

## **Time to remit: the effect of remittances on household consumption in India**

### **Abstract**

India has enjoyed over twenty years of rapid economic growth. The benefits of this growth, however, have largely by-passed India's poor: around a quarter of the world's malnourished children live in India, and their wasted bodies and stunted lives represent a challenge for the Indian government. Although the growth in India's domestic economy did not result in many trickle-down benefits for the hungry poor, anecdotal evidence suggests that food security has benefited from another factor. Both rural or urban families have become increasingly reliant on remittances and used them to improve their food security. This paper explores the pattern of relationship between remittances received and food consumption at the household level; the paper uses a panel data approach with data coming from two rounds of the 'India Human Development Survey' (IHDS) conducted in 2005 and in 2011-12, and employs an instrumental variable approach to control for the endogeneity of remittances. The econometric results indicate that remittances do have a significant positive effect on the size of expenditure on food, as well as on two key indicators of food diversity, the Shannon and the Simpson Index. Results are robust to models' specification and support the view that remittances do represent a mechanism by which households improve their food security.

### **1. Introduction**

Every year, millions of men and women in India migrate to access better economic opportunities for themselves and their households. The money sent home by working migrants represents a source of income for those struggling with their everyday's life. However, the Covid-19 pandemic prompted a massive reverse migration in India; after the Government of India announced the lockdown in March 2020, workers found themselves with no work and no income as industries shut down and construction projects were temporarily interrupted. Unable to access food without any income, most of them made harrowing journey back to their native regions to find that the family left behind was facing food shortages due to the lack of remittances. Not only the migrants became food-poor because of Covid-19, but their families -which relied on their remittances- faced severe liquidity constraints too (Save The Children, 2020).

In the last two decades India has experienced a fast-paced economic growth; nevertheless, the improvement in terms of food and nutritional security the Indian population has benefited is rather minimal. The country's GDP has more than tripled in the last 15 years, but this increase in wealth have not been benefitted by the large majority of the Indian population. The number of poor in the country is still incredibly high; 9% of poor live in urban centres with this percentage increasing to 23 in rural areas of the country (Choithani, 2016). The available literature has referred to this negative correlation with the concept of 'food security enigma' (Gillespie and Kadiyala, 2012 and Pritchard et al., 2014), aggravated by the mix of social tension -i.e. castes, gender and religion discrimination. The economic growth has created several contradictions; the average standard of living in India has increased over time and India is home to a number of millionaires, but chronic undernourishment of Indian dwellers still remains.

The Food and Agriculture Organization estimated that between 2014 and 2016 the number of undernourished people in India amounted to 194.6 million, representing a quarter of the total undernourished people in the world (Food and Agriculture Organization, 2015). The rates of malnourished children are still high; the Global Hunger Index (2020) -calculated combining the rates of those undernourished, children stunting and wasting, and child mortality- rank India at the 94th position out of 107 countries (Agoramoorthy and Hsu, 2021). Those statistics are echoed by the results coming from the fourth round of The National Family Health Survey (NFHS), conducted in 2015-2016, which found that the rates of underweight, stunted and wasted children under five was at 36, 38 and 21% respectively. The follow-up NFHS survey highlighted that out of the 22 states surveyed only nine showed an improvement in the rate of stunted, wasted and underweight children (Paul et al., 2019).<sup>1</sup>

The presence of a caste system has exacerbated differences among households; India is home to a variety of ethnic-caste groups which have long been and continue to be exposed to different opportunities. This system has been in place for more than 3,000 years and it divides Hindus into rigid hierarchical groups based on their work and duties (Ambedkar, 1916). The top caste group is represented by the Brahmins -mainly teachers and intellectuals- followed by the Kshatriyas -warriors and rulers- and by the Vaishyas -once mainly traders. At the bottom of the hierarchy are the Shudras, who do all the menial jobs. The logistic regarding rural communities has always taken into account this division, with the upper and lower castes living

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<sup>1</sup> Considering the size of the population in India and the fact that the NFHS is a survey, we caution the readers to interpret those statistics with a grain of salt.

in segregated colonies. Despite Independent India's constitution banning discrimination on the basis of caste, caste-based divisions continue to prevail - in employment (Thorat and Attewell, 2007), in education (Desai and Kulkarni, 2008) and in the economy (Deshpande, 2000; Kijima, 2006).

To better understand the magnitude of the remittances within the Indian context, it is worth mentioning a few facts about the Indian migration phenomena. The predominant stream of migration in India has involved rural-to-rural migration of labour (Census of India, 2001). However, low income paid agriculture-based jobs associated with the urban centric nature of economic growth has contributed to increase the rural to urban migration phenomenon. During the years 2007 and 2008, total migration to urban areas grew at the rate of 3.5% while for the same period the rural-to-rural migration increased by 2.6% (National Sample Survey, 2010). Another feature of migration in India is its seasonal nature, which constitutes a significant bulk of migratory movements. Keshri and Bhagat (2012) computed -using National Sample Survey data- that temporary migration is a phenomenon that involves approximately 13 million people each year although informal estimates suggest that temporary migration may be between 3 and 7 times more (Breman, 2010).

Migration -whether seasonal, long-term, domestic or international- may translate in remittances. The World Bank estimated that the remittances to low and middle-income countries reached a record high of 554 billion USD in 2019; even with the decline observed in 2020 due to the COVID-19 pandemic, remittance constitutes a vital source of external financing (The World Bank, 2020). The actual size of remittances may be even higher than that, as official figures are difficult to be measured. For India alone, in 2007–08 internal remittances amounted to 10 billion USD, and 30 per cent of all household expenditure was financed by these transfers among remittance-receiving households (Tumbe, 2011). More recent estimates suggest that remittances increased by 83 billion of USD in 2020, just a small drop compared to the previous year estimate.<sup>2</sup> Despite the size of the remittance phenomenon in India, systematic studies on the direct role of remittances in influencing rural households' food consumption patterns is still scanty. Studies on migrant remittances in India have focused on magnitude and flow of remittances and investigated the impact of remittances on the Indian economy at macro level (see as examples Bhagat et al. (2013) and Mahapatro et al. (2015)) and at the household level. Dey (2014) and Mohanty et al. (2014) link remittances with

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<sup>2</sup> For more information on the size of remittances in India, refer to the following website <https://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT?locations=IN>, lastly accessed the 25/05/2021.

development finding that both international and domestic remittances reduce the incidence of poverty of rural households and improve their well-being.

