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Migrant Remittances Received in Mexico: Gender Implications and Remittances' Impact on Children's Education and Nutrition

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Abstract

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By Sveta Milusheva

As remittances become an increasingly more important source of income for developing countries, it is necessary to critically examine their effect on issues of development, specifically focusing on the role that gender plays in the relationship between remittances and development. This study looks at three different gender effects on remittances in Mexico using the National Survey of Household Income and Spending. First, it examines the effect that the gender of the children has on the amount of remittances sent back, finding that there is a tendency of more remittances being sent back to households with male children as compared to those households with female children. Second, it looks at the effect of remittances on education, finding that remittances tend to be spent on boys' education but not on girls' education. And finally, it examines the effect of remittances on food spending, finding that in remittance receiving households headed by women, more is spent on education than in households headed by men, and the gender of the children does have some effect on the amount spent on food.

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I. Introduction

Remittances, the money sent by migrant workers back to their home countries, are a significant transfer of funds, mostly coming from developed countries and going into developing countries. At the start of the 21st century, an estimated 175 million people, or about 3% of the world population, worked and lived outside the country of their birth, and in 2008 remittances were at an estimated $433,086,774,000 (Adams et al 2005; WDI 2009). Mexico received a significant percentage of those world remittances, with a total of $26,304,300,000 in 2008, making up 2.42% of its GDP (WDI 2009). With such large numbers, Mexico receives more remittances than any other country except for India and China.

Considering the vast quantity of remittances being received, many have questioned and begun to study the development impact of these remittances, and currently a debate exists concerning whether remittances have a positive or negative impact. If evidence were to suggest that remittances have a positive effect on development, then it would be important to further examine this to find how remittances could be harnessed to have an even bigger impact on the development of lower income countries. If, on the other hand, it were indicated that remittances have a negative impact on development, then it might become necessary to construct policies that would help curb this impact, possibly even encouraging a decrease in remittances or the channeling of remittance funds in other directions. When looking at the effect of remittances on development, another important aspect to consider is the role of gender and whether there are gender differences in this impact. For example, if boys and girls are affected differently by remittances, although in some respects remittances could be helping with

development, at the same time they would be increasing the gender disparity that already exists in many low income countries. Thus, looking at the effects of remittances based on gender is key to truly understanding some of the overall development effects of remittances.

This paper enters the debate by exploring the development impact that remittances received in Mexico have on the receiving families using the 2008 Encuesta Nacional de Ingresos y Gastos de los Hogares (National Household Survey of Income and Spending, ENIGH). More specifically, the paper focuses on three different issues focused around gender differences. First, it analyzes whether the gender of the children has an effect on the amount of remittances sent back to Mexico. It then looks at whether the money sent back by migrant workers is used for the education of the children, which would suggest a positive impact on development, and whether there is a gender difference in how it is used, which could illustrate an increase in gender disparity. It also explores whether the gender of the head of household affects spending on education. Finally, it examines how remittances influence spending on food items compared to non-remittance receiving families, whether the gender of the children influences the spending, as well as how the gender of the head of household influences this spending.

The findings of this paper show some compelling outcomes that have potentially important policy implications. First, although the data shows no significant effect of the gender of the children on the amount of remittances received, there is a tendency that boys significantly affect the amount of remittances received while girls do not, and the coefficient on boys is consistently higher than that on girls across regressions, implying that some gender effect could be occurring. With spending on education, the data

consistently indicates that remittances significantly influence spending on boys' education while they do not affect spending on girls' education, suggesting that remittances could be contributing to an amplification of the gender gap. There is also a trend in the data showing that female heads of household tend to spend more on girls' education, although this is not significant except in the case that specifically examines rural areas. For nutrition, the findings show that in remittance receiving households headed by females, more tends to be spent on food and most food categories, while in non remittance receiving households, in fact more tends to be spent in male headed households. These findings could imply that the overall effect of remittances on development is mitigated by gender; therefore, any policies concerning using remittances as a tool for development must take into account and reduce the gender differences that remittances are causing.

II. Background on Remittances as a Development Tool

Over the last fifteen years, the amount of worker remittances coming into the developing world has increased tremendously. In 1995, it was recorded that US$ 57.5 billion of remittances flowed into the developing world. By 2000 that number had increased to US$84.5 billion, and in 2006 it reached US$ 221.3 billion, growing by 384.9 percent since 1995 (Ratha 2008). It would seem that such large quantities of money coming into the developing world would lead to positive economic growth, but this question remains largely divided as there exist opposing views of the effect of remittances on development.

