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A microeconomic analysis of the determinants and effects of economic migration in India

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Abstract

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Given the rising frequency and intensity of internal economic migration in developing countries, it is vital to better understand the determinants and effects of this type of migration. To this extent, I analyze economic migration in India, at a household level. Firstly, I explore the determinants of economic migration and find results that are mostly consistent with existing theories and literature. Secondly, using a Heckman selection model, I analyze the predictors of remittance amounts received by households and find statistically significant results. Lastly, using a propensity score matching method, I estimate the effect of remittances on household expenditure. I find that household marginal propensity to consume remittances equals 0.587. I attempt to contextualize my findings by highlighting potential mechanisms that may explain the results obtained.

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Contents

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1 Introduction

Migration is an integral part of broader processes of development and economic growth. However, migration is commonly misrepresented as the 'antithesis' of development. This idea is grounded in the assumption that poverty, violence and other forms of misery are the main drivers of migration. Hence, development is shown to be the solution to these perceived migration problems. However, this assumption ignores the large body of evidence which indicates that people migrate because of development, rather than because of a lack of it. Studies have found that at least initially, development in the form of state formation, infrastructure development, demographic transitions, increasing education, and transformations from agrarian to industrial societies, coincides with increased internal migration (De Haas (2021)).

Development typically leads to increasing levels of migration because it simultaneously endows people with (1) the capabilities and (2) the aspirations to move (De Haas (2010); De Haas (2021)). More specifically, this means that in order for migration to happen, people need to possess the willpower (or aspirations), as well as considerable resources (or capabilities) that are required to move. Development, in the form of improved infrastructure and technology, tends to increase people's capabilities to migrate over greater distances. However, this in itself does not automatically lead to increased migration. Migration aspirations depend on people's more general life aspirations, as well as their perceptions of life 'here' and 'there' (De Haas (2021)). These perceptions tend to be subjective and are likely to change due to the influence of broader processes of structural change. These changes tend to include improved information channels, images, and lifestyles conveyed through education and media, which likely change people's perceptions of the 'good life' (De Haas (2021)). Moreover, once substantial migrant communities have settled in destination regions, social networks tend to effectively reduce the costs and risks associated with migration. These established migration channels can further increase migration, even if wage and employment opportunity gaps actually decrease in origin areas.

With increased development comes an increase in migration, as people have both the capabilities, as well as the aspirations to move for a better quality of life. In India, there have been improvements in economic opportunities, transport networks and communication technologies, over the past two decades, which in turn has facilitated large-scale internal mobility. People in India migrate for a number of reasons, such as better employment opportunities, higher education, or moving to join one's parents and/or an earning member of the family who had migrated earlier. The rate at which people migrate for such economic purposes is relatively high, with recent evidence indicating that the numbers are in fact

higher than previously estimated.

According to the 2001 and 1991 Census, the number of migrants who moved within the previous year for economic reasons were 2.2 million and 1.4 million respectively, while in 2011 the number was estimated to equal 3.5 million. Additionally, a recent Cohort-based Migration Metric (CMM) estimated that an average of 5-6 million people migrated annually between 2001 and 2011, resulting in an inter-state migrant population of about 60 million and an inter-district migrant population of 80 million. It also included the first-ever estimate of internal work-related migration, which using railway data for 2011-16, indicated an annual average flow of close to 9 million people between states. Both these estimates are greater than the annual average number suggested by Census reports.

While the importance and magnitude of internal economic migration in India is commonly recognized, studies have failed to provide insight into the determinants and potential effects of economic migration. Most researchers have not distinguished between economic and non-economic migration and have hence treated both alike in their analyses. In India, non-economic migration tends to mostly involve marriage migration by females. While this type of migration is the most prevalent form of migration in India, its determinants and effects differ drastically in comparison to those of economic migration. Given the complexity of economic migration, in terms of its determinants and effects, I believe it is essential to specifically study economic migration separate from other forms of migration. Thus, in this paper, I distinguish between economic and non-economic migration and focus my analysis on the former.

Additionally, migration in India has commonly been studied from the perspective of the out-migrant, with little to no focus on the household from which the individual out-migrates

(Bhagat et al. (2010); Kumari (2014); Keshri and Bhagat (2013)). These studies tend to underestimate the influence of household factors on migration and remittances. Given the widespread acceptance of the new economics of labor migration theory, I believe it is imperative to study migration from the perspective of the household. Hence, this paper presents a household level analysis of the determinants and effects of economic migration.

Moreover, the majority of studies that focus on migration and remittances in India have been concerned with trends and characteristics of migration (Lusome and Bhagat (2006); Chandrasekhar and Sharma (2015); Bhagat and Keshri (2020)). There have been very few papers that empirically analyze the determinants of economic migration in India. Additionally, while remittances are an essential part of household welfare systems in India, there are no studies that estimate the effect of remittances on household expenditure. Thus, in this paper, I use econometric tools such as a Heckman selection model and propensity score matching method to provide empirical estimations of the determinants as well as the effects of economic migration.

The rest of the paper proceeds as follows: Section 2 provides a review of the theories and literature regarding migration and remittances. Section 3 describes the data source. Section 4 outlines the specifications used to analyze the determinants and effects of migration and remittances. Section 5 presents the results as well as potential conceptual explanations for the results. Section 6 concludes. Tables are presented at the end of the paper.

2 Theories of migration

2.1 Neoclassical economics: macro theory

Neoclassical macro-level migration theories explain migration in the broader process of economic development (Lewis et al. (1954); Ranis and Fei (1961); Todaro (1969);Harris and Todaro (1970); Todaro (1980)). According to this theory, internal migration is caused by geographic differences in the supply of and demand for labor, mostly between the rural agricultural sector and the urban industrial sector. Rural regions with a large endowment of labor relative to capital are characterized by low equilibrium market wage, while urban regions with a limited endowment of labor relative to capital have a high market wage. This wage differential causes workers from the low-wage rural areas to move to the high-wage urban areas (Dustmann (2003)). This movement results in a decrease in the supply of labor and an increase in wages in capital-poor regions, while the supply of labor rises and wages decrease in capital-rich regions, leading to an equilibrium, where the wage differential reflects only the cost of movement.

