On the Role of Social Comparisons in Shaping Migrants' Remittance Behavior: Theory, and Evidence from China

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Chapter 3

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3.1 Introduction

In many cases, the remittances sent by migrants are an important correlate of migration. Just as it is intriguing to find out why people decide to migrate and what determines the timing of their migration, it is revealing to explain why migrants remit (send money home) and what influences the size of their remittances. The articles on the reasons for sending remittances by Lucas and Stark (1985) and by Stark and Lucas (1988) have inspired a large empirical literature that has yielded insights about the motives for sending remittances and the roles that the earnings of migrants and the incomes of their families play in determining the sums remitted.

We now add to this literature by considering a variable that helps explain the variation in remittances between migrants: that in choosing how much to remit, a migrant is influenced by the remittance behavior of his reference group of migrants, namely the fellow migrants with whom he interacts and with whom he naturally compares himself. We construct a model in which a migrant's utility depends on his own consumption, on the remittances that he sends to his family back home, on his family's consumption, and on the difference between the mean level of the remittances of his reference group and his own level of remittances. Drawing on a utility function that incorporates these variables and satisfies standard assumptions, we show that at the optimum, a migrant's own remittances track the mean remittances of the migrant's reference group, and that the strength of this effect depends

on the closeness of the migrant's affiliation with his reference group. We test the model using data on Chinese rural-to-urban migrants across 15 major cities. The data are taken from the Longitudinal Study on Rural-to-Urban Migrants in China (RUMiC) project. Examining how a migrant's remittances compare to the remittances of fellow migrants in a given urban center who originate from the same home province and who share the same demographic characteristics, we find support for the model's key prediction: the remittance behavior of a migrant is influenced by the remittance behavior of fellow migrants.

Economists and others have done a considerable amount of empirical work on the importance of social interactions and comparisons with others for individual behavior.[1] One insight from this body of work is that comparisons with those who are "doing better" yield strong effects, whereas comparisons with those who are "doing worse" are either not made or, if they are made, barely influence behavior; in other words, "relative deprivation" affects behavior substantially, "relative satisfaction" hardly at all.[2] Indeed, relative deprivation, defined as the dismay sensed by an individual from a comparison of his income, consumption, or wealth with higher incomes, higher levels of consumption, or greater wealth of others who constitute the individual's reference group, is known to be a statistically significant explanatory variable of migration behavior. Research conducted three decades ago on the role of relative deprivation as a cause of migration from rural Mexico to the US finds that relative deprivation increases the probability that the labor time of household members will be allocated to migration (Stark and Taylor, 1989). Several more recent studies also demonstrate the significance of relative deprivation as an explanatory variable of labor migration in a wide range of countries: Mexico (Quinn, 2006), Poland (Stark et al., 2009), India (Czaika, 2011), Indonesia (Basarir, 2012), Uganda (Jagger et al., 2012), United States (Flippen, 2013; Vernazza, 2013), Germany (Hyll and Schneider, 2014), and Tanzania, Ethiopia, Malawi, Uganda, and Nigeria (Kafle et al., 2020).

Research on topics other than labor migration reveals that social comparisons have important influence on individual behavior in a wide range of spheres including savings decisions, substance use, academic performance, and social insurance choices. For example, Duflo and Saez (2002) report that the level of participation by employees in the retirement savings scheme of a large university is strongly affected by that of other members of the same

[1]Soetevent (2006) surveys empirical approaches for identifying social interaction effects in a number of areas. Several overviews are in Benhabib et al. (2011).

[2]A brief review of economics writings on comparisons with others and of evidence that trailing behind comparators is stressful is in Stark (2013).

department. Argys and Rees (2008) find that middle- and high-school females whose classmates are on average older than them are more likely to use marijuana, alcohol, or tobacco in comparison with those whose classmates are on average younger than them. Carrell et al. (2009) observe strong "peer effects" on the performance of college freshmen when the peers are fellow students with whom the freshmen have interacted over a substantial period. Lyle (2009) shows that the performance of high-ability peers accounts for most of the positive effect on the individual academic performance of cadets in a military academy. Mugerman et al. (2014) exploit within-department variation of peer groups in a large company and conclude that savings decisions are strongly affected by the savings choices of co-workers of the same ethnic group. Markussen and Røed (2015) who study how social insurance claims are spread among neighbors and former schoolmates find that there are significant local "peer effects" both in the overall use of social insurance and in the propensity to use one particular social insurance program rather than another.

Applying a new model of social comparisons to remittance behavior amounts to a meaningful contribution.[3] The results obtained influence the measurement and design of surveys aimed at assessing migrant behavior and on the formation of policies targeted at the integration of migrants and their remittances.

In the remainder of this chapter we proceed as follows. In Section 3.2 we model the remittance decision of a migrant. In Sections 3.3, 3.4, and 3.5 we test the theoretical model using data on rural-to-urban migrants in China. In Section 3.6 we conclude.

3.2 Analytical considerations

Let $Y > 0$ be a migrant's income; let R, such that $Y > R \geq 0$, be the remittances sent by the migrant to his family;[4] let $F > 0$ be the

[3]Chort et al. (2012), and Fenoll and Kuehn (2018) consider roles of migrant networks in the determination of remittance outcomes, yet the perspectives in those two studies are quite different from ours. Chort et al. view networks as an instrument used by households in the home country to influence the level of remittances by migrant members. Fenoll and Kuehn do not explicitly model the remittance behavior of individual migrants, let alone incorporate comparisons of migrants with fellow migrants in the city of destination. In addition, those studies do not examine the asymmetric manner in which a migrant's reference group in the migrant's city of destination influences a migrant's remittance behavior nor, for that matter, heterogeneity in the influence of a migrant's reference group on that behavior. Here we present a new behavioral model, which we subsequently test, drawing on a novel, longitudinal data set.

[4]The assumption that $R \geq 0$ is aimed at excluding the possibility of negative remittances (namely the possibility that the migrant is financially supported by his family back home), because such a situation is incompatible with the migration setting considered here.

pre-remittance income of the migrant's family; and let $\bar{R} \geq 0$ be the mean remittances sent by fellow migrants with whom the migrant compares himself. The migrant has information about the value of $\bar{R}$ and regards it as a group remittance norm.[5] We assume that the group is large enough for the effect of a change in a single migrant's remittances on the group's mean remittances to be negligible. This assumption overrules a "reflection" concern that it is difficult to distinguish between the effect of the remittance behavior of fellow migrants on the remittance behavior of an individual migrant and the effect of the remittance behavior of an individual migrant on the remittance behavior of fellow migrants. In our empirical inquiry we use panel data techniques in order to estimate the reference group effect of interest independently of reflection concerns or other sources of potential bias due to unobserved heterogeneity.

Consider a migrant who chooses the amount he remits so as to maximize his utility. Let the migrant's utility depend positively on his own consumption in his destination country or city, which is $Y-R$, on his family's income (a proxy for the family's consumption) in the family's home country or province, F, which, when supplemented by the migrant's remittances, is $F+R$, and on adherence to the remittance standard or norm of the migrant's reference group. As already noted in the Introduction, the received empirical evidence informs us that upward comparisons matter for utility and, hence, it is these comparisons that affect individuals' behavior. Consequently, the part of the utility function that is related to adherence to the remittance norm is present only for migrants whose remittances are lower than the mean remittances of their reference group. Additionally, we assume that $Y > \bar{R}$, namely we consider a migrant who, should he so choose, can adhere to the remittance norm.

