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When the Cat's Away...
The Effects of Spousal Migration on Investments on Children

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Abstract

This paper analyzes the effects of parental migration on children left behind in order to understand whether and how the effects of migration on children depend on which of their parents migrates. I describe the migration of one of the spouses as a sequential game in which the spouse who migrated chooses how much to send back to the spouse left behind in the form of remittances and then the latter decides how to allocate his total available budget within the household. A similar mechanism generates no difference in the share of total household income devoted to investment on children no matter which of the parents migrates, even when the two spouses have different preferences. These predictions are tested using data from Indonesia, where female migration is particularly widespread.
To solve the selection problems entailed in the comparison between households with migrant fathers and households with migrant mothers, I focus on households that have at least one migrant parent and develop a model in which the decision about whether to send the man or the woman eventually depends on the expected returns and risk associated to each of the two choices. These measures will provide me with a set of instrumental variables to test the theoretical model.
In accordance with the predictions of the model I find that the difference in children related expenditure is not significant between households in which mothers migrate and households in which fathers do. On the other hand I find that in households with migrant mother a significantly larger share of income is devoted to adult goods consumption;this difference reflects the difference in tastes for investment on children between men and women.

Keywords: Migration, Gender, Human Capital
JEL Codes: F22, O15, J13

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1 Introduction

In a context of global increase of international migration of workers, a relatively more recent phenomenon is represented by the sharp increase in female independent migration. This phenomenon, sometimes referred to as *feminization of migration*, regards the migration of female workers on their own without their families.

The most significant flows of female migrants are probably those of women from less developed countries who migrate to more developed ones to work as domestic workers and remain in the destination country for a few years before going back to their country of origin and rejoin their families. Scholars have suggestively labeled such phenomenon as "the global nanny chain" (Lan, 2006) or "the servants of globalization" (Parrenas, 2001) or "the globalization of household production" (Kremer and Watt, 2006).

Because the phenomenon is relatively recent and because these migrants often elude the official patterns and thus do not appear on the records, the economic literature has so far given them little attention. Nevertheless the everyday experience shows how massive some of these flows are: the Romanian women migrating to western European countries, those coming from the Philippines and Indonesia, as well as those migrating to the US from Latin America or even those migrating within Latin America such as the Peruvians to Chile.

While some studies have looked at the impact of migrant inflows on the destination countries' labour markets (Bhagwati and Hamada (1974), Borjas (1995), Borjas (1999), Kremer and Watt (2006)), considerably fewer have analyzed the impact of such phenomena on the sending country and on the households of origin.

The present work aims at analyzing the differential effects of parental migration on investments on children depending on whether it is the mother of the child that leaves or the father. Several studies have showed that women have stronger preferences for investing on children than men (for example Duflo (2003), Thomas (1990), Qian (2008)). Therefore the change in the structure of the household that is caused by migration is likely to have different effects depending on who migrates (see Chen (2009) on migration, but also a similar reasoning applies to the paper by Gertler et al. (2004)). Understanding whether and how migration of the father or of the mother differently affects the children left behind can have important policy implications: for instance it can help governments as well as non governmental organizations decide about how to target financial and non financial support to the families of migrants[1], or provide useful insights for the regulation of migration both in sending and receiving countries; indeed while receiving countries

[1]UNICEF, for example, promotes policy research on migration and children left behind with a special focus on gender issues

increasingly adopt policies that allow the immigration of female domestic workers from developing countries to face the ageing of their population and to encourage the labor force participation of the local women[2], sending countries are starting to perceive the dangers entailed by the massive outflows of local women and react by putting legal limits to emigration, the most impressive example being that of Sri Lanka, which in 2008 passed a law to ban the international migration of mothers of children under the age of five.

The existing literature has prominently used the existence and the structure of migrants' networks to predict migration decisions (Bansak and Chezum (2009), Hanson and Woodruff (2003), Hildebrandt and McKenzie (2005), Mansuri (2006)) and thus retrieve the effects of parental migration on the household left behind.
Much less numerous are then the contributions of the literature to the choice of female migration; to the best of my knowledge there currently are only two: Lauby and Stark (1988) and de la Briére et al. (2002). Both suggest that female migration would be a means to provide the family left behind with a more stable and reliable source of income than what would be in case of male migration, this because the jobs chosen by migrant women are typically less risky than those chosen by men (Lauby and Stark, 1988) and because women are intrinsically more attached to the family left behind and thus send more remittances (de la Briére et al., 2002).

I will build on this literature to design a model where female migration arises whenever the income for women at destination is either higher or less volatile than that of men and where the consequent allocation of resources will take into account the difference in preferences between men and women over investment on children.

The paper is structured as follows: section 2 describes the model of migration choice and of intra-household allocation of resources of the household; section 3 introduces the data employed; section 4 is dedicated to the identification and estimation strategy; section 5 shows the estimation results; finally section 6 provides some robustness checks and section 7 concludes.

[2]Similar policies are for instance in place in Hong Kong and Singapore, as analyzed in Kremer and Watt (2006)

2 A Model of Household Migration choice

2.1 The choice of the migrant

I model the migration choices of the household building on the intuition given by Lauby and Stark (1988) for whom female migration would represent a *safer* investment than male migration for the twofold reason that women are more reliable in sending back remittances, because they are typically more attached to the household of origin, and that the jobs that women get upon migration usually provide more stable streams of income.

In this setting, I will imagine that a rational, utility optimizing, risk averse household is faced with a risky source of income and thus decides to gain control of this risk through the diversification of its income sources. I assume that such diversification will take place through the placement of the “best suited” member of the household in a different location where income streams are not correlated with those at the original location.

In this model I further assume that the household decides *who* migrates but does not decide *where* the migrant will go, I will only assume that men and women would migrate to different places. Although it might be interesting to also model the decision of where to go, it is widely documented that migrants tend to show very little variation in the choice of their destinations, following instead quite stable patterns of migration from one place to the other.

What the household has to decide is who to send away between the two spouses, given the assigned gender-specific destination. To model this decision I will borrow the terminology of Modern Portfolio Theory (Markowitz, 1952): I imagine therefore that “woman migrates” and “man migrates” are two risky assets that can each be coupled with another risky asset which consists in “man stays” and “woman stays”. The combination of such assets therefore generates four types of *portfolios*:

1. Man migrates and woman stays
2. Woman migrates and man stays
3. Both spouses stay in their original location
4. Both spouses migrate to an alternative location

What I want to model is the choice of the household between portfolio 1 and portfolio 2.

As in Modern Portfolio Theory, I assume that each asset’s returns are normally distributed and define risk as the standard deviation of return. A portfolio will thus be a

linear combination of assets.
Therefore the returns associated to each migration portfolio will be a weighted average[3] of the constituent assets' returns, while portfolio risk (volatility) will be a linear combination of each component asset's own volatility and their covariance.

The expected returns of portfolios 1 (man migrates and woman stays) and 2 (woman migrates and man stays)[4] are thus:

$$\begin{aligned} E(R_m) = & \frac{1}{2}E(w_m^d) + \frac{1}{2}E(w_f^h) \\ E(R_f) = & \frac{1}{2}E(w_f^d) + \frac{1}{2}E(w_m^h) \end{aligned} \tag{1}$$

where $E(w_m^d)$ represents expected wages for men upon migration (at destination) and $E(w_f^h)$ the expected wages for women if they do not migrate (at home); symmetrically then $E(w_f^d)$ are expected wages for women upon migration and $E(w_m^h)$ the expected wages for men if they do not migrate.