2.2 Neoclassical economics: micro theory

In contrast to the macroeconomic model, the microeconomic model focuses on individual choice (Sjaastad (1962); Todaro (1969); Todaro (1977); Todaro (1980)). In this model, individual rational actors choose to migrate based on a cost-benefit calculation. Hence, internal migration is often conceptualized as a form of investment in human capital. These rational actors choose to migrate to a region where they can be highly productive, given

their skills. However, before they can earn higher wages associated with increased labor productivity, they must undertake certain investments, which include the material costs of traveling, the costs of subsistence while moving and looking for work, the effort involved in learning a new language and culture, the difficulty experienced in adapting to a new labor market, and the psychological costs associated with relocation (Massey et al. (1993)). Potential migrants estimate the costs and benefits of moving to alternative locations and migrate to where the expected discounted net returns are greatest over some time horizon (Borjas (2018)).

2.3   The new economics of labor migration

The "new economics of labor migration" (NELM) challenges several assumptions and derivations of neoclassical theory (Stark and Bloom (1985)). An insight of this theory acknowledges the collectivist nature of migration decisions. Shifting away from the neoclassical approach, the model highlights that migration decisions are not made by individual rational actors, but rather by larger units like families or households (Taylor (1999)). NELM indicates that households collectively diversify shared resources such as family labor to maximize expected earnings and minimize the risks associated with various market failures. Migration allows for these households to allocate labor to other markets where wages and employment are negatively or weakly correlated to origin region markets. This diversification helps reduce risk in the event that economic conditions in the origin area are unfavorable as households can depend on migrant remittances as a form of supplementary income.

In developed economies, households minimize risk to their income through insurance markets and government programs. However, in poor areas, these institutional systems tend to

be ineffective, inaccessible or absent. The lack of access to formal risk reduction strategies provides a strong incentive to households to diversify risk through migration. Furthermore, in developed economies, efficient banking systems allow for easy access of credit, providing households with the opportunity to acquire additional capital to make desired investments. However, credit markets in poor regions tend to be missing or highly inefficient, which severely limits investment opportunities for poor households. Since insurance programs and credit markets tend to be inaccessible or unaffordable in poor economies, there is pressure on households to send an individual to out-migrate.

Contrary to assumptions presented in the neoclassical approach, the new economics of labor migration elicits that income is not a homogeneous good. Therefore, for a household, the source of the income is of significance, and hence they have an incentive to invest family resources into activities that provide access to new income sources. While these activities may not guarantee higher total income, it offers the household the opportunity to minimize risks through diversification.

2.4   The perpetuation of internal migration

Massey et al. (1993) argues that the determinants that initiate migration may be quite different from those that perpetuate it across time and space. This implies that new conditions that arise in the course of migration begin to function as independent determinants themselves: migrant networks spread and the social meaning of work changes.

Migrant networks are a set of interpersonal ties that bind migrants, former migrants and non-migrants together through ties of kinship, friendship as well as shared origin region

(Massey et al. (1993)). These networks function as a collection of contacts between origin areas and destination regions. By providing a link between these places, migrant networks tend to reduce the costs and risks associated with migration. More specifically, through these networks, non-migrants in the origin places have access to social capital that can be utilized to help facilitate migration. By reducing the costs and risks associated with migration, migrant networks increase the likelihood of migration. Moreover, with each subsequent act of migration, these networks tend to grow larger and spread, which eventually helps migration become a self-perpetuating phenomenon.

Moreover, Massey et al. (1993) highlights that migration tends to sustain itself in other ways that make subsequent movement more likely over time. This process is known as a cumulative causation. Causation is argued to be cumulative in that each act of migration affects the social context within which subsequent migration decisions are made. Massey et al. (1993) explains that there are six socioeconomic factors that are potentially affected by migration in this cumulative manner: the distribution of income, the distribution of land, the organization of agriculture, culture, the regional distribution of human capital, and the social meaning of work.

2.5   Remittances

Migrant remittances, described as the 'new mantra' of economic development (Kapur (2003)), have assumed significant importance in the last two decades. Remittances are part of a private welfare system that transfers purchasing power from relatively richer to relatively poorer members of a family, or a community (Gupta et al. (2009)). They have been found to reduce poverty, smooth consumption, affect labor supply, provide working capital, and have

multiplier effects through increased household spending (Adams (2006); Rapoport and Docquier (2006); Acosta et al. (2009); Gupta et al. (2009); Combes and Ebeke (2011)). With increasing international and internal migration, remittances are an 'important and stable source of external development finance' for households in origin regions (Ratha (2003)), reducing transient poverty and at times even structural poverty (Kapur (2003)). Adams Jr and Page (2005) find that remittances can often be a more effective instrument for income redistribution, poverty reduction and economic growth than large, bureaucratic development programs or development aid.

Remittances commonly seem to be used to finance consumption, or investment in human capital, such as education, health, and better nutrition (Adams Jr and Cuecuecha (2013)). Combes and Ebeke (2011) found that migrant remittances to Ghana are counter-cyclical, and are effective in helping smooth household consumption, and welfare over time. Similarly, Adams Jr and Page (2005) found that remittances significantly relieved poverty among the "poorest of poor households." Another study conducted by Barajas et al. (2009) suggests that remittances that raise the consumption levels of rural households might have a significant multiplier effect, as they are more likely to be spent on domestically produced goods. Some studies (Edwards and Ureta (2003); Bansak and Chezum (2009)) have also found positive effects of remittances on human capital formation.

Remittances have emerged as the least unstable source of financial flows for regions afflicted by "shocks" and constitute an important source of insurance for many poor households. Remittance flows tend to be more stable than private capital flows, which exhibit strong herd like behavior, amplifying the boom-bust cycles in many emerging markets (Kapur (2003)). Consequently, remittances can be viewed as a self-insurance mechanism for poor households in rural areas whereby migration helps diversify the household's sources of external finance.