A number of researchers point out problems that can arise from remittances and how they may in fact lead to decreased growth. The negative impacts most often cited are

dependency on remittances, neglect of local productive activities, and inflation. Households can become extremely dependent on the inflow of remittances; a study found that on average, remittances of Bangladeshi migrants living in Japan accounted for 70% of household income (De Bruyn 2006). This can be a major setback because remittances are very unpredictable, often affected by the economy of the host country as well as other external shocks. For example, during the 1991 Gulf crisis when 1.5 million Egyptian workers were unexpectedly repatriated, it negatively impacted the country's budget (Ghosh, 2006, 62). Since remittances exemplify such volatility, it is not possible for them to be a reliable source of economic development.

In addition, Russell (1986) has found that remittances, rather than being spent on locally produced consumer goods, are spent on imported ones. This not only decreases the potential multiplier effect of the remittances as they do not help support businesses in the country, but it also increases import demand and inflation (Russell, 1986). Inflation occurs because as more money is spent on imports, the balance of payments problem is intensified, and the country then decreases the value of its currency in order to cover the deficit. In addition, some claim that remittances do not result in significant investment because in general remitters tend to send family members only enough money to provide for basic needs; therefore, their unpredictable and small nature renders investment particularly difficult (Meyers 2002, 65).

Another claim is that remittances affect local productive activities. Meyers (2002), looking at El Salvador, states that while the nature of the remittances is too small to foster investment, it nevertheless is more than other earnings and has affected people's

attitudes toward work, and in that way has negatively impacted the labor market participation of non-migrants. Also, Ahmad and Zohara (cited in De Bruyn 2006) find that in migrant households in Sylhet, 30% of income came from agriculture and businesses, while the other 70% came from remittances, but in households without any migrant workers abroad, the main sources of income came from these sectors, suggesting that those who received remittances no longer felt the need to participate as actively in local production.

Chami et al (2005) raise another argument against remittances as a development tool by using the economics of the family to create a model implying that remittances are compensatory transfers rather than profit-driven transfers. This model suggests that a negative correlation should exist between GDP growth and remittances, which holds true in their data set, underlining that "remittances do not act like a source of capital for economic development" (Chami et al 2005, 56).

Yet there are also numerous counterarguments that promote remittances as a source of economic development. The remittances, first of all, directly benefit those who may need them most, providing for basic needs like food and clothing as well as education (which helps to foster the advancement of human capital that may eventually lead to future development) (Mansoor 2007). Brown (2006) states that spending on consumer goods leads to Keynesian multiplier effects, which refers to an initial rise in spending leading to an even greater increase in national income. This side of the argument also claims that remittances are in fact a potential source of savings and investment capital formation that can be used for development in addition to allowing for

the import of capital goods and raw materials that can promote industrial development (Russell 1986).

A number of empirical studies indicate that remittances lead to increased economic development and challenge some of the arguments made by those who claim that remittances impede growth. Studies have illustrated high levels of savings from remittance incomes, especially in Asia. In Sri Lanka, 44 percent of remittance incomes were saved, and in Thailand 58 percent were saved. In addition it has been found that remittances have a statistically and economically significant impact on private investment, a private investment increase of 0.6 percent occurring for every one percentage point increase in remittances (Ghosh 2006). Therefore the argument that remittances are used only for consumption is not necessarily valid. In addition, the argument of remittances leading to inflation due to increased imports is disputed by surveys in migrant-sending countries which show that in rural areas a large part of remittances is in fact spent on locally produced goods and services. In the 1980s Pakistani worker migration to the Gulf States "led to an extensive grass roots transformation of the rural economy" (Ghosh 2006, 67). In addition, there is evidence of a positive effect of remittances on investment in Morocco, Egypt, Mexico and several transitioning Eastern European countries (Lucas 2005).