Because consumption is determined by the amount of income as specified in the preceding paragraph, we represent the migrant's utility by the function $U(Y, F, R, \bar{R})$. This function is assumed to satisfy standard properties and to fulfill the condition

$$\frac{\partial^2 U(Y, F, R, \bar{R})}{\partial R \partial \bar{R}} > 0 \tag{3.1}$$

for $R < \bar{R}$. The meaning of (3.1) is that for a migrant who trails behind the remittance norm of his reference group, the marginal utility from sending

[5]In some contexts, a "norm" is an enforceable standard. Here, it is used to refer to behavior that a migrant wishes to emulate for social reasons.

remittances increases when the norm increases. This link arises because the migrant seeks to adjust his behavior to the behavior of his fellow migrants. A migrant facing the group remittance norm aims not only to remit, but also to align the amount he remits with that of members of his group.

In the migrant's utility function, there is an obvious tension between his own consumption, remittances used to support the family's consumption, and adherence to the group norm. In particular, increased remittances reduce his own consumption but confer satisfaction from narrowing the gap with the group norm or from meeting it.

Additionally, we assume that the migrant's marginal utility from sending remittances increases when his income rises:

$$\frac{\partial^2 U(Y, F, R, \bar{R})}{\partial R \partial Y} > 0 \tag{3.2}$$

for every R. This assumption aligns with intuition because the higher the migrant's income, the easier (the more pleasing) it is for him to share his income with his family as his basic consumption needs are more likely to be met. We also assume that the marginal utility from sending remittances decreases in line with any increase in the pre-remittance income of the migrant's family because when the family's income is higher, remittances become less valuable or are needed less:

$$\frac{\partial^2 U(Y, F, R, \bar{R})}{\partial R \partial F} < 0 \tag{3.3}$$

for every R.

The migrant maximizes his utility with respect to the remittances that he sends to his family, taking the remittance norm $\bar{R}$ as given. Dropping temporarily the two income arguments Y and F from $U(\cdot)$ because they are independent of the remittance amount, the migrant's remittances which maximize his utility, denoted by R^*, has to satisfy the first order condition for a maximum

$$\frac{\partial U(R^*, \bar{R})}{\partial R} = 0 \tag{3.4}$$

and the second order condition for a maximum

$$\frac{\partial^2 U(R^*, \bar{R})}{\partial R^2} < 0. \tag{3.5}$$

We consider R^* as a function of $\bar{R}$, and by applying the implicit function theorem to condition (3.4) under the assumption that $R < \bar{R}$ (as per (3.1)), we get that

$$\frac{dR^*}{d\bar{R}} = -\frac{\partial^2 U(R^*, \bar{R})}{\partial R \partial \bar{R}} / \frac{\partial^2 U(R^*, \bar{R})}{\partial R^2} > 0, \tag{3.6}$$

which suggests that when the migrant falls behind the remittance norm $\bar{R}$, an increase of $\bar{R}$ will encourage him to increase his own remittances. Thus, even when the migrant's own income remains unchanged and, in particular, even when it does not increase, and even when the income of the migrant's family remains unchanged and, in particular, even if it does not decrease, the migrant will seek to remit more when the mean remittances of the group increases.

Additionally, when the two income arguments Y and F are brought back into $U(\cdot)$, then, by means of a similar procedure and drawing on assumptions (3.2) and (3.3), respectively, we see that $\frac{dR^*}{dY} > 0$ and $\frac{dR^*}{dF} < 0$: the utility-maximizing remittance amount increases with the income of the migrant and decreases with the pre-remittance income of the migrant's family.

We present next a specific form of a migrant's utility function:

$$U(Y, F, R, \bar{R}) = \alpha \ln(Y - R) + \ln\left[\beta(F + R) - \gamma \max\{\bar{R} - R, 0\}\right], \tag{3.7}$$

where α, β, and γ are positive parameters that represent the importance of the respective arguments in the migrant's utility function: α is the weight assigned by the migrant to the utility from his own consumption; β is the weight assigned by the migrant to the utility from his family's post remittance income; and γ is his preference parameter for adhering to the group norm. In order to avoid having a meaningless function in (3.7), we also assume that

$$\beta(F + R) - \gamma \max\{\bar{R} - R, 0\} > 0, \tag{3.8}$$

although, drawing on the assumption $Y > \bar{R}$, we will shortly show that condition (3.8) is satisfied for any R that constitutes an optimal choice of the migrant.

For migrants whose remittances are the same as or higher than the group remittance norm, namely for migrants for whom $R \geq \bar{R}$, the term $\max\{\bar{R} - R, 0\}$ in the utility function defined in (3.7) is equal to zero, and (3.8) is satisfied. Given that upward comparisons matter for a migrant's behavior, migrants for whom $R \geq \bar{R}$ do not need to bother to adhere to the

group norm because their remittances already satisfy the norm. As a result, their utility function can be simplified to

$$U(Y, F, R, \bar{R}) = \alpha \ln(Y - R) + \ln[\beta(F + R)]. \tag{3.9}$$

These migrants maximize their utility with respect to the remittances that they send such that the following conditions for a maximum hold:

$$\frac{\partial U(Y, F, R^*, \bar{R})}{\partial R} = -\frac{\alpha}{Y - R^*} + \frac{1}{F + R^*} = 0 \tag{3.10}$$

and

$$\frac{\partial^2 U(Y, F, R^*, \bar{R})}{\partial R^2} = -\frac{\alpha}{(Y - R^*)^2} - \frac{1}{(F + R^*)^2} < 0. \tag{3.11}$$

Given the assumption of a positive α, (3.11) is always satisfied. Then, from (3.10), the utility-maximizing amount of remittances sent by these migrants is

$$R^* = \frac{Y - \alpha F}{1 + \alpha}, \tag{3.12}$$

and we assume that $Y > \alpha F$.[6]

Assuming that the remittances sent cannot exceed the income earned means that for the optimal level of remittances determined in (3.10), it needs to hold that

$$\frac{Y - \alpha F}{1 + \alpha} < Y, \tag{3.13}$$

which is satisfied for $Y > 0$ and $F > 0$.

From (3.12) it follows that the optimal remittances of a migrant who has already adhered to the group's remittance norm increase with the migrant's own income and decrease with the pre-remittance income of the migrant's

[6]Because negative remittances are impossible (see footnote 4), we infer from (3.12) that the migrant will not remit when $Y \leq \alpha F$, that is, when his family's income is high in comparison with his own income, and/or when his own consumption weighs heavily in his utility function (his α is large). In pursuing the analysis further, we assume that $Y > \alpha F$, meaning that we do not consider the possibility of zero remittances because such a possibility is incompatible with the migration setting studied here. This is so for two reasons: (i) when $R^* = 0$, migration does not confer what it was expected to deliver, namely it does not provide additional means to the family back home; (ii) because we consider the case of a migrant who satisfies the remittance norm ($R^* \geq \bar{R}$), having $R^* = 0$ would mean that this norm is equal to zero ($\bar{R} = 0$), so it might just as well be stated that a norm does not exist.

family, but are neutral to a change in the group norm (as long as $R \geq \bar{R}$). In the limit (F approaching Y/α), if the migrant's family has a large pre-remittance income, optimal remittances will be zero.