This role is strengthened by the relatively low-risk correlation between the destination region of the out-migrant and the region of origin. Therefore, it is not surprising that remittances have emerged as a critical insurance mechanism for rural households that are highly dependent on agriculture.

3   Data

3.1   National Sample Survey 64th Round Employment & Unemployment and Migration Survey

In this paper, I use data from the "National Sample Survey (NSS) 64th Round Employment & Unemployment and Migration Survey", collected by the Ministry of Statistics and Programme Implementation. The NSS questionnaire on employment, unemployment and migration particulars collected information on household characteristics, employment status and migration particulars of household members and information on their out-migrants. Due to the lack of data available on out-migrants, this analysis is carried at the household level.

The survey covers 125,578 households across India and contains data on a range of socioeconomic variables. The data contains a binary variable to identify whether any former member of the household had migrated out of the household at any time in the past. It is important to note that only those persons who were members of the household at the time of their departure and are presently alive are considered. Any member who had migrated out in the past but returned to the household and is presently a member of the household was not considered an out-migrant. Additionally, the survey provides direct insight into

the reason for migration for every migrant. More specifically, the reasons for migration can be dichotomized as economic factors versus non-economic factors. I defined a migrant as an *economic migrant* if the reason of migration was any of the following: (1) in search of employment, (2) in search of better employment, (3) business, (4) to take up employment, (5) to take up better employment, (6) transfer of service/ contract, or (7) proximity to place of work. Contrastingly, I defined a migrant as a *non-economic migrant* if the reason of migration was any of the following: (1) marriage, (2) forced displacement, (3) acquisition of a house, (4) education, (5) migration of parent/ earning member of the house, or (6) other. Based on this distinction, I classified four types of households; economic migrant households, economic and non-economic migrant households, non-economic migrant households and non-migrant households. Additionally, from the sample, I removed households that only had an international migrant since this paper focuses on internal migration. After cleaning the data, I was left with 121,487 households for my analysis.

4 Methodology

4.1 Migration determinants

To identify the determinants of migration, I estimate the likelihood of a household sending a migrant as a function of household characteristics. Therefore, the linear regression of

migration determinants is as follows:

$$Y_{Mig} = (\beta_0 + \textbf{HhSize}\beta_1 + \textbf{HhSize}^2\beta_2 + \textbf{HhType}\beta_3 +$$

$$\textbf{HhSocialGroup}\beta_4 + \textbf{HhLandPossessed}\beta_5 + \textbf{HhHeadGender}\beta_6 +$$

$$\textbf{HhHeadAge}\beta_7 + \textbf{HhHeadAge}^2\beta_8 + \textbf{HhHeadEducation}\beta_9 +$$

$$\textbf{HhHeadPrincipalActivity}\beta_{10} + u_i) \tag{1}$$

The linear probability model is expressed as:

$$E(Y|\{X\}) = P(Y|\{X\}), \tag{2}$$

which can be rewritten as

$$P(Y_{mig} = 1|\{X\}) = (\beta_0 + \textbf{HhSize}\beta_1 + \textbf{HhSize}^2\beta_2 + \textbf{HhType}\beta_3 +$$

$$\textbf{HhSocialGroup}\beta_4 + \textbf{HhLandPossessed}\beta_5 + \textbf{HhHeadGender}\beta_6 +$$

$$\textbf{HhHeadAge}\beta_7 + \textbf{HhHeadAge}^2\beta_8 + \textbf{HhHeadEducation}\beta_9 +$$

$$\textbf{HhHeadPrincipalActivity}\beta_{10}). \tag{3}$$

In this paper, a household is defined as a group of persons 'normally living together' and 'taking food from a common kitchen.' Household size indicates the number of members in the household. Household type represents the primary income source for the household. Land possessed is a measure of land 'owned', 'leased in' and 'land neither owned nor leased in (i.e. encroached)' by the household but excludes land 'leased out'. Household head gender and age refer to the sex and age of the household head, respectively. Additionally, household head education represents the highest level of education attained by the household head.

Moreover, household head principal activity refers to the usual activity of the household head, with a reference period of 365 days preceding the date of survey.

While it is common to use a probit or logit model for binary outcome variables, the coefficients cannot be immediately interpreted and require additional steps to convert log odds coefficients into interpretable quantities. On the other hand, linear regression coefficients can directly be interpreted in terms of probabilities and is generally suitable when the mean of the outcome variable is between 0.2 and 0.8 (i.e. $0.2 \leq \bar{Y}_{mig} \leq 0.8$).

4.2   Determinants of remittance amount received

In this analysis, I seek to estimate the amount of remittance received by a household. The naive approach for doing so would require using a specification which would involve the regression of log remittance received by the household on a vector of explanatory variables including a dummy variable that is defined as $D = 1$ for remittance received and $D = 0$ otherwise. However, the problem with this naive model lies in the nature of the dummy variable. This specification treats the dummy variable D as exogenous when in fact D is endogenous. More specifically, there are likely many factors affecting whether a household receives remittances or not. Since the dummy variable is endogenous, it should be modeled directly; otherwise, the regression estimation of D will be biased.

To overcome the sample selection problem, I use a Heckman selection model to address sample bias. I present the general theoretical model and then lay out the specification used in this paper.

4.2.1 Heckman selection model

Heckman sample selection model involves two equations: (1) the regression equation considering mechanisms determining the outcome variable and (2) the selection equation considering a portion of the sample whose outcome is observed and mechanisms determining the selection process (Heckman (1979)). To model the sample selection process, a two equation model is used:

$$y_i = \mathbf{x}_i'\beta + \epsilon_i \tag{4a}$$

$$z_i^* = \mathbf{w}_i'\gamma + u_i \tag{4b}$$

where $\mathbf{x}_i$ is a vector of exogenous variables determining y_i, and $\mathbf{w}_i$ is a vector of exogenous variables determining the selection process or the outcome of z_i^*. The model also assumes that u_i and ϵ_i have a bivariate normal distribution with zero means and correlation ρ. The sample rule is that y_i is observed only when z_i^* is greater than zero. Thus, the model is as follows:

$$
\begin{aligned}
E(y_i \mid \text{when } y_i \text{ is observed}) &= E[y_i \mid z_i^* > 0] \\
&= E(y_i \mid u_i > -\mathbf{w}_i'\gamma) \\
&= \mathbf{x}_i'\beta + E(\epsilon_i \mid u_i > -\mathbf{w}_i'\gamma)
\end{aligned} \tag{5}
$$

