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Effects of International Migration on Child Schooling and Child Labour: Evidence from Nepal

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Working Paper in Economics 7/20

June 2020

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Abstract

In the last two decades, Nepal experienced a significant rise in work-related migration and subsequent remittance inflows. We examine the impacts on child education and child labour in a two-wave panel constructed from the 2008 Nepal Labour Force Survey and the 2010 Nepal Living Standards Survey. We use grade-specific net enrolment rates rather than the more commonly studied attendance rate, and exploit variation in destination-driven predicted migration as an instrumental variable. Migration and remittances appear to raise net enrolment of children in secondary education. The positive effect on school outcomes is complemented by a fall in child labour force participation. The effects appear larger for children aged ten and above, and seem to predominantly operate through remittances.

Keywords

human capital
child labour
migration
school enrolment
Nepal

JEL Codes

I20, J22, F22, I21, O15

A**cknowledgements**

We thank participants at the Australian Development Economics Workshop
and the New Zealand Association of Economists Conference for helpful suggestions.

1. Introduction

Labour migration from developing to developed countries has recently increased and is now an important livelihood strategy for many people in poor countries. The impact of this mobility on the welfare of the left-behind population, and especially on child labour and school outcomes, is of great interest (McKenzie and Rapoport 2011, Davis and Brazil 2016). The education of left-behind children is of particular interest to policymakers, given that human capital helps the escape from poverty by raising future earnings. In light of this interest, the current study identifies the impact of migration and remittances on child labour force participation and schooling in Nepal, which is a major supplier of work-related emigrants.

Theoretical studies emphasize positive effects of migration options on child human capital. Higher expected earnings from the prospect of migration raise expected returns to education; the higher returns to skill in the future induces human capital formation today (Batista *et al.* 2012, Beine *et al.* 2011, Beine *et al.* 2008, Beine *et al.* 2001, Fan and Stark 2007, Gibson and McKenzie 2010). Yet effects of migration on child schooling are not straightforward. Some empirical studies find either no effects or even negative effects of migration on schooling (Acharya and Leon-Gonzalez 2013, Acosta 2011, Amuedo-Dorantes and Pozo 2010, Bucheli *et al.* 2018, Davis and Brazil 2016, Di Maria and Lazarova 2012, Koska *et al.* 2013, McKenzie and Rapoport 2011, Nguyen and Nguyen 2015, Shrestha 2017). Suggested reasons for a lack of positive impact include: parental absence and family disruption, the need for extra workers due to household labour shortages and increased opportunity cost of participating in higher education if local wages rise.[1] Having a migrant family member in a foreign country may also dis-incentivize children from pursuing education if they perceive that less-skilled jobs in the destination can fetch them higher income from migrating rather than staying in school (Bredl 2011, Salas 2014).

A typical outcome of migration is subsequent remittances. Many studies from developing countries like Egypt, Mexico, Nepal, El Salvador, Sri Lanka, Ecuador, Peru, and Haiti find positive effects of remittances on schooling (Acharya and Leon-Gonzalez 2013, 2018, Acosta 2011, Alcaraz *et al.* 2010, Amuedo-Dorantes and Pozo 2010, Azizi 2018, Bredl 2011, Bucheli *et al.* 2018, Calero *et al.* 2009, De and Ratha 2012, Koska *et al.* 2013, Ngoma and Ismail 2013, Salas 2014, Shrestha 2017) although Karki Nepal (2016) finds no significant impact on enrolment and child labour. The effects may also differ between boys and girls, and between quantity (enrolments) and quality (such as sending children to private schools).

The empirical ambiguity of remittance effects reflects the fact that, theoretically, there can be offsetting effects. In one direction, remittances help households to overcome borrowing constraints and smooth consumption, which matters because many people in developing countries lack access to credit (Bredl 2011, Gyimah-Brempong and Asiedu 2015, Köllner 2013,

[1] Migration may force children to skip school and to participate in the labour market to help make up for the monetary loss faced when economically productive co-residents leave the household to go abroad.

Kugler 2006, Mansuri 2006, McKenzie and Rapoport 2011, Melkonyan and Grigorian 2008). These borrowing constraints may limit human capital investment, which translates into lower secondary school enrolment rates (given that this level of schooling is more costly than primary schooling), high dropout rates and low college enrolment rates (De Gregorio 1996, Melguizo *et al.* 1996, Sun and Yannelis 2016). Partly due to borrowing constraints, school children may do economic work, adversely affecting school performance, so a big income boost (e.g. scholarships) may be needed to reduce child labour (Datt and Uhe 2019). Thus remittances may alleviate the need for child labour, and by releasing children from working may improve their schooling (Calero *et al.* 2009, Nguyen and Nguyen 2015). On the other hand, if remittances fund migration and if the return to migration exceeds the returns to schooling, then remittances may have an indirect negative effect by raising the opportunity costs of staying in school (Köllner 2013).

Previous studies on effects of migration on left-behind children tend to focus on simple indicators, such as whether a child is in school (for Nepal this includes Acharya and Leon-Gonzalez 2013 and Shrestha 2017). This is a relatively crude measure because most school-age children are in school and it does not capture any impact on the quality of schooling. For instance, after the introduction of Nepal's Education for All (EFA) program (2001-08) and School Sector Reform Program (SSRP) (2009-2015), school attendance is already above 90 percent (CBS, 2008, 2010). However, children may not be in the age-appropriate grade. For example, in 2009/10 Nepal's Gross Enrolment Rate (GER) at Primary and Lower Secondary level was above 120%, due to over-age enrolments (DOE, 2015). If we only study school attendance, rather than age-appropriate enrolment, the impacts of migration and remittances on the timely transition through schooling will be obscurred.

Therefore, in contrast to prior studies, we consider the effect of migration and remittances on age-specific schooling outcomes and child labour indicators. Our age specific schooling measures are net enrolment rates at Basic (grade 1 to 8 for children aged 5 to 12) and Secondary education level (grade 9 to 12 for children aged 13 to 16), which is the new education structure in Nepal. We consider age-specific attendance rates of children aged 5-16, 5-12, and 13-16, and dropout rates for the same age ranges. To complement these schooling measures, we also estimate impacts of migration and remittances on child labour force participation rates, on the extensive and intensive margins, for those children aged 8-10 and aged 11-16.

A further difference from most studies is that we allow for local spillovers. Typically, studies just compare households with and without a migrant(s) abroad; this may understate the impacts if migration affects households without migrants through local multiplier and general equilibrium effects (Theoharides, 2018). For example, if migration changes the return to education the decisions of both migrant and non-migrant households about the optimal level of educational investment may be affected. Similarly, if migration affects local wages, then the opportunity cost of going to school changes as well. Therefore, we conduct our analysis at the PSU level (Primary Sampling Unit which we denote as village in this paper). The advantage of

using village level data is that the the local spillover effects will show up at village level but may be missed at household level. These spillover effects should matter in Nepal, where households living in the same village are closely interconnected and interdependent.

The decision to migrate is endogenous (Gibson *et al.* 2011) and so instrumental variables (IV) may be used to mitigate bias in econometric estimates of migration impacts. A shift-share variable is commonly used as an instrument, despite growing doubts about this method (Christian and Barrett 2017, Jaeger *et al.* 2018). Cross-sectional data are often used, even though such data have a risk of bias due to omitted variables. Instead, we use panel data, with fixed effects and instrumental variables estimation, following Theoharides (2018). We identify a plausibly exogenous instrument for the migration rate using village-level variation in predicted migration (derived from the destination country demand for migrants). This is based on a trend migration rate which depends on the baseline (in 2001) village share of migrants in each destination. We assume that a demand shock (change in demand for migrants) in the destination would primarily affect villages with stronger pre-existing migrant networks to that destination. The variation in predicted migration rates is determined by the factors outside of Nepal, and so such factors should only affect child schooling and child labour in Nepal through the migration and remittances channel.