Given our interest in finding out how a group norm affects individual behavior, in the remainder of this section we focus on migrants whose remittances trail behind the group's mean remittances, that is, on migrants for whom $R < \bar{R}$ and who, consequently, seek to narrow the distance from/meet the group norm.

On the basis of (3.7), the utility function of a migrant for whom $R < \bar{R}$ is given by

$$U(Y, F, R, \bar{R}) = \alpha \ln(Y - R) + \ln[\beta(F + R) - \gamma(\bar{R} - R)]. \tag{3.14}$$

Then, the following two conditions need to be met for a utility-maximizing migrant for whom $R < \bar{R}$:

$$\frac{\partial U(Y, F, R^*, \bar{R})}{\partial R} = -\frac{\alpha}{Y - R^*} + \frac{\beta + \gamma}{\beta(F + R^*) - \gamma(\bar{R} - R^*)} = 0, \tag{3.15}$$

and

$$\frac{\partial^2 U(Y, F, R^*, \bar{R})}{\partial R^2} = -\frac{\alpha}{(Y - R^*)^2} - \frac{(\beta + \gamma)^2}{[\beta(F + R^*) - \gamma(\bar{R} - R^*)]^2} < 0. \tag{3.16}$$

The second order condition for a unique maximum given in (3.16) holds. Solving the first order condition in (3.15) for R^* yields the optimal level of remittances:

$$R^* = \frac{\alpha\gamma\bar{R} + (\beta + \gamma)Y - \alpha\beta F}{(1 + \alpha)(\beta + \gamma)}, \tag{3.17}$$

where, under the assumption pertaining to (3.12), namely under the assumption that $Y > \alpha F$, it surely follows that $R^* > 0$.

As R^* has to be smaller than Y, then drawing on (3.17) and upon rearrangement, it needs to hold that

$$Y + \frac{\beta(F + Y)}{\gamma} > \bar{R}. \tag{3.18}$$

Under the assumption that $Y > \bar{R}$, (3.18) is satisfied.

Because we consider the case in which a migrant falls behind the group norm, that is, the case of a migrant with $R^* < \bar{R}$, it follows that the optimal

level of remittances given in (3.17) also has to be smaller than $\bar{R}$, which, after rearrangement, implies that

$$\frac{(\beta+\gamma)Y-\alpha\beta F}{\beta(1+\alpha)+\gamma}<\bar{R}. \tag{3.19}$$

Whether condition (3.19) imposes a lower bound on $\bar{R}$ for which R^*, as given in (3.17), is defined depends on the sign of the term on the left-hand side of (3.19). Because it is assumed that $\bar{R}\geq 0$, (3.19) specifies a lower boundary of $\bar{R}$ only when the left-hand side term in (3.19) is non-negative. The denominator of the term on the left-hand side of (3.19) is positive. The numerator of this term is non-negative when $Y\geq\frac{\alpha\beta}{\beta+\gamma}F$. Therefore, when this last inequality holds, (3.19) places a binding boundary on $\bar{R}$ for which R^*, as given in (3.17), is defined. Then, if (3.19) is violated, that is, if $\bar{R}$ is smaller than the term on the left-hand side of (3.19), the optimal remittances are higher than the group norm, and the migrant's utility is not affected by comparison of his remittances with the amounts of remittances of fellow migrants.

Abstracting from the irrelevant case of $\bar{R}=0$, the preceding discussion can be summarized by specifying the interval of $\bar{R}$ for which R^* as presented in (3.17) is defined:

$$\bar{R}\in\left(\max\left\{\frac{(\beta+\gamma)Y-\alpha\beta F}{\beta(1+\alpha)+\gamma},0\right\},Y\right). \tag{3.20}$$

Next, we note that for $R=R^*$ as defined in (3.17) and $R^*<\bar{R}$, the condition in (3.8) is equivalent to

$$\frac{\beta(F+Y)+\gamma(Y-\bar{R})}{(1+\alpha)}>0, \tag{3.21}$$

which is satisfied if $Y>\bar{R}$.

Indeed, (3.17) reveals that $\frac{dR^*}{d\bar{R}}>0$ (recall (3.6)): the higher the group's mean remittances $\bar{R}$, the larger the optimal remittances R^*. The conditions $\frac{dR^*}{dY}>0$ and $\frac{dR^*}{dF}<0$ hold as well for the specification of the utility function (3.7), and this is so both for the case $R^*<\bar{R}$ (recalling (3.17)) and for the case $R^*>\bar{R}$ (recalling (3.12)).

The preference parameter for adhering to the group remittance norm, γ, plays a key role in informing us how a migrant whose remittances lag behind the remittance norm responds to changes in the group's reference level.

From (3.17), we see that

$$\frac{dR^*}{d\gamma} = \frac{\alpha\beta(\bar{R}+F)}{(1+\alpha)(\beta+\gamma)^2} > 0, \tag{3.22}$$

and following (3.17), that

$$\frac{d\left(\frac{dR^*}{d\bar{R}}\right)}{d\gamma} = \frac{\alpha\beta}{(1+\alpha)(\beta+\gamma)^2} > 0. \tag{3.23}$$

The relationships $\frac{dR^*}{d\gamma} > 0$ and $\frac{d\left(\frac{dR^*}{d\bar{R}}\right)}{d\gamma} > 0$ suggest that, other things held constant, the stronger the role that adherence to the group norm plays in shaping utility, the larger the optimal remittances, and the larger the response to a change in the group remittance norm. This observation has implications for heterogeneity across migrants whose preferences might be shaped by the intensity of their contact with other migrants. For example, adherence to the remittance norm may decline with the duration of residence at destination, or vary depending on the type of residence as, for example, if residing in employer-provided dormitory housing as compared to domestic residence in the housework sector.

In addition, a migrant's perception of the group norm matters for his adherence to the norm. The model as above assumes that this perception is shaped through observing the amounts remitted by fellow migrants. For example, when a migrant whose remittances are smaller than the mean remittances of his reference group sees that there is large variability in the remittances sent by his fellow migrants, he might infer that adherence to the norm is not all that strict, and may even question the very existence of a group norm. Such an inference could weaken the effect of the norm on his remittances. To this end, the following additional considerations can be brought to bear on the analysis.

We refer to a migrant who seeks to adhere to the group's remittance norm and for whom $R < \bar{R}$. Let σ serve as a gauge of the perceived strictness of the group's norm: when σ is large, the norm appears loose, and when σ is small, the norm is strict. Several definitions of σ are possible, such as the group-level coefficient of variation in remittances, and the range of remittances within the group. As an example: let $R_{\max}$ denote the largest remittance amount in the migrant's reference group, and let $R_{\min}$ denote the smallest remittance amount in the migrant's reference group. The range of the remittances, $\sigma \equiv R_{\max} - R_{\min}$, is then a measure of the variability in the amount of remittances in the migrant's reference group.