Given the sample rule, the conditional expectation of the error term is (Greene (2003)):

$$E(\epsilon_i \mid u_i > -\mathbf{w}_i'\gamma) = \rho\sigma_\epsilon \cdot \frac{\phi(\mathbf{w}_i'\gamma)}{\Phi(\mathbf{w}_i'\gamma)}, \tag{6}$$

where $\phi(.)$ denotes the density and $\Phi(.)$ denotes the cumulative density function of the standard normal distribution. Thus, the conditional expectation of y_i can be rewritten as (Greene (2003))

$$E(y_i \mid \mathbf{x}'_i, z^*_i > 0) = \mathbf{x}'_i\beta + \rho\sigma_\epsilon \cdot \frac{\phi(\mathbf{w}'_i\gamma)}{\Phi(\mathbf{w}'_i\gamma)}. \tag{7}$$

By way of a probit model, the Heckman selection model estimates the inverse Mills ratio as

$$\lambda(\mathbf{w}'_i\gamma) = \frac{\phi(\mathbf{w}'_i\gamma)}{\Phi(\mathbf{w}'_i\gamma)}. \tag{8}$$

Therefore,

$$y_i \mid z_i* > 0 = E[y_i \mid z_i* > 0] + v_i \tag{9}$$

$$= \mathbf{x}'_i\beta + \rho\sigma_\epsilon \cdot \frac{\phi(\mathbf{w}'_i\gamma)}{\Phi(\mathbf{w}'_i\gamma)} + v_i. \tag{10}$$

This can be rewritten as

$$E[y_i|z_i = 1, \mathbf{x}_i, \mathbf{w}_i] = \mathbf{x}'_i\beta + \rho\sigma_\epsilon\lambda(\mathbf{w}'_i\gamma). \tag{11}$$

Using the above theoretical model, the specification I use in this paper is as follows:

$$\begin{aligned} Y_{RemitLevel} = {} & \beta_0 + \mathbf{HhSize}\beta_1 + \mathbf{HhType}\beta_2 + \\ & \mathbf{HhLandPossessed}\beta_3 + \mathbf{HhHeadGender}\beta_4 + \\ & \mathbf{HhHeadAge}\beta_5 + \mathbf{HhIncome}\beta_6 + u. \end{aligned} \tag{12}$$

In this specification, $Y_{RemitLevel}$ is the log of monthly remittance received per capita by the household. The household income variable is the total sum of income earned by members of the household. Since the data has no information on household assets, I use land possessed by the household as a proxy for family wealth. Additionally, the selection equation is

$$
\begin{aligned}
w_{RemitReceived} \ = \ & \gamma_0 + \textbf{HhSize}\gamma_1 + \textbf{HhType}\gamma_2 + \\
& \textbf{HhSocialGroup}\gamma3 + \textbf{HhLandPossesed}\gamma4 + \textbf{HhHeadGender}\gamma_5 + \\
& \textbf{HhHeadAge}\gamma_6 + \textbf{HhIncome}\gamma_7 + \textbf{HhHeadEducation}\gamma_8 + \\
& \textbf{HhHeadPrincipalActivity}\gamma_9 + \textbf{HhStateRegion}\gamma_{10} + \epsilon,
\end{aligned}
\tag{13}
$$

where $w_{RemitReceived}$ is a binary outcome for whether the household received remittance or not.

Since Heckman selection models should include at least one variable in the first stage that does not appear in the second stage (Sartori (2003)), I include state/region into my selection equation. This variable influences the probability of an observation appearing in the sample, but does not influence the ultimate dependent variable of interest in the second-stage equation. Similar to the state/region variable, the household social group, household head education and principal activity are likely to determine whether a household receives remittances, but are unlikely to influence the remittance amount received.

4.3 Effect of remittances on household expenditure

In this analysis, I look to estimate the effect of remittances on household expenditure. Since remittances were not received at random, households that received remittances and those

that didn't cannot be considered valid counterfactual. Hence, treatment effects cannot be estimated directly by comparing the consumption of the household groups. To estimate treatment effects of remittances, empirical studies have often adopted an instrumental variable (IV) regression framework. However, as mentioned by McKenzie and Sasin (2007) and Adams JR (2011), this approach requires the use of an instrumental variable strategy with a robustness that is highly sensitive to the quality of available instruments. In the context of this paper, I was unable to find a perfectly suitable instrument (i.e. a variable strongly correlated with the receipt of remittances and with no direct impact on household expenditure patterns).

Given these difficulties, I use an alternative approach. I carry out a propensity score matching (PSM) analysis, which helps estimate the effect of receiving treatment when random assignment of treatment is not possible. The main purpose of this PSM analysis is to estimate the average effect related to the receipt of remittances by matching remittance-receiving households (the treatment group) with households with similar characteristics that do not receive remittances (the control group). This method is now widely used as it helps reduce selection bias linked to the existence of observed differences in socioeconomic characteristics between recipient and non-recipient households (Cox-Edwards and Rodríguez-Oreggia (2009); Clément (2011)).

4.3.1 Propensity score matching

The propensity score matching method is estimated in two stages. The first stage involves regressing a logit model of the receipt of remittances (binary dependent variable) on observed socioeconomic variables (independent variables). The propensity score, which is defined as

the probability of receiving remittances conditional on the characteristics included in the model, are estimated from this first stage. The second stage involves matching households receiving remittances (treated households) with non-recipient households (control households) that have close propensity scores and are hence comparable households on the basis of observed characteristics. The average treatment effect (ATT) is given by the difference in expenditure patterns of the two matched groups. I will present the theoretical framework (Rosenbaum and Rubin (1983)) for estimating the average treatment effect (ATT) using the PSM approach.