This paper looks at the nexus between remittances and the food consumption patterns of Indian dwellers. The remittances-food consumption patterns nexus here is analysed using a panel approach combined with the use of an instrumental variable; the household level data used here come from two rounds of the 'India Human Development Survey' (IHDS), the first one collected in 2005 and the second in 2010. The nutritional related indicators used here are the (logarithm of the) food expenditure, and two indicators of food diversity, namely the Shannon Index and the Simpson Index. These indicators are used in ecological economics to give a standardised measure of abundance (Shannon index) and evenness (Simpson index) of the species present, but could be used in nutrition to indicate how rich and diversified a diet is. Results indicate that remittances do increase the expenditure on food and the dietary diversity of the dwellers; while those results are statistically significant and robust to different model specification, marginal effects are not large enough to solve the chronic undernutrition and dietary deficiencies largely experienced by Indian dwellers.

The rest of the paper is organised as it follows. Next section will discuss the main studies on the economic and social impacts of remittances. The description of the data used, the estimation strategy and a statistical summary of the data will be presented in section 3. The main body of the results is in section 4; the concluding remarks and the policy implications of this paper are in the final section.

## **2. Literature review**

Migration is a 'feature' shared by several developing countries; the International Organisation for Migration has estimated that 272 million people migrated in 2019 (United Nations, 2019). The majority of those migrating are originally from countries and areas where prospects for works are low; remittances -associated to both domestic and international migration- do represent a non-negligible source of income for those members staying behind (Williams et al, 2020). Migration and -hence- remittances have become a key component in the livelihood strategies of an increasing number of households living in developing areas, with large numbers of people seeking better earning opportunities in richer countries or in more developed areas within their own country (Zezza et al., 2011). Global remittances have grown steadily over the past several years, to a point where the total remittances in 2003 were the second biggest capital

flow into developing countries after the foreign direct investment (Ratha et al., 2010). Such an increase in the size of remittances has been driven by a dramatic rise of international and rural-to-urban migration, and they are seen as an important feature in reducing poverty and increasing the standard of living of those left behind.

Remittances have an impact on the economic growth of the recipient country and on poverty reduction. At a micro-level, remittances offer an extra income which help with routine household-related expenses (education, health, consumables for the household) as well as financial means for business activities (for a review of the impacts of remittances on development indicators see Ebadi et al (2020)). Recognising the importance remittances play, the Bill and Melinda Gates Foundation recommended that the G20 countries improve the ease of remitting funds to improve the health and nutrition of those who stayed in the country of origin (Gates, 2011).

Based on the neo-classical microeconomic theory, it is likely that remittances affect nutrition through their effect on total household available income (Thow et al., 2016). Remittances increase access to food purchased hence helping the consumption smoothing effect via reducing the vulnerability of households to crises. Thow et al. (2016) reviewed 20 studies to find support on the positive link between remittances and nutrition. However, remittances are not intended to be a long-term source of income, which explain the negative findings with respect to stunting -indicator of longer-term chronic undernourishment. It has been observed that it is not always the poorest strata of the population who migrate, and -as a result- remittances may not generate substantial long-term gains in reducing undernutrition at the nationwide level. Lastly, income coming from remittances may be directed by the remitter for specific uses and -as it is not a consistent source of income- it may be used differently to other sources of income (Tolstokorova, 2012).

Discussions on the nutritional impacts of remittances focussed on the international more than on internal/domestic remittances (Choithani, 2016). The flow of international remittance to developing countries have increased three-fold from 1995 to 2014 (from 159 to 436 billion USD), and in 2015 the current levels of remittances received by developing countries was nearly three times as much as their receipts of official development assistance (World Bank 2015).

Citing all the studies on the link between international remittances and nutrition will be a long exercise; the evidence coming from studies published in the last thirty years agree on the

existence of a positive nexus. Adams (1991) found that in rural Egypt, the number of poor households declines by 10% when household income includes international remittances, and that remittances account for 15% of total income of poor households. Jongwanich (2007) examined the impact of workers' remittances on growth and poverty reduction in developing Asia-Pacific countries using panel data over the period 1993-2003. The result showed that, while remittances do have a significant impact on poverty reduction through increasing income, smoothing consumption and easing capital constraints of the poor, they have only a marginal impact on growth operating through domestic investment and human capital development. The evidence continues with the studies presented Lachaud (1999) who looked at remittances to Burkina Faso in 1994-1995 and found that they went mostly to rural households headed by farmers or inactive people. They reduced rural poverty by 7.2% and urban poverty by 3.2%. Leliveld (1997) concluded that in Lesotho remittances play a very important role in giving households the means to achieve at least minimum food requirements. de Brauw (2011) found that in El Salvador during the food price shocks of 2007–08, young children in households with access to international remittances witnessed an improvement of their nutritional status compared to those of children in households not receiving remittances. A positive relationship between international remittances and nutritional-related indicators was found in Ghana (Quartey and Blankson, 2004), rural Mali (Generoso, R2015), Bangladesh (Regmi & Paudel, 2016, 2017) and Guatemala (Carletto et al., 2011)

The nexus between domestic migration and the effects that remittances may have on the nutrition related indicators of those staying at home has been less researched (Choithani, 2016). The link between domestic migrants and their family is even stronger, with migrants making periodic visits to places of origin, maintaining close relations with family, and sending home remittances that are crucial for the food security of members at places of origin (de Haan, 2002). Available evidence on the significance of domestic remittances suggests the same. For instance, a study by Castaldo et al. (2012) found that in India and Ghana internal migrants and domestic remittances outnumbered international migrants and their total receipts, with potentially significant human development impacts. For India alone, in 2007–08 internal remittances amounted to US\$10 billion, and 30 per cent of all household expenditure was financed by these transfers among remittance-receiving households (estimated at 10 per cent of all rural households in India) (Tumbe, 2011). Systematic research on the direct role of remittances in influencing rural households' food consumption patterns is scarce, however.

