

Do migrants send remittances as a way of self-insurance?

By **Catia Batista^a** and **Janis Umblijs^b**

^aNova School of Business and Economics and NOVAFRICA, Nova University of Lisbon, Portugal; e-mail: catia.batista@novasbe.pt

^bRagnar Frisch Centre for Economic Research, Oslo, Norway; e-mail: janis.umblijs@frisch.uio.no

Abstract

How do risk preferences affect migrant remittance behaviour? Examination of this relationship has only begun to be explored. Using a tailored representative survey of 1,354 immigrants in the Greater Dublin Area, Ireland, we find a positive and significant relationship between risk aversion and migrant remittances. Risk-averse individuals are more likely to send remittances home and are, on average, likely to remit a higher amount, after controlling for a broad range of individual and group characteristics. The evidence we obtain, that more remittances are sent by risk-averse immigrants who face higher wage risks and to individuals with more financial resources, is consistent with self-insurance although we cannot, with our data, rule out other exchange motives.

JEL classifications: D81, F22, F24, J15, J61

1. Introduction

The scale and growth of global remittance flows over the past decade has been unprecedented. Officially recorded remittances to developing countries have quadrupled over the past decade from US\$85 billion in 2000 to US\$372 billion in 2011 ([World Bank, 2011](#)), a value three times greater than total official development assistance.

Whilst this substantial global flow of money has motivated a great deal of research, the reasons behind people remitting are still an object of investigation. An already long debate has indeed been taking place over whether remittances are sent as a result of broadly defined altruistic or self-interested motivations.¹ [Becker \(1974\)](#) proposed the seminal model of altruism as the main determinant of inter-household transfers. This model was first tested by [Cox \(1987\)](#), who found that inter-vivos transfers in the USA were more consistent with exchange-related motives than with pure altruism. Several ensuing studies, including field evidence from a variety of developed and developing countries at different points in

1 [Arrondel and Masson \(2006\)](#), [Rapoport and Docquier \(2006\)](#), and [Cox and Fafchamps \(2007\)](#) are good sources reviewing the literature on private giving.

time, have also failed to support altruism as a motivation for remittances—or at least as the single motivation for remittances.² A more recent strand of research has conducted behavioural experiments to examine the altruistic motivations behind giving. These experiments have found an important role for selfish or reciprocal motives—desires on the part of givers to reward recipients for past behaviour or to influence future behaviour—in addition to altruism and social pressure as determinants of giving behaviour.³ Overall, the evidence in the literature is consistent with mixed motives for remittance behaviour, as discussed by Brown and Jimenez (2011): in line with the findings of Cox (1987), Cox *et al.* (1998, 2004), and Kazianga (2006), they observe that altruistic remittance motives dominate below a certain threshold for the income of remittance recipients, whereas exchange motives seem to take the lead above that threshold.

Restricting our analysis to non-altruistically motivated remittances *outside the household*,⁴ we can further distinguish between three main different self-interest or exchange incentives to remit. First, the absent remittance sender may be motivated by a wish to guarantee the provision of services to his or her family left behind by the remittance recipients outside the household (purchase of current and future goods and services for the benefit of others). Second, the remitter may be investing in his or her good reputation in the home community (which may mean that remittances are the result of social pressure as in Chort *et al.*, 2012, or of reciprocation to the network that covered the initial migration costs, as in Ilahi and Jafarey, 1999). Finally, the migrant may remit as a way to self-insure in the event of an unexpected negative shock that he or she experiences in the host country (purchase of future goods and services for own use in specific states of nature), as in Amuedo-Dorantes and Pozo (2006).

In this article we investigate the extent to which the desire of migrants to self-insure against future risks faced in the host country constitutes a motive to send remittances—this is our definition of self-insurance purchased from the migrant's network at home and what we call the *self-insurance motive* to remit. There is evidence that networks at home often provide financial assistance to migrants in case of negative income shocks in the receiving country and that home networks are able to monitor the financial situation of the migrant through contacts with network members in the receiving country (Agarwal and Horowitz, 2002; De la Briere *et al.*, 2002). In this setting, because the willingness of network members at home to provide financial assistance in difficult times is likely to depend on past

- 2 See, for instance, Lucas and Stark (1985) on evidence for Botswana; Altonji *et al.* (1992, 1997) for the USA; Cox *et al.* (1998) for Peru; Cox *et al.* (2004) for the Philippines; Kazianga (2006) for Burkina Faso; Osili (2007) for Nigeria; Brown and Jimenez (2011) for Tonga; and De Weerd *et al.* (2014) for Tanzania.
- 3 These behavioural studies include Andreoni and Vesterlund (2001), Andreoni and Miller (2002), and Camerer and Fehr (2004), who explored the existence and nature of altruistic motives for giving. More recent studies that found the prevalence of non-altruistic motivations for giving include Leider *et al.* (2009), DellaVigna *et al.* (2012), Ligon and Schechter (2012), Binzel and Fehr (2013), and Batista *et al.* (2015).
- 4 A commonly reported motive for (non-altruistic) remittances within the household is a desire by the migrant remitter to save or invest in the home country—see, for instance, Ashraf *et al.* (2015). This is in addition to altruistic motives such as income smoothing or insurance for household members in the origin country, as studied by Gubert (2002), Yang and Choi (2007), and Amuedo-Dorantes and Pozo (2011).

remittances from the migrant, the decision to remit can be viewed as insurance against future negative shocks.

Whilst this self-insurance motive is sometimes mentioned in the literature, there are few studies that test this motive empirically—notable exceptions being [Lucas and Stark \(1985\)](#), [Agarwal and Horowitz \(2002\)](#), and [Amuedo-Dorantes and Pozo \(2006\)](#). The existing literature has mostly used two approaches to empirically test the self-insurance motive to remit. The first strand of literature proposes that a positive relationship between income of migrant networks at home and migrant remittances is indicative of a self-insurance motive to remit, whilst a negative relationship indicates altruism as the relevant remittance determinant. This would happen because migrants remitting with an insurance motive will increase the amount remitted when networks at home have larger incomes and hence offer a larger insurance payoff. The underlying assumption being that the willingness of network members at home to provide financial assistance in difficult times is likely to depend on past remittances from the migrant and on the magnitude of their income flows. Alternatively, migrants will increase remittances in response to worsening economic situations in the home country when altruism is the dominant factor. Testing this theory empirically [Lucas and Stark \(1985\)](#) found that the ‘insurance motive’ dominated, whereas [Agarwal and Horowitz \(2002\)](#) concluded that altruism was the main motive for remitting. The main drawback of this approach is that it labels a set of possible reciprocal remittance motives (including any desire on the part of givers to reward recipients for past behaviour or influence their current and future behaviour) as self-insurance, which is presented as the single (mutually exclusive) alternative to altruistic remittance motives. Moreover, this testing approach focuses entirely on the remittance recipients and misses the variation in risk faced by the migrants themselves, which must have a strong impact on the demand for this type of self-insurance through the remittance channel.

An alternative, more direct way of testing for the self-insurance mechanism is to look at the wage risks that migrants face in the host country and how these relate to remittances. If migrants respond to increases in wage risk in the receiving country by remitting more, this may be interpreted as evidence of remittances as a way of self-insuring (against more likely future negative shocks affecting the migrant). Note that if remittances were motivated by altruism, one would not be able to predict an obvious change in remittances—although altruistic motives may still be at play simultaneously with insurance motives. [Amuedo-Dorantes and Pozo \(2006\)](#) find evidence that Mexican migrants remit more when faced with higher wage risks and seem therefore driven, at least in part, by insurance motives. This approach has the advantages of being able to account for the wage risk faced by migrants in the host country using a number of proxy variables, and also of allowing simultaneously for the possibility of both altruistic and insurance motives for remittances. One limitation of the approach taken by [Amuedo-Dorantes and Pozo \(2006\)](#) is, however, the difficulty in ensuring that the proxy variables used for wage risk (such as legal status, educational attainment, time in the USA, work experience, type of job, and industry of employment) are not conflated with differences in migrant unobservable characteristics, such as risk attitudes, which can influence the demand for insurance.