The risk associated to the two portfolios will instead be:

$$\begin{aligned} \sigma_m^2 = & \frac{1}{4}Var(w_f^h) + \frac{1}{4}Var(w_m^d) + \frac{1}{2}Cov(w_m^d, w_f^h) \\ \sigma_f^2 = & \frac{1}{4}Var(w_m^h) + \frac{1}{4}Var(w_f^d) + \frac{1}{2}Cov(w_f^d, w_m^h) \end{aligned} \tag{2}$$

I assume that the household's utility is increasing in the expected returns of the portfolio chosen and decreasing in the associated risk. I also consider that household's degree of risk aversion (β_h) will amplify their taste for risk and in some cases determine which one is the preferred portfolio.

Indeed, let's consider the case in which:

1. $E(w_m^d) > E(w_f^d)$: Men earn on average more than women at destination;

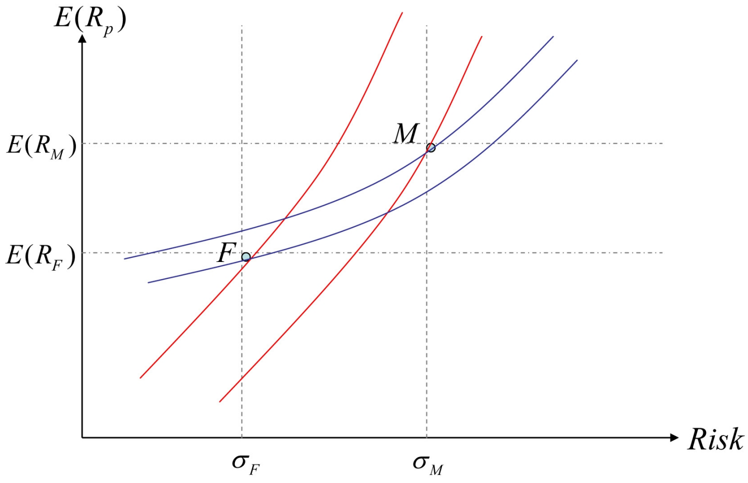
2. $Var(w_m^d) > Var(w_f^d)$: Men's income is more volatile than women's upon migration.

Under such conditions we get that portfolio 1 (man migrates and woman stays) entails higher expected returns , but also higher risk, than portfolio 2 (Figure 1).

[3] Given the particular nature of the problem we are examining in which the only possible diversification is to allocate the two spouses to different sources of income the weights assigned to the two component assets will necessarily be 1/2 and 1/2

[4] I will denote portfolio 1 (man migrates and woman stays) by subscript m to indicate that it is the man that migrates whereas I will use subscript f for portfolio 2 to indicate that it is the female spouse who migrates.

Figure 1: Returns-Risk Profiles of Migration Portfolios



In Figure 1 the red indifference curves are those of a more risk averse household whereas the blue ones are those of a less risk averse one. The graph shows that in a similar case more risk averse households (red indifference curves) will prefer female migration (portfolio 2) whereas less risk averse households (blue indifference curves) will prefer male migration (portfolio 1).

The maximization problem faced by the household will thus be that of maximizing expected returns holding risk fixed and minimizing risk holding expected returns fixed.

2.2 The Allocation of resources within the household

Having decided together which member of the household should migrate so that the expected returns are maximized while risk is minimized, the spouses are faced with two types of decisions: the migrant has to decide how much to remit to the household left behind, while the spouse who stayed at home has to decide how to allocate resources within the household. These two decisions are taken sequentially: first the migrant spouse decides how much to remit; then the spouse left behind decides how to allocate his total available budget, which will consist of his own income and the remittances received.

The household is composed of the two spouses who earn some positive income and decide on the allocation of the household budget and by kids who do not earn any income and do not participate in the decision making process. The man and the woman's preferences are such that each i gets utility from the consumption of some private good

X_i and from that of a common good Z which instead yields utility to both spouses.

Call X_f the vector of the woman's private goods and X_m that of the man's. We imagine that Z, the vector of common goods, contains all children related expenditure, i.e. both parents benefit from investment on children. However preferences are such that the woman always weighs expenditure on children more than the man in her utility functions[5].

Assuming Cobb-Douglas preferences, I can express the preferences of men and women in the following way:

$$\begin{aligned} U_m &= \alpha \log X_m + (1-\alpha) \log Z \\ U_f &= \beta \log X_f + (1-\beta) \log Z \end{aligned}$$

where the fact that men have a stronger preference for personal consumption over investment on children than women do is simply captured by imposing:

$$\alpha > \beta \tag{3}$$

With income pooling and equal bargaining power between the spouses, the utility maximization problem the household wishes to solve when no migration occurs will be the following:

$$\begin{aligned} \max_{X_f, X_m, Z} \quad & \alpha \log X_m + (1-\alpha) \log Z + \beta \log X_f + (1-\beta) \log Z \\ s.t.: \quad & X_m + X_f + Z = Y_m + Y_f \end{aligned}$$

Which simply yields the following conditions:

$$\begin{aligned} X_m^0 &= \frac{\alpha}{2}(Y_m + Y_f) \\ X_f^0 &= \frac{\beta}{2}(Y_m + Y_f) \\ Z^0 &= \left(1 - \frac{\alpha+\beta}{2}\right)(Y_m + Y_f) \end{aligned} \tag{4}$$

Suppose now that the woman migrates: she will have to decide how much to send back in the form of remittances (R). Once the husband receives the remittances from his wife, he decides how to spend the total budget available.

[5]The fact that women have stronger preferences for investing on children than men has been showed in many papers among which Duflo (2003), Thomas (1990), Qian (2008)

The problem can be solved through backward induction: the husband decides how to allocate the budget available to him according to his own preferences; the wife anticipates this allocation and incorporates the husband's choice in her decision problem to choose how much of her income to send back in remittances.