This paper aims at providing more insights on the sign and size of the link between domestic remittances-nutritional status; as the next section explains, it does so by investigating how remittances contributed to the nutritional status of rural Indians in 2005 and 2011-12.

### 3. Data and estimation strategy

The data used in the paper comes from two rounds of the India Human Development Survey (IHDS), a nationally representative panel survey consisting of 42,152 households in 2011-12 and 41,554 households in 2005 collected from 1,503 villages and 971 urban neighbourhoods across India. The household survey covers a range of questions relating to economic activity, income, remittances, food consumption, migration, education, and health.

Based on the information available on remittances we have classified two types of households; household who received remittances and household who did not. An estimated 4.95% of household in 2005 and 13.93% of household in 2011-12 received remittances. Table 1 reports summary statistics on the variables used in this paper; the statistics are disaggregated by the year of the survey and by households non receiving (receiving) remittances.

**Table 1: Summary statistics**

|  | 2005                      |                           | 2011-12                    |                             |
|--|---------------------------|---------------------------|----------------------------|-----------------------------|
|  | <i>Without remittance</i> | <i>With remittances</i>   | <i>Without remittance</i>  | <i>With remittances</i>     |
| Household monthly food expenditure (in Rs)                               | 3,296.266<br>(2,087.07)   | 3,212.52<br>(2,037.30)    | 4,179.17<br>(2,455.38)     | 3,816.94<br>(2,430.49)      |
| Simpson Index  | 0.84<br>(0.07)            | 0.84<br>(0.07)            | 0.85<br>(0.05)             | 0.85<br>(0.05)              |
| Shannon Index  | 2.15<br>(0.31)            | 2.15<br>(0.30)            | 2.26<br>(0.25)             | 2.24<br>(0.24)              |
| Household total yearly income (in Rs)                                    | 88,073.55<br>(137,881.26) | 93,808.85<br>(121,007.67) | 139,220.79<br>(231,057.50) | 141,439.910<br>(234,939.80) |
| Household total yearly consumption (in Rs)                               | 94,157.97<br>(178380)     | 109,348.62<br>(233,595.6) | 127,006.89<br>(127,645.98) | 119,839.74<br>(133,926.63)  |
| Amount of remittances (in Rs)  | 0.00<br>(0.00)            | 33,561.81<br>(29,429.99)  | 0.00<br>(0.00)             | 48,323.84<br>(70,908.84)    |
| Households living in villages experiencing conflict amongst caste (in %) | 28                        | 30                        | 40                         | 40                          |

|   |        |        |        |        |
|---|--------|--------|--------|--------|
|   | 45)    | (45)   | (49)   | (49)   |
| Household size                            | 5.21   | 4.72   | 5.07   | 4.58   |
|   | (2.47) | (2.67) | (2.33) | (2.75) |
| No of household members aged 0-14         | 1.65   | 1.51   | 1.32   | 1.28   |
|   | (1.56) | (1.68) | (1.41) | (1.60) |
| No of household members aged 15-19        | 0.74   | 0.67   | 0.63   | 0.55   |
|   | (0.97) | (0.89) | (0.86) | (0.81) |
| No of household members aged more than 19 | 2.80   | 2.53   | 3.11   | 2.74   |
|   | (1.37) | (1.42) | (1.44) | (1.48) |
| Dependency ratio (in %)                   | 55     | 59     | 41     | 43     |
|   | (59)   | (84)   | (50)   | (65)   |
| Highest male education (in years)         | 6.93   | 5.41   | 7.89   | 5.67   |
|   | (5.14) | (5.49) | (5.19) | (5.58) |
| Highest female education (in years)       | 4.61   | 4.89   | 5.93   | 5.29   |
|   | (5.04) | (5.17) | (5.36) | (5.39) |
| Household owning land (in %)              | 41     | 53     | 40     | 55     |
|   | (49)   | (49)   | (49)   | (49)   |
| Household residing in urban area (in %)   | 36     | 25     | 39     | 25     |
|   | (48)   | (43)   | (49)   | (43)   |
| Number of rooms in the dwelling           | 2.51   | 3.06   | 2.83   | 3.21   |
|   | (1.61) | (1.98) | (1.69) | (1.92) |
| <i>Caste</i>                              |        |        |        |        |
| Brahmin (in %)                            | 0.05   | 0.07   | 0.05   | 0.07   |
|   | (0.23) | (0.25) | (0.22) | (0.25) |
| Forward castes (in %)                     | 0.26   | 0.28   | 0.26   | 0.25   |
|   | (0.44) | (0.45) | (0.43) | (0.43) |
| Other backward classes (in %)             | 0.38   | 0.42   | 0.38   | 0.43   |
|   | (0.48) | (0.49) | (0.48) | (0.49) |
| Dalit (in %)                              | 0.20   | 0.17   | 0.20   | 0.18   |
|   | (0.40) | (0.38) | (0.40) | (0.38) |
| Scheduled tribes (in %)                   | 0.08   | 0.04   | 0.09   | 0.06   |
|   | (0.27) | (0.20) | (0.28) | (24)   |
| Number of observations                    | 39,474 | 2,056  | 27,990 | 4,531  |

Notes: Authors' elaboration from IHDS 2005 and 2011-12. Standard deviation in parenthesis. Numbers refer to Rs. £1 is equal to Rs 103.45 (July, 2020). Expenditure and income variables are intended to be monthly and yearly, (as indicated) and at the household level.