Our article uses a unique representative data set of 1,354 immigrants in the Greater Dublin Area, Ireland, which includes detailed information not only on the characteristics of individual migrants and their networks both in the home and in the host countries but also on migrant remittances, wage risks, and risk preferences. With this information in hand, we build on the work of [Amuedo-Dorantes and Pozo \(2006\)](#) and use the established positive

relationship between individual risk preferences and the purchase of insurance to investigate the existence of an insurance motive for sending remittances.

Our identification strategy rests first on the hypothesis that more risk-averse individuals have a preference for purchasing more insurance than do less risk-averse individuals. In the migration context, this would translate into more risk-averse migrants remitting more with the aim of self-insuring against potential negative outcomes. Therefore, a statistically significant positive link between risk aversion and money sent home would provide supportive evidence for the insurance motive.

This hypothesis that more risk-averse individuals have a preference for purchasing more insurance than do less risk-averse individuals is well grounded both in theoretical and empirical terms. To illustrate this fact, we start by proposing a simple theoretical model where migrants may remit for altruistic, self-insurance, or other exchange motives. In this well-defined context, we derive the results that self-insurance by a migrant wishing to insure against future bad states of nature indeed increases with risk aversion. This relationship is also supported by recent experimental field evidence offering actual insurance to real-life subjects in risky contexts—as opposed to the line of behavioural experimentation using university students as experimental subjects. These empirical studies have been conducted in domains as different as health insurance, agricultural weather insurance, and flood insurance—respectively, the works by [Galarza and Carter \(2011\)](#), [Hill *et al.* \(2013\)](#), and [Petrolia *et al.* \(2013\)](#). All of these studies find positive significant relationships between risk aversion and insurance take-up.

To complement our novel empirical strategy that uses risk preferences as a source of variation in establishing self-insurance as a remittance motive, and to provide convincing evidence to support this motive, one needs to also account for other correlates with the self-insurance motive for remittances that were introduced in the past literature. Namely, we need to control for the income risk faced by the migrant in the host country (which will likely determine insurance demand), and also for the income variation faced by the migrant's network in the home country (which is a determinant of the expected insurance pay-off). For this purpose, our empirical analysis uses proxies for the income risk that the individual migrant faces in the host country, and also for the income variation in his network at home. We expect the relationship between risk aversion and remittances to be stronger for individuals facing higher wage risk and remitting for self-insurance motives, and not meaningful for those not facing wage risk and remitting for altruistic motives. The inclusion of information on individual risk preferences to the empirical strategy followed by [Amuedo-Dorantes and Pozo \(2006\)](#) should help control for some of the unobserved heterogeneity potentially present in previous work, in addition to providing a direct test of the self-insurance motive for migrant remittances.

Overall, we find that there is a statistically significant positive relationship between being risk-averse and both the probability to remit and the amount remitted by migrants. This result remains statistically significant after including a wide range of controls suggested by the existing literature. Furthermore, we find that the relationship between risk aversion and remittances is especially strong for individuals with temporary contracts, those expressing an intention to return, and those with working network members in the sending country—a variety of robustness checks that strengthens the support for the self-insurance motive of remittances. Although we cannot definitely exclude other motives to remit, our results do suggest that migrants remit with the purpose of self-insuring against uncertainty faced in the host country.

The rest of the article is organized in the following way. Section 2 proposes a theoretical framework for our analysis and describes the empirical strategy to be used; Section 3 describes the survey design and presents descriptive statistics, and Sections 4 and 5 present and discuss the results of our empirical work. Section 6 concludes.

2. Theoretical framework and empirical strategy

2.1 Theoretical framework

Our aim is to examine the question of whether risk-averse individuals send more remittances with the purpose of purchasing self-insurance from their networks outside of the household in the home country. For this purpose, it is useful to provide a theoretical framework for our analysis.

The model we propose is a simple, tractable model that illustrates different motivations to remit (namely, altruism towards own family left behind in the origin country, purchase of self-insurance outside of the family in the origin country, and other exchange motives), whilst also allowing for the possibility of mixed motives—that is, that all of the remittance motives in the model are non-exclusive and simultaneously at play. This model is more general than the mixed motive models proposed by Cox (1987), Cox *et al.* (1998, 2004), and Brown and Jimenez (2011), in the sense that it does not provide any threshold that determines the prevalence of each of the different remittance motives. Instead, we allow for the possibility that altruistic, self-insurance, and other exchange transfers all happen simultaneously provided their net marginal benefits are equalized.

Our model, which we now describe, is an extension of the theoretical model proposed by Amuedo-Dorantes and Pozo (2006). However, we use a constant relative risk aversion utility function that allows us to do comparative statics on amounts remitted as a function of the relative risk aversion parameter, η . Also, we reinterpret the asset accumulation mechanism originally proposed by Amuedo-Dorantes and Pozo (2006) to include any exchange-motivated transfer from the migrant to his or her network at home—in the sense that, similarly to asset accumulation, exchange-motivated remittances provide a return without uncertainty, regardless of whether the realized state of nature is good or bad.

Let us consider a two-period model. In the first period, individuals earn a sure amount Y_H , whilst there is income uncertainty in period 2. The two possible outcomes for income in period 2 are Y_H and Y_L , such that $Y_H > Y_L$.

The inter-temporal utility function for each migrant is given by:

$$U = \frac{(C_1^\omega a^{1-\omega})^{1-\eta} - 1}{1-\eta} + \delta \frac{C_2^{1-\eta} - 1}{1-\eta} \quad (1)$$

where $\eta > 0$ is the (constant) relative risk aversion parameter; $\delta < 1$ is the discount factor specifying the relative tastes between utility in the two periods; and $0 < \omega < 1$ is a weighting parameter denoting the utility contribution of the migrant's consumption at time 1, C_1 , relative to his or her altruistic payments to family members left behind, a .

Migrants may choose to self-insure against the bad state of nature in period 2. To do so, they can make a payment x at time 1 to their network at home, which results in a linear payoff $k \cdot x$, with $k > 0$, to be received in period 2 in the event that the bad state of nature is realized. We assume insurance is not complete, $k \cdot x < Y_H - Y_L$. This assumption seems reasonable in the context of migrants self-insuring against possible negative shocks occurring in the host country, but who do not otherwise choose to return in the face of this risk.

The important distinction between altruistic and self-insurance payments is that the migrant expects nothing in return for the altruistic payment, whereas there is an exchange between the migrant and the self-insurance payment recipient in the event that the bad state of nature realizes in period 2.

In addition to purchasing self-insurance from their network in the origin country, migrants can choose to make an alternative type of investment. In this case, migrants save an amount z out of their period 1 income, Y_H , which pays interest at the rate of return r in period 2, regardless of the state of nature. Note that this investment and its rate of return may be interpreted broadly: z may be simply interpreted as migrant savings, earning an interest rate r ; but one may also think of z as an exchange-motivated transfer from the migrant to his/her network at home, which pays back $(1+r)$.

Purchasing self-insurance from the migrant's network in the origin country differs from the migrant's asset accumulation in the sense that migrant savings (and their return) are available to the migrant in period 2, regardless of economic conditions, whereas network-provided self-insurance will only work if the bad state of nature is realized in period 2.

The migrant budget constraints for periods $t=1$ and $t=2$ will therefore be given, respectively, by:

$$C_1 \leq Y_H - x - z - a_1 \quad (2)$$

$$C_2 \leq \pi[Y_L + g(x) + z(1+r)] + (1-\pi)[Y_H + z(1+r)] \quad (3)$$

where π is the probability with which the migrant expects the bad state of nature to realize.