We use two nationally representative household surveys - the National Labour Force Survey 2008 and the National Living Standard Survey 2010 - to construct a two-period village-level panel. We find that migration increases net enrolment rate in secondary education, and this positive effect occurs through reduced child labour for those aged 11-16. One pathway through which this effect could occur is that migration and remittances help credit constrained households to cover schooling costs and compensate for the foregone earnings from child labour. Yet the opposite picture would emerge if we were to just estimate effects on attendance and dropouts, as in some previous studies, specifically, migration seems to decrease attendance and increase dropouts. However, because of Nepal's universal free education program, the dropout rate is very low (especially in the 2010 survey) and so the estimated effect is for a rare outcome. Plausibly, there is more to be learned from examining the net enrolment rates in order to see overall schooling impacts that account for timely progress through the various school grades.

The rest of the paper is as follows: Section 2 briefly describes education and migration in Nepal and Section 3 discuss the data, methodology and empirical strategy. Section 4 presents the results, while Section 5 has the conclusions and policy discussion.

2. Context

School Education in Nepal

Nepal has three schooling systems: public (community-based), institutional (private) and religious (*Madrasas*). Of the 36,016 schools nationwide, 30,034 are public, 5087 are private and the other 895 are religious schools. Community schools are funded by the government and managed by the school management committee (SMC). Institutional schools are privately owned

and managed, are fully funded by fees paid by parents for school-related activities, and have become more widespread (especially in urban areas) after the education sector was opened for private investment. The institutional schools are considered to be quality education providers and they charge high fees. The religious schools are *Madarasha*, *Gumba*, and *Gurukul*, they are few in number and are operated and funded by the religious organizations.

For a long time (1850-1950) under the rule of *Rana*, education in Nepal was centralized and limited to the ruling and *high caste* elites. The end of *Rana* period brought the provision of the decentralized education system in Nepal, and during the *Panchayat* system, the 1971 Education Act was introduced along with the national education plan to nationalize school education. These schools were managed at the local level with centralized control. Later, in an effort to decentralise management of public schools, the EASA 2001 (Education Act Seventh Amendment) has aided establishing school management committees (SMC) with full representation of parents.

More recently, universal free education is seen as a way to address poverty and to achieve high economic growth. To boost the universal access to quality education, Ministry of Education (MOE) has initiated a number of strategies and reform programs including BPEP I (1992-1998), BPEP-II (1998-2003), EFA program (2001-08), and SSRP (2009-2015). Through these programs, MOE has introduced and developed planning and strategies to transform school education and increase access to quality education. The Education for All (EFA) program has focused on improving access and quality of primary education and supported the tradition of community management in school. Under EFA, the government has supported free compulsory primary education to increase the participation from disadvantaged and marginalized groups. To further increase access and complete educational sector reform, the government has introduced SSRP (2009-2015). The main goal of SSRP was to meet Millennium Development Goals in education, and it was also aimed to expand equitable access to education, improve quality and relevance, and strengthen the institutional capacity of the entire school education system.

Previously, Nepal's education system had primary level (grade 1 to 5), lower secondary level (grade 6-8), secondary level (grade 9-10) and higher secondary level (grade 11-12) that should correspond to ages 5-9, 10-12, 13-14 and 15-16. The 8th Amendment to the Education Act, in 2016, reclassified school education in two broad categories- Basic Education (1-8 grade) and Secondary Education (9-12 grade) that should be for children aged 5-12 and 13-16.[2] In 2011, while the gross enrolment rate at basic and secondary education was as high as 124.4% and 86%, net enrolment rates were just 46.2% and 27.1% (MOE, 2016). The high gross enrolments at primary level and very low net enrolments at secondary and higher secondary level (see Table 1 for details) indicates that the school progression rate is very poor and over-aged children are enrolled.

[2] Education Act 8th Amendment has categorised school education into Basic and secondary education. Basic education (until 8 schooling year) includes Early Childhood Development (ECD) to Lower secondary level while secondary education (9-12 schooling year) includes Secondary (9-10) and Higher secondary (11-12) level (MOE, 2016).

Table 1: Descriptive Statistics (N=499)

	NLFS 2008		NLSS 2010	
	Mean	Std Dev	Mean	Std Dev
Basic Education (grade 1-8) enrolment rate for child aged 5 -12	0.705	0.148	0.813	0.031
Secondary Education (grade 9-12) enrolment rate for child aged 13 -16	0.176	0.178	0.361	0.288
Primary level (grade 1-5) Gross Enrolment Rate for children of all age	1.397	0.626	1.358	0.609
Primary level (grade 1-5) Net Enrolment Rate for children of aged 5-9	0.552	0.194	0.718	0.235
Lower secondary level (grade 6-8) Gross Enrolment Rate for children of all age	0.854	0.63	0.984	0.662
Lower secondary level (grade 6-8) Net Enrolment Rate for child aged 10-12	0.137	0.171	0.326	0.306
Secondary level (grade 9-10) Gross Enrolment Rate for children of all age	0.591	0.66	0.929	0.867
Secondary level (grade 9-10) Net Enrolment Rate for child aged 13-14	0.061	0.129	0.191	0.277
Higher Secondary level (grade 11-12) Gross Enrolment Rate for children of all age	1.307	1.874	0.935	1.038
Higher Secondary level (grade 11-12) Net Enrolment Rate for child aged 15-16	0.078	0.17	0.137	0.252
Attendance rate for children of all age	0.903	0.114	0.919	0.115
Dropout rate for children of all age	0.129	0.028	0.011	0.031
Child labour force participation (child labour) for child aged 11-16	0.495	0.322	0.588	0.332
Child labour force participation (child labour) for child aged 8-10	0.232	0.273	0.324	0.342
Hours spend in labour market by child aged 11-16	21.928	15.20	16.909	13.988
Hours spend in labour market by child aged 8-10	8.678	10.212	6.208	8.234
Migration rate (in 1,000 ppln)	71.525	50.584	85.738	59.196
Average remittance received by Household in PSU (In NPR)	3705	5993	4471	6703

Notes Above figure are rates which ranges from 0 to 1. The quantity of child labour participation is reported in average number of hours spend in last seven days. Migration rate is measured as number of migrants in per thousand of population. The average remittance includes remittance from all the sources which is divided by no of household in PSU. Basic education includes primary and lower secondary level, and secondary education combines secondary and high-secondary level. NPR is Nepalese rupees.

The universal free education and partial scholarship program, especially for girls, is mandated by the constitution of Nepal. This has increased access to education, yet school progression at secondary education level remains low. Moreover, given that child labour coexists with schooling, any small value of scholarships may not be sufficient to reduce child labour (Datt and Uhe, 2019) and raise school retention. Therefore, other factors like family income, including from remittances, are also important to improve children's access to education.

Migration from Nepal

Nepal has a long history of work-related migration. After conquest of the Kathmandu valley by the King *Prithivinayaran Shah*, migration to India rose substantially, and was further augmented by territorial expansion of Nepal and the *Sagauli* peace treaty with the British government.[3] The 1950 open border treaty with India, which allowed free labour mobility, made India an attractive and low-cost destination to escape domestic unemployment, especially for households in the far-west and mid-west regions of Nepal that have high unemployment, poverty, and food insecurity. India is the first choice for people from relatively poor regions since well-established migrant's network helps new migrants to find a job in Indian cities and there are no recruitment and visa costs. For instance, migrants from the far-west and mid-west regions of Nepal accounted for 48% and 36% of total work-related Nepalese migrants to India in 2001 and 2011 (CBS, 2001, 2011).

The migration for work to other destinations, especially the Middle East, is a fairly new phenomenon in Nepal. The restoration of democracy in 1990 and the official move to embrace the market economy has facilitated and encouraged migration by allowing private recruiters to recruit Nepalese workers for foreign employment (GON, 2014). This new opportunity to migrate to high wage destinations has become a boom for the Nepali migrants, especially from central and eastern regions whose close proximity to the capital city aids recruitment and visa processes. People in these regions also have more access to finance for upfront migration-related costs. In the last decade, the outflow of migrants extended from Middle-East and North African countries to ASEAN, Hong Kong and Korea. Recently, skilled migration to OECD countries is also rising. For instance, one-fifth of migrants are in developed countries like USA, Canada, Europe, Japan and Australia (CBS, 2008, 2010). Migration to high wage destinations has become an alternative income-generating activity to escape high unemployment and low quality of life in Nepal. Consequently, the out-migration continues to rise and one-third of households have at least one migrant member working abroad, mostly in the 15-59 age group (CBS, 2010).