The average food expenditure and other consumption expenditure is lower for the household who receive remittances; however, their income is higher as it includes the remittances

received. Households with remittances live in a smaller size household, have lower level of education for male, are less likely to live in urban areas, have more rooms in their house, and are more likely to own land. There is no clear trend in terms of caste and religion groups, however Muslims households are more likely and Dalit and STs are less likely to receive remittances. The average remittance is Rs 33,561 in 2005 and Rs 48,323 in 2011-12. There is no difference in terms of the Shannon and the Simpson index between those households (non) receiving remittances; while the Simpson index does not show an increase over time, the Shannon index does marginally increase across the two waves. The share of the different castes' groups over time is constant; there are no major differences in terms of receiving remittances although the Brahmin and Muslim groups seem to receive more remittances in proportion.

### **Estimation Strategy**

To estimate a relationship between remittances and the three indicators related to the nutritional food status of the household, the equation in (1) is employed.

$$(1) Y_{it} = \alpha + \delta_1 REMITTANCES_{it} + \delta_2 X_{it} + \mu_i + \varepsilon_{it}$$

where  $Y_{it}$  represents the dependent variable (log of total expenditure on food, Shannon index and Simpson index) for the  $i_{th}$  household in the sample at the  $t_{th}$  time period,  $REMITTANCES$  is the log of the amount of remittance household received,  $X_{ij}$  is a vector of household characteristics, and  $\mu_i$  is an individual specific unobservable effect and  $\varepsilon_{it}$  is an error term.

Three measures related to the household food consumption patterns will be here used for the analysis -the amount of household expenditure for food, the Simpson index and Shannon index. The Simpson Index can be measured as it follows:

$$(2) \text{Simpson Index} = 1 - \sum_i (w_i)^2$$

where  $w_i$  indicates the expenditure share (or caloric intake share; this last is not being used in this paper) for food group  $i$ . The Simpson index ranges between zero -indicating a little diversified diet (all the budget spent on the same food group)- and one -more diversified diet (budget equally spent on several food groups).

The Shannon index, measures the concentration of food groups and it is measured in the following way:

$$(3) \textit{Shannon Index} = - \sum_i w_i \log(w_i)$$

where  $w_i$  still indicates the expenditure share (or caloric intake share) for food group  $i$ ; the index takes the values from zero to the value of log of the highest number of food groups. In the sample considered here, the Shannon index could vary between zero and a maximum of 2.94 (2.99) in 2005 (2011-12).

To identify which empirical methodology – fixed effects or random effects model – is most appropriate, we perform the Hausman specification test (Hausman, 1978). A rejection of null hypothesis in the Hausman test statistic suggests that fixed effects estimates are more appropriate (see Table 2).

Another methodological issue which may arise when analysing the impact of remittances on food expenditure and diversity is the existence of endogeneity which can be caused by self-selection and simultaneity bias. Self-selection bias could occur when households with similar observable characteristics have different level of unobserved features (e.g. more or less motivated, more or less entrepreneurial) which may lead to different probability of receiving remittances. The self-selection is corrected by using the Heckman two-step procedure in the econometric analysis later presented. We correct for selection by including one (independent) variable that appears in the selection equation but not in the outcome equation, with this independent variable that affects the selection but not the outcome (Sartori, 2003). Dependency ratio -measured as the ratio between the number of members under 14 years of age and the number of adults (15+) in the household fills the requirement for being an appropriate variable for identification. As remittances -on top of providing cash to be used for food- could be used for household expenditure including health care for the elderly (Amuedo-Dorantes & Pozo, 2011), investments (Yang, 2008), housing (Osili, 2004), higher education (Arif, Raza, Friemann, & Suleman, 2019), the probability of receiving remittances is affected by the composition of the household or the dependency ratio<sup>3</sup>. Hence, a higher share of adult to children -lower values of the dependency ratio variable- may increase the probability of receiving remittances. However, the amount of remittances are largely determined by migrant's economic situation. The coefficient of dependency ratio is negative which suggests that households with the lower dependency ratio - i.e., more adults compared to young members- are more likely to receive remittances (Table 4 in the Appendix).

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<sup>3</sup> Self-interested migrants are more likely to send remittances if they aspire to receive inheritance (Lucas and Stark, 1985).

Simultaneity bias is caused by the presence of endogenous variable -remittances being one of them- which may cause reverse causality. Remittances influence food expenditure, however, it can be dependent on the food expenditure as well. We address this by adopting an instrumental variable (IV) approach using the presence of conflict among castes in the residing village as an instrument for remittance<sup>4</sup>. Caste based conflicts between upper castes and lower castes -and sometimes within the same caste groups- are often caused by social, economics, and political reasons and constitute salient feature of Indian communities, particularly in rural areas (Borooah, Tagat, and Mishra, 2019). An increase in the presence of conflicts could reduce employment opportunities for those in a given caste and can lead to higher level of migration of those members involved in the conflict (Brottrager, Cuaresma, and Muttarak, 2019; Christensen, Onul, and Singh, 2018 & Naudé, 2008). Those who migrate as unable to find an occupation provide income support through remittances for those who are left behind. Although conflicts may deter remittances for investment and business purposes, they increase the likelihood of remittances being sent for food related need.

In the two stage least square (2SLS) IV approach, our first stage treats the log of the amount of remittance as a dependent variable and use dummy variables for the presence of conflict among castes as an independent variable. In the second stage, we regress our three dependent food patterns related variables on the predicted value of log of remittances obtained from the first stage regression. Our first stage regression shows that the instrumental variable used is a strong determinant of the amount of remittances household received (see Table 5 in the Appendix). The second stage regression shows that remittances increase the expenditure on food and diversity of food. We also test for the relevance of the instrument in the first-stage regression. Staiger and Stock (1997) proposed a rule of thumb declaring the instruments weak when the first stage *F* statistic is less than 10. The *F*-statistic from the first-stage is sufficiently large, suggesting that our IV is sufficient for this purpose.