Given that the treatment effect for household i measures the difference between the relevant outcome indicator with the treatment, and the relevant outcome indicator without the treatment, the average treatment effect is given by:

$$\Delta Y_i = E(Y_{i1}|D_i = 1) - E(Y_{i0}|D_i = 1), \tag{14}$$

where D_i is the dummy variable equal to 1 if household i received remittances and 0 is not, and Y_{i1} and Y_{i0} are the outcome variables describing household expenditure for household i conditional on the presence and absence of treatment, respectively.

While the post-treatment outcome is observed, the outcome value in the counterfactual (i.e. absence of treatment) state is not. Therefore, $E(Y_{i1}|D_i = 1)$ and $E(Y_{i0}|D_i = 0)$ are observed while $E(Y_{i1}|D_i = 0)$ and $E(Y_{i0}|D_i = 1)$ are not. The propensity score matching approach provides a potential solution to this by filling in the missing data for the counterfactual. More specifically, the propensity score matching method, which is based on the conditional independence assumption (CIA), states that the outcome in the untreated state is independent of treatment participation conditional on a particular set of observable char-

acteristics, denoted by X (Rosenbaum and Rubin (1983)). This can be expressed as:

$$(Y_{i0}, Y_{i1}) \perp D_i | X_i. \tag{15}$$

Hence, given X_i, the outcomes of control households can be used to approximate the counterfactual outcome of treated households in the absence of treatment. Thus,

$$E(Y_{i0}|D_i = 1, X_i) = E(Y_{i0}|D_i = 0, X_i). \tag{16}$$

Here, it is possible to condition participation on the propensity score denoted $P(X)$ rather than on observable characteristics X. Since, the propensity score represents the probability of treatment conditional on a vector of observable variables, it may be interpreted as the one-dimensional summary of the set of observable variables.

$$P(X_i) = Pr\{D_i = 1|X_i\} \tag{17}$$

The estimation of the counterfactual is expressed as:

$$E[Y_{i0}|D_i = 1, P(X_i)] = E[Y_{i0}|D_i = 0, P(X_i)]. \tag{18}$$

Therefore, the average treatment effect for household i is estimated by:

$$\Delta Y_i = E[Y_{i1}|D_i = 1, P(X_i)] - E[Y_{i0}|D_i = 0, P(X_i)]. \tag{19}$$

Once propensity scores are estimated from a logit model, a suitable matching estimator is selected in order to describe how control households relate to treated households. Thus, the average treatment effect (ATT) is (Rosenbaum and Rubin (1983)):

$$\Delta \overline{Y} = \frac{1}{T} \sum_{i=1}^{T} \left[Y_{i1} - \sum_{j=1}^{C} W(i,j) Y_{ij0} \right], \tag{20}$$

where Y_{i1} is the post-treatment outcome of the treated household i, Y_{ij0} is the outcome of the jth control household matched to the ith treated household, T is the total number of treated households, C is the total of number of control households, and $W(i,j)$ is a positive valued weight function.

In this paper, the dependent variable is a dummy variable that takes the value 1 when a household receives remittances and 0 if not. Since, the propensity scores are a one-dimensional summary of a set of socioeconomic characteristics, the selected variables must be suitable instruments for remittance receipts. This implies that covariates have to be chosen to avoid reverse causality with remittance receipts in the logit models (Caliendo and Kopeinig (2008)). Additionally, the explanatory variables in the logit regression must not influence household expenditure patterns other than through the remittances channel. Hence, the selected covariates relate to household characteristics such as household size, household type and land possessed as well as characteristics of the head of household such as sex, age, principal activity and education. Additionally, household income has been excluded as a covariate in the logit regression. This is as household income has a strong direct impact on expenditure patterns and not merely an indirect effect through the remittance channel, which could potentially create an endogeneity bias ((Caliendo and Kopeinig (2008))).

To find the effect of remittances on household expenditure, I estimate the regression of

monthly remittances received per capita on monthly consumption expenditure per capita. Moreover, household consumption expenditure is measured as the expenditure incurred by a household during a reference period. It also includes the imputed values of goods and services, which are not purchased but procured otherwise for consumption. Therefore, the expenditure value of a household includes expenditure on food, consumer goods and durables, as well on investment goods such as education, health and housing.

In this paper, I use the package *MatchIt* in R, using the optimal matching method, and ratio $= 1$ (Sekhon (2008)). Given that the dataset was large, in the context of PSM method, and that set of control households was far greater than the treated households, I was able to construct a balanced dataset with $18,172$ households.

5 Results

5.1 Migration determinants

In table 3, the coefficient on household size is statistically significant and negative. This implies that smaller households are more likely to send an individual to out-migrate. However, the estimate on household size squared indicates that beyond a certain household size (15 members), migration is more likely to occur with increases in household size. These results are significant and consistent with theory as well as previous empirical studies. This can potentially be explained since small households tend to have less diversified income streams, which results in higher risk to household income. Therefore, to diversify household income and hence reduce risk, the household send an out-migrant.

In general, I find that household type is a statistically significant predictor of out-migration. Compared to reference households (i.e. self-employed in non-agricultural labor (rural)), agricultural labor households (rural) and self-employed in agriculture households (rural), are both positively associated with sending an out-migrant. To self-insure against income risks associated with crop damage and crop price volatility, households can send members to other regions, where migrant income and thus remittances are uncorrelated to household income. Contrastingly, coefficients on self-employed (urban) and casual labor (urban) households relative to the reference group are negative and statistically significant, indicating that these households have a lower likelihood of sending an individual to out-migrate. This may be as individuals in urban areas are less motivated to migrate. This finding is consistent with literature as rural out-migration is the most prevalent form of internal migration in India. Additionally, since other (rural) and other (urban) households do not earn any income from economic activity, they are more likely to have an out-migrant, which is evidenced by the statistically significant positive coefficient.

Moreover, I find that relative to scheduled tribes (ST), scheduled castes (SC) and other backward castes (OBC) have a positive coefficient, indicating that these households are more likely to have an out-migrant. While STs and SCs are the two most disadvantaged groups (Maity (2017)), STs have remained largely isolated from the larger society; often living in remote, hilly and forested areas, which could explain their lack of migration. On the other hand, SCs and OBSs are relatively more assimilated in society. Often, SCs and OBCs face significant barriers to employment and education in their origin areas, and hence, these households are more likely to send an out-migrant, relative to the reference group.

