-0.630 (1.615)	-1.306 (1.999)
Quasi-experimental	-3.144*** (0.388)	-3.251** (0.764)	-2.883** (0.730)
Age sample	2.682*** (0.749)	3.855* (1.458)	2.129 (1.951)
Father	0.691* (0.395)	0.502 (1.304)	0.268 (0.778)
Mother	-0.200 (0.425)	-0.494 (1.630)	-0.560 (0.956)
Regional or district-fixed effects	2.124*** (0.454)	2.245* (0.841)	1.922* (0.811)
Education of the household head	5.451*** (0.555)	5.116* (1.948)	4.981** (1.630)
LN Observations	1.107*** (0.389)	1.665 (2.381)	0.814 (0.888)
Interaction term	-2.508*** (0.498)	-3.040*** (0.493)	-1.942 (2.031)
Secondary data	-3.476*** (0.500)	-4.103** (0.981)	-2.598* (1.035)
Number of children in the family	-1.348*** (0.221)	-1.029 (0.801)	-0.639 (0.726)
LN Google Scholar citations weighted by publication age	-0.809*** (0.254)	-1.365*** (0.716)	-0.636 (0.745)
Publication age	0.014*** (0.005)	0.022 (0.014)	0.011 (0.019)
Observations		366	

*Note: *$p<0.1$; **$p<0.05$; ***$p<0.01$.*

Appendix 17: Multivariate analysis for negative educational

	Dependent variable: t-value		
	OLS (Clustered SE)	Fixed Effects (SE)	Multilevel Random Effects (SE)
	(1)	(2)	(3)
Negative educational outcomes			
Genuine effect	-0.074*** (0.003)	-0.075*** (0.0001)	-0.074*** (0.013)
Bias	6.478*** (0.283)	6.575*** (0.007)	6.478*** (0.839)
Long-term effect	1.227*** (0.126)	1.263*** (0.006)	1.227 (0.843)
Immediate effect	-1.303*** (0.150)	-1.415*** (0.005)	-1.303** (0.580)
Girls	-4.420*** (0.190)	-4.495*** (0.023)	-4.420*** (1.485)
Boys	-5.135*** (0.191)	-5.211*** (0.022)	-5.135*** (1.486)
Observations		67	

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$. Clustered standard errors could not be calculated for the fixed effects and multilevel random effects model because of the limited number of observations in combination with the amount of moderators included.

Appendix 18: Multivariate analysis for child labour outcomes

	Dependent variable: t-value		
	OLS (Clustered SE)	Fixed Effects (Clustered SE)	Multilevel Random Effects (Clustered SE)
	(1)	(2)	(3)
Child labour outcomes			
Genuine effect	-0.036*** (0.004)	-0.032*** (0.008)	-0.034*** (0.007)
Bias	3.969*** (0.609)	3.365** (0.939)	3.714** (0.941)
Instrumental variable approach	0.811*** (0.193)	1.107** (0.318)	0.884** (0.321)
Quasi-experimental	-2.044*** (0.612)	-1.886* (0.844)	-1.969* (0.889)
Girls	-1.138*** (0.371)	-0.785 (0.562)	-1.103* (0.526)
Boys	-0.608* (0.310)	-0.246 (0.429)	-0.594 (0.431)
LN Google Scholar citations weighted by publication age	0.479*** (0.078)	0.516*** (0.087)	0.434** (0.117)
Observations		137	

*Note: *p<0.1; **p<0.05; ***p<0.01.*

Appendix 19: Immediate vs long-term effect subsamples multivariate analysis

	OLS (Clustered SE)	Fixed Effects (SE)	Multilevel Random Effects (SE)
	(1)	(2)	(3)
Immediate effects			
Positive educational outcomes			
Genuine effect	-0.125 (0.092)	-0.138*** (0.0006)	-0.152*** (0.048)
Bias	-22.440** (9.146)	-35.446*** (0.102)	-54.421*** (14.163)
Observations	87	87	87
Long-term effects			
Positive educational outcomes			
Genuine effect	-0.025 (0.051)	0.003*** (0.001)	-0.025 (0.143)
Bias	18.628 (14.243)	9.986*** (0.789)	18.627 (57.919)
Observations	81	81	81

Dependent variable: t-value (spanning columns 1–3)

Note: $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$. Clustered standard errors could not be calculated for the fixed effects and multilevel random effects model because of the limited number of observations in combination with the number of moderators included. The subsample analysis was not possible for child labour outcomes since there were no long-term observations and the distinction between short-term and long-term child labour outcomes is also not practically meaningful. All models for positive educational outcomes control for the following variables: Other method, Fixed effects regression, SEM, Father, Mother, Regional/District fixed effects, LN observations, Interaction term, Secondary data, Number of children in the family, Google Scholar citations weighted by publication age, and Publication age. The Age sample and Quasi-experimental variables were only included in the Immediate effects model due to the variation in the variables.