#### **4. Econometric results**

Our fixed effect model and IV results are shown in Table 2 and Table 6 (in the Appendix). Both models show that remittances have positive impact on total food expenditure and food diversity using Shannon and Simpson index. Using the IV approach in Table 2, we found that 1% increase in remittance increases the expenditure on food by 0.54 %, Simpson index by 0.03

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<sup>4</sup> Previous studies have used various instruments for remittances including migration network (Acosta 2006; Carrington et al. 1996; Nguyen and Winters 2011), changes in population of the region, and relative level of overall human capital (Karamba, Quiñones and Winters, 2011)

units (which represents a 3.5% increase in the index), and Shannon index by 0.25 units (10% increase), with those results being statistically significant at 1% level. Other factors that increased food expenditure and food diversity are male education, and number of adults, teen and children in the household whereas female education, living in urban area, number of rooms in the house has a negative relationship with our dependent variables. Land ownership also increases the expenditure on food but has no effect on food diversity.

Our fixed effect analysis in Table 6 in the Appendix shows similar pattern; however, the coefficient stemming from the IV estimates are larger than the fixed effect model suggesting that fixed effect model would underestimate the true effect of remittances on food expenditure and diversity.

**Table 2: IV estimate of the impact of the amount of remittances on food consumption and diversity**

| <i>Variables</i>                          | <i>(1)</i><br><i>Log of food expenditure</i> | <i>(2)</i><br><i>Simpson Index</i> | <i>(3)</i><br><i>Shannon Index</i> |
|---|--|------------------------------------|------------------------------------|
| Log of remittance                         | 0.54***<br>(0.04)                            | 0.03***<br>(0.01)                  | 0.25***<br>(0.02)                  |
| Highest education male                    | 0.09***<br>(0.01)                            | 0.01***<br>(0.00)                  | 0.04***<br>(0.00)                  |
| Highest education female                  | -0.05***<br>(0.00)                           | -0.00***<br>(0.00)                 | -0.02***<br>(0.00)                 |
| Land ownership                            | 0.06***<br>(0.01)                            | -0.00<br>(0.00)                    | -0.00<br>(0.01)                    |
| Urban/rural                               | -0.43***<br>(0.05)                           | -0.04***<br>(0.01)                 | -0.23***<br>(0.03)                 |
| Number of rooms                           | -0.10***<br>(0.01)                           | -0.01***<br>(0.00)                 | -0.05***<br>(0.00)                 |
| No of household members aged 0-14         | 0.29***<br>(0.02)                            | 0.01***<br>(0.00)                  | 0.10***<br>(0.01)                  |
| No of household members aged 15-19        | 0.51***<br>(0.03)                            | 0.03***<br>(0.00)                  | 0.18***<br>(0.01)                  |
| No of household members aged more than 19 | 0.31***<br>(0.01)                            | 0.01***<br>(0.00)                  | 0.10***<br>(0.01)                  |
| <i>Caste</i>                              |  |                                    |                                    |
| Brahmin                                   | 0.25***<br>(0.03)                            | 0.02***<br>(0.00)                  | 0.10***<br>(0.02)                  |
| Forward Caste                             | 0.16***                                      | 0.01***                            | 0.05***                            |

|                          |           |            |           |
|--------------------------|-----------|------------|-----------|
|                          | (0.02)    | (0.00)     | (0.01)    |
| Other backward classes   | 0.09***   | 0.00**     | 0.03***   |
|                          | (0.02)    | (0.00)     | (0.01)    |
| Scheduled tribe          | 0.13***   | 0.00       | 0.03**    |
|                          | (0.03)    | (0.00)     | (0.01)    |
| Dalits (reference group) | -         | -          | -         |
| Mills                    | -0.19***  | -0.01***   | -0.08***  |
|                          | (0.02)    | (0.00)     | (0.01)    |
| Constant                 | 6.11***   | 0.77***    | 1.61***   |
|                          | (0.09)    | (0.01)     | (0.05)    |
| <i>Hausman FE-RE</i>     | 719.78*** | 372.78 *** | 508.26*** |
| R-squared                | 0.15      | 0.02       | 0.04      |
| Number of observations   | 73,731    | 73,791     | 73,791    |

Notes: Authors' elaboration from IHDS 2005 and 2011-12. Standard deviation in parenthesis. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

To check the robustness of our result and see whether the results would hold when we change the specification; the remittance variable here is a binary variable taking the value of one (zero) if the household did (not) receive any remittance from a non-resident. The results associated to this model specification are in Table 3. We find that households which received remittances increased their expenditure on food by 12 %, whereas the Simpson index increased by 0.01 units and Shannon index by 0.06 units. The marginal effects associated to this specification are consistent with our main results and the existing literature on the nexus between remittances and food consumption patterns.

**Table 3: The impact of receiving remittances on food consumption and diversity**

| <i>Variables</i>         | (1)<br><i>Log of food expenditure</i> | (2)<br><i>Simpson Index</i> | (3)<br><i>Shannon Index</i> |
|--------------------------|---------------------------------------|-----------------------------|-----------------------------|
| Remittances (1/0)        | 0.12***<br>(0.01)                     | 0.01***<br>(0.00)           | 0.06***<br>(0.01)           |
| Highest education male   | 0.02***<br>(0.00)                     | 0.00***<br>(0.00)           | 0.01***<br>(0.00)           |
| Highest education female | 0.01***<br>(0.00)                     | 0.00***<br>(0.00)           | 0.00***<br>(0.00)           |
| Land ownership           | 0.07***                               | -0.00                       | 0.00                        |