Additionally, relative to households that possess less than 0.005 hectares, households with significant land holding have a higher likelihood of having an out-migrant. In both a rural as

well as urban context, land possessed is often a proxy for household wealth. Consistent with previous research, these results imply that individuals from wealthier households in rural regions are more likely to have an out-migrant.

Furthermore, I find that households with a male head are less likely to have an out-migrant. The regression results also find that household head age is positively correlated with the likelihood of having an out-migrant. As household heads get older, the household is likely to become more dependent on the next generation for household income. Thus, age is positively associated with the likelihood of sending an out-migrant. However, age squared has a negative coefficient. This could potentially be as household heads get older than a certain threshold, individuals are less likely to migrate out. This can be attributed to cultural factors in India where it is almost the norm for children to be in close proximity to aging parents. Moreover, relative to having an illiterate household head, higher education generally has a statistically significant positive coefficient. This is consistent with empirical studies which find a positive association between household head education level and likelihood of sending an out-migrant. Additionally, the coefficient on household head principal activity is generally statistically significant. In comparison to the reference group (i.e. self-employed in household enterprise), households that had heads engaged in household enterprise (as employer and employee) had a lower likelihood of having an out-migrant. Contrastingly, households that had the head unemployed or engaged in domestic activities had a statistically significant positive coefficient.

5.2 Determinants of remittance amount received

Table 1: Determinants of remittance amount received

	Dependent variable:
	log(Remittance received per capita)
Household size	−0.112***
	(0.005)
Household Type	
Agricultural labor (rural)	−0.286***
	(0.066)
Other labor (rural)	−0.162**
	(0.072)
Self-employed in agriculture (rural)	0.103
	(0.075)
Other (rural)	0.132*
	(0.073)
Self-employed (urban)	0.267***
	(0.082)
Regular wage earning (urban)	0.303***
	(0.071)
Casual labor (urban)	−0.113
	(0.080)
Others (urban)	0.737***
	(0.113)
Land Possessed	
0.005 - 0.01 hectares	0.023
	(0.035)
0.02 - 0.20 hectares	0.145***
	(0.038)
0.21 - 0.40 hectares	0.089*
	(0.046)
0.41 - 1.00 hectares	0.156***
	(0.049)
1.01 - 2.00 hectares	−0.010
	(0.060)
Greater than 2.00 hectares	0.198***
	(0.076)
Household Head Gender	
Male	−0.370***
	(0.041)
Household head age	−0.005***
	(0.002)
log(Monthly household income per capita)	0.323***
	(0.015)
Constant	4.696***
	(0.165)
Observations	61,843
ρ	−0.395
Inverse Mills Ratio	−0.445*** (0.067)

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

I find a negative coefficient on household size. As mentioned above, smaller households tend to pursue migration as a household income diversification strategy and may thus be more dependent on remittances.

Additionally, relative to households that are self employed in non-agricultural labor (rural), I find a statistically significant negative coefficient on households that are involved in agricultural labor. This is contrary to theoretical models that identify agricultural risks as pull factors for remittances. Moreover, urban households (i.e. self employed (urban), regular wage earning (urban), and other (urban)) have a positive coefficient, indicating that out-migrants from these households are more likely to remit higher values than compared to the reference group. Additionally, the other (rural) and other (urban) group represents households that do not earn any income from economic activities. Since these households have no income from economic activity, their dependence on remittances is likely higher, which explains the statistically significant positive coefficient.

In most cases, households with higher land possession are more likely to receive a greater remittance amounts. This could potentially be explained by two differing mechanisms. Firstly, theory suggests that migrants with a bequest motive are more likely to send greater sums of remittances if households are wealthy (i.e. own land). Secondly, in the context of rural agricultural areas, large land possession also require more capital for maintenance which could lead to a higher demand for remittances from the household.

Moreover, I find a statistically significant negative coefficient on male headed households. This is consistent with past research that finds that female headed households receive higher remittance amounts. In this dataset, female headed households, on average, had a 24% lower household income than male headed households. Given that on average female led

households have a lower income, remittance may be crucial to supplementing household income to help maintain household consumption and welfare. Additionally, of the 18,009 female led households, over 55% of the household heads were widowed, which further helps contextualise the findings.

In contrast to some empirical studies, I find a positive coefficient on household income. This implies that wealthier households receive larger remittances. While this is inconsistent with some literature, theories and contrasting research highlight that there are various situations of Pareto-improving exchanges that involve remittance. In these situations, it is assumed that remittances simply "buy" a variety of services such as taking care of the out-migrant's assets (e.g. land, cattle) or relatives (children, elderly parents) at home. The positive coefficient in this regression could be explained using this exchange mechanism, where wealthier families expect higher remittances for these services. Given this expectation, out-migrants may have an inelastic demand for these services and hence may be willing to remit higher sums. Additionally, bequest motives could also contribute to a migrant's decision to send larger remittances.

5.3 Effect of remittances on household expenditure

Table 2: Effect of remittances received on household expenditure

	Dependent variable:	
	(Expenditure per capita)	log(Expenditure per capita)
	(1)	(2)
Remittance received per capita	0.587***	
	(0.014)	
log(Remittance received per capita + 1)		0.034***
		(0.002)
Constant	916.666***	6.624***
	(8.328)	(0.006)
Observations	18,174	18,174
R²	0.088	0.023
Adjusted R²	0.087	0.023
Residual Std. Error (df = 18172)	1,059.998	0.610
F Statistic (df = 1; 18172)	1,743.338***	432.093***

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

Using propensity score matching, I was able to construct a balanced dataset to find the average treatment effect of remittances on household expenditure. In accordance with literature, I find a statistically significant positive relation between remittances received and household expenditure. The coefficient obtained indicates that a 1 rupee increase in remittance received per capita results in a 0.587 rupee increase in household expenditure per capita, ceteris paribus. This coefficient represents the marginal propensity to consume remittances, and is consistent with estimates from other researchers (Adams Jr (1998); Zarate-Hoyos

(2004); Adams Jr and Cuecuecha (2010); Barai (2012); Shrestha (2017)). Additionally, using a log-log transformation, I find that a 1 percent increase in remittance received per capita increases household expenditure per capita by 0.034 percent, all else constant. These findings contribute to the wealth of literature that indicates that remittances are generally spent on consumption and investment necessities - food, clothing, medicine and education - which helps improve household welfare by supporting a higher level of consumption than would otherwise be possible. While there are various studies that estimate the effect of remittances on household expenditure composition, there remains limited literature on the causal effect of remittances on household expenditure.