The migrant therefore needs to solve the problem of maximizing expected inter-temporal utility (1), subject to (2) and (3), to choose consumption at time $t=1$ and $t=2$, the level of altruistic payments, a , the amount of self-insurance purchased from the network abroad, x , and the investment amount, z .

Optimality conditions imply that altruistic payments must verify the intra-temporal optimality condition equalizing the altruistic payments to period 1 consumption ratio to a function of the migrant's altruistic preference parameter, ω :

$$\frac{C_1}{a} = \frac{\omega}{1-\omega} \quad (4)$$

In terms of inter-temporal equilibrium, two conditions arise, one relative to each inter-temporal transfer mechanism:

$$C_2^\eta = C_1^{\eta\omega+1-\omega} a^{(\eta-1)(1-\omega)} \frac{\delta\pi k}{\omega} \quad (5)$$

$$C_2^\eta = C_1^{\eta\omega+1-\omega} a^{(\eta-1)(1-\omega)} \frac{\delta(1+r)}{\omega} \quad (6)$$

Note that these two inter-temporal equilibrium conditions imply that the expected return on self-insurance is the same as that on investment, $\pi k = 1+r$.

It is clear to see that eqs (4)–(6), together with the budget constraints (2)–(3), form a system of equations that jointly determines the optimal choices of C_1 and C_2 , a , x , and z . We can use this system of equations to derive comparative statics. In particular, we wish to examine the response of the three types of remittances (altruistic, self-insurance, or exchange motivated) to different degrees of risk aversion. Using the implicit function theorem, we obtain:

$$\frac{\delta a}{\delta \eta} = 0 \quad (7)$$

This result implies that altruistic remittances do not depend on a migrant's degree of risk aversion, which seems a sensible property.

$$\frac{\delta x}{\delta \eta} = \frac{\ln\left(\frac{C_1^\omega a^{1-\omega}}{C_2}\right)}{\frac{\eta \pi k}{C_2} + \frac{\eta \omega + 1 - \omega}{C_1}} > 0 \quad \text{since} \quad \frac{C_1^\omega a^{1-\omega}}{C_2} = (\pi.k)^\eta = (1+r)^\eta > 0 \quad (8)$$

$$\frac{\delta z}{\delta \eta} = \frac{\ln\left(\frac{C_1^\omega a^{1-\omega}}{C_2}\right)}{\frac{\eta(1+r)}{C_2} + \frac{\eta \omega + 1 - \omega}{C_1}} > 0 \quad \text{since} \quad \frac{C_1^\omega a^{1-\omega}}{C_2} = (\pi.k)^\eta = (1+r)^\eta > 0 \quad (9)$$

Expressions (8) and (9) imply that both self-insurance and savings/investment should increase in the presence of higher levels of (relative) risk aversion. This finding is sensible in light of the theoretical definition of risk aversion as demanding additional insurance, and also if we think of the exchange-motivated remittances as a type of precautionary savings that increase in an uncertain environment in the presence of increased risk aversion.

2.2 Econometric model and empirical strategy

To introduce empirical content to our theoretical model, we start with the finding that more risk-averse migrants should remit more with the aim of self-insuring against potential negative outcomes in the host country. Therefore, identification of a statistically significant positive link between risk aversion and money sent home would suggest support for the self-insurance motive – which includes both remittances sent with the sole purpose of self-insuring (i.e. those which offer a return only in the bad state of nature), and also other remittances sent with exchange motives that offer a return in bad and good states of nature (similarly to precautionary savings).

In this context, the relevant empirical relationship between risk aversion and remittances can be summarized as follows:

$$\text{Remittances}_i = \beta_1 \text{Risk Aversion}_i + \beta_2 \text{Individual Controls}_i + \varepsilon_i \quad (10)$$

This expression describes how migrant remittances vary with risk aversion, whilst controlling for an array of individual characteristics that are correlated with a migrant's willingness and capacity to remit. These controls include basic demographics, such as gender, age, years of schooling, religion, marital status, having children, industry of occupation, income, financial distress indicators, and world region of origin. In addition, our specification includes controls for likely determinants of the willingness to self-insure through remittances: namely, income risk faced by the migrant in the host country (proxied by employment contract duration) and proxies for the likelihood to return home (such as the reported intention to return, number of years in Ireland, partner living in Ireland, and Irish partner), which are both correlated with the likelihood of requesting financial assistance on return home, and hence determine insurance demand. We also include as a control income variation faced by the migrant's network in the home country (proxied by employment status of the network member, an indicator of financial resource availability), which may be interpreted as a determinant of the expected insurance payoff. Finally, we control for the presence of migrant savings, which are an additional (or alternative) way of transferring income into the future, which may also be used in case of bad risks, as described in our model.

We estimate different specifications of this econometric model. In additional specifications, we add interaction terms for risk preferences and contract duration, intention to

return, and employment status of network members to provide a stricter test of the self-insurance motive for remittances. This is because one would expect that risk-averse migrants would seek additional insurance when they face a larger likelihood of needing to request financial assistance from their networks and also when they perceive greater financial availability in their networks at home.

We are interested in examining whether migrants decide to remit (the extensive margin of remittances) and the amount of remittances sent (the intensive margin of remittances). However, remittance data suffer from two main problems: censoring (i.e., individuals who do not remit because their circumstances do not allow them to, e.g., they do not have enough disposable income) and sample selection (i.e., individuals who could remit but choose not to do so). To deal with these econometric problems, we estimate the independent double hurdle model proposed by Cragg (1971), and also used by Sinning (2011), Bettin *et al.* (2012), and Brown *et al.* (2014). In this model, the first hurdle follows a probit model of participation, given by eq. (11), where the dependent variable is a binary variable taking the value of 1 when the individual migrant sent any form of remittances in the year before the survey; and the second hurdle of the model, given by eq. (12), is represented by a standard linear regression model of the amount remitted. More specifically our econometric specification is:

$$\text{Prob}[Y_i > 0 | \mathbf{X}_i] = \Phi [(\beta_1 x_{i1} + \beta_2 x_{i2} + \beta_{12} x_{i1} x_{i2} + \mathbf{X}_i \beta) / \sigma] \quad (11)$$

$$E[Y_i | Y_i > 0, \mathbf{X}_i] = \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_{12} x_{i1} x_{i2} + \mathbf{X}_i \beta + \sigma \frac{\phi((\beta_1 x_{i1} + \beta_2 x_{i2} + \beta_{12} x_{i1} x_{i2} + \mathbf{X}_i \beta) / \sigma)}{\Phi((\beta_1 x_{i1} + \beta_2 x_{i2} + \beta_{12} x_{i1} x_{i2} + \mathbf{X}_i \beta) / \sigma)} \quad (12)$$

where Y_i is the value of any remittances sent by individual i to anyone in his network in the home country in the past year; β_1 is the coefficient on the variable summarizing risk aversion x_{i1} ; x_{i2} is a dummy variable for the type of contract, intention to return, or employment status of network member; and β_{12} captures the interaction effect between x_{i1} and x_{i2} . \mathbf{X}_i is the vector of control variables described previously, which are likely correlated with remittance behaviour.

3. Data and descriptive statistics

3.1 Background on survey

This article uses a tailored representative household survey of the immigrant population in the Greater Dublin Area, including illegal and non-registered migrants. The survey was conducted amongst 1,354 immigrants aged 18 years or older, residing in the Greater Dublin Area, who arrived in Ireland between 10 years and 6 months prior to the interview date, and who were not Irish or British citizens. Eligibility requirements were set to maximize the probability that migrants still kept contacts outside of Ireland but were already minimally established in Ireland so that contacts with their networks abroad could provide useful information. The survey was conducted between February 2010 and December 2011.