|   |         |          |          |
|---|---------|----------|----------|
|   | (0.01)  | (0.00)   | (0.01)   |
| Urban/rural                               | 0.20*** | 0.01     | 0.05***  |
|   | (0.03)  | (0.00)   | (0.01)   |
| Number of rooms                           | 0.03*** | 0.00**   | 0.01***  |
|   | (0.00)  | (0.00)   | (0.00)   |
| No of household members aged 0-14         | 0.04*** | -0.00*** | -0.01*** |
|   | (0.00)  | (0.00)   | (0.00)   |
| No of household members aged 15-19        | 0.10*** | 0.00     | 0.00**   |
|   | (0.00)  | (0.00)   | (0.00)   |
| No of household members aged more than 19 | 0.14*** | 0.00***  | 0.02***  |
|   | (0.00)  | (0.00)   | (0.00)   |
| <i>Caste</i>                              |         |          |          |
| Brahmin                                   | -0.06** | -0.00    | -0.04*** |
|   | (0.03)  | (0.00)   | (0.01)   |
| Upper Caste                               | -0.01   | -0.00    | -0.02**  |
|   | (0.02)  | (0.00)   | (0.01)   |
| Other backward classes                    | -0.03** | -0.00*   | -0.03*** |
|   | (0.02)  | (0.00)   | (0.01)   |
| Scheduled tribe                           | 0.01    | -0.00    | -0.02    |
|   | (0.03)  | (0.00)   | (0.01)   |
| Dalits (reference group)                  | -       | -        | -        |
| Constant                                  | 7.12*** | 0.83***  | 2.08***  |
|   | (0.02)  | (0.00)   | (0.01)   |
| R-squared                                 | 0.14    | 0.02     | 0.03     |
| Number of observations                    | 73,792  | 73,792   | 73,792   |

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Notes: Authors' elaboration from IHDS 2005 and 2011-12. Standard deviation in parenthesis. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 5. Concluding remarks

India has witnessed a remarkable transformation of its economy in the past two decades: economic growth, declining overall poverty, expanding seasonal and permanent migration and change in the food consumption patterns. It is within this scenario that we examine the nexus between remittances and food consumption patterns (food expenditure, Shannon and Simpson index). When a given household experience the loss a (male) member due to its migration, this could potentially translate in a decline of available income, food consumption and its diversity,

and caloric intake. Alternatively, if the migrant sends remittances back to those left behind, the household of origin may experience an increase in the dietary related indicators.

Using household level data from two rounds of the IHDS for 2005 and 2011-12 and using conflict among caste in the respondent's region as our instrumental variable, we find that remittances positively affect expenditure on food and improve diversity of food, as changes in the Shannon and Simpson index show. In the context of India, these findings can be explained through following channels. First, increase in the income through remittances eases budget constraints and enhances the household capacity to spend more on food; second, along with remittances, migrants may also bring knowledge of health and nutrition which can improve food diversity; lastly, in the absence of the male head of the household (approximately 80% of the migrants are the male head of the household), female may spend more on food and less for entertainment (Quisumbing and McClafferty, 2006). Those results may not hold when external circumstances manifest which may affect the availability of food -i.e. drought, flooding and other shocks of the kind.

This paper has several policy implications. Due to better economic opportunities in urban areas (in India but not only there), there is an increase in the migration from rural to urban areas. This has made remittances an important source of income for the household's member who are left behind. Thus, there is a need for improving this channel by reducing the transaction cost of these remittances and providing resources for migration to the places of opportunities.

Food, nutrition and dietary diversification constitute complex issues and it is crucial that governments now start looking and thinking beyond the simple food production (quantity) to the quality and diversity of nutrition. The result from this paper suggests that there is a need for recognising the role that remittances play in affecting the food consumption patterns. We also acknowledge the fact that remittances are no silver bullet and any intervention for supporting remittances should also aim to fix the root cause of food insecurity in the first place.

As this paper and the relevant literature on the remittance-food pattern shows, remittances do influence the household food consumption patterns and have a positive impact on its dietary diversity; it is important to keep in mind that migration of (male) household member increases the livelihood burden on those members who are left behind -especially women. This could negatively impact the growth of those children in the household by reducing the available time and the quality of childcare. Policymakers and development practitioners need to further investigate on this possible link and strengthen the available safety nets (improving access to

education, health care, credit market, labour markets, etc) in those regions with higher rates of migration.

## 6. References

Abel, G.J., Brottrager, M., Cuaresma, J.C. and Muttarak, R., 2019. Climate, conflict and forced migration. *Global environmental change*, 54, pp.239-249.

Adams, R.H Jr, (1991). The Effects of International Remittances on Poverty, Inequality, and Development in Rural Egypt”, IFPRI Research Report 86, Washington: IFPRI.

Adams Jr, R.H. and Cuécuecha, A., 2013. The impact of remittances on investment and poverty in Ghana. *World Development*, 50, pp.24-40.

Agoramoorthy, G., & Hsu, M. J. (2021). How the coronavirus lockdown impacts the impoverished in India. *Journal of racial and ethnic health disparities*, 8(1), 1-6.

Amuedo-Dorantes, C. and Pozo, S., 2011. New evidence on the role of remittances on healthcare expenditures by Mexican households. *Review of Economics of the Household*, 9(1), pp.69-98.

Ambedkar, B. R. (1916). Castes in India: Their mechanism, genesis and development. Readings in Indian Government and Politics Class, Caste, Gender, 131-53.

Arif, I., Raza, S.A., Friemann, A. and Suleman, M.T., 2019. The role of remittances in the development of higher education: Evidence from top remittance receiving countries. *Social Indicators Research*, 141(3), pp.1233-1243.

Bhagat, R. B., Keshri, K., and Ali, I. (2013). Emigration and flow of remittances in India. *Migration and Development*, 2, 93–105.

Borooah, V.K., Tagat, A. and Mishra, V., 2019. Conflict, caste and resolution: a quantitative analysis for Indian villages. *Indian Growth and Development Review*.

Breman, J. (2010). Outcast labour in Asia: circulation and informalization of the workforce at the bottom of the economy. Oxford: Oxford University Press.

Castaldo, A., Deshingkar, P. and McKay A., 2012. Internal migration, remittances and poverty: evidence from Ghana and India.