6 Conclusion

In conclusion, I believe the findings of this paper contribute to understanding internal migration in India more clearly. This paper utilizes econometric tools to provide insight into various mechanisms that can explain the determinants of internal migration and its effect in India. Additionally, I believe by focusing exclusively on economic migrants, I have been able to provide significant insight into the labor migration process in India. As mentioned above, marriage migration is certainly significant in the context of migration in India; however, I believe there must exist a dichotomy between economic and non-economic migration to build a more intricate and accurate framework to explain economic migration. To my knowledge, this is the first paper that analyzes NSS data with a pure focus on economic migration.

Firstly, I find variables that determine whether a household is likely to send an individual to out-migrate. Most coefficients obtained are statistically significant and hence provide

insight on household factors that influence economic migration. The findings presented in this paper are mostly consistent with past literature. I find that agricultural households are more likely to send an out-migrant. This reflects the new economics of labor migration model sufficiently well since theory suggests that migration is often pursued by agricultural households as a risk reduction strategy. Moreover, the results also contribute to research that indicates that relatively wealthy households are more likely to send an out-migrant. Since migration tends to have significant costs and risks attached to it, individuals from the poorest and most vulnerable households are often unable to move, representing a form of involuntary immobility.

Secondly, the model presented in this paper helps identify the variables that determine the amount of remittance received by a household. By employing a Heckman selection model, I control for any sample selection bias. This technique helps provide more accurate estimations on the variables that affect the level of remittance received by a household. Most of the results from this paper are consistent with literature. Nonetheless, I was surprised to see the positive coefficient on the household income variable. While wealthier households are likely to be less dependent on remittances as a source of household income, there could potentially exist expectations of higher remittances or even informal contractual agreements between the out-migrant and the household.

Lastly, by utilising a propensity score matching approach, I am able to estimate the treatment effect of remittances on household expenditure. Given how broadly expenditure is defined, expenditure can be an accurate proxy for household welfare. I find a statistically significant positive coefficient, indicating that remittances positively affect household expenditure. Based on my research, I believe that this is the first paper to estimate the effect of remittances on household expenditure in India. These findings are consistent with previous

empirical studies that highlight the role of remittances in household welfare. These findings further contribute to the evolving literature regarding the nexus between migration and welfare.

7 Tables

Table 3: Determinants of migration

	Economic Migrant	Non-Economic Migrant	Migrant
	Dependent variable:		
	(1)	(2)	(3)
Household size	−0.018***	−0.023***	−0.017***
	(0.001)	(0.001)	(0.002)
Household size squared	0.001***	0.001***	0.001***
	(0.0001)	(0.0001)	(0.0001)
Household Type			
Agricultural labor (rural)	0.015**	0.007	0.039***
	(0.007)	(0.007)	(0.008)
Other labor (rural)	−0.050***	0.007	−0.016*
	(0.008)	(0.007)	(0.008)
Self-employed in agriculture (rural)	0.063***	−0.007	0.041***
	(0.005)	(0.005)	(0.006)
Other (rural)	0.135***	−0.008	0.118***
	(0.007)	(0.006)	(0.007)
Self-employed (urban)	−0.043***	−0.034***	−0.049***

	(0.005)	(0.005)	(0.006)
Regular wage earning (urban)	−0.001	−0.047***	−0.011
	(0.007)	(0.007)	(0.008)
Casual labor (urban)	−0.076***	−0.015*	−0.049***
	(0.009)	(0.008)	(0.009)
Others (urban)	0.164***	−0.048***	0.125***
	(0.009)	(0.008)	(0.009)
Social Group			
Scheduled castes	0.028***	0.074***	0.064***
	(0.004)	(0.004)	(0.005)
Other backward classes	0.016***	0.057***	0.044***
	(0.004)	(0.004)	(0.004)
Other	0.007*	0.069***	0.043***
	(0.004)	(0.004)	(0.004)
Land Possessed			
0.005 - 0.01 hectares	0.049***	0.027***	0.057***
	(0.004)	(0.003)	(0.004)
0.02 - 0.20 hectares	0.082***	0.029***	0.093***
	(0.004)	(0.004)	(0.004)
0.21 - 0.40 hectares	0.095***	0.041***	0.108***
	(0.005)	(0.004)	(0.005)
0.41 - 1.00 hectares	0.105***	0.059***	0.129***
	(0.005)	(0.005)	(0.005)
1.01 - 2.00 hectares	0.117***	0.094***	0.152***

	(0.006)	(0.005)	(0.006)
Greater than 2.00 hectares	0.147***	0.152***	0.206***
	(0.007)	(0.006)	(0.007)
Household Head Gender			
Male	−0.227***	−0.002	−0.212***
	(0.004)	(0.004)	(0.005)
Household head age	0.009***	0.008***	0.017***
	(0.001)	(0.001)	(0.001)
Household head age squared	−0.00003***	0.00001	−0.0001***
	(0.00001)	(0.00001)	(0.00001)
Household Head Schooling			
Literate without any schooling	0.012	−0.006	0.017*
	(0.009)	(0.009)	(0.010)
Below primary	0.015***	−0.007*	0.008*
	(0.004)	(0.004)	(0.005)
Primary	0.017***	0.005	0.017***
	(0.004)	(0.004)	(0.004)
Upper primary	0.019***	−0.008**	0.012***
	(0.004)	(0.004)	(0.004)
Secondary	0.025***	0.00003	0.020***
	(0.005)	(0.004)	(0.005)
Higher secondary	0.034***	0.003	0.023***
	(0.006)	(0.005)	(0.006)
Diploma	−0.007	0.008	−0.005