In order to incorporate the effect of variability of the amounts of remittances in a migrant's reference group on the migrant's utility, we modify the function defined in (3.7). Focusing on a migrant for whom $R < \bar{R}$, we represent the migrant's utility function as

$$U(Y, F, R, \bar{R}) = \alpha \ln(Y - R) + \ln\left[\beta(F + R) - \gamma\frac{\bar{R} - R}{1 + \sigma}\right]. \tag{3.24}$$

The utility-maximizing level of the migrant's remittances will then satisfy the following two conditions:

$$\frac{\partial U(Y, F, R^*, \bar{R})}{\partial R} = -\frac{\alpha}{Y - R^*} + \frac{\beta + \gamma\frac{1}{1+\sigma}}{\beta(F + R^*) - \gamma\frac{\bar{R} - R^*}{1+\sigma}} = 0, \tag{3.25}$$

and

$$\frac{\partial^2 U(Y, F, R^*, \bar{R})}{\partial R^2} = -\frac{\alpha}{(Y - R^*)^2} - \frac{\left(\beta + \gamma\frac{1}{1+\sigma}\right)^2}{\left[\beta(F + R^*) - \gamma\frac{\bar{R} - R^*}{1+\sigma}\right]^2} < 0. \tag{3.26}$$

The second order condition given in (3.26) is met. Upon rearrangement of the right-hand side equality in (3.25), we can express the optimal level of remittances as

$$R^* = \frac{\alpha\gamma\bar{R} + [\beta(1 + \sigma) + \gamma]Y - \alpha\beta(1 + \sigma)F}{(1 + \alpha)[\beta(1 + \sigma) + \gamma]}. \tag{3.27}$$

It follows that variability of the amounts of remittances in the migrant's reference group weakens the impact of the group norm on R^*: the larger the variability, the smaller the effect of an increase of the group norm in raising the migrant's remittances. Formally, from (3.27), we have that

$$\frac{dR^*}{d\bar{R}} = \frac{\alpha\gamma}{(1 + \alpha)[\beta(1 + \sigma) + \gamma]}, \tag{3.28}$$

and, thus,

$$\frac{d\left(\frac{dR^*}{d\bar{R}}\right)}{d\sigma} = -\frac{\alpha\beta\gamma}{(1 + \alpha)[\beta(1 + \sigma) + \gamma]^2} < 0. \tag{3.29}$$

In addition, and as could be expected intuitively, variability in the amounts of remittances has a negative overall effect on the optimal level of the migrant's remittances:

$$\frac{dR^*}{d\sigma} = -\frac{\alpha\beta\gamma(\bar{R} + F)}{(1 + \alpha)[\beta(1 + \sigma) + \gamma]^2} < 0.$$

3.3 The empirical approach

In this section we outline our approach to empirical testing of predictions of the model that we presented in the preceding section, using to that end RUMiC-based longitudinal data as discussed in Section 3.4.

Collecting terms from (3.17) and taking a linear approximation, the remittances of migrant i in destination city c at time period t whose reference group is g are given by

$$R^g_{ict} = \delta_1 \bar{R}^g_{-ict} + \delta_2 Y_{it} + \delta_3 F_{it} + \delta_4 X_{ict} + \varepsilon^g_{ict} \tag{3.30}$$

Thus, R^g_{ict} is the total remittances sent in the course of the preceding year, and $\bar{R}^g_{-ict}$ is the mean level of the remittances of the reference group of migrant i during year t.[7] The migrant's remittances depend also on his own income, Y_{it}, on his family's pre-remittance income, F_{it}, and on a vector of demographic characteristics of the migrant, X_{ict}, accounting for additional factors that influence the demand for and the supply of remittances. The key parameter of interest, δ_1, identifies how the migrant's remittances change in response to a change in the mean level of the remittances of other migrants in his reference group, g. The additional coefficients in (3.30), δ_2, δ_3, and δ_4, respectively, link the migrant's remittances with his income, with his family's pre-remittance income, and with his demographic characteristics. The farthest item on the right-hand side of (3.30), ε^g_{ict}, is the error term representing unobserved heterogeneity that varies by migrant, city, time period, and reference group.

Central to the empirical application is an appropriate definition of the reference group, g. The task involved is challenging: because we do not have direct information from the migrants on the identity of their comparators, we need to use a synthetic construction of the group of comparators. Following earlier writings that draw on ethnographic and sociological factors, we define a migrant's reference group as other migrants in the same city who share common demographic characteristics, and who face similar demands on their labor income. There is illuminating evidence that in their cities of destination, Chinese migrants form networks with migrants of the same gender and from the same provinces of origin (He and Gober, 2006; Zhang, 2006; Ngai, 2007; Su et al., 2018; Meng and Xue, 2020), and that they

[7] That is, for individual i in group g with n_g members, the $\bar{R}$ term in (3.30) represents the mean value of the remittances sent by all *other* migrants in the reference group, or $\bar{R}^g_{-i} = \frac{1}{n_g - 1} \sum_{j \neq i} R^g_j$. This representation avoids a mechanical reflection concern of including individual i's remittances on both the left-hand side and the right-hand side.

socialize with migrants in the same age group (Tang and Feng, 2015; Bernard et al., 2019). Specifically, we define a reference group as fellow migrants who in a given year reside in the same city, originate from the same home province, are of the same sex, and in the same age bracket out of three age brackets.[8] In Subsection 3.5.1 we consider other definitions of the reference group, discuss possible biases that could arise from misidentification, and conduct sensitivity tests that lend empirical support to the appropriateness of this characterization of reference groups.

Equations of the type of (3.30) that relate an individual's outcome (behavior) to a group mean are often encountered in writings on "peer effects" and pose several identification challenges (Bertrand et al., 2000; Epple and Romano, 2011). Chief among these are two concerns: that a positive estimate of δ_1 reflects a bias from factors omitted at the level of the individual, reference group, time, or city; and a reflection problem, where the level of remittances of the migrant and the migrant's reference group are determined simultaneously. It is worth noting that the potential biases caused by these concerns apply to all migrants. Therefore, neither omitted variables nor concerns about reflection generate the predicted asymmetry that the reference group norm influences only the remittance behavior of migrants whose remittances are lower than the remittances of their peers. That being said, in order to isolate the reference group effect of interest, we follow an approach similar to the one taken in writings on the "peer effect." Our empirical strategy is to look at a given set of migrants in two consecutive years and utilize panel data techniques to isolate the impact of the remittances of the reference group on migrant i while controlling for observed characteristics of the reference group and a series of fixed effects. This strategy is in line with the strategies of Hanushek et al. (2003) and Altonji and Mansfield (2018), with the added advantage that our demography-based definition of reference groups abstracts from concerns of endogenous peer-group formation. We thus end up estimating the following modified version of (3.30):

$$R^g_{ict} = \delta_1 \bar{R}^g_{-ict} + \delta_2 Y_{it} + \delta_3 F_{it} + \delta_4 X_{ict} + \delta_5 \bar{X}^g_{-ict} + \mu_t + \mu_i + \mu_c + e^g_{ict} \quad (3.31)$$

In comparison with the representation in (3.30), the representation in (3.31) explicitly controls for the mean characteristics of the other migrants in the reference group, $\bar{X}^g_{-ict}$, that are linked to the migrant's own remittances

[8] We define three age brackets: 15 to 29, 30 to 39, and 40 and above. This categorization helps in distinguishing between migrants from generations born in the 1980s and 1970s and migrants from generations born in the pre-reform period (Bernard et al., 2019).

through the coefficient δ_5. These characteristics also serve as proxies for unobserved differences across reference groups that may otherwise be correlated with $\bar{R}^g_{-ict}$ and cause bias to the estimate of δ_1 (Altonji and Mansfield, 2018). In addition, the representation in (3.31) incorporates a series of fixed effects at the year level, μ_t, and either at the individual level, μ_i, or at the city level, μ_c, so as to control for stable sources of observed and unobserved heterogeneity. The farthest item on the right-hand side of (3.31), e^g_{ict}, is the error term.