III. Background on Remittances to Mexico

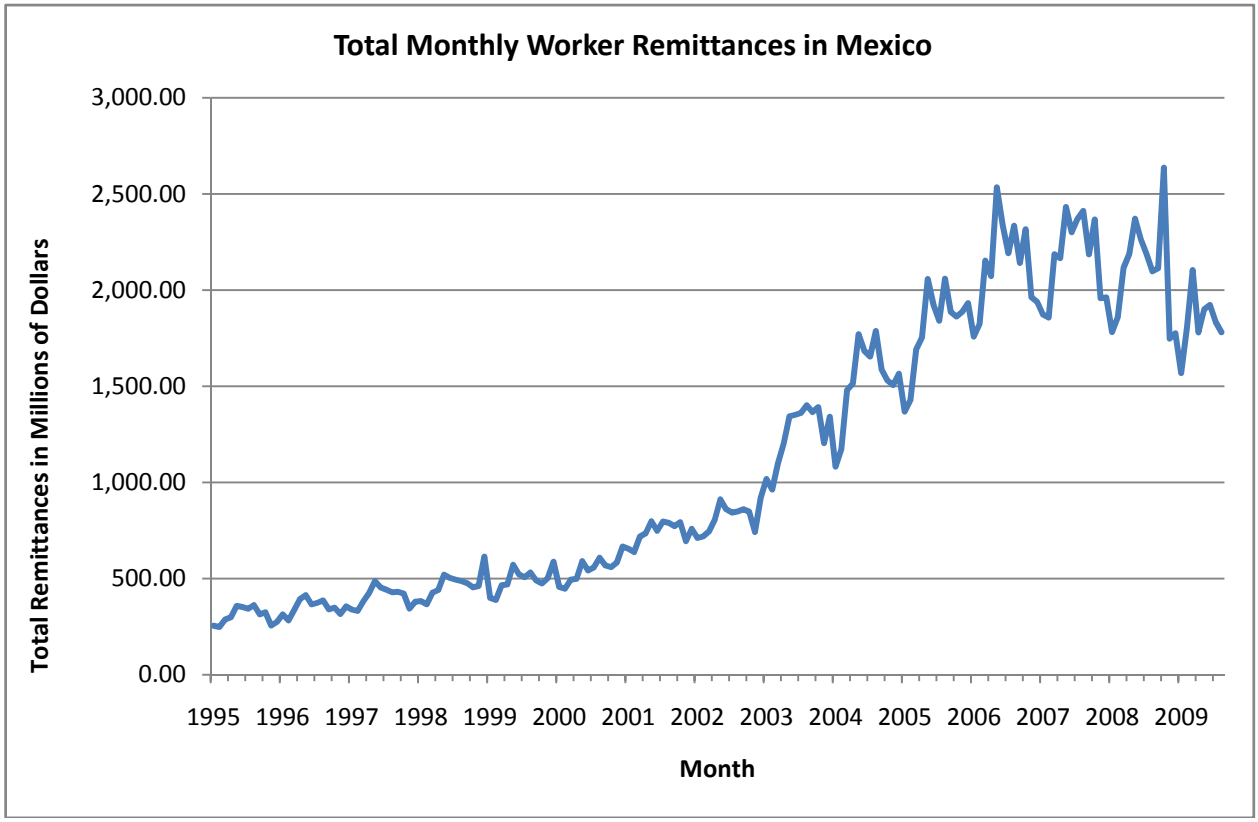
99% of migration from Mexico is to the U.S., and this unique relationship between the two countries has spanned more than 100 years (Zarate-Hoyos 2005). It was estimated in 1996 that there were between 7 and 7.3 million residents of Mexican

descent in the U.S., and by 2000 that number had grown to 8 million (Ceron 2004). One of the most recent estimates, from 2006, states that more than 11.5 million Mexican immigrants reside in the U.S., which is a startling one-tenth of the entire population born in Mexico (Batalova 2008). As expected, the reason for the large number of migrants from Mexico to the U.S. has to do with the massive differences in median income for the labor force in the two countries. For example, 1980 censuses from the U.S. and Mexico found the median income in U.S. border cities to be about five times higher than that of the Mexican border counties (Garcia et al 1990). Similarly, in 1987, the Mexican minimum wage was only about one-tenth of the value of the U.S. minimum wage when both were expressed in dollars (Garcia et al 1990). One of the primary ways for migrants to take full advantage of these wage differentials is by spending the dollars they earn in the U.S. in Mexico, which they do by sending remittances home to relatives in Mexico.

There are many different estimates of the actual amount of remittances sent back, as remittances are especially hard to quantify due to the fact that as much as 30% of remittances are carried back by migrants on return visits, and there are many transfers made in the form of goods and services which are not captured by most surveys (Zarate-Hoyos 2005). One of the actors that have been tracking the amount of remittances coming into Mexico on a monthly basis is the Mexican central bank, Banco de Mexico. Figure 1 demonstrates the dramatic growth that has occurred in the last fourteen years, that has been tracked by Banco de Mexico. Especially starting around 2003, there was a significant leap in the growth of remittances that continued until late 2008, with a peak of $2,636.60 million received in Mexico in October of 2008.Although the growth in remittances has stagnated due to the economic crisis and recession that followed in the

United States, remittances received in Mexico are still a large figure. And again, it is important to remember that the numbers are most likely even larger because the bank is not able to capture all of the remittances coming into the country through informal channels. Therefore the amount of remittances coming into Mexico every month is very significant and could thus have an important impact on those that receive the remittances and on general development in the country.