	(0.010)	(0.009)	(0.011)
Graduate	0.031***	−0.015***	0.015**
	(0.006)	(0.005)	(0.006)
Postgraduate and above	0.031***	−0.002	0.014
	(0.009)	(0.008)	(0.010)
Household Head Principal Activity			
Employer in household enterprise	−0.024**	0.030***	−0.005
	(0.010)	(0.009)	(0.010)
Employed in household enterprise	−0.012	0.051**	0.039
	(0.023)	(0.021)	(0.025)
Wage employee	−0.071***	−0.004	−0.072***
	(0.006)	(0.006)	(0.007)
Casual wage labor	0.005	−0.021***	−0.024***
	(0.006)	(0.006)	(0.007)
Unemployed	0.057**	0.072***	0.097***
	(0.026)	(0.024)	(0.027)
Attended educational institution	−0.179***	0.085***	−0.094***
	(0.015)	(0.014)	(0.016)
Attended domestic duties	0.139***	0.020***	0.120***
	(0.007)	(0.007)	(0.008)
Rentier	0.086***	0.030***	0.071***
	(0.007)	(0.007)	(0.008)
Unable to work (disability)	0.007	0.006	0.019
	(0.012)	(0.011)	(0.012)

Others	−0.026***	−0.022***	−0.047***
	(0.009)	(0.008)	(0.009)
Constant	0.078***	−0.193***	−0.120***
	(0.015)	(0.013)	(0.016)
Observations	121,440	121,440	121,440
R^2	0.168	0.115	0.196
Adjusted R^2	0.168	0.114	0.196
Residual Std. Error (df = 121398)	0.417	0.382	0.441
F Statistic (df = 41; 121398)	598.791***	383.930***	722.580***

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

Table 4: Household Type

	Economic Migrant Household	Economic and Non-Economic Migrant Household	Non-Economic Migrant Household	Non-Migrant Household
Self employed in non-agriculture	7.24	8.45	9.66	9.37
Agricultural Labor	14.32	11.33	14.77	15.13
Other labor	4.38	3.86	7.60	8.47
Self employed in agriculture	27.49	34.99	27.03	19.12
Other (Rural)	15.84	14.43	7.89	7.15
Self Employed	9.49	10.04	14.44	15.15
Regular Wage/salary earning	9.64	7.51	11.90	17.57
Casual labor	2.30	1.65	3.83	5.23
Other (Urban)	9.31	7.74	2.88	2.81

n = 121,487

Table 5: Household Head Gender

	Economic Migrant Household	Economic and Non-Economic Migrant Household	Non-Economic Migrant Household	Non-Migrant Household
Female	32.26	21.65	11.67	8.32
Male	67.74	78.35	88.33	91.68

n = 121,487

Table 6: Household Social Group

	Economic Migrant Household	Economic and Non-Economic Migrant Household	Non-Economic Migrant Household	Non-Migrant Household
Scheduled Tribes	16.09	10.41	10.70	14.69
Scheduled Caste	16.35	15.82	17.61	17.18
OBC	37.29	38.04	37.50	36.75
Other	30.27	35.74	34.18	31.38
n = 121,487				

Table 7: Household Land Possessed

	Economic Migrant Household	Economic and Non-Economic Migrant Household	Non-Economic Migrant Household	Non-Migrant Household
Less than 0.005 Hectares	16.39	13.45	18.01	29.39
0.005-0.01 Hectares	21.35	20.38	21.85	23.84
0.02-0.2 Hectares	19.49	16.07	16.87	15.46
0.21-0.40 Hectares	12.00	10.54	10.07	9.40
0.41-1.00 Hectares	15.65	16.03	14.49	11.32
1.01-2.00 Hectares	9.54	12.97	10.61	6.93
Greater than 2.00 Hectares	5.58	10.55	8.10	3.65
n = 121,487				

Table 8: Household Head Education

	Economic Migrant Household	Economic and Non-Economic Migrant Household	Non-Economic Migrant Household	Non-Migrant Household
Not literate	36.77	39.10	37.36	29.30
Literate without school	1.97	1.67	1.95	1.65
Below primary	10.15	10.36	10.20	10.11
Primary	13.08	13.27	13.88	14.23
Upper Primary	14.15	11.81	12.93	16.12
Secondary	10.08	9.86	10.21	11.20
Higher Secondary	4.99	5.12	4.63	5.96
Diploma	0.96	1.26	1.35	1.77
Graduate	6.20	5.53	5.74	7.44
Postgraduate and above	1.66	2.02	1.74	2.23
n = 121,487				

Table 9: Household Head Usual Principal Activity

	Economic Migrant Household	Economic and Non-Economic Migrant Household	Non-Economic Migrant Household	Non-Migrant Household
Own account worker in household enterprise	39.17	43.66	44.80	40.45
Employer in household enterprise	1.22	2.40	2.23	1.44
Employed in household enterprise	0.29	0.44	0.52	0.18
Wage employee	11.71	8.69	14.46	22.86
Casual wage labor	17.53	12.38	19.68	25.33
Unemployed	0.29	0.20	0.22	0.20
Attended educational institutions	0.21	0.21	0.07	1.38
Attended domestic duties	14.63	9.55	4.55	2.45
Pensioners	11.13	14.85	7.24	2.92
Unable to work (disability)	1.29	2.10	2.17	0.88
Others	2.53	5.52	4.07	1.93
n = 121,487				

Table 10: Descriptive Statistics

	Economic Migrant Household		Economic and Non-Economic Migrant Household		Non-Economic Migrant Household		Non-Migrant Household	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Household head age	48.92	13.13	57.00	12.42	52.99	12.08	42.61	12.76
Household size	4.49	2.29	4.47	2.80	5.06	2.63	4.51	2.17
Household income per month	5368.55	6781.20	5683.67	7392.63	5801.13	6789.45	5745.00	16148.36

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