The rise in migration has led to a massive surge in remittances, rising from US$0.9 billion in 2004/05 to US$6 billion in 2016/17. Nepal is now the sixth-highest remittance-

[3] After this treaty, the British army was permitted to recruit three Gurkha regiments from Nepalese hill people.

receiving country, in terms of remittances as a share in national GDP. This share reached 31.3% in 2016, up from 10.7% in 2001. Yet actual remittance inflows are likely much higher because the informal channel remittances, especially from India, are difficult to track. According to CBS (2010), around 55% of households receive remittances each year and the average size of remittances sent per migrant is around US$730 a year. Of that, the average household spends around 87% on daily consumption and loan repayment, and just six percent is used for education and capital formation.

3. Data and Methods

We use data from the 2008 Nepal Labour Force Survey (NLFS II) and the 2010 Nepal Living Standard Survey (NLSS III). The primary sampling units for NLSS III are a subset of those used for the NLFS II, where this design was to take advantage of the cartographic segmentation and household listing already carried out in 2008 (CBS, 2010)[4]. Out of 799 PSU in NLFS II (399 Urban and 400 Rural PSU), 174 urban and 325 rural PSU were randomly selected to provide a sample of 499 PSU used for NLSS III. Thus, we can average over the surveyed households in each PSU to construct a two-wave village-level panel to study impacts of migration and remittances, allowing for inter-household spillovers within villages.

Both surveys have information on household members working abroad, and age, gender, ethnicity, literacy, education and employment status of household members, remittance income and household land ownership. We develop basic and secondary level net enrolment rates and four indicators for child labour force participation for school-aged (5-16) children. Our unit of observation is a village, and we measure migration as a rate, in terms of migrants per thousand population. We calculate the average remittances per household in each village (in terms of 1000s of Nepalese rupees, NPR).

We use the above information to construct as control variables, the quantity of land owned (a proxy for wealth), the average members per household, the share of migrants whose education is grade 8 or above, the share of the working-age population (15-60) in total populaton, the share of the working-age population with grade 8 or above education, the literacy rate, and the unemployment rate.[5] The surveys did not have relationship matrixes to enable us to directly identify the parents of each child. Therefore we developed a proxy, that assumes that household residents aged 30 and above are likely to have a school aged children in the household. For this 30 and above age group we calculate the proportion who have high school education or higher, and use this as a proxy for parental education, which is usually relevant to children's schooling outcomes. We also use data from the 2001 population census,

[4] In NLFS II, PSU's are either individual wards, sub-wards, or groups of neighboring wards of a village (CBS, 2010). In NLSS III, 12 households are randomly selected for interview within each PSU, while 20 household are interviewed per PSU in NLFS II.

[5] We apply the definition of unemployment from NLFS II to both surveys, which is that someone did not have a job or business but either looked for work in the last 30 days or did not look for work but was available for work.

to calculate for each village the international destinations of migrants. We separate migration to India from MEOA (Middle-East and Other Asia) since these are two different migration channels – informal and low-cost to India, and formal and high-cost to the Middle East and Other Asian countries (MEOA) (Sharma and Gibson, 2019). We create measures of historical migration networks separately for these two main migration channels.

We assume that the effect of migration is mainly channeled through remittances, given that identifying separate effects can be difficult because migration and remittances are highly correlated. Also, remittances depend upon migrants becoming established in the destination, so it may take some time to compensate their left-behind family members for the initial loss of local income that the migrant would have earned if they had not emigrated. Of the total migrants from Nepal, 76% of them are living abroad for more than a year (CBS, 2008, 2010), and these are the ones most likely to send remittances. Thus, households with longer duration emigrants may see more pronounced effects than do households sending new migrants. With our village-level data we are implicitly averaging over these differences.[6]

The Econometric Model

We assume that altruistic parents get utility from additional human capital of household members. They send children to school if they expect the discounted value of future returns from the additional year of schooling to outweigh the current costs. We consider that migration can have two opposing effects. It may decrease child human capital if parental absence, household labour shortages, and family disruption effects dominate. Conversely, if a household is credit constrained then migration-induced remittances will increase household consumption and may release the children from labour market activity, allowing them to spend more time in school education.

We use a fixed-effect panel model to reduce endogeneity bias, due to unobserved village characteristics that are correlated with schooling and migration. Our use of village-level averages also helps mitigate effects of measurement error in the household-level data. Various advantages of panel data fixed-effect models are discussed in Hsiao (2007) and Adams (2011). Our panel fixed effect model is as follows:

$$Y_{it} = \mu_i + \lambda_t + \beta X_{itmig} + \theta X_{it} + u_{it} \quad (1)$$

$$u_{it} \sim N(0, \sigma^2 l_N) \quad (2)$$

In equation (1), the NT × 1 vector of dependent variables, denoted by Y_{it}, is modelled as depending on μ_i and λ_t village and time fixed effects, the variables of main interest, migration and remittances, are denoted as a matrix of X_{itmig} and other control variables (like size of land

[6] Initially, the increase in income and the relaxation of credit constraints from receipt of remittances would primarily help a household with debt repayment, but as the duration of migration rises the effects on human capital may appear.

owned, parents education, share of working age population) are denoted by matrix X_{it}. The β and θ are vectors of coefficients for X_{it} and u_t is a NT × 1 vector of error terms which is clustered at the district level for the 71 districts in the survey.

Villages may differ in terms of their population composition, school access and quality, market access, labour market conditions and so on. The village and time fixed effects allow us to control for time-invariant village effects, and for space-invariant time effects but time-variant unobserved characteristics that may correlate with migration and schooling still pose a problem. Specifically, the endogeneity of migration and remittances may bias the estimate of β because it is likely that households are not randomly participating in migration and instead there may be a simultaneity of migration decisions and human capital decisions, so there is threat of reverse causality. For example, a village with high illiteracy and poverty, low education and high rates of child labour may only be able to send migrants to a low-cost destination like India. So schooling, migration, and subsequent remittances may be affected by factors that are unobservable, but correlated with outcomes and with the treatment variables.

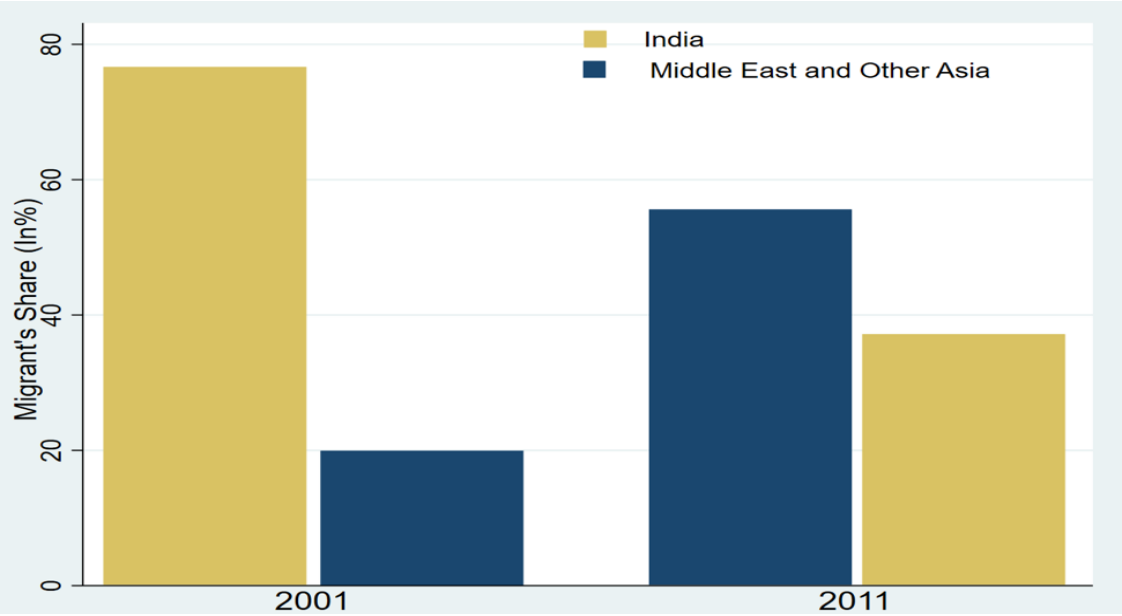
To address potential endogeneity from migrant self-selection, a shift-share instrumental variables (IV) strategy is often used (Acharya and Leon-Gonzalez 2013, Acosta 2011, Adams 2011, Calero *et al.* 2009, Datt and Wang 2012, Koska *et al.* 2013). However, there are doubts about shift-share variables as instruments (Christian and Barrett 2017). So we, instead, follow Theoharides (2018) and use historical census data (from 2001) to construct the IV. The reason is that previous migration to a destination is a good predictor of subsequent migration, due to network effects. This is shown in Figure 2, for migration from Nepal to either India or MEOA. Consider the migration network in terms of the share of labour that migrated from village i to destination country k in year 2001 (out of the total number of people who migrated to k from Nepal). We then sum the total number who migrated to destination k in each year t (2008 and 2010 given the timing of our panel). To predict the total number of migrants from the village in each survey year (that is, in 2008 and 2010) we weight the total migrants to destination k by the 2001 village i migrants share to destination k. Our predicted migrant flows, which reflect destination-drive demand migrants, for each village are:

$$M_{ikt}^{p} = \sum_{i}^{n} M_{kt} \frac{M_{ik}^{2001}}{M_{k}^{2001}} \tag{3}$$

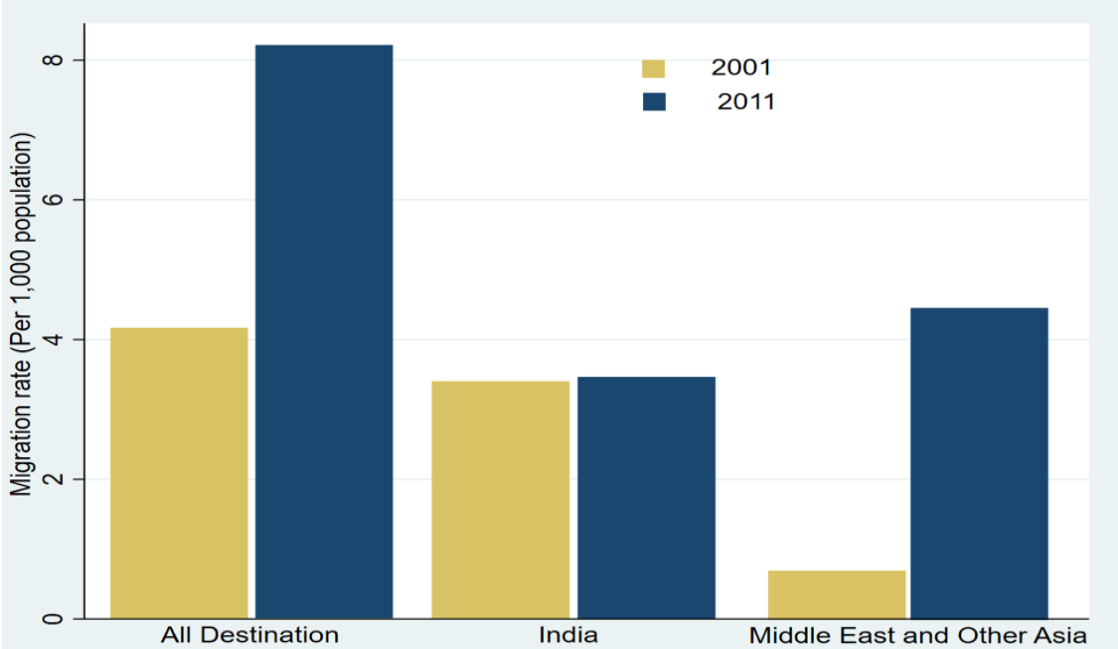
where M_{ikt}^{p} is the predicted number of people migrating to destination k from village i in year t, M_{kt} is the total number of people who migrated from Nepal to destination k in year t (2008 or 2010), and $\frac{M_{ik}^{2001}}{M_{k}^{2001}}$ is the village i migrants share in total national migrants to destination k in the past (in 2001 in our case). We normalize the predicted number of migrants by dividing M_{ikt}^{p} by the total village population each year. The performance of this IV depends on the stability of the distribution of migrants across destinations over time (Theoharides, 2018). For

Nepal's five development regions, the migrants' distribution across destinations is quite stable, for example, India is still a favourite destination for people from mid-west and far-west regions while relatively developed regions like central and eastern regions prefer sending migrants to MEOA. The relationship between 2001 and 2011 migrants share (refer to Figures 1 and 2) is quite strong, as villages continue to send migrants to destination countries at similar rate, with just a small fall for India and a rise for MEOA. Therefore, we believe that our instruments are reasonably good predictors of the actual migration rate. We distinguish between the predicted migration rate to India and the predicted migration rate to MEOA, considering that these two are the major migrants' destinations for Nepal.