- Carletto, C., Covarrubias, K., & Maluccio, J. A. (2011). Migration and child growth in rural Guatemala. *Food Policy*, 36(1), 16–27
- Census of India (2001), Data Highlights – Migration Table D1, D2 and D3, New Delhi, Registrar General and Census Commissioner.
- Choithani, C. (2017). Understanding the linkages between migration and household food security in India. *Geographical Research*, 55(2), 192-205.
- Christensen, J., Onul, D. and Singh, P., 2018. Impact of ethnic civil conflict on migration of skilled labor. *Eastern Economic Journal*, 44(1), pp.18-29.
- De Brauw, A. (2011). Migration and child development during the food price crisis in El Salvador. *Food Policy*, 36(1), 28-40.
- de Haan, A. (2002). Migration and livelihoods in historical perspective: a case study of Bihar, India. *Journal of Development Studies*, 38(5), pp.115–142.
- Dey, S. (2014). Impact of remittances on poverty at origin: A study on rural households in India using covariate balancing propensity score matching. *Migration and Development*.
- Ebadi, N., Ahmadi, D., & Melgar-Quíñonez, H. (2020). Domestic and International Remittances and Food Security in Sub-Saharan Africa. *Remittances Review*, 5(1), 37-54.
- Food and Agriculture Organization (2015). *The State of Food Insecurity in the World: Meeting the 2015 International Hunger Targets – Taking Stock of Uneven Progress*. Rome: Food and Agriculture Organization.
- Gates B. (2011). A report by Bill Gates to G20 Leaders, Cannes Summit, November 2011. Seattle, WA: Bill and Melinda Gates Foundation.
- Generoso, R. (2015). How do rainfall variability, food security and remittances interact? The case of rural Mali. *Ecological Economics*, 114, 188–198.
- Gillespie, S. and Kadiyala, S. (2012). Exploring the agriculture-nutrition disconnect in India. In: S. Fan and R. Pandya-Lorch, eds. *Reshaping agriculture for nutrition and health*. Washington, DC: International Food Policy Research Institute.
- Jongwanich, J. 2007. *Workers’ Remittances, Economic Growth and Poverty in Developing Asia and the Pacific Countries*, UNESCAP Working Paper, WP/07/01, January.

- Keshri, K. and Bhagat, R.B., 2012. Temporary and seasonal migration: regional pattern, characteristics and associated factors. *Economic and Political Weekly*, 47(4), pp.81–88.
- Lachaud, J.P. (1999). *Pauvreté, ménages et genre en Afrique subsaharienne. Série de recherche 03, Centre d'Economie du Développement de l'Université Montesquieu Bordeaux IV.*
- Leliveld, A. (1997). The Effects of Restrictive South African Labour Policy on the Survival of Rural Households in Southern Africa: A Case Study from Rural Swaziland”, *World Development*, Vol. 25, No. 11.
- Lucas, R.E. and Stark, O., 1985. Motivations to remit: Evidence from Botswana. *Journal of political Economy*, 93(5), pp.901-918.
- Mahapatro, S., Bailey, A., James, K. S., & Hutter, I. (2017). Remittances and household expenditure patterns in India and selected states. *Migration and Development*, 6(1), 83-101.
- Mohanty, S. K., Dubey, M., & Parida, J. (2014). Economic well-being and spending behaviour of households in India: Does remittances matter? *Migration and Development*, 3, 38–53.
- National Sample Survey, 2010. Migration in India 2007–08. NSS 64th Round, Report no. 533 (64/10.2/2). New Delhi: Ministry of Statistics and Programme Implementation, Government of India.
- Naudé, W., 2008. *Conflict, disasters and no jobs: Reasons for international migration from Sub-Saharan Africa* (No. 2008/85). WIDER Research Paper.
- Osili, U.O., 2004. Migrants and housing investments: Theory and evidence from Nigeria. *Economic development and cultural change*, 52(4), pp.821-849.
- Paul, P., Chouhan, P., & Zaveri, A. (2019). Impact of child marriage on nutritional status and anaemia of children under 5 years of age: empirical evidence from India. *Public health*, 177, 95-101.
- Pritchard, B., Rammohan, A., Sekher, M., Parasuraman, S. and Choithani, C. (2014). *Feeding India: Livelihoods, Entitlements and Capabilities*. Earthscan (Routledge): Oxon.
- Quartey, P., and Blankson, T. (2004). Do migrant remittances minimize the impact of macro-volatility on the poor in Ghana? Final report submitted to the global development network.
- Ratha, D., Mohapatra, S., Silwal, A., 2010. Outlook for Remittance Flows 2010–11. *Migration and Development Brief No. 12*, July. The World Bank, Washington, DC.

Regmi, M., & Paudel, K. P. (2016). Impact of remittance on food security in Bangladesh. In A. Schmitz, P. Lynn Kennedy, & T. G. Schmitz (eds.), *Food security in a food abundant world: An individual country perspective* (pp. 145–158). Emerald Group Publishing Limited.

Save The Children, India. (2020). Millions of Children risk poverty and hunger as India's covid crisis spiral. Available at <https://www.savethechildren.net/news/millions-children-risk-poverty-and-hunger-india%E2%80%99s-covid-crisis-spirals>, lastly accessed on 04/10/2021

Thow, A. M., Fanzo, J., & Negin, J. (2016). A systematic review of the effect of remittances on diet and nutrition. *Food and nutrition bulletin*, 37(1), 42-64.

Tolstokorova, A. V. (2012). The Woman and Sixpence: Gendered impact of remittances on social sustainability of Ukrainian transnational households. *Anal J.* vol. 5(1): 74-97.

Tumbe, C. (2011). *Remittances in India: facts and issues*. Working Paper Number 331. Bangalore: Indian Institute of Management Bangalore.

United Nations (2019). *International Migration 2019 report*. United Nations New York, 2019.

Williams, N. E., Bhandari, P., Young-DeMarco, L., Swindle, J., Hughes, C., Chan, L., ... & Sun, C. (2020). Ethno-Caste influences on migration rates and destinations. *World development*, 130, 104912.

World Bank the, (2015). *Migration and remittances: recent developments and outlook*. Available at: <https://sitere-sources.worldbank.org/INTPROSPECTS/Resources/334934-1288990760745/MigrationandDevelopmentBrief24.pdf> lastly accessed 26/05/2021.

World Bank the (2020). *World Bank Predicts Sharpest Decline of Remittances in Recent History*. PRESS RELEASE NO: 2020/175/SPJ available at <https://www.worldbank.org/en/news/press-release/2020/04/22/world-bank-predicts-sharpest-decline-of-remittances-in-recent-history> accessed the 25/05/2021.