The sample of immigrants in our survey is representative of the total immigrant population, in the Greater Dublin Area. To perform random sampling, 100 electoral districts (EDs) were randomly selected out of the 323 EDs in the Greater Dublin Area. This selection was performed according to probability-proportional-to-size sampling, in which size is defined as the total number of non-Irish and non-British individuals residing in Ireland, according to the 2006 census of Ireland. After the first randomization level of ED selection,

15 households were selected within each ED using a random route approach, starting at initial addresses within each ED that were also selected randomly. Furthermore, in the presence of more than one eligible respondent in the household, the individual respondent within each household was selected randomly based on a next-birthday rule.

Obtaining a representative sample of migrants is important in the context of our research as it avoids sample selection problems, which are present in related work where data collection methodologies include surveys conducted in the border regions of sending countries (Amuedo-Dorantes and Pozo, 2006), or generally limited to return migrants and family members left in the home country (Lucas and Stark, 1985; Agarwal and Horowitz, 2002).

To measure risk preferences in the domain of money, we use a hypothetical lottery question. This measure has been used by a number of studies in the literature,⁵ and has been validated using real monetary payments by Dohmen *et al.* (2011).

The survey includes a number of questions regarding remittances to encompass all channels that could be used to transfer money or gifts, as well as on frequency and magnitudes. The survey allowed for the possibility of money transfers, money handed over in person (in Ireland or in the sending country), and gifts sent or given in person. In addition, survey respondents were asked a range of questions on their five closest social connections outside of Ireland, defined as the five individuals the migrant had the most regular contact with. In addition to basic demographic characteristics of social contacts, we collected data on country of residence and the relationship to the respondent.⁶ We use this information to construct our network variables.

In defining a respondent's main network contact, we considered the person who has received the largest share of remittances in case there is more than one recipient of remittances—which happens to only 35% of respondents. If the respondent has not sent any remittances in the year prior to the interview, the network variable is based on the characteristics of the main social contact (the person listed first when asked with whom the respondent has most contact with). Note that for those who did remit, the recipient of the remittances was also the main social contact in 91% of cases.

Batista and Narciso (2013) and Batista and Umblijs (2014) present complementary analysis of the same migrant survey focussing on questions related to the importance of asymmetric information in transnational networks in determining remittance flows and the role of risk attitudes in migrant entrepreneurship.

3.2 Descriptive statistics

Table 1 presents a brief description of each variable used in our empirical analysis, together with descriptive statistics. Our sample includes 1,354 immigrants from a broad range of countries. The three most popular origin countries are Nigeria, Poland, and India. Other EU 'new member states' are also represented, with the largest groups being Romanians, Lithuanians, and Latvians. The two largest migrant groups in greater Dublin by world region of birth are Africa and Asia.

5 See for example, Van Praag and Cramer (2001), Bonin *et al.* (2007), Zimmermann *et al.* (2009), Ahn (2010), and Caliendo *et al.* (2010).

6 The survey question asking about the relationship between the remitter and the remittance recipient allowed for the following possibilities: 1. Spouse/partner; 2. Parent/parent in law; 3. Sibling/sibling in law; 4. Child; 5. Other family member; 6. Friend; 7. Co-worker; 8. Other. This answer categorization allowed a clear classification of remittance recipients as family vs. non-family members.

Table 1. Variable description and descriptive statistics

Variable	Obs.	Mean	S.D.	Min	Max	Description
Risk averse	1,354	0.3995569		0	1	Risk preferences in the domain of money using a hypothetical lottery question. Dummy variable for choosing to pay less than €10,000
Risk averse— alternative 1	1,354	0.5339734		0	1	Risk preferences in the domain of money using a hypothetical lottery question. Dummy variable for choosing to pay less than €20,000
Risk averse— alternative 2	1,354	0.3050222		0	1	Risk preferences in the domain of money using a hypothetical lottery question. Dummy variable for choosing to pay less than €5,000
Remittance binary variable	1,354	0.3345643		0	1	Respondent has remitted at least once in the last year
Remittance amount	1,354	424.5554	1,125.133	0	10,000	Amount remitted by respondent in previous year
Self-employed	1,354	0.0251108		0	1	Respondent is self-employed
Temporary contract	1,354	0.2474151		0	1	Respondent works under a temporary contract
Return intention	1,354	0.5265879		0	1	Respondent states intention to return home
Savings	1,354	0.1159527		0	1	Respondent has savings in Ireland
Female	1,354	0.5361891		0	1	Respondent is female
Age	1,335	32.60899	7.983768	18	72	Respondent's age in years
Years of schooling	1,337	14.57966	2.95801	0	17	Completed years of schooling
Married	1,354	0.4032496		0	1	Respondent is married or has stable partner
Children	1,354	0.4519941		0	1	Respondent has children
Income (€)	1,221	1162.273	1,093.486	0	10,500	Respondent's monthly net income in euros
Unable to pay bills	1,277	0.4259984	1.263875	0	12	Amount of times household not able to pay bills in previous year
No family network	1,354	0.342688		0	1	Network member is not a family member
Employed network	1,238	0.677706		0	1	Network member is employed
EU (NMS)	1,354	0.2001477		0	1	Born in EU (new member state)
EU (OMS)	1,354	0.0679468		0	1	Born in EU (non-new member state)
Africa	1,354	0.4468242		0	1	Born in Africa
Asia	1,354	0.1536189		0	1	Born in Asia
North America	1,354	0.0169867		0	1	Born in North America
South America	1,354	0.0487445		0	1	Born in South America
Australasia	1,354	0.0051699		0	1	Born in Australasia
Manufacturing sector	1,329	0.027088		0	1	Respondent works in industry sector
Construction sector	1,329	0.03386		0	1	Respondent works in construction sector
ICT sector	1,329	0.1136193		0	1	Respondent works in communications sector
Health sector	1,329	0.1234011		0	1	Respondent works in health sector
Education sector	1,329	0.0195636		0	1	Respondent works in education sector
Student	1,354	0.1957164		0	1	Respondent is a student
Unemployed	1,354	0.0886263		0	1	Respondent is unemployed
Christian	1,354	0.6779911		0	1	Respondent is Christian
Muslim	1,354	0.0974889		0	1	Respondent is Muslim
No religion	1,354	0.1107829		0	1	Respondent follows no religion
Partner lives in Ireland	1,354	0.359675		0	1	Respondent's partner lives in Ireland
Same nationality partner	1,354	0.3146233		0	1	Respondent's partner has same nationality
Irish partner	1,354	0.0406204		0	1	Respondent's partner is Irish
Years in Ireland	1,335	7.055431	2.898314	1	10	Respondent's length of stay in Ireland (in years)

According to [Table 1](#), a little over half of immigrants in our sample are female. They average 33 years of age and nearly 15 years of schooling. Forty percent of the respondents are married or in a stable relationship, and 45% have children. They average a net monthly wage of €1,162, and close to 25% work under a temporary contract. One fifth of the respondents reports being a student, whilst 12% work in the health sector and 11% in ICT. Nearly 9% of respondents report being unemployed. In terms of religion, 68% of the respondents in our sample followed a Christian religion, whereas 10% were Muslim, and 11% followed no religion.

Finally, immigrants in our sample were reportedly living in Ireland for an average of seven years, and 53% of them reported their wish to eventually return to their home country. Thirty-one percent of our respondents were married to or in a stable relationship with someone with the same nationality as themselves, and 4% to an Irish partner.