Figure 1: (a) Migrants Share in India and MEOA



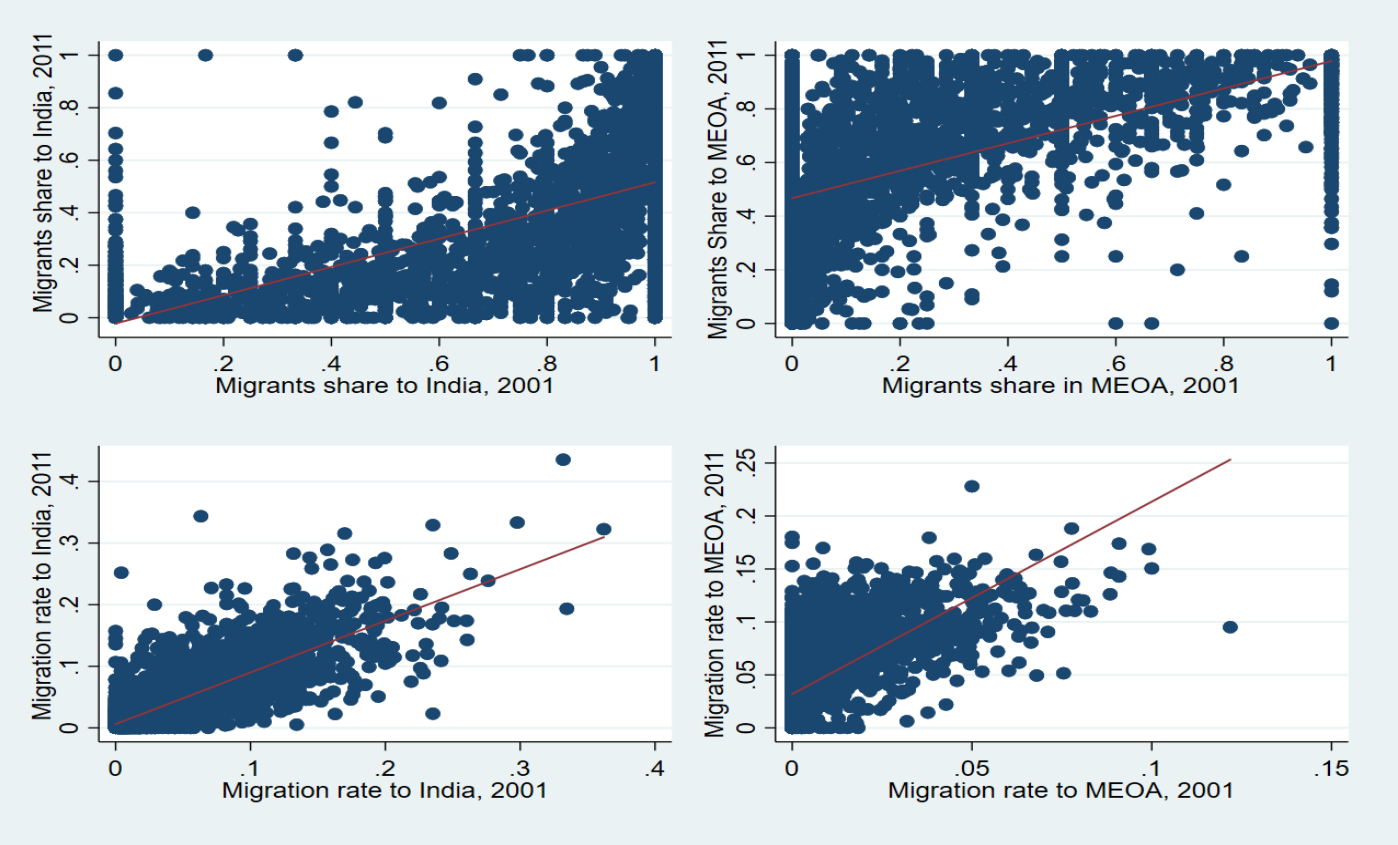
(b) Mean of Migration Rate



Source: CBS (2001), (2011). *Note*: MEOA is Middle-East and Other Asia

We estimate equation (1) using our two predicted migration variables (as derived from equation (3)) as instrumental variables for the actual village migration rate. The resulting estimates should show the effect of migration and remittances on schooling and child labour and we can rule out reverse causation that would occur if the current schooling conditions and child labour rates affect migration. The reason we can rule out this channel is that our predicted migration variable depends on the migration network from a decade before, yet current school enrolment and child labour rates should not matter to historical migration.

Figure 2: The Migrants Share and Migration Rate in 2001 and 2011



Source: CBS (2001, 2011)

4. Results and Discussion

The results of the first stage equations, for the migration rate and the value of remittances received, are reported in Table 2. The instrumental variables[7] that are derived from equation (3) have a strong first-stage effect on the migration rate (the *F*-test for excluding the instruments is 71.53 and so it easily exceeds the usual threshold of 10 for not having weak instruments) after controlling for village and time fixed effects. The first stage equations closely reflect recent migration trends for Nepal (these trends are seen in Figure 1). For example, while the

[7] We have also developed two alternative instruments to check the suitability of our IV. The Shift share IV after interacting GDP and exchange rate shows the opposite migration trend for MEOA than what country has actually observed. The effect of these IV are weak and one instrument is insignificant. The first stage estimate from additional two IVs is available from authors.

share of migrants in India has decreased to 37% in 2011 (from 75% in 2001), the share in MEOA has increased to 56% in 2011 (from 20% in 2001) (CBS, 2001, 2011). This large shift in destinations is also evident from the sign of the coefficients for the instrumental variables in Table 2.

Given the validity of the instrumental variables, we proceed with the main analyses, which are laid out as follows (with fuller details given below). Table 3 contains results for the impacts of migration and remittances on Basic and Secondary education net enrolment rates. Table 4 has the results for the effects of migration and remittances on child labour force participation, in terms of the extensive margin (whether working or not) and the intensive margin (how many hours worked). Finally, the impacts of migration and remittances on the more typically studied indicators, of school attendance and the dropout rate, are reported in Table 5, where the purpose of these additional results is to contrast with the more nuanced results shown in Tables 3 and 4.

Table 2: The First Stage Migration and Remittance Model Estimating the Effect of Instrument

	Migration	Remittance
Predicted migration to India	-1.157	-0.502
	(6.367)***	(3.236)***
Predicted migration to MEOA	0.823	0.518
	(9.565)***	(4.824)***
Agriculture land owned	1.367	-4.327
	(0.662)	(1.573)
Number of Household members	0.53	1.036
	(0.258)	(0.641)
Parents' education (with high school or above)	62.274	68.003
	(1.962)*	(0.92)
Share of working age (15-60)	-189.123	-23.054
	(6.046)***	(0.742)
Share of Migrants with grade ≥ 8	5.569	14.258
	(1.28)	(1.35)
Share of 15-60 with grade ≥ 8	2.485	-0.329
	(0.102)	(0.024)
Literacy rate aged ≥ 17	-5.855	15.195
	(0.225)	(0.726)
Unemployment rate	76.954	95.925
	(2.082)**	(0.983)
R-Squared	0.216	0.166
F-Statistics	71.53	53.7
Observations	998	998

Notes This table shows first-stage results for migration rate instrumented with predicted migration to India and MEOA also including unreported time and village fixed effects. Both columns show the results from both IVs. The t-statistics in ( ) are derived from cluster-robust standard errors (clustered at 71 Districts). ***, **, * denote 1%, 5%, 10% statistically significance.

Table 3: The Effect of Migration on Net Enrolment Rate at Basic and Secondary Education for Children Aged 5 to 12 and 13 to 16

	Basic Education (aged 5-12)				Secondary Education (aged13-16)			
	FE	FE-IV	FE	FE-IV	FE	FE-IV	FE	FE-IV
Migration Model	-0.016	0.010			0.023	0.201		
	(0.853)	(0.141)			(1.141)	(2.504)**		
Remittance Model			-0.006	-0.045			0.041	0.361
			(0.41)	(0.415)			(1.62)	(3.018)***
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time and Village Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared (within)	0.26	0.26	0.26	0.25	0.35	0.30	0.357	0.11
Wald test (Chi-squared)		1109.45		3542.42		539.27		2136.94
Observation	977	977		977	992	992		992

Notes This table shows the second-stage results for educational outcome for children aged 5-12 and 13-16. Table presents both migration and remittance models. The OLS FE and FE-IV are also presented in the table to show the difference in the coefficients if migration is not instrumented. In FE-IV we have instrumented migration with predicted migration to India and MEOA. The t-statistics in ( ) are derived from cluster-robust standard errors (clustered at 71 Districts), ***, **, * denote 1%, 5%, 10% statistically significance. Basic education aged 5-12 indicates the enrolment of child aged 5 to 12 in primary and lower secondary level. Secondary education aged 13-16 indicates the enrolment of child aged 13 to 16 in secondary and higher secondary level. Migration and remittance estimates are in percentage. Full results are available from authors.

Table 4: The Effect of Migration on Child Labour Force Participation and Number of Hours Worked In Labour Market

	Labour Force Participation Rate				Number of Hours Worked			
	FE	FE-IV	FE	FE-IV	FE	FE-IV	FE	FE-IV
Panel A: For children aged 8 to 10								
Migration Model	0.007	-0.378			0.003	0.046		
	(0.210)	(3.606)***			(0.303)	(1.671)*		
Remittance Model			-0.019	-0.657			-0.002	0.043
			(1.03)	(3.409)***			(0.46)	(1.027)
R-Squared (within)	0.099		0.100		0.080		0.080	
Walt test (Chi-squared)		78.08		286.88		254.88		94.20
Panel B: For children aged 11 to 16								
Migration Model	0.019	-0.184			-0.031	-0.165		
	(0.963)	(2.218)**			(1.647)	(2.265)**		
Remittance Model			-0.003	-0.355			-0.063	-0.397
			(0.16)	(2.869)***			(4.88)***	(3.889)***
R-Squared (within)	0.237		0.236		0.099		0.122	
Walt test (Chi-squared)		482.91		2654.05		265.86		91.58
Control Variables	Yes	Yes		Yes	Yes	Yes		Yes
Time and Village Fixed Effects	Yes	Yes		Yes	Yes	Yes		Yes
Observation	998	998		998	998	998		998

Notes: This table shows the second-stage results for child labour force participation for children aged 8-10 and 11-16 at extensive and intensve margin. The table has two different panel (A and B) for two different age group of children. Table presents both migration and remittance models. The OLS FE and FE-IV are also presented in the table to show the difference in the coefficients if migration is not instrumented. In FE-IV we have instrumented migration with predicted migration to India and MEOA. The t-statistics in ( ) are derived from cluster-robust standard errors (clustered at 71 Districts). ***, **, * denote 1%, 5%, 10% statistically significance. *Note:* Migration and remittance estimates are in percentage. Full results are available from authors

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Effect of Migration on School Performance

The effect of migration on child schooling depends, in part, on how the remittances that migration enables help households to overcome liquidity constraints. To the extent that extra income from remittances reduces the need for child labour, and provides more funds for schooling related expenses, it can be expected to improve indicators of school performance, such as the net enrolment rate. There will also be other changes due to migration, to the extent that migration opportunities change the decision-making of parents and children about the optimal investment in their human capital.