With the two-period panel data set that we employ, we also estimate models that are variants of (3.31), where we use the group's lagged remittances, $\bar{R}^g_{-ict-1}$, so as to guard against any contemporaneous correlation between the $\bar{R}$ term and the error term. When combined with reference group level controls and city fixed effects, the lag approach helps deflect concerns about reflection and omitted variables (Hanushek et al., 2003).

After adjusting for the migrant's income, the resources of the migrant's family, the demographic characteristics of the migrant, the reference group level factors, and fixed effects, any potential factor causing an upward bias on δ_1 in (3.31) would have to vary within a city over time in a manner that creates a positive correlation between the $\bar{R}$ term and the R term. Furthermore, such a factor would have to do this in a way that is consistent with the analytically predicted heterogeneity. If an omitted variable bias or a simultaneity of the $\bar{R}$ term and the R term were to drive our results, then it could be expected that estimates of δ_1 in (3.31) will be consistently positive, whereas the theoretical model predicts that δ_1 should be positive only for those who lag behind the reference norm, and vary both with the strictness of the group norm, and with a desire to adhere to the norm.

We next describe the data that we use and the general setting, and after that, we present our empirical results.

3.4 Data: Chinese rural-to-urban migrants

The analytical framework presented in Section 3.2 applies to both cross-border and internal migration. The data requirements for testing the predictions of the theoretical model are demanding: we need longitudinal information on the incidence and level of remittances by a migrant, on the migrant's reference group, on demographic characteristics of the migrant, on the migrant's income, and on the pre-remittance income of the migrant's family. Only a few surveys provide such representative cross-sectional data, and due to the inherent difficulty of identifying and tracking a mobile

population, an even smaller number of data sets exist that track migrants in a longitudinal design. Here we draw on one such study: the 2008 and 2009 Migrant Household Surveys (MHS) of the Longitudinal Study of Rural-to-Urban Migration in China (RUMiC).

Since the 1950s, the Chinese household registration system (*hukou*) has classified people into rural agricultural citizens and urban non-agricultural citizens. The distinction makes it difficult for people whose home town is rural to access state-provided services and formal employment opportunities in urban areas, thus creating dual, or segmented, labor markets in Chinese cities (Liu, 2005; Maurer-Fazio et al., 2015; Meng and Xue, 2020). In comparison to urban *hukou* holders who work in the primary market, rural-to-urban migrants work almost exclusively in the secondary market, where wages are lower, benefits are fewer, and legal employment protection is limited. As revealed by the RUMiC data, the migrants in China's cities work primarily in manufacturing, construction, and low-skill retail trade and service occupations.

Despite the obstacles, an estimated 240 million rural migrants live and work in urban centers, making labor migration within China the largest migration episode in history (NBS, 2018). About 90 percent of this migration is circular in nature (Taylor et al., 2003; Hu et al., 2011), with migrants maintaining close links to family and community members in the home locations where they are formally registered. Migrant remittances play a particularly important role in this context, where a legacy of Confucian traditions combines with incomplete formal safety nets and limited social services in rural sending communities to create social norms that encourage remittance behavior.

We make use of the publicly available 2008 and 2009 waves of the MHS, which contain detailed information on migrants and their families, as compiled by IZA and other institutions in 2014 (IZA, 2014).[9] The survey began in 2008 with a representative sample of approximately 5,000 migrants from 15 major Chinese cities. A "migrant" in the sampling frame is an individual who has a rural residence permit (*hukou*) but at the time of the survey lives in a city. Given the difficulty in identifying a representative sample of migrants, the RUMiC team conducted a pre-survey census of all the workplaces across randomly selected blocks within each

[9]Although the MHS includes nine waves that were completed up until 2016, only the first two waves (Wave 1 and Wave 2) were released for public use. In these files, geographical identifying information is restricted: whereas the migrants' home province is known, the migrants' home prefecture or home county are not.

city. Enumerators then randomly sampled migrants in each workplace and interviewed migrants and their family members living with the migrants in the city. For details on the sampling design, consult Kong (2010).

The MHS has already helped improve our understanding of the experience of migrants in Chinese cities (consult, for example, Meng and Manning, 2010; Meng, 2012; Akgüc et al., 2014; and Meng and Yamauchi, 2017). A series of papers using the 2008 cross section report on how migrants' sense of well-being depends on upward income comparisons (Akay et al., 2012) and on the decision to send remittances (Akay et al., 2014). The 2008 MHS data have also been used to highlight the role played by migrants' rural families in the determination of migrants' remittances (Akay et al., 2016).

RUMiC was designed to track and follow respondents for as long as they stay within the 15 target cities. Because of the mobile nature of a population of migrants, only approximately 35 percent of the migrants sampled in 2008 were re-interviewed in 2009, with the remainder returning to their home provinces or moving to work elsewhere (for details consult Kong et al., 2009). Although the attrition rate is substantial, when it comes to publicly available survey data, the existence of longitudinal individual level information on remittances, reference groups, and demographic characteristics is unique. This information plays a key role in identifying our empirical models. As in another inquiry that utilizes the longitudinal migrant sample in RUMiC (Meng and Xue, 2020), when interpreting our estimates we are conscious of the possibly selective nature of the population groups studied.

In Table 3.1 we present descriptive statistics of our migrant sample. Column (1) refers to the full, pooled sample from the two waves (namely those included are all migrants, regardless of whether they were observed only in the first time period or in both time periods), henceforth referred to as the *full sample*, whereas column (2) refers to the sample of the panel respondents who were observed in the two time periods that we study, henceforth referred to as the *panel sample*. The first three rows summarize key variables in the theoretical model measured at annual levels: the remittances of the migrant, the income of the migrant's household, and the (estimated) pre-remittance family income. Remittances constitute approximately 11 percent of a migrant's household income and approximately 14 percent of the pre-remittance income of the migrant's family. The average migrant in the sample is 31 years old, and has been away from home for eight years. About 29 percent of the migrants are female. (When we write in this chapter "he" or "his," these are abbreviations of he/she, his/hers, respectively).

Table 3.1: Descriptive statistics.