The problem is thus a two-stage one where at the second stage the man solves:

$$\begin{aligned} \max_{X_m, Z} \quad & \alpha \log X_m + (1-\alpha) \log Z \\ s.t.: \quad & X_m + Z = Y_m + R \end{aligned}$$

Solving this yields:

$$\begin{aligned} Z^* &= (1-\alpha)(Y_m + R) \\ X_m^* &= \alpha(Y_m + R) \end{aligned} \tag{5}$$

In the first stage of the game the migrant wife anticipates the husband's choice and decides how much to send back through remittances by solving:

$$\begin{aligned} \max_{R} \quad & \beta \log X_f + (1-\beta) \log Z \\ s.t.: \quad & X_f = Y_f - R \\ & Z = Z^* = (1-\alpha)(Y_m + R) \end{aligned}$$

She will hence choose to send remittances:

$$R^* = Y_f - \beta(Y_m + Y_f)$$

The equilibrium allocations of the sequential game described are therefore:

$$\begin{aligned} X_m^* &= \alpha(1-\beta)(Y_m + Y_f) \\ X_f^* &= \beta(Y_m + Y_f) \\ Z^* &= (1-\alpha)(1-\beta)(Y_m + Y_f) \end{aligned} \tag{6}$$

It is straightforward to solve the symmetric problem for the case in which it is the husband that migrates and sends back remittances. In this case we would get the following equilibrium allocations:

$$\begin{aligned} X_m^{**} &= \alpha(Y_m + Y_f) \\ X_f^{**} &= \beta(1-\alpha)(Y_m + Y_f) \\ Z^{**} &= (1-\alpha)(1-\beta)(Y_m + Y_f) \end{aligned} \tag{7}$$

with remittances sent by the husband being:

$$R^{**} = Y_m - \alpha(Y_m + Y_f)$$

Because of the the ability of the migrant to anticipate the allocation that will be chosen by the spouse left behind, the model predicts that the share of household income devoted to children will be the same no matter which one of the spouses migrates. This is because the non-migrant parent wants to shift away resources from children onto his private consumption, but this can be offset by the migrant parent through remittances.
Denote with small letters the share of income devoted to each type of consumption goods, we have:

$$z^* \quad = \quad z^{**}$$

the share of total household income spent on expenditure on children will be the same no matter which of the parents migrates (where $z^* = \frac{Z^*}{Y_m+Y_f}$ and $z^{**} = \frac{Z^{**}}{Y_m+Y_f}$).

On the other hand, the person who migrates is always better off than the person left behind whose level of private consumption will depend on the "generosity" of the migrant spouse. For example a comparison between shares of total household income spent for consumption of the husband's private goods when he migrates and when instead it is the wife who migrates shows that:

$$x_m^{**} - x_m^* = \ \alpha - \alpha(1-\beta) = \beta$$

Which means that the "loss" that the non migrant spouse experiences is proportional to the degree of "selfishness" of the migrant spouse (where $x_m^{**} = \frac{X_m^{**}}{Y_m+Y_f}$ and $x_m^* = \frac{X_m^*}{Y_m+Y_f}$).

It further appears that the spouse who migrates is always better off than when nobody migrates, for example for men:

$$x_m^{**} - x_m^0 = \alpha - \frac{\alpha}{2} = \frac{\alpha}{2} \quad > \quad 0$$

While the one left behind gains from migration of the spouse only when the latter is "generous enough"; for example the man left behind gets a larger share of total household income when his wife migrates compared to the case in which nobody migrates if $\beta < \frac{1}{2}$:

$$x_m^{*} - x_m^0 \;=\; \alpha(1-\beta) - \frac{\alpha}{2} \quad > \quad 0 \qquad\qquad \text{for } \beta < \frac{1}{2}$$

Finally the share of income spent on children is always lower than in the case in which both parents remain in the household: this is because the parent left behind will always have an incentive to shift resources away from the children onto his own private consumption whenever his spouse is away.

$$z^0 \quad > \quad z^*, z^{**} \qquad\qquad\qquad \text{for any } \alpha, \beta$$

3 Data

This paper uses the data on Indonesian families provided by the Indonesia Family Life Survey (IFLS)[6]. The IFLS is an ongoing longitudinal survey of Indonesian households which started in 1993 and contains a sample that is representative of about 83% of the total Indonesian population, containing over 30,000 individuals living in 13 of the 27 provinces of Indonesia.

These data give me the possibility of tracking individuals over time and thus to detect migration. Indeed for all individuals who appeared in the first wave of the survey the IFLS roster provides information on where they currently are (if they are not in the household anymore), why and when they left and how much they earned in the past twelve months. This will allow me to partition the sample of households with children in: households with no migrants, households with migrated mother, households with migrated father and households with both father and mother that have migrated leaving their children behind.

[6]For an introduction to the dataset see Thomas et al. (2010)

Table 1 shows the actual partition of households with children in the 2007 IFLS sample.

Table 1: Households' *portfolio* choices. IFLS 2007.

	Woman Migrates	Woman Stays
Man Migrates	40	258
Man Stays	152	9,186

I will define migrants as those adult people who have left the household and are reported to having done so for work reasons or explicitly to help the family. For every child under the age of 18, I then check whether his father or mother migrated and assign the child to the relative group. Aim of the paper is that of comparing households of children with migrated fathers to households with migrated mothers. Table 6 shows descriptive statistics for the different types of households.

Tables 2 and 3 below show that the shares of migrants have steadily increased over time: from the time of the first interview more than one household out of four had at least one member that had migrated (and not come back).

Table 2: Sample size. IFLS.

Wave	Individuals	Migrants	%	Households	Migrant Households	%
1993	33,081	-	-	13,536	-	-
1997	38,250	1,701	4.45	7,699	1,304	16.94
2000	49,429	2,792	5.66	10,435	2,022	19.38
2007	62,935	6,185	9.83	13,536	3,787	27.98

Moreover Table 3 shows that there are significant gender differences: almost two thirds of migrants are men, but women are twice as likely as men to migrate internationally and this is particularly true for mothers versus fathers. On the other hand mothers tend to stay away for a period of time that is significantly shorter than that of fathers.

Table 3: Migrants by gender. IFLS 2007.

	Number	% of total migrants	% of men migrants	% of women migrants	% international	Migration Spell (years)
Men	3,939	63.70	100	-	7.74	4.61
Fathers	261	4.22	6.62	-	16.15	3.403
Women	2,245	36.30	-	100	16.99	4.21
Mothers	158	2.55	-	7.04	63.46	2.078

Finally, data from the Indonesian Statistical Office (BPS, 2007) give a hint of what jobs the Indonesian migrants perform when they migrate internationally. There is strikingly little variation in the types of jobs performed at destination by Indonesian migrants: 53% of migrants who had been abroad in 2007 had worked as domestic helpers, while 42% as either construction, factory or plantation workers.
Although I am not able to split such information by the gender of the migrant, I can still see a difference between typical female jobs and typical male jobs. Indeed domestic workers are very likely to be the female migrants, whose total percentage is in fact around 55% of total international migrants, while the construction, factory and plantation workers are likely to be the men.

4 Estimation Strategy

I want to estimate an equation in which I look at the shifts in the shares of total household expenditure from one category of consumption goods to another. A similar equation represents the direct translation into estimation equation of the model introduced in section 2.2. Indeed we will think that there are some types of expenditure, such as that for education or food, which well proxy for household's investment on children (Z in the model of section 2.2).

I will estimate an equation of the following type:

$$w_{ih} = \alpha_{ih} + \beta_i \ln n + \gamma F_h + \delta X_h + u_{ih} \tag{8}$$

where on the left hand side I have the share of total household income allocated to expenditure for commodity i, and on the right hand side I have the number of members in the household n together with household's observable characteristics X_h, and a term F_h which indicates that the household is one in which the mother of the children in the household has migrated, while the father did not, F_h will be zero if instead it was the

father who migrated and the mother remained with the children.
The coefficient of interest is thus γ, associated to the term F_h; this will provide us with a measure of the *difference* between the budget allocation of households with migrant mothers and households with migrant fathers. Given that households belonging to the two groups of interest do not differ with respect to their structure, it is possible to compare them to retrieve the effects of migration of one of the spouses.