Our measure of willingness to take risks is based on a hypothetical lottery question as shown in [Appendix Table A1](#). The results from the question range from 0 (corresponding to no lottery purchase) to 10 (corresponding to spending all available €100,000 in a risky lottery). [Figure 1](#) shows the distribution of responses to the hypothetical lottery question. According to [Fig. 1](#), the most common answer to the hypothetical lottery question was not to gamble any of the money, whilst the other responses approximate a normal distribution with a mean of gambling 60% of the available amount.

As shown in [Table 1](#), 36% of immigrants in our sample report having sent money at least once in the year preceding the interview, whereas less than 12% report having savings in Ireland. From those who did send money home, the amount varied significantly as shown in [Fig. 2](#), ranging from €3 to €10,000. The main remittance recipient is not a family member in 34% of the interviews, and this main network member was working at the time of the interview in 61% of the cases.

There is substantial variation in the probability of remitting across world regions of birth. As shown in [Table 2](#), migrants from Africa are the most likely to remit, with 40% sending some money home, migrants from Asia are the second most likely to remit (36% do so in our sample). Whilst 31% of the EU new member state migrants remit money home, only 7% of pre-2004 enlargement EU states send remittances home.

Regarding the relationship between risk aversion and the probability of remitting, [Table 3](#) shows that whilst only 27% of risk-loving individuals sent remittances, 40% of risk-averse migrants sent money to their networks abroad.

[Table 4](#) describes the covariates of risk aversion. Overall, and most important, the results are consistent with the existing literature, namely, with a (weak) negative relation between income and risk aversion. Interestingly, students are very strongly negatively correlated with risk aversion. The marital situation of migrants also seems to be strongly correlated with risk aversion: those whose partner also lives in the host country seems to be significantly more risk averse, although sharing the same nationality of the partner is associated with lower risk aversion. Finally, those migrants who remit to non-family members seem to be particularly more risk averse, both in terms of magnitude of the estimated coefficient and of its statistical significance.

4. Empirical results

4.1 Risk aversion and remittances

[Table 5](#) presents estimates for the relationship between risk aversion and remittances at both the extensive and intensive margins. Column (1) of [Table 5](#) suggests that there is a

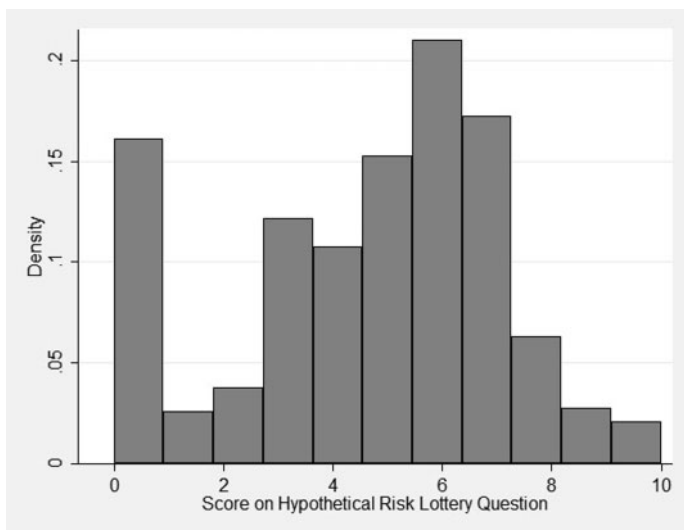


Fig. 1. Risk preferences in migrant sample

Note: The figure shows the density distribution of risk preferences amongst migrants. The numbers scored reflect the answer to a hypothetical lottery question. The scale of the responses ranges from 0 to 10, with 10 corresponding to the highest willingness to take risks.

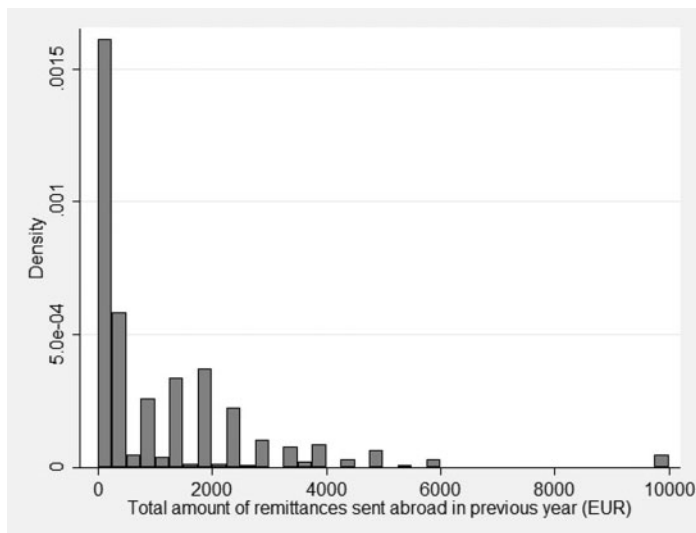


Fig. 2. Amount of remittances sent home in the previous year (Euros)

Note: The figure shows the density distribution of migrant remittances sent in the previous year in Euros. It represents the 36% of respondents who sent at least some remittances in the previous year.

statistically significant positive relationship between risk aversion and the probability of remitting, as well as the amount remitted: being risk averse (according to our empirical definition) corresponds to a 52 percentage point increase in the probability of remitting and 30 percentage point increase in the amount remitted.

Table 2. Percentage of migrants remitting by region of birth

Region	Percent remit
Africa	40
Asia	36
EU (NMS)	31
South America	19
North America	12
EU (OMS)	7
All, average	33

Notes: The table shows the percentage of individuals from each world region of birth who have remitted money or sent goods home at least once in the last year. EU (NMS) refers to countries that joined the European Union after 2004, EU (OMS) refers to countries that were in the EU prior to 2004.

Table 3. Risk aversion and probability of remitting

	Percentage remitting
Risk averse	40
Risk loving	27

Notes: The table shows the percentage of individuals who have sent money or goods home at least once in the last year. 'Risk averse' refers to individuals choosing to invest less than €10,000 in a hypothetical lottery, 'Risk loving' refers to individuals choosing to invest more than €10,000 in the hypothetical lottery.

These controls include short contract duration (as a proxy for wage risk in the host country) and the intention to return (as a proxy for the likelihood of needing to use insurance on return). According to the existing literature, both these variables should correlate positively with the demand for self-insurance via remittances. We indeed obtain positive coefficients, but they are not precisely estimated when we account for individual risk aversion. We also control for savings, which could be regarded as an alternative way for migrants to obtain self-insurance against adverse shocks in the host country. This coefficient shows, however, positively in our estimation, although not very precisely estimated, which may indicate that savings are a complementary to remittances as a way for migrants to obtain self-insurance.

Note that the dummy variable 'risk averse', as used in columns (1) of Table 5, is defined as investing less than €10,000 in the hypothetical lottery and corresponds to approximately 50% of the responses in our sample of migrants. Columns (2) and (3) of Table 3 show that the relationship between risk aversion and remittances keeps holding positive and significantly when risk aversion is defined as investing less than €20,000 (Risk Aversion alternative 1) or €5,000 (Risk Aversion alternative 2) in the hypothetical lottery.

4.2 Income risk and remittances

Table 6 shows how the probability of remitting correlates with temporary employment contracts, with duration of less than one year—a proxy for wage risk faced by migrants.