	(1) Full sample	(2) Panel sample
Remittances (CNY)	3005.10	3516.19
	(71.57)	(106.5)
Migrant's household income (CNY)	27444.30	30289.86
	(286.44)	(393.87)
Family's pre-remittance income (CNY)	21775.64	23023.18
	(275.19)	(440.30)
Demographic characteristics of the migrant		
Female (%)	28.8	27.5
	(0.6)	(0.7)
Age	31.21	32.51
	(0.12)	(0.17)
Years of education	9.18	9.19
	(0.03)	(0.04)
Years since migrated	8.12	8.83
	(0.08)	(0.11)
Ever married (%)	59.8	67.6
	(0.6)	(0.8)
Number of children*	0.594	0.682
	(0.009)	(0.013)
Existence of not-co-resident [...]		
Spouse (%)	18.1	16.8
	(0.5)	(0.6)
Children (%)	27.3	28.6
	(0.6)	(0.8)
Parents (%)	89.6	88.8
	(0.4)	(0.5)
Parents in-law (%)	48.4	55.4
	(0.6)	(0.8)
N. Individuals	4,726	1,587
N. Observations	6,313	3,174

Notes: The Table displays means and, in parentheses, standard errors for the observations drawn from the 2008 and 2009 Migrant Household Survey (MHS) of the RUMiC Longitudinal Study. The migrant's remittances, the migrant's household income, and the family's pre-remittance income are measured on an annual basis. CNY stands for Chinese Yuan. On the basis of the 2008 and 2009 exchange rates of the Yuan to the US dollar, the mean remittances for the full sample and for the panel sample are equivalent, respectively, to about 450 and 525 US dollars.

*The information in this line is for both co-resident and not co-resident children.

The economic standing and the demographic characteristics of the rural family of the migrant influence the demand for remittances from back home. We have information on the migrant's marital status and family composition: 18.1 percent of the migrants have a spouse who is

not co-resident, 27.3 percent of the migrants have children who are not co-resident ("left-behind children"), and the majority of the migrants have rural parents or parents-in-law. Because the migrants' rural families were not interviewed, the best measure of the migrant's family pre-remittance income available to us in the RUMiC survey comes from the migrants' reported wages in the home villages, adjusted according to the number of working age individuals in a migrant's family. As validity checks, we note that the calculated values in the third row of Table 3.1 closely match the values of household pre-remittance incomes reported in the independent rural sample of RUMiC households, as well as the mean rural household income in the China Household Finance Survey (Gan, 2013).

Descriptive statistics of the migrants tracked across the two waves of the survey (the panel sample) is provided in column (2). Compared to those observed only in 2008 (namely compared to migrants who constitute a subset of the migrants enumerated in column (1)), the migrants in the panel sample send more remittances, and exhibit characteristics of a relatively more stable group in the sense that they earn slightly more, are a little older, are more likely to be married, and are somewhat more likely to have children.

Figure 3.1 illustrates the distributions of the measure of the remittance norm of the reference group for the full sample and the panel sample. Given the censored nature and skew of the levels of remittances, we use the inverse hyperbolic sine, or arcsinh, transformation of the reference norm in both the

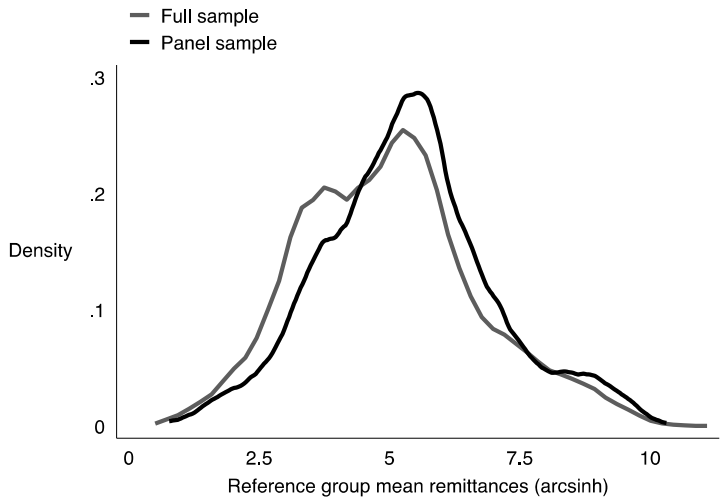

Figure 3.1: Kernel densities of the mean level of remittances of the reference group ($\bar{R}$).

Figure and in the regressions reported in Section 3.5.[10] There is considerable variation in the mean levels of remittances across groups. These levels are higher for migrants in first-tier cities, notably Shenzen and Guangzhou, than for migrants in secondary and tertiary cities. The mean levels of remittances of reference groups that consist of migrants aged 30-to-39 and of men are higher than those of women, and they are higher too than those of migrants aged 40 and above, and than those of migrants aged 29 and younger.

3.5 Estimation results

We begin by testing the association between a migrant's remittances and the remittances of the migrant's reference group. We subsequently look at aspects of the theoretical predictions concerning the asymmetry of the reference group norm, and the heterogeneity based on preference and strictness of the norm. As defined in Section 3.3, a migrant's reference group in a given year consists of migrants who live in the same city, come from the same home province, and share the same demographic characteristics as those of the migrant. The mean number of individuals in a migrant's reference group based on this definition is 28.

We use the inverse hyperbolic sine, or arcsinh, transformation of both the dependent variable and the reference norm. This specification avoids ad hoc transformations of meaningful zero remittances observations such as $\ln(R+1)$, or using only observations for which $R>0$. The coefficient estimates reflect elasticities of the underlying latent remittance index (Bellemare and Wichman, 2020). All standard errors allow arbitrary forms of heteroskedasticity, and are adjusted for clustering at the city level.

3.5.1 *Remittances respond to the reference group level*

Table 3.2 presents the baseline regression coefficients obtained from estimating models of the form presented in (3.31). We report coefficients on the mean remittances of the migrant's reference group, the migrant's household income, and the pre-remittance income of the migrant's family. Columns (1), (2), and (3) pertain to the full sample, columns (4), (5), and (6) pertain to the panel sample.

By way of illustration: column (1) in Table 3.2 reports a bivariate version of (3.31), estimating the relationship between a migrant's own remittances

[10]The arcsinh specification approximates a natural log but unlike ln(0), the arcsinh specification is defined at zero.

Table 3.2: The role of reference group's remittances.

	Dependent Variable: Own Remittances					
	(1)	(2)	(3)	(4)	(5)	(6)
Mean remittances of the reference group	0.610*** (0.103)	0.525*** (0.105)	0.195*** (0.073)	0.193** (0.096)	0.262*** (0.093)	0.249* (0.130)
Migrant's household income		1.120*** (0.214)	1.198*** (0.387)	1.301*** (0.430)	1.448*** (0.383)	1.801** (0.552)
Family's pre-remittance income		−0.149** (0.071)	−0.237*** (0.082)	−0.266*** (0.826)	−0.014 (0.167)	−0.188 (0.102)
Additional controls			y	y	y	y
City fixed effects			y	y		y
Year fixed effects			y	y	y	
Individual fixed effects					y	
Lagged reference group remittances						y
N. Observations	6,313	6,313	6,313	3,174	3,174	1,587

Notes: The Table reports coefficients and standard errors clustered at the city level for the arcsinh of the mean remittances of the reference group, the migrant's household income, and the family's pre-remittance income. These variables are measured on an annual basis. The arcsinh of remittances is the dependent variable. The models in columns (1) through (4) are Tobits. Column (5) reports results from a censored panel regression model with individual fixed effects following Honoré (1992) with robust standard errors calculated by the bootstrap method. Column 6 is a Tobit model using a one-year lag of the reference group's remittances. *** p<0.01, ** p<0.05, * p<0.1. The letter *y* is an abbreviation of "yes," meaning included.

and the mean remittances of the migrant's reference group. The results suggest that a one percent increase in the mean of the remittances of the reference group is associated with a 0.610 percent increase in the predicted value of a migrant's own remittances. The result is estimated precisely (standard error 0.103), and reveals a clear correlation between a migrant's own remittance behavior and that of migrants in his reference group.