Estimating the effects of migration and how they differ depending on the gender of the migrant spouse entails problems of endogenous selection into treatment of two types: first there is a problem of *selection into migration* as households that decide to send some member out for migration will likely differ from the others on both observable and unobservable characteristics; secondly there is a problem of *selection into female migration* because households from which it is the mother that migrates are likely to differ from those from which the father migrates in a number of unobservable factors that might as well influence the variables of outcome we are looking at.

These ideas are confirmed by Table 6, which shows that households with no migrants are on average smaller, richer, more from urban areas, more educated and with younger children than households from which either the mother or the father migrated. Moreover households from which it is the mother that migrated appear to be more rural, less educated and poorer than those from which it is the father that migrated. It is therefore very likely that these households differ on other unobservable characteristics as well.

This paper relies on the assumption that the decision of *selection into migration* and that of *selection into female migration* are not taken jointly: the household decides whether someone should migrate first and then decides which member.
With respect to the first choice, i.e. *selection of households into migration*, I will simply condition on households having decided to send out a member for migration and focus on the decision of which member should migrate.

This estimation choice, nevertheless, comes at a cost in terms of identification: indeed, following this approach, I will not be able to separately estimate the effect of female versus male migration from the effect of migration per se; in other words I will only identify the effect of female migration in households in which either the woman or the man have migrated but not in households in which no one has migrated.
Such identification issue, though, should not affect the reliability of my estimates because there is no theoretical reason to expect migration of mothers from non migrant households to have opposite effects than migration of mothers from migrant households; so,

as long as this assumption holds, the sign of the coefficients I estimate will be correct, although the true parameters would be smaller in absolute value.

In order to control for *selection into female migration*, I will exploit the intuition of the model described in section 2 and thus find a set of instrumental variables that may influence the decision of migrant households about which of the spouses to send out for migration but will not have any direct effect on the outcome variables of equation 8.

The model of section 2 is translated into the data by first assigning a destination to each individual. To do so I identify for each household the year in which the migration decision has been taken as that in which the migrant (whether the man or the woman) has departed; I then look at the destinations chosen by the previous migrants from the same village and take the destination that was most popular among female migrants as destination for women and the one that was most popular among male migrants as destination for men.
This choice is justified by the finding that migrants from the same village tend to choose the same destination (Table 4); this can be interpreted both as the consequence of the formation of *networks of migrants*, which is also well documented in the migration literature (Patel and Vella (2007), Lafortune and Tessada (2010)), but also can be justified by the widespread use in South Asia of recruiting agencies which are connected to other agencies in a foreign country and therefore tend to send all the people of the village they visit to the same destination (Suradji, 2004). Table 8 shows the gender specific destinations assigned to each household.

Table 4: Migrants per village. IFLS 2007.

	Men	Women
Adults per village	55.31	58.70
	[40.99]	[42.29]
Migrants per village	15.64	9.39
	[14.002]	[9.185]
% Migrants at same destination	.617	.622
	[0.231]	[0.234]

*Standard deviations reported in brackets

Once I have assigned a destination to each household, I exploit again the information about previous migrants. Thus I generate, for every destination and year of migration decision, a measure of expected returns and risk by taking the mean and standard deviation of the incomes of all male and female migrants that migrated to that destination, and then I combine them as in equations 1 and 2.

For what regards the covariance between income at home and income at destination, instead, I exploit the longitudinal dimension of the data, and compute the covariance for every village-destination pair across waves.

The case suggested in Section 2, in which female migration is on average associated with lower but more certain expected wages than male migration is confirmed in the data:

Table 5: Expected Returns and Risk from Migration Portfolios (log).

	Men	Women
$E(w_i^d)$	16.218	15.945
	[.516]	[.360]
$Var(w_i^d)$	16.390	15.912
	[.881]	[.556]
$Cov(w_i^d, w_j^h)$	32.051	32.030
	[1.235]	[.902]
$E(R_i)$	16.029	16.046
	[.408]	[.347]
σ_i	16.177	16.106
	[.788]	[.566]

*Standard deviations reported in brackets

Table 5, as well as Figures 2 and 3, show that while the expected value and variance of wages of female migrants at destination are stochastically dominated by the expected value and variance of wages of male migrants, once we combine the assets into portfolios as described above the difference becomes much less significant.

In line with the model of section 2, I will include in the regressions a measure of risk aversion, which will be included as a control variable on its own and then as an instrumental variable when interacted with the level of risk of respectively male and female migration. Risk aversion is captured in the IFLS through a number of questions in which individuals are faced with a series of lotteries with hypothetical high stakes and, depending on the path of answers they give, they are assigned a level of risk aversion between 0 and 4. Assuming that decisions are taken jointly by the spouses and that there is assortative matching on risk aversion, I use the level of risk aversion of the head of the household or, if that is missing, I take the level of risk aversion of the spouse.

Figure 2: Expected Wages and Returns from Migration Portfolios

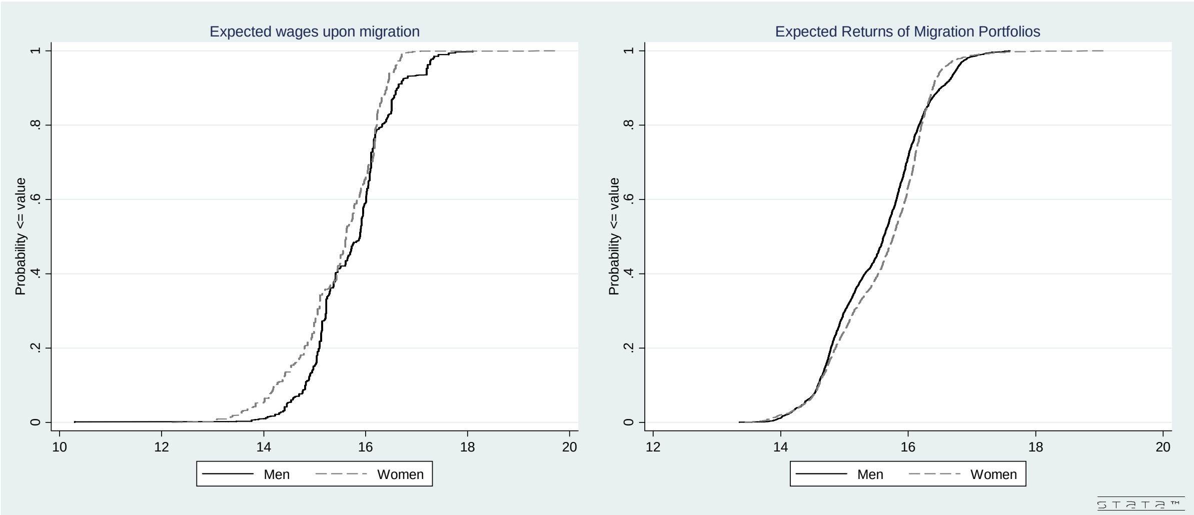
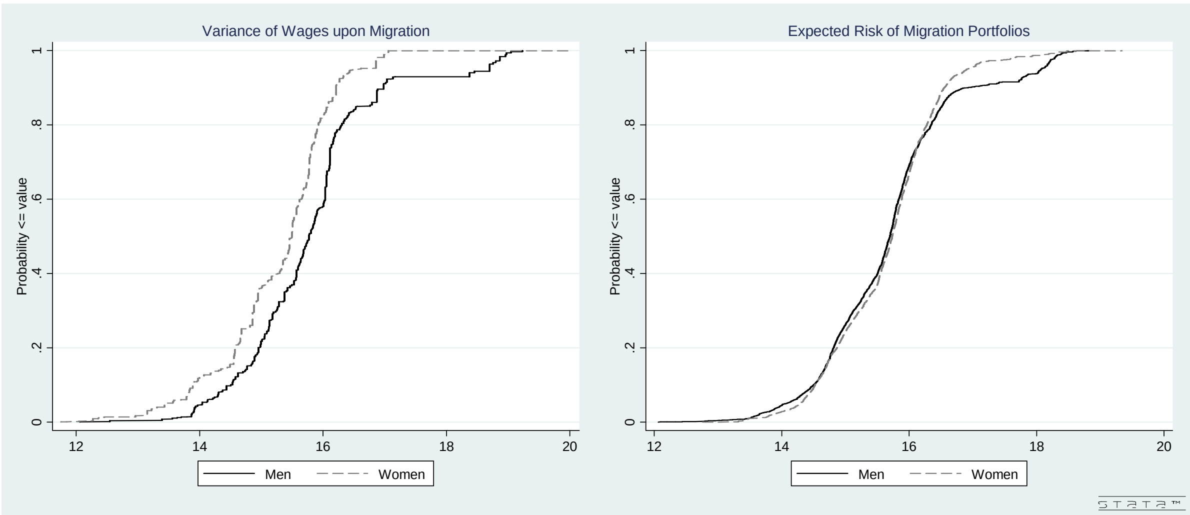