Table 4. Risk aversion and covariates used in empirical analysis

	Probit	S.E.
Female	0.014	(0.095)
Age	-0.005	(0.006)
Years of schooling	-0.015	(0.020)
Married	-0.224	(0.344)
Having children	-0.169	(0.182)
Income	-0.000*	(0.000)
Savings	0.101	(0.136)
Financial distress indicator	0.071*	(0.038)
Temporary contract	0.137	(0.134)
Employed network	0.072	(0.092)
Non-family network	0.249***	(0.095)
Self-employed	-0.046	(0.234)
Manufacturing sector	-0.084	(0.212)
Construction sector	-0.027	(0.301)
ICT sector	0.194	(0.139)
Health sector	0.249*	(0.147)
Education sector	0.264	(0.285)
Student	-0.357***	(0.129)
Unemployed	-0.349	(0.223)
Christian	0.242	(0.201)
Muslim	-0.101	(0.172)
No religion	-0.166	(0.174)
Africa	0.195	(0.132)
Asia	0.103	(0.180)
EU (NMS)	-0.059	(0.186)
Rest of the world	-0.005	(0.180)
Same nationality partner	-0.424**	(0.176)
Irish partner	0.171	(0.239)
Partner lives in Ireland	0.602*	(0.324)
Partner lives in same house	0.560	(0.367)
Year of arrival	0.013	(0.016)
Observations	1107	
Pseudo R^2	0.116	

Notes: Marginal effects; standard errors in parentheses, clustered by country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The table reports marginal effects of probit estimates. The dependent variable in this regression is a binary variable taking value 1 for risk-averse individuals, defined as those selecting to invest less than €10,000 in the hypothetical lottery question described in Section 2. The explanatory variables are described in Table 1.

The reference group is given by individuals with permanent employment contracts. The results in Table 6 suggest that the relationship between having a temporary contract and the probability of sending remittances is especially significant for risk-averse individuals. The results suggest that although having a temporary contract is associated with a lower probability of remitting and with remitting less relative to the control group, being risk averse

Table 5. Probability of remitting and risk preferences

	(1) Double hurdle		(2) Double hurdle		(3) Double hurdle	
Tier 1: participation						
Risk averse	0.515***	(0.086)				
Risk aversion—alt. 1			0.340***	(0.086)		
Risk aversion—alt. 2					0.442***	(0.088)
Temporary contract	0.119	(0.107)	0.109	(0.108)	0.146	(0.107)
Return intention	0.076	(0.092)	0.096	(0.092)	0.107	(0.092)
Savings	0.175	(0.126)	0.167	(0.125)	0.183	(0.125)
Tier 2: level						
Risk averse	0.306*	(0.166)				
Risk aversion—alt. 1			0.346*	(0.180)		
Risk aversion—alt. 2					0.242*	(0.145)
Temporary contract	0.286	(0.192)	0.260	(0.190)	0.295	(0.193)
Return intention	-0.227	(0.167)	-0.228	(0.166)	-0.201	(0.168)
Savings	0.581***	(0.195)	0.571***	(0.193)	0.585***	(0.195)
Controls	Yes		Yes		Yes	
Observations	1,107		1,107		1,107	
Chi ²	175.591		157.249		168.848	

Notes: Marginal effects; standard errors in parentheses, clustered by country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The table reports marginal effects of independent double hurdle estimates. Control variables include basic demographics, such as gender, age, years of schooling, religion, marital status, having children, industry of occupation, income, financial distress indicators, and world region of origin. We also include employment contract duration, reported intention to return, number of years in Ireland, partner living in Ireland, and Irish partner, as well as employment status of the network member, and the presence of migrant savings.

and having a temporary contract is associated with a higher probability of remitting and sending more remittances.

This evidence strengthens our hypothesis that when facing additional income risk in the host country, risk-averse individuals will remit more in an attempt to purchase additional self-insurance from their network members at the origin.

Table 7 investigates the relationship between intention to return and remittances, including risk aversion interaction terms. The results shows that expressing an intention to return whilst being risk averse is associated with an increased probability of remitting.

These results show that remittances sent by risk-averse migrants are increasing with the likelihood of returning to the origin country and benefiting from any ‘insurance’ the migrant has purchased with remittances.

4.3 Status of network members and remittances

As well as the relationship of the remittance recipient to the migrant, the financial situation of the home network may play a role in the decision to send money home as a method of self-insurance. The insurance motive is likely to dominate when home network members have more resources, whereas altruism usually dominates when networks are less financially stable. We test this hypothesis by using information on the employment status of

Table 6. Remittances and type of contract: extensive and intensive margins

	(1) Double hurdle	
Tier 1: participation		
Risk averse	0.305***	(0.096)
Temporary contract	-0.247*	(0.134)
Temporary contract × averse	0.779***	(0.185)
Tier 2: level		
Risk averse	0.136	(0.196)
Temporary contract	-0.155	(0.292)
Temporary contract × averse	0.641*	(0.349)
Controls	Yes	
Observations	1,177	
Chi ²	193.636	

Notes: Marginal effects; standard errors in parentheses, clustered by country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The table reports marginal effects of independent double hurdle estimates. Control variables include basic demographics, such as gender, age, years of schooling, religion, marital status, having children, industry of occupation, income, financial distress indicators, and world region of origin. We also include employment contract duration, reported intention to return, number of years in Ireland, partner living in Ireland, and Irish partner, as well as employment status of the network member, and the presence of migrant savings.

Table 7. Remittances and intention to return: intensive and extensive margins

	(1) Double hurdle	
Tier 1: participation		
Risk averse	0.302**	(0.128)
Return intention	-0.090	(0.118)
Return intention × averse	0.392**	(0.170)
Tier 2: level		
Risk averse	0.116	(0.248)
Return intention	-0.408*	(0.242)
Return intention × averse	0.361	(0.309)
Observations	1,107	
Chi ²	179.643	

Notes: Marginal effects; standard errors in parentheses, clustered by country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The table reports marginal effects of independent double hurdle estimates. 'Return intention' is a dummy variable for intending to return in the next 10 years. Control variables include basic demographics, such as gender, age, years of schooling, religion, marital status, having children, industry of occupation, income, financial distress indicators, and world region of origin. We also include employment contract duration, reported intention to return, number of years in Ireland, partner living in Ireland, and Irish partner, as well as employment status of the network member and the presence of migrant savings.

Table 8. Employment status of network member and remittances - intensive and extensive margin

	(1)	
	Double hurdle	
Tier 1: participation		
Risk averse	0.218	(0.158)
Employed network	-0.154	(0.116)
Employed network \times averse	0.428**	(0.185)
Temporary contract	0.106	(0.108)
Return intention	0.064	(0.093)
Tier 2: level		
Risk averse	-0.051	(0.296)
Employed network	-0.231	(0.244)
Employed network \times averse	0.504*	(0.241)
Temporary contract	0.268	(0.190)
Return intention	-0.245	(0.166)
Controls	Yes	
Observations	1,107	
Chi ²	186.076	

Notes: Marginal effects; standard errors in parentheses, clustered by country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The table reports marginal effects of independent double hurdle estimates. Control variables include basic demographics, such as gender, age, years of schooling, religion, marital status, having children, industry of occupation, income, financial distress indicators, and world region of origin. We also include employment contract duration, reported intention to return, number of years in Ireland, partner living in Ireland, and Irish partner, as well as employment status of the network member and the presence of migrant savings.

network members. In our sample 61% of network members are currently employed, and we would expect the insurance motive to be stronger for migrants sending remittances to this group compared with those with network members not working.

Table 8 shows the results of the intensive and extensive margin for the employment situation of the remittance recipient. The results suggest that there is a positive link between having an employed network member and being risk averse. Similar results can be seen for the intensive margin, where there is a (marginally) significant positive link between having an employed network member and being risk averse.

This evidence lends some support to the hypothesis that migrants target network members with good economic status to purchase self-insurance by sending remittances to these 'well-off' network members.

4.4 Outside family networks and remittances

It is likely that altruistic motives dominate for remittances to immediate family (such as parents, children, or spouses). This proposition would imply that remitting to a network contact outside the immediate family is therefore relatively more likely to follow the self-insurance motive for remittances. We test this implication by examining the remittance impact of having a main network contact outside of the immediate family.