The results in Table 3 shows that both migration and remittances have positive and significant effects on the net enrolment rate in secondary education for children aged from 13 to 16. Specifically, a rise in the migration rate by one person per thousand of population would raise the mean net enrolment rate at secondary school by 0.20% ($p < 0.01$). Similarly, the remittance model shows an impact on secondary school mean net enrolment of around 0.36% ($p < 0.01$) for an increase of NPR 1,000 in the average value of remittances received. Another way to see the magnitude of these effects is in terms of standard deviation changes, where a one standard deviation increase in the migration rate and in the value of remittances received would result in 0.62 and 0.96 standard deviation increases in the secondary school net enrolment rate.

There are two other notable features about the results in Table 3. First, the effects on net enrolment at the Basic education level, for children aged 5-12, are imprecisely estimated, for both migration and remittances. There are two possible reasons for this pattern. First, the Basic education level is far cheaper (see Table A.1 for details) and so borrowing constraints may be less binding on enrolment decisions at this level. In that case, migration and the resulting receipt of remittances are less needed to overcome these less binding constraints. Secondly, the enrolment rates at the Basic level are universally much higher, and so there is less scope for between-village variation than is possible at the secondary school level.

The second feature of Table 3 is that coefficient estimates are larger (and consequently more statistically significant) when the instrumental variables approach is used. For the fixed effects models without instrumental variables, even with control variables and time and village fixed effects, there is still the threat of reverse causality that would bias the coefficient estimates. The difference between the FE and FE-IV specifications reinforces the importance of having plausibly exogenous sources of variation when studying the impacts of migration and remittances.

An important feature of the Table 3 results is that the positive impact of migration only comes into play for the children aged 13 and above in secondary school. This age-specificity is likely due to several factors. First, the secondary school cost is much higher for households, with the figures in Appendix A1 showing costs are up to four times as high as the cost of school

at the Basic level. Second, in addition to the out of pocket cost of secondary education, parents also have to consider the opportunity cost of sending children in this age group to school. For instance, child labour force participation rates (for ages 10-14) in rual and urban areas are 37% and 15%, respectively and, around 55% of children aged 10-14 attend school while also working in the labour market (CBS, 2008). Thus, if remittances help households to overcome liquidity constraints, which lessens the need for children to be the labour market, then this effect should show up especially for older children at the secondary school level. Third, at the secondary level there are more private school options, and enrolment in these schools can be thought of as a quality response rather than a quantity response. This response on the quality margin may be another pathway through which migration and remittances help in achieving a timely completion of secondary education (Acharya and Leon-Gonzalez, 2013).

Effect of Migration on Child Labour Force Participation

The migration of parents or other economically productive household members may mean that left-behind children have to undertake additional household work or participate in the labour market to compensate for the foregone inputs of time and money. This may especially matter early in the duration of the migration tenure, because it takes time for migrants to become established and to save some money and send it back home (McKenzie and Rapoport, 2011). Eventually, remittances may rise to compensate for the income loss and the household may rearrange activities to require less labour or use some remittance income to hire in labour, and so when that stage is reached the time demands on children may fall. Consequently, at the household level there is a duration-dependent heterogeneity in the impact of emigration and remittances on the left-behind (Gibson *et al.* 2013) and averaging across households in a village will yield a net effect of the offsetting positive and negative impacts on the demand for child labour.

It appears that for Nepal in the 2008-10 period that we study the net effect of migration and remittances is to reduce the risk of child labour (Table 4). This result is in line with previous studies like Calero at al. (2009), Gyimah-Brempong et al. (2015), and Koska et al. (2013). The reduction in the child labour force participation rate as migration rises and as remittances increase is apparent both for younger children (age 8-10) and for older children (age 11-16). Specifically, the impact for the younger children is that a one percentage point increase in the migration rate would result in a 0.38% ($p<0.01$) fall in the labour force participation rate while for older children the impact is a 0.20% fall ($p<0.05$). We also observe a similar pattern in results from the remittance model. If the village average of remittance receipts rises by NPR 1000 then it would reduce the probability of child labour force participation by 0.66% for the younger children and by 0.36% for the older children (both effects are statistically significant at the $p<0.01$ level).

In addition to the effects of migration and remittances on the probability that a child is in the labour force, there is also an effect on the number of hours that they work. These effects are predominantly negative, and especially for the older children. For example, if the village average remittance receipts rise by NPR 1000 then average hours worked by 11-16 year olds would decline by 0.4 hours, according to the IV results. There is a very small and imprecisely estimated positive effect of migration on hours worked by 8-10 year old children (an average rise of three minutes per week) while there is a much larger negative effect on the hours worked by older children.

Effect of Migration on School Attendance and Dropout Rates

In order to examine the effects of migration and remittances on commonly used schooling measures in previous studies, we also developed attendance and dropout rate estimates. These only consider whether a child is currently enrolled, irrespective of whether they are in the appropriate grade for their age. Results are shown in Table 5 (Panel A and B). From the IV estimates its seems that migration and remittances reduce the likelihood of a child being enrolled in school. For example, the results suggest that an increase in migration rate reduces the attendance rate for a child aged 5-16 by 0.07% ($p < 0.01$). For the sub-group of older children (aged 13-16) the estimated fall in the attendance rate is by 0.18% ($p < 0.01$).

We observe similar pattern in dropout rates, in that migration and remittances appear to increase the number of children out of school who have previously enrolled. For instance, effects on dropout are 0.03% and 0.14% (at $p < 0.01$) for the children aged 5-12 and 13-16. The remittances model shows similar results. The apparently negative effect of migration on school attendance that can be inferred from the results in Table 5 (and is contrary to the results in Table 3) does align with some earlier findings for Nepal, such as Acharya and Leon-Gonzalez (2013), and also some findings from elsewhere.

It is important to emphasize the contrast between the Table 3 and Table 5 results. In Table 3, it is seen that migration and remittances improve age-appropriate enrolment rates in secondary education (for 13-16 year olds) yet in Table 5 it appears that school attendance (at any schooling level) for this age group is depressed by migration and remittances, while the dropout rate is increased. Adding interest to this contrast is the fact that the outcome variables in Table 5 – attendance rates and dropout rates – are more like the outcome variables that previous studies for Nepal have used, while an innovation of the current study is to calculate and the age-appropriate net enrolment rate as the preferred outcome measure. One motivation for doing this is that the simple attendance rate is a crude measure of schooling outcomes as it do not capture the quality dimension, such as the timely transition through the various levels of schooling. This is especially in settings such as Nepal where over 90% of school-age children are in some sort of school, albeit with considerable over-age enrolment (as seen from gross enrolment rates of almost 1.4, meaning that there are 40% more children in primary grades 1-5 than would be expected from the age structure of children).