Figure 3: Expected Risk from Migration Portfolios



In terms of validity of these instruments I imagine that households will make their migration decision based on the information they have about the possibilities they might have at destination, thus it is reasonable to believe that the experience of previous migrants best represents the information set available to potential migrants.

On the other hand, the excludability of these instrumental variables is less straightforward: in order for the wages of previous migrants not to be directly correlated with the outcome variables, I will need to assume that they are not influenced by unobserved characteristics of the migrant but are somehow exogenous and thus non migrants would be faced with the same wages if they migrated. Such assumption is supported by the data reported by the Indonesian Statistical Office (BPS, 2007) about jobs of international migrants which I mentioned in section 3 : there is very little variation in the type of jobs that migrants get upon migration and they are all low skilled jobs, for this reason we can reasonably assume that the wages are fixed and exogenous. Moreover, at least for women, there is vast anecdotal evidence that they are hired to go work abroad as domestic workers under standard contracts that specify the same wage and duration of employment for all (Suradji, 2004).

5 Results

In order to estimate Equation 8, I first need to to create a measure of total household income. To do so I follow Dai et al. (2011) who have estimated the distribution of household income using the same data from the fourth wave of the IFLS. As in their study, income is computed as the summation of five components: labour income; income from agricultural business; income from non agricultural business; household non labour income (scholarships, pensions, other transfers); household assets income.
Following Dai et al. (2011) I have also estimated income for households for which it was missing using a two step Heckman procedure that exploits a dummy variable for whether the respondent is the head of the household to predict the probability of response in the first stage. Table 7 shows descriptive statistics for the levels of household income (actual and predicted) and expenditure for households with migrant fathers and households with migrant mothers, together with the shares of income allocated to the various types of commodities.

Equation 8 is first estimated through OLS, the results are reported in Table 9. Table 9 shows that households in which mothers have migrated spend significantly more on adult goods[7] and less on non food items[8]. The shift is about four percentage points, while the difference on expenditure on other types of goods is not significant. The results are robust to the inclusion of a set of control variables derived from table 6.

[7]These are coffee, tea, tobacco and alcohol. The use of adult goods to detect son preferences has been suggested by Deaton (1997)

[8]Non food items include: Electricity, Water, Fuel, Telephone, Personal Toiletries, Household items, Domestic Services, Recreation and Entertainment, Transportation, Sweepstakes, Clothing for children and adults, Household Supplies and Furniture, Ritual Ceremonies, Charities and Gifts, Taxes, Others such as Cars, Television Sets, Mobile Phones, etc..

If households from which mothers migrate are poorer, more rural and less educated than households from which fathers migrate (table 6), then for example the OLS coefficient associated to non food items or that associated to education will likely be downward biased. For this reason, in order to control for the possibility that households from which mothers migrate differ from those from which it is the father who leaves, I proceed to estimate equation 8 by Two Stage Least Squares (TSLS).

Table 10 shows the results of the First Stage regression: columns (1)-(3) use only the *destination side* of the migration portfolios and show that female migration arises when it is associated with higher expected returns and lower variance than male migration; columns (4)-(6) then use the measures of expected returns and risk of migration portfolios constructed according to equations 1 and 2. The signs still confirm the existence of a tradeoff between expected returns and expected risk.

For all specifications, the last three rows of the table report the values of the Cragg Donald F Statistic of excluded instruments (Cragg and Donald, 1993) and of the Hansen J test of overidentifying restrictions (Hansen, 1982) with its p-value for the cases in which the number of instruments exceeds the number of endogenous variables (all columns except 1 and 4). A first look at these values convinces us that the best set of instruments to employ is that of columns (2)-(3), i.e. the relative measures of profitability and riskiness of female versus male migration, as the F statistic is highest and the test of overidentifying restrictions does not reject the null hypothesis that all instruments are exogenous.

Table 11 then shows the results of the TSLS estimation of equation 8. If we compare these results with those of the OLS, we observe that the increase in adult expenditures is larger than it was in the OLS, while the decrease of non food items becomes non significant.
The results are in line with what the model in section 2.2 predicts: the difference in the share of household income devoted to investment on children (here expenditure on food, health and education) is not significantly different between households from which the man migrated and households from which it was the woman that migrated. This was due to the possibility of the migrant spouse to control the amount of remittances to send back home in a way so as to offset the shifts in the allocation of the household budget that would be made by the spouse left behind.

On the other hand, the model was predicting that the share of household income

devoted to adult's private consumption when the woman migrated was $x_m^* = \alpha(1-\beta)$ while the share of household income devoted to adult private consumption when it was the man that migrated was $x_f^* = \beta(1-\alpha)$.
The coefficient estimated in column (5) of table 11 is thus the difference between the two shares: $\alpha(1-\beta) - \beta(1-\alpha) = \alpha - \beta > 0$.
The associated positive sign thus confirms that men have a larger preference for private consumption over investment on children than women and that this difference ranges between 13.6 and 18.6 percentage points. In other words men's preferences are such that they would like to spend around 15 percentage points more than women on private consumption rather than on expenditure on common goods.

I compare these estimates with the existing literature on models of intrahousehold allocation to verify their validity. Many authors have provided robust evidence that women have stronger preferences for consumption on common goods than men do: Thomas (1990), Lundberg et al. (1994), Duflo (2003) all show that income accruing to women generates larger benefits for children than that accruing to men.