Table 9. Outside family networks and remittances: intensive and extensive margin

	(1)		(2)	
Tier 1: participation				
Risk averse	0.218	(0.158)	0.138	(0.277)
Employed network	-0.154	(0.116)	0.264*	(0.138)
Employed network \times averse	0.428**	(0.185)	0.287	(0.217)
Non-family net.			-1.959***	(0.158)
Non-family net. \times averse			0.419	(0.302)
Tier 2: level				
Risk averse	-0.051	(0.296)	-0.460	(0.313)
Employed network	-0.231	(0.244)	0.037	(0.254)
Employed network \times averse	0.504	(0.341)	-0.058	(0.357)
Non-family net.			-0.742***	(0.269)
Non-family net. \times averse			1.348***	(0.355)
Controls	Yes		Yes	
Observations	1,107		1,107	
Chi ²	186.076		323.453	

Notes: Marginal effects; standard errors in parentheses, clustered by country of birth. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The table reports marginal effects of independent double hurdle estimates. Control variables include basic demographics, such as gender, age, years of schooling, religion, marital status, having children, industry of occupation, income, financial distress indicators, and world region of origin. We also include employment contract duration, reported intention to return, number of years in Ireland, partner living in Ireland and Irish partner, as well as employment status of the network member, and the presence of migrant savings.

The results confirm that having a main network contact outside of the immediate family is associated with a lower probability of sending remittances as well as remitting a lower amount in the year prior to the survey, as shown by Table 9, columns (1) and (2). However, when we investigate the interaction term for being risk averse and remitting outside of the immediate family, the results support our hypothesis that more self-insurance motivated remittances are sent to the network members outside of the immediate family.

5. Discussion

Our results suggest that there is a positive relationship between risk aversion and remittances. Given that we control for individual key characteristics, this measure is a good proxy for the inherent risk preference of individuals in the domain of money. In addition, this type of risk measure has been validated using real monetary incentives for the German Socioeconomic Panel study by Dohmen *et al.* (2011), which lends confidence that this hypothetical question is able to capture actual risk attitudes in the domain of money of the individuals in our survey.

As stated in Section 2.2, even though self-insurance and other exchange-motivated remittances are distinct concepts that we can precisely define at the theoretical level, they behave similarly with respect to risk aversion and so we cannot use the theoretical model to devise one empirical test to distinguish them. The empirical examination we do when checking for the role of risk aversion after controlling for migrant's savings is an attempt to

isolate more precisely the self-insurance mechanism. However, according to our model it is not perfectly narrowed down and may still include other related exchange-motivated transfer components. Therefore, the effect we identify when we observe a positive relationship between risk aversion and remittances may include both self-insurance transfers (in the sense that they will give rise to bad-state contingent transfers) and exchange-motivated transfers (that will provide future income to the migrant regardless of the state of nature that realizes).

Although we are not able to separate out the exchange motive from the self-insurance motive completely, our analysis of the relationship between risk aversion and remittances to family and non-family members (Table 9) suggests that bequest motives, which are salient exchange motives, do not seem to be driving migrant remittances in our results.⁷

We are also able to test the relationship between wage risk and remittances. As in Amuedo-Dorantes and Pozo (2006) we also found evidence that migrants on temporary contracts are more likely to remit than those with permanent contracts. However, we include an additional test to support the suggestion that the link between wage risk and remittances is due to the insurance motive by interacting the contract type variables with our risk preference variable. As suggested by our hypothesis, we find that having a non-permanent contract is only significantly related to remittances for the risk-averse individuals in our sample.

Given that migrants who intend to return are more likely to benefit from the support of network members after return, we also investigated the link between intention to return and the probability of remitting. Although we find no strong significant link between the intention to return and remittances in general, we do find a significant positive link for this relationship for risk-averse individuals. This corresponds to the insurance motive for remittances as risk-averse individuals have a stronger preference to purchase insurance, and these risk-averse individuals with an intention to return have a higher incentive to remit for insurance purposes as they are most likely to benefit from this insurance.

We also look at the relationship between the employment status of the network member and remittances. We expect that employed network members are more likely to have the resources to assist migrants in case of difficulty and are therefore more likely targets of remittances sent with the purpose of self-insurance. We find that although risk-loving migrants are less likely to send remittances if network members are employed, risk-averse migrants are more likely to send remittances if network members are employed. This supports the hypothesis that risk-averse migrants have a higher preference for insurance and therefore remit more when networks have a more stable situation. Risk-loving individuals have a lower preference for insurance and are more likely to remit for other motives, such as altruism, in which case we would expect a negative link between the financial resources of the network and remittances.

6. Conclusions

The relationship between risk aversion and remittance behaviour was tested using a representative household survey of the immigrant population in the Greater Dublin Area, in

7 Additional results suggesting that the bequest motive to remit is not prevalent in our study show that more risk-averse migrants are more likely to remit to younger recipients, and no more likely to remit to less healthier recipients (as proxied by their communication flows). Additional detail on these results is available from the authors on request.

Ireland. We find a statistically significant positive relationship between immigrant risk aversion and the probability to remit and the amount remitted by individuals in our sample.

The results suggest that being risk averse is associated with an increase in the probability of remitting of around 40 percentage points and an increase in the amount remitted of around 30 percentage points. Examining specific groups in our sample, we find that migrants on temporary contracts, those expressing an intention to return, and those with employed network members are more likely to remit the more risk averse they are. This relationship is robust to different specifications.

Our results, that more remittances are sent by risk-averse immigrants, particularly those who face higher wage risks and to those individuals with more financial resources, is consistent with self-insurance although we cannot, with our data, rule out other exchange motives to remit. The use of an individual risk aversion variable allowed us to investigate the self-insurance remittance motive in a novel way, accounting for relevant unobservable characteristics of immigrants, whilst strengthening the case already made in support of this hypothesis in previous literature. This is an important suggestive finding for policy making in a world where the magnitude and importance of remittance flows particularly for developing countries keeps growing. Future research may build on our findings and attempt to further disentangle self-insurance from other exchange-motivated remittances more precisely by collecting longer-term panel data on reverse remittances and wealth transfers from network members at home to migrants in the receiving country.

Acknowledgements

We thank the editor, two anonymous referees, Pedro Pita Barros, Gaia Narciso, Pedro Vicente, and participants in several seminars and international conferences for helpful comments.

Funding

This work was supported by the Irish Research Council (IRC), Trinity College Dublin, and Nova Forum at the Nova School of Business and Economics. This paper is based on a representative immigrant survey funded by the EU NORFACE Programme on International Migration.

References

- Agarwal, R. and Horowitz, A. (2002) Are international remittances altruism or insurance? Evidence from Guyana using multiple-migrant households, *World Development*, 30, 2033–44.
- Ahn, T. (2010) Attitudes toward risk and self-employment of young workers, *Labour Economics*, 17, 434–42.
- Altonji, J., Hayashi, F., and Kotlikoff, L. (1992) Is the extended family altruistically linked? Direct tests using micro data, *American Economic Review*, 82, 1177–98.
- Altonji, J., Hayashi, F., and Kotlikoff, L. (1997) Parental altruism and inter vivos transfers: theory and evidence, *Journal of Political Economy*, 105, 1121–66.
- Amuedo-Dorantes, C. and Pozo, S. (2006) Remittances as insurance: evidence from Mexican immigrants, *Journal of Population Economics*, 19, 227–54.
- Amuedo-Dorantes, C. and Pozo, S. (2011) Remittances and income smoothing, *American Economic Review*, 101, 582–87.