Table 5: The Effect of Migration on School Attendance and Dropout Rate of Children Aged 5-16, 5-12 and 13-16

	Child aged 5-16				Child aged 5-12				Child aged 13-16			
	FE	FE-IV	FE	FE-IV	FE	FE-IV	FE	FE-IV	FE	FE-IV	FE	FE-IV
Panel A: Attendance Rate												
Migration Model	-0.002	-0.069			0.005	0.004			-0.007	-0.185		
	(0.266)	(3.390)***			(0.634)	(0.170)			(0.404)	(2.959)***		
Remittance Model			0.013	-0.101			0.015	0.011			0.002	-0.323
			(2.02)**	(2.414)**			(1.88)*	(0.413)			(0.19)	(2.406)**
R-Squared (within)	0.056		0.061		0.041		0.047		0.077		0.077	
Wald test		19692.02		14659.26		7929.04		32157.73		1909.90		2740.86
Panel B: Dropout Rate												
Migration Model	0.000	0.043			0.002	0.032			-0.004	0.140		
	(0.026)	(2.981)***			(0.347)	(2.987)***			(0.302)	(1.993)**		
Remittance Model			0.001	0.071			0.001	0.055			-0.006	0.239
			(0.87)	(2.888)***			(0.76)	(2.841)***			(0.642)	(2.026)**
R-Squared (within)	0.005		0.006		0.013		0.013		0.043		0.043	
Wald test		10.34		126.11		13.65		104.32		54.18		120.08
Control Variables	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes		Yes
Time and Village FE	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes		Yes
Observation	998	998		998	997	997		997	992	992		992

Notes: This table shows the second-stage results for child school attendance and dropout rate for children aged 5-16, 5-12 and 13-16. Table has two different panels (A and B) for attendance and dropout rate. Table presents both migration and remittance models. The OLS FE and FE-IV are also presented in the table to show the difference in the coefficients if migration is not instrumented. In FE-IV we have instrumented migration with predicted migration to India and MEOA. The t-statistics in ( ) are derived from cluster-robust standard errors (clustered at 71 Districts), ***, **, * denote 1%, 5%, 10% statistically significance. *Note:* Migration and remittance estimates are in percentage. Full results are available from authors.

The second implication of the contrast between the Table 3 and Table 5 results is that the effects of migration and remittances on human capital of the left behind may operate in fairly subtle ways, for example, by improving age-specific enrolment of older children but not of younger children, with the most likely explanation for this pattern due to the differing costs of the various levels of schooling (including the opportunity cost of labour market work). Given that many previous studies have used simple enrolment and dropout indicators, like those in Table 5, we suggest that it is important to construct other measures of schooling outcomes such as age-specific net enrolment rates, schooling deprivation indices, schooling inequality indices, and scores in national assessment of student achievement, in order to better understand the actual situation in terms of the school performance of children. This is especially because, for policymakers, school performance may be more important than school attendance because better school performance can translate into a productive workforce and break the cycle of poverty.

5. Conclusions

Work-related international migration from Nepal has become a major income generating activity for households. From the period 2001 to 2010, Nepal experienced a significant rise in emigration rates and in remittance inflows, and in the same period the country has managed to reduce the poverty rate by half. While prior studies have linked this increase in migration and in remittances to the poverty reduction that occurred, concerns have remained about the impacts on child human capital (and relatedly on child labour), as it is the quality of human capital that will be important to ongoing poverty reduction in the future. Even though the beneficial effects of remittance on the macroeconomic indicators like GDP, the current account, and trade have been studied (for example, Sapkota 2018) the potential long term impact on human capital is still not very clear. In part, this uncertainty reflects the offsetting pathways that, theoretically, can come into play – overcoming borrowing constraints and reducing the need for child labour on the one hand, but also possibly reducing the opportunity cost of staying in school, on the other.

In order to inform understanding of the impacts of migration and remittances on human capital in Nepal we have constructed a two-wave panel of 499 villages, from the Nepal Labour Force Survey 2008 and the Nepal Living Standard Survey 2010. Our research design exploits the variation in village-level predicted migration, which is driven by destination countries and so should have impacts on these villages that only operate through migration and remittances. In contrast to prior studies, we focus on net enrolment rates as our main outcome variables. The advantage of studying net, rather than gross, enrolment rates is that it recognizes that over-age enrolment, slow progression, and grade repetition are common problems that plague schooling in many developing countries.

Our results show that the rise in migration and remittances increased the net enrolment in Secondary education (for older children aged 13 to 16) even while it was not having any significant impact on enrolment in Basic education. The possible reason is that the Basic education is much cheaper for parents, with a schooling cost that is about four times lower than at the secondary level. Thus, borrowing constraints may matter less for enrolment at Basic level, whereas migration and remittances come to matter for the higher cost of Secondary level education – both public and private. There is suggestive evidence that the positive effect on Secondary education is channeled through reduced child labour. The rise in remittance receipts helps households to compensate for the initial income loss from having productive members abroad, so this reduces the need for children to be in the labour market. In turn, with reduced need for child labour it may free the child to participate in secondary education.

In contrast to these findings, if we use a cruder indicator such as the school attendance rate, which does not distinguish between age-appropriate and over-age enrolments, it appears that the effect of migration and remittances is to reduce the number of children attending school. We believe that when a country has universal free education (at the Basic level) and when the majority of children are in school (as is the case for over 90% of Nepali children), the simple measure of whether a child is in school or not may provide misleading inferences. In particular, such a simple indicator fails to show impacts on the quality of schooling outcomes and on the timely progression through the schooling system. Hence, one take-away from the current study is the need to develop other measures of schooling outcomes, which can also help to measure some of the more subtle impacts of migration and remittances. Moreover, given the positive impact that remittances are shown to have, from a policy perspective it is important to increase remittance receipts. One way to do this, independent of increasing the number of emigrants, is to decrease the cost of remitting to, especially, rural areas. This reduction in costs could come from increasing the number of financial institutions operating in rural areas, as a policy intervention to help achieve greater impacts of migration and remittances on human capital.

References

Acharya, C., and Leon-Gonzalez, R. (2013). How do migration and remittances affect human capital investment? The effects of relaxing information and liquidity constraints. *Journal of Development Studies, 50*(3), 1-17.

Acharya, C., and Leon-Gonzalez, R. (2018). 'The quest for quality education: International remittances and rural–urban migration in Nepal.' *Migration and Development*, 2018, 1-36.

Acosta, P. (2011). School attendance, child labour, and remittances from international migration in El Salvador. *Journal of Development Studies*, *47*(6), 913-936.

Adams Jr, R. H. (2011). Evaluating the economic impact of international remittances on developing countries using household surveys: A literature review. *Journal of Development Studies*, *47*(6), 809-828.

Alcaraz, C., Chiquiar, D., & Salcedo, A. (2010). Remittances, schooling, and child labor in Mexico. *Journal of Development Economics*, *97*(1), 156-165.

Amuedo-Dorantes, C., & Pozo, S. (2010). Accounting for remittance and migration effects on children's schooling. *World Development*, *38*(12), 1747-1759.