Unfortunately it is generally difficult to compare the magnitude of their estimates with those found in this paper because typically both the outcome and the explanatory variables are defined differently. Nevertheless I believe that there are at least two papers which contain comparable estimates they use as outcome variables the shifts in the shares of household expenditure like I do. Aggregating their shares in a way that is comparable to the one used in this paper, Hoddinott and Haddad (1995) show that the shares of the household budget allocated to adult goods are between 3.2 and 6.6 percentage points lower in the case in which the woman earns the whole household budget with respect to the case in which it is the man. Similarly Attanasio and Lechene (2002) find that a 100% increase of the woman's household income share generates a decrease in the share of expenditure allocated to alcohol and tobacco between 19 and 40 percentage points. The two papers just cited do not provide an exact test of the model introduced in this paper because the presence of the spouse, even when she does not contribute to the household's income at all, is likely to affect the choice of how to allocate it.

Another paper I would like to relate my results to is then Ashraf (2009): she uses an experimental setting in the Philippines to test whether husbands and wives have different preferences over the allocation of the household budget and how information and communication affect their choices. Interestingly, she shows that in situations in which one of the spouses receives a temporary shock to income and the other spouse is not able to control how he spends this extra budget (in the setting of her experiment this is the "Private" treatment), 60.4% of men versus 52.1% of women choose to deposit that money on their own private account rather than converting it into food vouchers. This is a rough test of the difference in the "generosity" parameters included in the parents' utility functions described in section 2: this difference can be interpreted as $\alpha - \beta = 8.3\%$, a number quite close to the estimates of table 13.

6 Robustness Checks

The first concern I have relates to the possibility that the instruments employed might be *weak*: if they do not have enough explanatory power in the first stage then TSLS estimates risk to be biased towards the corresponding OLS estimates.

A general test of the weakness of the instruments is based on the analysis of the F-statistic (Stock and Yogo, 2002): it can be proved that whenever this gets small, the bias of TSLS approaches that of OLS. In order to assess whether the F statistic of the excluded instruments is big enough, I follow Stock and Yogo (2002) and compare the value of the Cragg Donald F Statistic with the threshold values they tabulated. I find that the Cragg Donald F statistic of my TSLS only exceeds the critical value corresponding to 20% size of test.

The bias in TSLS is an increasing function of the number of instruments employed, while the just identified TSLS is approximately unbiased. For this reason my first test of the robustness of the coefficients estimated consists in estimating equation 8 using only the most powerful instrument I have, namely $E(w_f^d)/E(w_m^d)$. Results are reported in Table 12: the F Statistic is now high enough to exceed the 15% critical value as tabulated by Stock and Yogo (2002); the difference between households with migrant mothers and households with migrant fathers in their allocation of the household budget to adult goods is now larger than in the baseline TSLS, which confirms that the latter is slightly biased towards the OLS estimator. Nevertheless none of the coefficients estimated in this table is statistically different from those of table 11 as the test in the last row confirms.

In the case of overidentified models, the Limited Information Maximum Likelihood Estimator (LIML) is median-unbiased. This estimator performs particularly well in small samples and whenever the number of instruments is large. Stock et al. (2002) have compared the critical values for the weak instrument test based on the first stage F Statistic for a number of estimators and showed that, whenever the model is overidentified, the LIML is the estimator with the lowest threshold values for the F Statistic. They also show that LIML and Fuller-k estimator (with $\alpha = 1$) generally have smaller critical values than TSLS. For this reason, in table 13, I have reestimated the model using a set of alternative estimators for which the critical values for the F Statistic are lower. In the table I also report the corresponding critical values tabulated by Stock and Yogo (2002). As expected, the LIML estimates are the most unbiased ones as the value of the F Statistic exceeds the 10% critical value of 8.68.

Table 13 also includes estimates with two Fuller-k estimators (Fuller, 1977). When errors are normally distributed and instruments are fixed, the Fuller-k with $\alpha = 1$ is best unbiased to second order (Rothenberg, 1984). While the critical values for the F Statistic are not significantly lower than those for TSLS, this estimator has been proved to yield more precise estimates than both TSLS and LIML when instruments are weak. Fuller (1980) has shown that for an estimator of the coefficients in the linear model, the value $\alpha = 4$ yields smaller mean squared error than any smaller value of α, while $\alpha = 1$ gives a nearly unbiased estimator. Both Fuller estimators anyway generate a substantial reduction in the mean square error (MSE) relative to TSLS and LIML. In table 13 both these estimators produce coefficients that are very close to the TSLS and LIML ones, with the Fuller-k with $\alpha = 1$ being closer to the LIML and the Fuller-k with $\alpha = 4$ almost equal to the TSLS.

As predicted by Blomquist and Dahlberg (1999), the absolute magnitude of the coefficients estimated through LIML is slightly larger than the TSLS estimates, as are the standard errors, but the fact that the difference between the coefficients estimated with the different procedures is negligible reinforces our hypothesis that the instruments have enough predictive power. Indeed, if they were weak, the TSLS estimates would have been much closer to the OLS ones than to the LIML ones.

Although the Test of Overidentifying restrictions has systematically not rejected the hypothesis that the instruments are not directly correlated to the outcome variables, I have performed a further test of exogeneity of the instruments. As specified in section 4, the instruments I am employing are essentially time (of migration) and village specific. One might therefore be concerned that some villages have unobserved characteristics that have traditionally pushed their migrants to a certain destination and therefore, while the wages at destination are exogenous, the destination itself would not. For example it might be the case that a village that is very badly connected through infrastructures has less probability of sending its migrants overseas. In particular one needs to make sure that it is not the case that poorer villages systematically send women to more attractive destinations than men. If that was the case then I may well be concerned about the fact that my results are driven by village specific unobserved characteristics (for example lack of schools and other infrastructures).

I thus regress a number of village specific characteristics on our instruments to check that there is no correlation between the two. The results are reported in table 14 and show no clear pattern of correlations which gives us enough confidence about the actual exogeneity of our instruments.

As a last check I performed some Montecarlo simulations to assess the robustness of the estimates. I have drawn 1000 random samples, adequately calibrated to reproduce the correlation between endogenous and outcome variable of the real sample, and I have estimated the TSLS and the LIML coefficients for each drawn.
Table 15 reports the averages and standard deviations of the coefficients estimates, together with the corresponding Cragg Donald F Statistic, the p-value of the test of overidentifying restrictions and the confidence interval corresponding to the test of equality between the coefficient estimated from the simulated sample and the ones estimated from the real sample and reported in table 13.

The coefficients estimated are very similar to those of table 11, I do not reject that they are equal in more than 95% of the cases (*coverage*). Moreover the F Statistic is now systematically larger than 10, which is above the 20% level of the Stock and Yogo (2002) critical values for the TSLS, and above the 10% one for the LIML estimator. Finally, the test of overidentifying restrictions leaves us little doubt about the possibility that the instruments are not exogenous.

7 Concluding Remarks

In this paper I looked at the effects of parental migration on investments on children left behind. The main concern is that migration of one of the spouses may be associated with a shift of resources away from the children due to a moral hazard problem; as the migrant would lose the ability to observe the behavior of the spouse left behind, this would create for the latter incentives to shift away resources from the common good (investment on children) onto the private ones. I find that when the migrant decides how much to send back home in the form of remittances and, sequently, the spouse left behind chooses how to allocate the available budget within the household, the Subgame Perfect Nash equilibrium is one in which the share of total income devoted to children is the same no matter which of his parents migrates. This is because remittances act as a device in the hands of the migrant for controlling the decisions of the spouse left behind.