Yang, D., 2008. International migration, remittances and household investment: Evidence from Philippine migrants' exchange rate shocks. *The Economic Journal*, 118(528), pp.591-630.

Zeza, A., Carletto, C., Davis, B., & Winters, P. (2011). Assessing the impact of migration on food and nutrition security. *Food Policy*, 36(1), 1-6.

## 7. Appendix

**Table 4: Fixed effect logit model**

| <i>Variables</i>                          | <i>(1)</i><br><i>Remit (1/0)</i> |
|---|----------------------------------|
| Conflict among castes                     | 0.13***<br>(0.05)                |
| Dependency ratio                          | -0.20**<br>(0.08)                |
| Highest education male                    | -0.11***<br>(0.01)               |
| Highest education female                  | 0.12***<br>(0.01)                |
| Land ownership                            | 0.00<br>(0.08)                   |
| Urban/rural                               | 1.25***<br>(0.24)                |
| Number of rooms                           | 0.21***<br>(0.02)                |
| No of household members aged 0-14         | -0.72***<br>(0.04)               |
| No of household members aged 15-19        | -0.35***<br>(0.04)               |
| No of household members aged more than 19 | -0.32***<br>(0.04)               |
| <i>Caste</i>                              |                                  |
| Brahmin                                   | -0.90***<br>(0.26)               |
| Upper Caste                               | -0.35*<br>(0.18)                 |
| Other backward classes                    | -0.35**<br>(0.16)                |
| Scheduled tribe                           | -0.29<br>(0.25)                  |
| Dalits                                    | -                                |
| Number of observations                    | 9,322                            |

Notes: Authors' elaboration from IHDS 2005 and 2011-12. Standard deviation in parenthesis. Standard errors in

parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5: First stage regression of IV model**

| <i>Variables</i>                          | <i>(1)</i><br><i>Log of Remittance</i> |
|---|--|
| Conflict amongst castes                   | 0.14***<br>(0.03)                      |
| Highest education male                    | -0.13***<br>(0.01)                     |
| Highest education female                  | 0.11***<br>(0.01)                      |
| Land ownership                            | 0.02<br>(0.06)                         |
| Urban/rural                               | 1.05***<br>(0.18)                      |
| Number of rooms                           | 0.22***<br>(0.02)                      |
| No of household members aged 0-14         | -0.67***<br>(0.07)                     |
| No of household members aged 15-19        | -0.41***<br>(0.04)                     |
| No of household members aged more than 19 | -0.29***<br>(0.03)                     |
| <i>Caste</i>                              |  |
| Brahmin                                   | -0.49***<br>(0.16)                     |
| Upper Caste                               | -0.26***<br>(0.10)                     |
| Other backward classes                    | -0.20**<br>(0.09)                      |
| Scheduled tribe                           | -0.19<br>(0.14)                        |
| Dalits                                    | -                                      |
| mills                                     | 0.20*                                  |

|                        |         |
|------------------------|---------|
| Constant               | (0.12)  |
|                        | 1.91*** |
|                        | (0.16)  |
| Number of observations | 73,791  |
| R-squared              | 0.06    |
| F- test                | 132.56  |

Notes: Authors' elaboration from IHDS 2005 and 2011-12. Standard deviation in parenthesis. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6: Fixed effect model without IV**

| <i>Variables</i>                          | (1)<br><i>Log of food expenditure</i> | (2)<br><i>Simpson Index</i> | (3)<br><i>Shannon Index</i> |
|---|---------------------------------------|-----------------------------|-----------------------------|
| Log of remittance                         | 0.01***<br>(0.00)                     | 0.00***<br>(0.00)           | 0.01***<br>(0.00)           |
| Highest education male                    | 0.03***<br>(0.00)                     | 0.00***<br>(0.00)           | 0.01***<br>(0.00)           |
| Highest education female                  | -0.00<br>(0.00)                       | -0.00<br>(0.00)             | -0.00*<br>(0.00)            |
| Land ownership                            | 0.07***<br>(0.01)                     | -0.00<br>(0.00)             | 0.00<br>(0.01)              |
| Urban/rural                               | 0.05<br>(0.03)                        | -0.01<br>(0.00)             | -0.01<br>(0.02)             |
| Number of rooms                           | 0.00<br>(0.00)                        | -0.00**<br>(0.00)           | -0.00**<br>(0.00)           |
| No of household members aged 0-14         | 0.10***<br>(0.01)                     | 0.00<br>(0.00)              | 0.01***<br>(0.00)           |
| No of household members aged 15-19        | 0.20***<br>(0.01)                     | 0.01***<br>(0.00)           | 0.04***<br>(0.01)           |
| No of household members aged more than 19 | 0.18***<br>(0.01)                     | 0.01***<br>(0.00)           | 0.04***<br>(0.00)           |
| <i>Caste</i>                              |                                       |                             |                             |
| Brahmin                                   | 0.05*<br>(0.03)                       | 0.00<br>(0.00)              | 0.01<br>(0.01)              |
| Upper Caste                               | 0.05***                               | 0.00                        | 0.00                        |

|                        |          |          |          |
|------------------------|----------|----------|----------|
|                        | (0.02)   | (0.00)   | (0.01)   |
| Other backward classes | 0.01     | -0.00    | -0.01    |
|                        | (0.02)   | (0.00)   | (0.01)   |
| Scheduled tribe        | 0.05**   | -0.00    | -0.00    |
|                        | (0.03)   | (0.00)   | (0.01)   |
| Dalits                 | -        | -        | -        |
| Mills                  | -0.17*** | -0.01*** | -0.07*** |
|                        | (0.02)   | (0.00)   | (0.01)   |
| Constant               | 7.22***  | 0.84***  | 2.12***  |
|                        | (0.02)   | (0.00)   | (0.01)   |
| Number of observations | 73,791   | 73,791   | 73,791   |
| R-squared              | 0.15     | 0.02     | 0.04     |

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Notes: Authors' elaboration from IHDS 2005 and 2011-12. Standard deviation in parenthesis. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1