Column (1) abstracts from all other relevant factors that could potentially be correlated both with the migrant's own remittances and with the mean remittances of the reference group and is thus likely to be biased. Column (2) adds the migrant's household income and the family's pre-remittance income to the model, also specified as the arcsinh to maintain consistency with the measures of remittances. As specified by the theoretical model, both the migrant's household income and the pre-remittance income of the migrant's family are statistically significant co-predictors of the migrant's remittances, with signs that match the theoretical positive and negative predictions, respectively. Although the inclusion of the income variables slightly weakens

the association between the mean remittances of the reference group and the migrant's own remittances, the reference group norm remains a large and statistically significant predictor.

Column (3) adds controls aimed at isolating the impact of the reference group norm from demographic characteristics of the migrant, from demographic characteristics of the migrant's family, and from characteristics of the reference group that could otherwise cause a spurious correlation between the $\bar{R}$ term and the R term. City and year fixed effects are also included so as to remove common factors that affect all migrants in a given city and in a given year. Inclusion of these controls reduces the correlation between the mean remittances of the reference group and the migrant's own remittances, yet the reference group norm remains statistically significant and of a substantial magnitude: a one percent increase in the mean remittances of the reference group relates to a 0.195 percent increase in a migrant's own remittances (standard error 0.073), holding fixed additional controls in the model of column (3).

As already noted, columns (4), (5), and (6) of Table 3.2 refer to the panel sample. Column (4) re-estimates the model of column (3), so as to assess whether the smaller panel sample yields fundamentally different results from the full sample. As it turns out, it does not. Whereas the coefficient for the full sample regression in column (3) is 0.195 (standard error 0.073), the same model estimated in column (4) for the panel sample results in a coefficient of 0.193 (standard error 0.096). These two coefficients are not statistically or meaningfully different.

While the contemporaneous control variables in columns (3) and (4) help significantly to isolate the association of interest, it is still possible that the results are biased due to factors that are unobserved at the individual level. To address this concern, column (5) reports estimates from a censored regression model with individual level fixed effects, following the approach of Honoré (1992). These effects control for all unobserved and observed factors that are stable with regard to a migrant over time, such as steady preferences and steady reference group characteristics. After the inclusion of individual fixed effects, the coefficient of the $\bar{R}$ term is identified only by changes over time in a migrant's reference group.

The results in column (5) reveal once again a clear response to a change in the remittance norm of the reference group: a one percent increase in the remittance norm of the migrant's reference group is associated with a 0.262 percent increase in a migrant's own remittances (standard error 0.093). We also see in column (5) that the migrant's household income remains a

statistically significant predictor of his remittances. The estimated family income effect attenuates to zero, suggesting little intertemporal variation in family income over the 2008 and 2009 waves.

An alternative way of identifying the reference group effect is to use the lagged value of the reference group norm to guard against contemporaneous simultaneity between the error term and the mean remittances of the reference group. This follows a common practice in the "peer effect" literature (consult, for example, Hanushek et al., 2003). Column (6) reports results from a Tobit regression where a migrant's remittances in 2009 are regressed on the lagged level of the mean remittances of the reference group in 2008 with the same control variables for the individuals, their reference group, and city fixed effects as in columns (3) and (4). We estimate the elasticity with respect to the group's remittance norm to be 0.249 (standard error 0.130), which is similar to the result obtained from the panel approach reported in column (5). Here, again, we observe a strong link between a migrant's remittances and the mean remittances of his reference group, after controlling for city fixed effects, additional demographic factors, and freed from any contemporaneous correlation between a migrant's remittances and the mean remittances of his reference group.

In sum: from Table 3.2 we conclude that across specifications that account for several factors that could confound the association between the mean remittances by a migrant's reference group and a migrant's own remittances, the reference group norm is a statistically significant and meaningful predictor of a migrant's own remittances. In addition to standard variables that shape the demand for and the supply of remittances, we find that changes in the mean level of the remittances of a migrant's reference group are reflected in the migrant's own remittances.

It is natural to wonder how accurate the reference group specification was. As already noted, our data do not inform us explicitly about the membership of that group: we do not have direct knowledge of the identity of fellow migrants whose behavior influences the migrant's behavior. For example, we do not know who a migrant meets on a regular basis and with whom he socializes. We assumed that exposure to comparators results in a spillover effect from their remittance behavior, but because we did not have precise information on the identity of the comparators, we had to create a synthetic reference group. We based this enterprise on a set of factors chosen in line with the existing literature. But there could be alternative reasonable sets. Because of the importance of this issue, we have found it helpful to run robustness checks where the construction of the reference group is based on alternative configurations of identifiers. In guiding the

robustness tests, we had it in mind that our lack of definite knowledge of who constitutes the migrant's reference group could have resulted in errors arising either from inclusion of irrelevant migrants in the group, or from exclusion of relevant migrants from the group. Each type of misspecification would result in an attenuation of the reference group effect reported in Table 3.2 (For a discussion of issues of this nature, consult Cornelissen et al., 2017). An adverse consequence of such attenuation would be to make it harder to identify the effect of the reference group norm on a migrant's own remittances. Given that we found convincing support for the reference group effect, defining the group incorrectly is not likely to drive the positive and statistically significant results reported in Table 3.2.

That being said, a scrutiny of alternative ways of revising the definition of the reference group, either by tightening the criteria (rendering them more restrictive) or by relaxing the criteria (rendering them more inclusive) suggests that the definition that we have used appears to be an appropriate one. Relating to the size of the coefficient of the reference group effect reported in column (6) of Table 3.2, namely 0.249, as a base, this coefficient declined towards zero when we restricted a migrant's comparators to be in the same occupation, or in the same industry, or to have the same level of education. This dwindling of the reference group effect suggests that the aforementioned restrictions have the effect of "expelling" relevant comparators that were included in the baseline definition.

To address the concern that we might have inadvertently omitted relevant comparators from the reference group, we adopted two approaches. First, we widened the group definition as compared to the baseline definition, letting a migrant compare himself with others within his city, independently of their province of origin, sex, or age. This expansion resulted in the reference group coefficient attenuating towards zero, suggesting that doing so introduced a measurement error in the estimate of $\bar{R}$ stemming from the inclusion of migrants who were in fact not relevant comparators.

Second, it is also possible that migrants compare themselves to others who answer to characteristics that were not included in our baseline definition. To address this possibility, we constructed placebo reference groups for each migrant. These groups are of the same size as the groups in the baseline definition, but consist of randomly selected migrants from the same city. We repeated this construction process 1,000 times, and we estimated the model in column 6 of Table 3.2 with each of these runs. Our working hypothesis was that if the baseline definition does not systematically omit relevant comparators, then the distribution of the placebo coefficients should be centered around zero with few, if any, estimates higher than the estimate of

0.249 in Table 3.2. This is in fact what we found: the mean of the reference group coefficients obtained from invoking the re-runs procedure is 0.002, and only 1 out of the 1,000 runs yielded a magnitude that is higher than the one reported in Table 3.2.