Azizi, S. (2018). The impacts of workers' remittances on human capital and labor supply in developing countries. *Economic Modelling, 75*, 377-396.
Batista, C., Lacuesta, A., & Vicente, P. C. (2012). Testing the 'brain gain' hypothesis: Micro evidence from Cape Verde. *Journal of Development Economics*, *97*(1), 32-45.
Beine, M., Docquier, F., & Oden-Defoort, C. (2011). A panel data analysis of the brain gain. *World Development*, *39*(4), 523-532.
Beine, M., Docquier, F., & Rapoport, H. (2008). Brain drain and human capital formation in developing countries: winners and losers. *The Economic Journal*, *118*(528), 631-652.
Beine, M., Docquier, F., & Rapoport, H. (2001). Brain drain and economic growth: theory and evidence. *Journal of Development Economics*, *64*(1), 275-289.
Bredl, S. (2011). Migration, remittances and educational outcomes: The case of Haiti. *International Journal of Educational Development*, *31*(2), 162-168.
Bucheli, J., Bohara, R., & Fontenla, A. (2018). Mixed effects of remittances on child education. *IZA Journal of Development and Migration, 8*(1), 1-18.
Calero, C., Bedi, A. S., & Sparrow, R. (2009). Remittances, liquidity constraints and human capital investments in Ecuador. *World Development*, *37*(6), 1143-1154.
CBS (2001). Report of the census of population and housing 2001. Kathmandu: Central Bureau of Statistics.
CBS (2008). Nepal Labour Force Survey-II 2008: Statistical Report. Kathmandu: Central Bureau of Statistics.
CBS (2010). Nepal Living Standard Survey III 2010: Statistical Report, Vol 1 and 2. Kathmandu: Central Bureau of Statistics.
CBS (2011). National population and housing census 2011: Vol 1. Kathmandu: Central Bureau of Statistics.
Christian, P., & Barrett, C. B. (2017). Revisiting the effect of food aid on conflict: A methodological caution. *World Bank Policy Research Working Paper*, No. 8171.The World Bank.
Datt, G., & Wang, L. C. (2012). Is emigration of Nepalese workers contributing to better schooling outcomes for children in Nepal? *Department of Economics and Centre for Development Economics and Sustainability, Monash University*.
Datt, G., & Uhe, L. (2019). A Little Help May Be No Help at All: Size of Scholarships and Child Labour in Nepal. *The Journal of Development Studies*, *55*(6), 1158-1181.
Davis, J., & Brazil, N. (2016). Disentangling fathers' absences from household remittances in international migration: The case of educational attainment in Guatemala. *International Journal of Educational Development, 50*, 1-11.
De Gregorio, J. (1996). Borrowing constraints, human capital accumulation, and growth. *Journal of Monetary Economics, 37*(1), 49-71.
De, P. K., & Ratha, D. (2012). Impact of remittances on household income, asset and human capital: Evidence from Sri Lanka. *Migration and Development, 1*(1), 163-179.
Di Maria, C., & Lazarova, E. A. (2012). Migration, human capital formation, and growth: An empirical investigation. *World Development*, *40*(5), 938-955.
DOE (2015). The Flash Report I 2014-15. Kathmandu: Department of Education, Government of Nepal.
Fan, C. S., & Stark, O. (2007). International migration and 'educated unemployment'. *Journal of Development Economics*, *83*(1), 76-87.
Gibson, J., & McKenzie, D. (2010). How does high-skilled emigration affect small countries? Microeconomic Evidence from Tonga. *Annals of Economics and Statistics / Annales D'Économie Et De Statistique*, (97/98), 167-185.
Gibson, J., McKenzie, D., & Stillman, S. (2011). The impacts of international migration on remaining household members: omnibus results from a migration lottery program. *Review of Economics and Statistics*, *93*(4), 1297-1318.
Gibson, J., McKenzie, D., & Stillman, S. (2013). Accounting for selectivity and duration-dependent heterogeneity when estimating the impact of emigration on incomes and poverty in sending areas. *Economic Development and Cultural Change*, *61*(2), 247-280.
GON (2014). Labour migration for employment. A Status Report for Nepal 2013/2014. Government of Nepal.

Gyimah-Brempong, K., & Asiedu, E. (2015). Remittances and investment in education: Evidence from Ghana. *The Journal of International Trade & Economic Development, 24*(2), 173-200.
Hsiao, C. (2007). Panel data analysis—advantages and challenges. *TEST, 16*(1), 1-22.
Jaeger, D. A., Ruist, J., & Stuhler, J. (2018). Shift-share instruments and the impact of immigration (No. w24285). National Bureau of Economic Research.
Karki Nepal, A. (2016). The impact of international remittances on child outcomes and household expenditures in Nepal. *The Journal of Development Studies, 52*(6), 838-853.
Köllner, S. (2013). Remittances and educational attainment: Evidence from Tajikistan (Vol. 124): Julius Maximilian University of Würzburg, Chair of Economic Order and Social Policy.
Koska, O. A., Saygin, P. T., Artal-Tur, A., & Çağatay, S. (2013). International migration, remittances, and the human capital formation of Egyptian children. *International Review of Economics and Finance, 28*, 38-50.
Kugler, M. (2006). Migrant remittances, human capital formation and job creation externalities in Colombia. *Borradores de Economía* No. 370.
Mansuri, Ghazala. (2006). Migration, school attainment, and child labor: Evidence from rural Pakistan. The World Bank.
McKenzie, D., & Rapoport, H. (2011). Can migration reduce educational attainment? Evidence from Mexico. *Journal of Population Economics, 24*(4), 1331-1358.
Melguizo, T., Sanchez, F., & Velasco, T. (2016). Credit for low-income students and access to and academic performance in higher education in Colombia: A regression discontinuity approach. *World Development, 80*, 61-77.
Melkonyan, T. A., & Grigorian, M. D. A. (2008). Microeconomic implications of remittances in an overlapping generations model with altruism and self-interest (No. 8-19). International Monetary Fund.
MOE (2016). School Sector Development Program (2016-2023). Ministry of Education, Government of Nepal.
NEAN (2016). National Education Account Nepal 2016: Expenditure for Education 2009-2015. Ministry of Education, Government of Nepal.
Nguyen, C.V., & Nguyen, H.Q. (2015). Do internal and international remittances matter to health, education and labor of children and adolescents? The case of Vietnam. *Children and Youth Services Review, 58*, 28-34.
Ngoma, A. L., & Ismail, N. W. (2013). Do migrant remittances promote human capital formation? Evidence from 89 developing countries. *Migration and Development*, *2*(1), 106-116.
Salas, V. (2014). International remittances and human capital formation. *World Development, 59*(C), 224 237.
Sapkota, C. (2013). Remittances in Nepal: Boon or Bane? *The Journal of Development Studies, 49*(10), 1-16.
Sharma, H., & Gibson, J. (2019). Civil War and International Migration from Nepal: Evidence from a Spatial Durbin Model. *Working Paper in Economics 19/06, University of Waikato*.
Shrestha, M. (2017). The impact of large-scale migration on poverty, expenditures, and labor market outcomes in Nepal. The World Bank.
Sun, S. T., & Yannelis, C. (2016). Credit constraints and demand for higher education: Evidence from financial deregulation. *Review of Economics and Statistics, 98*(1), 12-24.
Theoharides, C. (2018). Manila to Malaysia, Quezon to Qatar International Migration and Its Effects on Origin-Country Human Capital. *Journal of Human Resources, 53*(4), 1022-1049.

Appendix

Table A1: Per Capita Expenditure by Household, Activity Cost and Total Cost

In NPR at Each Level

Education Level	Total Household Cost	Total Cost by Activities[8]	Total Cost
Primary Level	**5,417**	**14,832**	**15,459**
Community school[9]	1,888	13,092	13,092
Institutional school	25,576	27,546	27,116
Lower Secondary	**7,410**	**15,905**	**16,482**
Community school	3,525	13,419	12,419
Institutional school	28,307	29,668	29,668
Secondary	**14,298**	**26,468**	**27,083**
Community school	7,589	22,236	22,236
Institutional school	42,973	45,138	45,138
Higher secondary	**24,978**	**34,963**	**35,528**
Community school	16,359	29,334	29,334
Institutional school	46,203	48,823	48,823

Source: NEAN (2016)

[8] Activity cost includes teaching, uniform, text book, transport, private tuition etc.

[9] Community schools are owned and managed by government, and institutional schools are privately managed.

Table A2: The Effect of Migration on Lower Secondary, Secondary and Higher Secondary Net Enrolment Rate School-Aged Children 10-16

	Lower-Secondary				Secondary				Higher Secondary			
	FE	FE-IV	FE	FE-IV	FE	FE-IV	FE	FE-IV	FE	FE-IV	FE	FE-IV
Migration Model	-0.003 (0.116)	0.396 (1.867)*			-0.012 (0.466)	0.365 (2.158)**			0.036 (1.525)	0.084 (0.802)		
Remittance Model			0.019 (0.96)	0.620 (1.904)*			0.039 (1.85)*	0.720 (2.941)***			0.062 (1.91)*	0.143 (1.143)
Control Variables	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes		Yes
Time and Village FEs	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes		Yes
Observation	998	998		998	998	998		998	998	998		998

Notes: This table shows the second-stage results for net enrolment rate for child aged 10 to 16. Lower-Secondary NER indicates enrolment of child aged 10-12 in lower secondary level, Secondary NER indicates the enrolment of child aged 13-14 in secondary level and Higher-Secondary. NER indicates the enrolment of child aged 15-16 in higher secondary level. The OLS FE and FE-IV are also presented in the table to show the difference in the coefficients if migration is not instrumented. In FE-IV we have instrumented migration with predicted migration to India and MEOA. The t-statistics in ( ) are derived from cluster-robust standard errors (clustered at 71 Districts), ***, **, * denote 1%, 5%, 10% statistically significance. Migration and remittance estimates are in percentage. Full results are available from authors.