- Andreoni, J. and Vesterlund, L. (2001) Which is the fair sex? Gender differences in altruism, *Quarterly Journal of Economics*, 116, 293–312.
- Andreoni, J. and Miller, J. (2002) Giving according to GARP: an experimental test of the consistency of preferences for altruism, *Econometrica*, 70, 737–53.
- Arrondel, L. and Masson, A. (2006) Altruism, exchange or indirect reciprocity: what do the data on family transfers show?, In S. Kolm and J. M. Ythier (eds), *Handbook on the Economics of Giving, Reciprocity and Altruism*, Elsevier, Amsterdam.
- Ashraf, N., Aycinena, D., Martinez, C., and Yang, D. (2015) Savings in transnational households: a field experiment among migrants from El Salvador, *Review of Economics and Statistics*, 97, 332–51.
- Batista, C. and Narciso, G. (2013) Migrant remittances and information flows: evidence from a field experiment, IZA Discussion Paper 7839, Bonn.
- Batista, C., and Umblijs, J. (2014) Migration, risk attitudes, and entrepreneurship: evidence from a representative immigrant survey, *IZA Journal of Migration*, 3, 1–25.
- Batista, C., Silverman, D., and Yang, D. (2015) Directed giving: evidence from an inter-household transfer experiment, *Journal of Economic Behavior and Organization*, forthcoming.
- Becker, G. S. (1974) A theory of social interactions, *Journal of Political Economy*, 82, 1063–94.
- Bettin, G., Lucchetti, R., and Zazzaro, A. (2012) Endogeneity and sample selection in a model for remittances, *Journal of Development Economics*, 99, 370–84.
- Binzel, C. and Fehr, D. (2013) Giving and sorting among friends: evidence from a lab-in-the-field experiment, *Economics Letters*, 121, 214–17.
- Bonin, H., Dohmen, T., Falk, A., Huffman, D., and Sunde, U. (2007) Cross-sectional earnings risk and occupational sorting: the role of risk attitudes, *Labour Economics*, 14, 926–37.
- Brown, R. and Jimenez, E. (2011) Subjectively-assessed welfare and international remittances: evidence from Tonga, *Journal of Development Studies* 47, 829–845.
- Brown, R., Leeves, G., and Prayaga, P. (2014) Sharing norm pressures and community remittances: evidence from a natural disaster in the Pacific islands, *Journal of Development Studies* 50, 383–398.
- Caliendo, M., Fossen, F., and Kritikos, A. (2010) The impact of risk attitudes on entrepreneurial survival, *Journal of Economic Behavior and Organization*, 76, 45–63.
- Camerer, C. and Fehr, E. (2004) Measuring social norms and preferences using experimental games, in J. Henrich and R. Boyd, S. Bowles, C. Camerer, E. Fehr, and H. Gintis (eds), *Foundations of Human Sociality: Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies*, Oxford University Press, Oxford, 55–95.
- Chort, I., Gubert, F., and Senne, J. (2012) Migrant networks as a basis for social control: remittance incentives among Senegalese in France and Italy, *Regional Science and Urban Economics*, 42, 858–74.
- Cox, D. (1987) Motives for private income transfers, *Journal of Political Economy*, 95, 508–46.
- Cox, D., Eser, Z., and Jimenez, E. (1998) Motives for private transfers over the life cycle: an analytical framework and evidence for Peru, *Journal of Development Economics*, 55, 57–80.
- Cox, D. and Fafchamps, M. (2007) Extended family and kinship networks: economic insights and evolutionary directions, in R. Rodrik and M. Rosenzweig (eds), *Handbook of Development Economics*, vol 4, pp. 3711–84, Amsterdam, Elsevier.
- Cox, D., Hansen, B., and Jimenez, E. (2004) How responsive are private transfers to income? Evidence from a laissez-faire economy, *Journal of Public Economics*, 88, 2193–219.
- Cragg, J. 1971. Some statistical models for limited dependent variables with application to the demand for durable goods, *Econometrica*, 39, 829–44.
- De la Briere, B., Sadoulet, E., De Janvry, A., and Lambert, S. (2002) The roles of destination, gender, and household composition in explaining remittances: an analysis for the Dominican Sierra, *Journal of Development Economics*, 68, 309–28.
- DellaVigna, S., List, J., and Malmendier, U. (2012) Testing for altruism and social pressure in charitable giving, *Quarterly Journal of Economics*, 127, 1–56.

- De Weerdt, J., Genicot, G., and Mesnard, A. (2014) Asymmetry of information within family networks, IZA Discussion Paper 8395, Bonn.
- Dohmen, T., Falk, A., Huffman, D., Schupp, J., Sunde, U., and Wagner, G. (2011) Individual risk attitudes: measurement, determinants, and behavioral consequences, *Journal of the European Economic Association*, 9, 522–50.
- Galarza, F. and Carter, M. (2011) Risk preferences and demand for insurance in Peru: a field experiment, Working Paper 11-08, Universidad del Pacífico.
- Gubert, F. (2002) Do migrants insure those who stay behind? Evidence from the Kayes area (Western Mali), *Oxford Development Studies*, 30, 267–87.
- Hill, R., Robles, M., and Ceballos, F. (2013) Demand for weather hedges in India: an empirical exploration of theoretical predictions. IFPRI discussion paper 1280, Washington, DC.
- Ilahi, N. and Jafarey, S. (1999) Guestworker migration, remittances and the extended family: evidence from Pakistan, *Journal of Development Economics*, 58, 485–512.
- Kazianga, H. (2006) Motives for household private transfers in Burkina Faso, *Journal of Development Economics*, 79, 73–117.
- Leider, S., Mobius, M., Rosenblat, T., and Do, Q. (2009) Directed altruism and enforced reciprocity in social networks, *Quarterly Journal of Economics*, 124, 1815–51.
- Ligon, E., and Schechter, L. (2012) Motives for sharing in social networks, *Journal of Development Economics*, 99, 13–26.
- Lucas, R., and Stark, O. (1985) Motivations to remit: evidence from Botswana, *Journal of Political Economy*, 93, 901–18.
- Osili, U.O. (2007) Remittances and savings from international migration. Theory and evidence using a matched sample, *Journal of Development Economics*, 83, 446–65.
- Petrolia, D., Landry, C., and Coble, K. (2013) Risk preferences, risk perceptions, and flood insurance, *Land Economics*, 89, 227–45.
- Rapoport, H., and Docquier, F. (2006) The economics of migrants' remittances, in J. Mercier-Ythier and S. C. Kolm (eds) *Handbook on the Economics of Giving, Altruism and Reciprocity*, Amsterdam, Elsevier.
- Sinning, M. (2011) Determinants of savings and remittances: empirical evidence from immigrants to Germany, *Review of Economics of the Household*, 9, 45–67.
- Van Praag, C., Cramer, J. (2001) The roots of entrepreneurship and labour demand: individual ability and low risk aversion, *Economica*, 68, 45–62.
- World Bank. (2011) *Migration and Remittances Factbook 2011*, Washington, DC, World Bank Publications.
- Yang, D. and Choi, H. (2007) Are remittances insurance? Evidence from rainfall shocks in the Philippines, *World Bank Economic Review*, 21, 219–48.
- Zimmermann, K., Bonin, H., Constant, A., and Tatsiramos, K. (2009) Native-migrant differences in risk attitudes, *Applied Economics Letters*, 16, 1581–86.

Appendix: Lottery question

Respondents were asked the following question:

Please consider what you would do in the following situation. Imagine that you had won €100,000 in a lottery.

Almost immediately after you collect the winnings, you receive the following financial offer from a reputable bank, the conditions of which are as follows:

- There is the chance to double the money within two years.
- It is equally possible that you could lose half of the amount invested within two years.

You have the opportunity to invest the full amount, invest part of the amount, or reject the offer.

Question: What share of your lottery winnings would you be prepared to invest in this financially risky, yet lucrative investment?

Table A1. Survey response scale

Nothing, I would decline the offer	0
€100	1
€500	2
€1,000	3
€5,000	4
€10,000	5
€20,000	6
€40,000	7
€60,000	8
€80,000	9
All €100,000	10