In order to account for the problems of endogenous selection implied, I modeled the decision of the household with regard to which member to send out for migration as a returns/risk comparison and I showed that households prefer to send the member who is expected to earn more upon migration and whose earnings will be less volatile (less risky). For this reason households which are more risk averse will prefer to send away for migration the spouse whose earnings upon migration are expected to be less uncertain, even if lower; this is generally the case of female migration.

I tested the predictions of this model on data from Indonesia, where female migration is particularly high, and showed that the share of total income devoted to children related expenditure does not change significantly between the case in which the father migrates and that in which it is the mother that leaves.

I also proved that the difference in the share of total household income devoted to private adult consumption between the case in which the mother migrates and that in which it is the father is positive and reflects the difference in tastes for private consumption, as predicted by the model of section 2. The difference between fathers' and mothers' "generosity" is around 15 percentage points.

The findings of this paper indicate that female migration has no detrimental effects on their children, compared to migration of the father, as long as the migrant mothers have the possibility of sending remittances in an efficient way. For this reason it is crucial to improve the quality of remittance services as only this allows migrant women to ensure that their children receive all the cares they desire.

Further research should broaden the research question addressed in this paper to estimate the *total* effect of parental migration on children by comparing children with one migrant parent with children with none.

Finally studying the effects of the *feminization of migration* on children left behind should include some analysis of the behaviors of female migrants upon return to their country of origin and to their household. The experience acquired by such women during their migration spell will presumably induce significant changes in the household's decision making process, changes which might eventually generate further benefits for the children.

Table 6: Households' Characteristics. IFLS 2007.

	(1) Non Migrant Households	(2) Migrant Father	(3) Migrant Mother	(4) Difference (2) - (3)
Size of Household	4.012	4.574	4.605	-0.031
	(1.981)	(1.944)	(1.798)	
Rural	0.451	0.519	0.671	-0.152***
	(0.498)	(0.501)	(0.471)	
Muslim	0.890	0.930	0.958	-0.028
	(0.313)	(0.255)	(0.202)	
Number of Children (< 18)	1.237	2.043	2.072	-0.029
	(1.183)	(1.113)	(1.055)	
Age of Children	8.749	9.722	10.41	-0.688*
	(4.797)	(3.749)	(3.303)	
Gender of Children	0.495	0.475	0.500	-0.025
	(0.406)	(0.364)	(0.361)	
Years of Education Mother	8.280	7.638	7.027	0.611*
	(3.841)	(3.648)	(2.762)	
log Total Expenditure	15.36	15.18	14.95	0.23***
	(1.034)	(0.875)	(0.688)	

Standard deviations reported in parenthesis

Table 7: Household income levels and shares

	(1) Migrant Father	(2) Migrant Mother
log Total Income	15.67	15.895
(actual values)	(1.287)	(1.081)
	[193]	[133]
log Total Income	16.251	16.264
(predicted values)	(0.717)	(0.621)
	[254]	[147]
log Total Expenditure	15.15	14.93
	(0.905)	(0.659)
	[255]	[148]
Shares of total income spent on:		
Food	0.764	0.582
	(0.858)	(0.667)
	[254]	[147]
Non Food	2.025	0.398
	(14.923)	(0.435)
	[254]	[147]
Education	0.171	0.137
	(0.304)	(0.157)
	[254]	[147]
Health	0.058	0.027
	(0.292)	(0.094)
	[254]	[147]
Adult	0.06	0.107
	(0.133)	(0.133)
	[254]	[147]

Standard deviations reported in parenthesis

Number of observations reported in brackets

Table 8: Household gender specific destinations, 2007

Destination Assigned	Men		Women	
	No.	%	No.	%
Sumatra	1	0.01		
N Aceh Darussalem	4	0.03	9	0.07
North Sumatra	824	6.16	702	5.3
West Sumatra	264	1.97	302	2.28
Riau	99	0.74	51	0.39
Jambi			0	0
South Sumatra	526	3.93	406	3.06
Bengkulu	2	0.01		
Lampung	594	4.44	389	2.93
Riau Islands	1	0		
Jakarta	1,609	12.02	1655	12.49
West Java	3,237	24.19	2583	19.49
Central Jawa	1,798	13.43	1909	14.41
Yogyakarta	249	1.86	251	1.89
East Jawa	2,301	17.2	2616	19.74
Banten	46	0.35	13	0.1
Bali	289	2.16	246	1.86
West Nusa Tenggara	307	2.29	259	1.96
Central Kalimantan	12	0.09		
South Kalimantan	279	2.08	273	2.06
East Kalimantan	24	0.18	65	0.49
Central Sulawesi			37	0.28
Nort Sulawesi	15	0.11		
South Sulawesi	401	3	389	2.94
Southeast Sulawesi	32	0.24		
West Sulawesi	1	0.01		
Irian Jaya	2	0.02		
Malaysia	459	3.43	263	1.98
Singapore			4	0.03
Taiwan			3	0.02
Saudi Arabia	2	0.01	749	5.65
Timor Leste	4	0.03		
United Arab Emirates			74	0.56
Total	13,380	100	13249	100

Table 9: OLS Estimation. Household Level.

	Shares of Total Household Income spent on:				
	(1)	(2)	(3)	(4)	(5)
	Food	Non Food	Education	Health	Adult
A. No controls					
Migrant Mother	-0.206**	-1.961	-0.038	-0.028	0.056***
	(0.096)	(1.382)	(0.030)	(0.020)	(0.017)
Size of Household	-0.402***	1.515	0.103	-0.456	-0.003
	(0.104)	(2.575)	(0.178)	(0.300)	(0.078)
Observations	337	337	337	337	337
R^2	0.053	0.009	0.023	0.051	0.045
B. Controls included					
Migrant Mother	-0.104	-0.632	-0.012	-0.019	0.062***
	(0.079)	(0.724)	(0.022)	(0.019)	(0.017)
Size of Household	-0.032	3.861*	-0.036	-0.080	0.000
	(0.099)	(2.077)	(0.031)	(0.052)	(0.019)
Observations	337	337	337	337	337
R^2	0.376	0.338	0.097	0.064	0.078

Controls are: Rural Household, Education of Mother, log Total Household Expenditure

Standard errors robust to village level clustering in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Table 10: First Stage Regression.

	Migrant Mother							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$E(w_f^d)/E(w_m^d)$	0.149***	0.297***	0.315***	0.308***				
	(0.057)	(0.101)	(0.101)	(0.099)				
$Var(w_f^d)/Var(w_m^d)$		-0.092*	-0.089*	0.039				
		(0.048)	(0.048)	(0.106)				
$RA \times Var(w_f^d)/Var(w_m^d)$				-0.032				
				(0.026)				
$E(R_f)/E(R_m)$					0.059	0.241	0.365**	0.383**
					(0.069)	(0.185)	(0.180)	(0.174)
σ_f/σ_m						-0.089	-0.114	0.003
						(0.081)	(0.079)	(0.128)
$RA \times \sigma_f/\sigma_m$								-0.030
								(0.031)
Observations	379	372	337	321	377	369	334	318
R^2	0.026	0.046	0.081	0.090	0.002	0.010	0.053	0.066
F Statistic	10.03	8.840	9.487	6.437	0.746	1.919	4.017	3.317
Hansen J Statistic		0.985	0.755	1.211		0.542	0.131	0.591
p-value		0.321	0.385	0.546		0.462	0.717	0.744

Controls are: Rural Household, Education of Mother, log Total Household Expenditure

Standard errors robust to village level clustering in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Two Stage Least Squares Estimation. Household Level.