Appendix 20: China subsample multivariate analysis

	Dependent variable: t-value		
	OLS (Clustered SE)	Fixed Effects (SE)	Multilevel Random Effects (SE)
	(1)	(2)	(3)
China			
Positive educational outcomes			
Genuine effect	-0.069*** (0.019)	-0.137*** (0.0004)	-0.049** (0.022)
Bias	-3.861 (3.453)	-19.963*** (0.078)	-1.638 (3.685)
Observations	276	276	276
Child labour outcomes			
Genuine effect	0.011*** (0.003)	0.014*** (0.0003)	0.011 (0.043)
Bias	-1.077*** (0.310)	-1.314*** (0.031)	-1.077 (4.458)
Observations	48	48	48
Other countries			
Positive educational outcomes			
Genuine effect	-0.026 (0.043)	-0.111*** (0.0004)	-0.026 (0.021)
Bias	-13.280*** (4.163)	-27.233*** (0.117)	-13.285** (5.441)
Observations	90	90	90
Child labour outcomes			
Genuine effect	-0.042*** (0.004)	-0.040*** (0.0001)	-0.032*** (0.010)
Bias	5.218*** (0.830)	4.354*** (0.013)	3.855*** (1.218)
Observations	89	89	89

*Note: *$p<0.1$; **$p<0.05$; ***$p<0.01$. Clustered standard errors could not be calculated for the fixed effects and multilevel random effects model because of the limited number of observations and the number of moderators included. All models for positive educational outcomes control for the following variables: Other method, Fixed effects regression, Quasi-experimental method, Age sample, Father, Mother, Regional or district fixed effects, LN observations, Interaction term, Number of children in the family, Google Scholar citations weighted by publication age, and Publication age. SEM and Secondary data are only controlled for in the models related to China due to the number of observations of the variables. All models for child labour outcomes control for IV, Quasi-experimental, Girls, Boys, and Google Scholar citations weighted by publication age.*

Appendix 21: Country-income subsamples multivariate analysis

	Dependent variable: t-value		
	OLS (Clustered SE)	Fixed Effects (SE)	Multilevel Random Effects (SE)
	(1)	(2)	(3)
Low-income countries			
Positive educational outcomes			
Genuine effect	0.024*** (0.006)	0.029*** (0.001)	0.024 (0.017)
Bias	-9.721*** (1.382)	-8.109*** (0.215)	-9.719** (3.975)
Observations	113	113	113
Child labour outcomes			
Genuine effect	-0.039* (0.021)	-0.011*** (0.001)	-0.039 (0.046)
Bias	3.645* (1.864)	1.129*** (0.063)	3.644 (4.060)
Observations	61	61	61
Lower-middle income countries			
Positive educational outcomes			
Genuine effect	-0.126 (0.082)	-0.155*** (0.001)	-0.051 (0.058)
Bias	-4.680 (6.954)	-9.491*** (0.108)	2.440 (8.865)
Observations	165	165	165
Child labour outcomes			
Genuine effect	-0.042*** (0.002)	-0.033*** (0.000)	-0.042*** (0.013)
Bias	4.349*** (0.522)	2.934*** (0.023)	4.349*** (1.649)
Observations	47	47	47
Upper-middle income countries			
Positive educational outcomes			
Genuine effect	-0.124** (0.040)	-0.068*** (0.001)	0.046 (0.052)
Bias	6.309*** (3.162)	3.729***(0.202)	-4.223 (11.259)
Observations	88	88	88
Child labour outcomes			
Genuine effect	0.041*** (0.010)	0.028*** (0.000)	0.045*** (0.014)
Bias	-1.018*** (0.289)	-0.543*** (0.013)	-1.564** (0.688)
Observations	83	83	83

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$. *Clustered standard errors could not be calculated for the fixed effects and multilevel random effects model because of the limited number of observations and the number of moderators included. All models for positive educational outcomes control for the following variables: Other method, Fixed effects regression, Quasi-experimental, Age sample, Father, Mother, Regional or district-fixed effects, LN Observations, Number of children in the family, LN Google Scholar citations weighted by publication age, and Publication age. Due to limited availability of data on these variables, only the lower- and lower-middle income models control for Education of the household head, and interaction term. The SEM and Secondary data variables are only included in the lower-middle-income models. All models for child labour outcomes control for the following variables: IV, Quasi-experimental, Girls, Boys. Only models related to lower- and lower-middle income control for Google Scholar citations weighted by publication age.*