From this analysis of sensitivity and robustness we conclude that the definition of reference groups that we used for the derivation of the results reported in Table 3.2, namely of fellow migrants who reside in the same city, originate from the same home province, are of the same sex, and are in the same age bracket, is the most fitting for our study.

We next consider heterogeneity in the remittance response of migrants to the reference group norm predicted by our theoretical model.

3.5.2 *Heterogeneity in adherence to the reference group's norm*

Table 3.3 refers to predictions of the theoretical model that relate to the relevance of the group norm for those who lag behind the norm, and for those with a stronger preference to adhere to the norm, and for groups with stricter norms.

Table 3.3: Heterogeneity in adherence to the reference group's norm.

Theoretical prediction	Asymmetry		Preference	Strictness
Model parameters	$R \geq \bar{R}$	$R < \bar{R}$	γ	σ
	(1)	(2)	(3)	(4)
Lagged value of [...]				
Mean remittances of the reference group	0.016	0.552***	1.044***	0.771***
	(0.136)	(0.186)	(0.314)	(0.192)
Mean remittances of the reference group x years since migration			−0.047**	
			(0.021)	
Mean remittances of the reference group x reference group coefficient of variation				−0.040**
				(0.018)
Migrant's household income	1.942**	1.711*	1.663*	1.540*
	(0.852)	(0.944)	(0.870)	(0.842)
Family's pre-remittance income	−0.138	−0.330*	−0.184	−0.343*
	(0.117)	(0.181)	(0.198)	(0.187)
Additional controls and city fixed effects	y	y	y	y
N. Observations	928	659	659	659

Notes: The Table reports coefficients and standard errors clustered at the city level for the arcsinh of the mean remittances of the reference group, the migrant's household income, and the family's pre-remittance income. These variables are measured on an annual basis. The arcsinh of remittances is the dependent variable. The models in columns (3) and (4) include interactions. The interacted variable is included separately as a control. *** p<0.01, ** p<0.05, * p<0.1. The letter *y* is an abbreviation of "yes," meaning included.

The perception that upward comparisons matter, whereas downward comparisons do not, implies that the coefficient on reference group remittances should be zero for migrants whose remittances are above the norm, and positive for migrants whose remittances fall below the norm. We test this prediction by re-estimating the lagged model of column (6) of Table 3.2, doing so after stratifying the sample into two sub groups. The split is based on the level of remittances in the preceding year, where we distinguish between migrants who are at or above the norm, and migrants who are below the norm. As before, we include additional control variables and city fixed effects.

In the model that forms the basis of Table 3.2, where we pool those who are above the group norm and those who are below the group norm, we obtain, recalling column (6) in Table 3.2, an estimated coefficient on lagged group remittances of 0.249 (standard error 0.130). Columns (1) and (2) of Table 3.3 reveal that this effect masks a stark heterogeneity across the two sub groups, as predicted by the theoretical model. Migrants who remitted above the mean level of the remittances of their reference group are considered in column (1). While the income of the migrant's household remains a statistically significant predictor for this group, the association with the reference group norm has reduced to a coefficient of 0.016 (standard error 0.136). In contrast, those who lagged behind, considered in column (2), are apparently very much concerned about the reference group norm, with a large and statistically significant coefficient of 0.552 (standard error 0.186), meaning that a 0.552 percent increase in remittances for each one percent increase in the group's mean remittances. Not only does this result align neatly with a prediction of our theoretical model, it also lends credence to the ability of our empirical approach to estimate the reference group effect in the absence of concerns about bias caused by unobserved heterogeneity or simultaneity.

The theoretical model also predicts that the strength of the association between a migrant's own remittances and the mean remittances of the migrant's reference group depends on γ, (recall (3.23)), the preference parameter scaling how much a migrant values adhering to the norm. Column (3) of Table 3.3 explores this idea by examining heterogeneity in the reference group effect based on the number of years that have elapsed since the initial migration. Focusing on the sample of migrants from column (2) who lag behind their group norm, we include an interaction between the reference group norm and the number of years that a migrant has been

away from home.[11] The findings suggest that the impact of the norm for migrants who are new at destination, namely those whose years away are equal to zero, is 1.044 (standard error 0.314). The negative interaction term, −0.047 (standard error 0.021), suggests that this impact decreases for each additional year that the migrant has been away from home, presumably becoming more connected to the city, and less concerned about aligning his remittance behavior with the remittance behavior of fellow migrants.

In column (4) of Table 3.3 we report results of a test of the prediction that the effect of the reference group norm on a migrant's own remittances is weaker in groups with looser norms (as elaborated in (3.29)). We specify σ, namely the parameter representing the looseness of the norm, as the group level coefficient of variation in remittances. To recall, large values of σ represent looser norms. The theoretical model in Section 3.2 predicts that the effect of the remittance norm should be decreasing in σ, as groups with more diverse levels of remittances among migrants can be perceived as having norms that are less strict. The model underlying column (4) includes an interaction between the group remittance norm and the group level coefficient of variation as well as the non-interacted coefficient of variation so as to separately identify the interaction effect. The results reveal that the predicted pattern holds. The coefficient on the norm, 0.771 (standard error 0.192), and the interaction coefficient, −0.040 (standard error 0.018), suggest that the positive relationship between the group's remittance norm and a migrant's own remittances is reduced in groups with less strict norms.

3.6 Conclusion

We outline a model of remittance behavior in which the level of a migrant's remittances depends on the remittance behavior of fellow migrants, which we refer to as the group's remittance norm. Predictions of the model are that the optimal remittances of a migrant whose remittances lag behind the norm rise in response to increases in the remittance norm, and that this effect is most pronounced for migrants whose affiliation with the group is close, and when the group norm is strict.

We test the predictions of the theoretical model with longitudinal data on rural-to-urban migrants from 15 major Chinese cities. Defining the reference group on the basis of originating from the same home province and on the

[11] Recall that the number of years away is already included in the model as a control and, thus, the approach that we take does not confound the direct effect of years since migration on remittances with the interaction term.

basis of similar demographic characteristics, we obtain clear support for the core predictions of the model, as well as for nuanced heterogeneity in this regard.

The reported results add to our understanding of the determinants of migrants' remittance behavior in particular, and of the role of social comparisons in shaping economic decisions in general. In addition, our study bears on future empirical work in at least two respects. First, the standard list of questions administered in migration-remittance surveys ought to be expanded to include questions on the remittance behavior of comparators. Specifically, questions should be incorporated that render it possible to identify the reference group of a migrant and record information that a given migrant has on the remittances of comparators. Second, the influence of the remittance behavior of other migrants on the remittance behavior of a given migrant can range from very strong to nil. Considering the latter possibility, although typically migrants do have some contact with fellow migrants, this contact could be minimal when migrants are geographically dispersed, when they seldom meet, and so on. Identifying cases across the strong to nil spectrum as factors that influence a variety of migrants' behaviors (such as remittances, assimilation, fertility, and so on) is a fruitful topic of future inquiry.

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