	Shares of Total Household Income spent on:				
	(1)	(2)	(3)	(4)	(5)
	Food	Non Food	Education	Health	Adult
A. No controls					
Migrant Mother	0.026	-3.190	-0.082	0.089	0.165**
	(0.335)	(5.009)	(0.112)	(0.150)	(0.083)
Size of Household	-0.419***	-1.450	-0.074***	-0.114	-0.027
	(0.102)	(1.289)	(0.023)	(0.070)	(0.022)
Observations	337	337	337	337	337
Uncentered R^2	0.443	0.0208	0.278	0.0163	0.162
F Statistic	8.604	8.604	8.604	8.604	8.604
Hansen J Statistic	0.847	1.290	1.025	1.018	0.812
p-value	0.357	0.256	0.311	0.313	0.367
B. Controls included					
Migrant Mother	-0.293	-8.203	-0.082	0.082	0.149**
	(0.337)	(7.552)	(0.102)	(0.135)	(0.074)
Size of Household	-0.027	4.077*	-0.034	-0.083	-0.002
	(0.102)	(2.316)	(0.030)	(0.054)	(0.021)
Observations	337	337	337	337	337
Uncentered R^2	0.633	0.262	0.329	0.0652	0.230
F Statistic	9.374	9.374	9.374	9.374	9.374
Hansen J Statistic	0.723	0.908	0.775	0.771	0.637
p-value	0.395	0.341	0.379	0.380	0.425

Controls are: Rural Household, Education of Mother, log Total Household Expenditure

Standard errors robust to village level clustering in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Robustness Checks: IV Estimates, only one instrument

	Shares of Total Household Income spent on:				
	(1)	(2)	(3)	(4)	(5)
	Food	Non Food	Education	Health	Adult
Migrant Mother	-0.153	-5.750	-0.017	0.150	0.186**
	(0.342)	(6.156)	(0.126)	(0.158)	(0.087)
Size of Household	-0.031	4.007*	-0.036	-0.085	-0.003
	(0.100)	(2.226)	(0.029)	(0.057)	(0.022)
Observations	337	337	337	337	337
Uncentered R^2	0.639	0.309	0.341	-0.000855	0.155
F Statistic	14.03	14.03	14.03	14.03	14.03
χ^2 test	0.17	0.11	0.41	0.26	0.24
p-value	0.677	0.745	0.521	0.612	0.623

Controls are: Rural Household, Education of Mother, log Total Household Expenditure

Excluded Instrument: $E(w_f^d)/E(w_m^d)$

Robust standard errors in parentheses

χ^2 test: null is that coefficients estimated are not statistically different from those of table 11

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Robustness Checks: Weak Instruments

	Shares of Total Household Expenditure					Cragg -Donald	Stock-Yogo weak ID		
	(1)	(2)	(3)	(4)	(5)	F Statistic	test critical values		
	Food	Non Food	Education	Health	Adult		10%	20%	30%
OLS	-0.104	-0.632	-0.012	-0.019	0.062***				
	(0.079)	(0.724)	(0.022)	(0.019)	(0.017)				
TSLS	-0.293	-8.203	-0.082	0.082	0.149**	9.374	19.93	8.75	7.25
	(0.337)	(7.552)	(0.102)	(0.135)	(0.074)				
IV	-0.153	-5.750	-0.017	0.150	0.186**	14.03	16.38	6.66	
	(0.342)	(6.156)	(0.126)	(0.158)	(0.087)				
LIML	-0.299	-8.498	-0.086	0.088	0.154**	9.374	8.68	4.42	3.92
	(0.348)	(7.873)	(0.107)	(0.143)	(0.078)				
Fuller ($\alpha = 1$)	-0.288	-8.063	-0.081	0.082	0.149**	9.374	10.89	9	7.49
	(0.329)	(7.400)	(0.101)	(0.135)	(0.073)				
Fuller ($\alpha = 4$)	-0.262	-6.995	-0.071	0.067	0.136**	9.374	10.89	9	7.49
	(0.282)	(6.277)	(0.087)	(0.116)	(0.062)				

Controls: Rural Household, Education of Mother, log Total Household Expenditure

Standard errors robust to village level clustering in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Table 14: Robustness Checks: Exogenous Instruments

	(1) % of Households with electricity	(2) Elementary Schools	(3) Junior High Schools	(4) Number of Midwives	(5) Health Posts	(6) Distance to Coach Station	(7) Distance to Post Office
$E(w_f^d)/E(w_m^d)$	-5.901	-0.599	0.316	-0.115	0.950	23.984	-0.950
	(4.430)	(0.499)	(0.283)	(0.106)	(1.233)	(21.131)	(1.940)
$Var(w_f^d)/Var(w_m^d)$	3.782**	0.293	-0.336**	0.015	0.264	-11.480	-1.190
	(1.815)	(0.226)	(0.163)	(0.048)	(0.540)	(8.781)	(0.872)
Observations	12,217	12,766	12,686	8,796	12,190	9,229	10,183
R^2	0.0188	0.0046	0.0217	0.0056	0.0155	0.0105	0.0299

Unit of observation is household

Standard errors robust to village level clustering in parenthesis

*** p<0.01, ** p<0.05, * p<0.1

Table 15: Robustness Checks: Montecarlo Simulations

	Shares of Total Household Expenditure				
	(1) Food	(2) Non Food	(3) Education	(4) Health	(5) Adult
OLS	-0.104	-0.623	-0.011	-0.020	0.062
	(0.079)	(1.171)	(0.033)	(0.028)	(0.016)
TSLS	-0.113	-2.556	-0.084	0.068	0.14
	(0.348)	(4.922)	(0.141)	(0.124)	(0.075)
Coverage	[0.969]	[0.962]	[0.964]	[0.964]	[0.951]
Cragg Donald F	10.669	10.693	10.723	10.719	10.624
Hansen J Statistic - pvalue	0.502	0.503	0.503	0.502	0.504
LIML	-0.113	-2.744	-0.092	0.074	0.146
	(0.393)	(5.571)	(0.164)	(0.139)	(0.084)
Coverage	[0.968]	[0.968]	[0.965]	[0.968]	[0.956]
Cragg Donald F	10.669	10.693	10.723	10.719	10.624
Hansen J Statistic - pvalue	0.504	0.505	0.506	0.505	0.508

Standard Deviations in parenthesis

Number of iterations = 1,000

Coverage is the frequency with which the hypothesis of equality between coefficient estimated from actual sample and coefficient estimated from simulated sample has not been rejected

Controls included

Standard errors robust to village level clustering

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