Appendix 22: Types of child labour subsamples multivariate analysis

	Dependent variable: t-value		
	OLS (Clustered SE)	Fixed Effects (SE)	Multilevel Random Effects (SE)
	(1)	(2)	(3)
Unpaid domestic work			
Genuine effect	-0.047*** (0.005)	-0.042*** (0.000)	-0.047*** (0.015)
Bias	4.430*** (0.423)	3.890*** (0.025)	4.430*** (1.492)
Observations	30	30	30
Unpaid farm work			
Genuine effect	-0.009 (0.009)	0.002*** (0.000)	-0.009 (0.024)
Bias	1.638 (0.989)	0.274*** (0.030)	1.638 (2.434)
Observations	17	17	17
Paid work			
Genuine effect	0.072*** (0.011)	0.079*** (0.0003)	0.072 (0.047)
Bias	-4.406*** (0.064)	-4.689*** (0.023)	-4.406 (2.551)
Observations	22	22	22
Unspecified work			
Genuine effect	-0.029*** (0.003)	-0.031*** (0.000)	-0.032*** (0.010)
Bias	3.529*** (1.063)	3.090*** (0.023)	4.351** (1.814)
Observations	60	60	60

*Note: *p<0.1; **p<0.05; ***p<0.01. Clustered standard errors could not be calculated for the fixed effects and multilevel random effects model because of the limited number of observations and the number of moderators included. The models estimating unpaid and unspecified work control for the following variables: IV, Girls, Boys, and Google Scholar citations weighted by publication age. The model that estimates paid work controls for the following variables: IV, Girls and Boys.*

Appendix 23: Intensive versus extensive margin subsamples multivariate analysis

	Dependent variable: t-value		
	OLS (Clustered SE) (1)	Fixed Effects (SE) (2)	Multilevel Random Effects (SE) (3)
Intensive margin			
Positive educational outcomes			
Genuine effect	-0.020 (0.031)	0.002 *** (0.000)	0.012 (0.021)
Bias	-0.686 (3.413)	4.702 *** (0.054)	2.103 (3.143)
Observations	332	332	332
Child labour outcomes			
Genuine effect	0.028** (0.015)	0.023*** (0.000)	0.035*** (0.013)
Bias	-0.517 (0.015)	-0.198***(0.008)	-0.769 (0.765)
Observations	140	140	140
Extensive margin			
Positive educational outcomes			
Genuine effect	-0.030 (0.074)	-0.044*** (0.001)	0.004 (0.025)
Bias	6.556*** (1.428)	3.749*** (0.122)	2.462 (5.460)
Observations	86	86	86
Child labour outcomes			
Genuine effect	-0.020 (0.031)	-0.138*** (0.000)	-0.173*** (0.024)
Bias	-0.686 (3.413)	13.116*** (0.011)	16.652*** (2.880)
Observations	80	80	80

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$. Clustered standard errors could not be calculated for the fixed effects and multilevel random effects model because of the limited number of observations and the number of moderators included. All models for positive educational outcomes control for the following variables: Other method, Fixed effects regression, Quasi-experimental, Age sample, Father, Mother, Regional or district-fixed effects, Education of the household head, LN Observations, Interaction term, Secondary data, and Number of children in the family. SEM is only controlled for in the models related to intensive margin, and LN Google Scholar citations weighted by publication age and Publication age is only controlled for in the models of extensive margin. All models for child labour outcomes control for the following variables: IV, Quasi-experimental, Girls, and Boys.

Appendix 24: Peer-reviewed subsample multivariate analysis

	Dependent variable: t-value		
	OLS (Clustered SE)	Fixed Effects (SE)	Multilevel Random Effects (SE)
	(1)	(2)	(3)
Peer reviewed			
Positive educational outcomes			
Genuine effect	-0.050* (0.025)	-0.072*** (0.000)	-0.038* (0.017)
Bias	-6.959** (2.789)	-11.249*** (0.044)	-5.219** (2.869)
Observations	360	360	360
Child labour outcomes			
Genuine effect	-0.055 (0.055)	-0.105*** (0.000)	-0.133*** (0.023)
Bias	4.412 (4.838)	9.949*** (0.010)	9.421*** (2.516)
Observations	101	101	101
Not peer reviewed			
Positive educational outcomes			
Genuine effect	-0.073** (0.032)	-0.038*** (0.003)	-0.073 (0.077)
Bias	-0.366 (1.631)	-0.361*** (0.133)	-0.366 (2.599)
Observations	58	58	58
Child labour outcomes			
Genuine effect	-0.018 (0.019)	-0.036*** (0.000)	0.026* (0.013)
Bias	0.910 (0.600)	1.806*** (0.006)	-1.216 (1.199)
Observations	120	120	120

Notes: $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$. Clustered standard errors could not be calculated for the fixed effects and multilevel random effects model because of the limited number of observations and the number of moderators included. All models for positive educational outcomes control for the following variables: Other method, Fixed effects regression, Father, Mother, LN Observations, and Interaction term. Educational models related to peer reviewed also control for Publication age, LN Google Scholar citations weighted by publication age, SEM, Quasi-experimental, Age sample, Regional or district-fixed effect, Education of the household head, Secondary data, and Number of children in the family. All models for child labour outcomes control for the following variables: IV, Girls, and Boys. The models related to peer-reviewed studies also control for Quasi-experimental.