Figure 1: Remittances Received in Mexico



Source: Banco de Mexico, 2009

Nevertheless, it is important to note that according to the National Survey of Demographic Dynamics, over 3 million households with migrants do not receive remittances (Zarate-Hoyos 2005). Only 4.1% of the Mexican population, or about

870,000 households, receives remittances (Zarate-Hoyos 2005). In addition, 23% of households receiving remittances do not have a migrant from the household (Zarate-Hoyos 2005). This could be important for the current analysis, especially when looking at the effects of the gender of the children on amount of remittances sent back because it cannot be assumed that all or any of the children in households that receive remittances belong to the migrant remitter.

Some other important statistics to note about remittance receiving households in Mexico is that they have a higher ratio of non productive members to productive members (.67 compared to .50), and the proportion of economically inactive people per 100 economically active people is 108 for remittance receiving households and 75 for non receiving households (Zarate-Hoyos 2005). This potentially supports some of the arguments of those who promote the negative impacts of remittances on development.

IV. Theory and Hypotheses

A. Migrant Remittances and the Gender of the Children

Parents are described as having a 'preference' for sons when they express a desire for male rather than female children, or if they discriminate against female children in allocation of resources (Lundberg 2005). This type of preference is often associated with traditional societies and the economic and social roles that men and women play in them, and more industrialized and wealthy societies tend to be associated with more equal treatment of sons and daughters (Lundberg 2005). Although the World Bank (2010) labels Mexico an upper-middle-income economy, there still exist significant differences in gender roles and gender disparities across urban and rural Mexico (Katz and Correia 2001).

Considering the possible presence of male preference in households in Mexico, it is possible that the amount of remittances sent back is affected by the gender of the children. If this were the case, then potentially that could be leading to an increased gender gap as those households with male children receive more remittances and therefore may provide the male children with more opportunities. Lundberg and Rose (2002) look at a similar effect in a study they conducted analyzing the effect of the gender of the children on the number of hours worked and wages of the father. This study divided the men into two groups, those born before and those born after 1950. In the case of the men born before 1950, there was a significant difference between the wages earned and the gender of the child, with each son raising wages by about 3% more than each daughter (Lundberg and Rose 2002). For the full sample, which includes both age groups, it was found that men worked 53 hours more if they had at least one son versus at least one daughter. Even more striking is that if their first child was a boy rather than a girl, they worked 65 hours more per year (Lundberg and Rose 2002).

These results are confirmed in a study done by Choi et al (2007) that looks at West German men and finds that a first son seems to have a more positive effect on the father's work hours compared to a first daughter. They also find that sons increase both the hours worked and earnings of their fathers in a subsample of men with more than 11 years of education (Choi et al 2007). If these findings hold true in the case of Mexican men, it is possible that Mexican migrant men might work longer hours if they have a son, making more money, and thus sending more money back to their families in the form of remittances. Considering that Mexican migration has been largely male populated, with 87.4 percent of migrants coming to the US between 1990 and 1992 being male, this paper

will explore whether this type of difference in the work hours based on the gender of the children will be reflected in the amount of remittances sent back, so that men abroad who have sons will tend to work more hours and send more remittances back home (Durand 2001). Hence:

HYPOTHESIS 1 (H1): Of the remittance receiving households, those with male children will receive more remittances than households with female children.

B. Migrant Remittances and the Effect on the Education of the Children

Lu and Treiman (2007) find that in households that receive remittances the likelihood that children are in school increases in three ways. It increases through increased household educational spending, reduced child labor, and lessening of the negative effect of parental absence due to the fact that at least one parent has migrated. This paper specifically looks at the effect of remittances on household educational spending. This study seeks to further test Lu and Treiman's finding that increased remittances leads to increased spending on education.

Focusing more specifically on women's education, it has been shown that women's education has a strong impact on variables such as children's health and mortality as well as their own fertility and reproductive health, all of which are important for development, and yet in most countries girls still have a lower level of schooling than boys (Katz and Correia 2001). Parker and Pederzini (2001) find that the overall gender gap in education in Mexico has diminished, although they find that there are differences between rural and urban children with rural ones achieving lower levels of education, and they also find that the gender gaps are higher in rural areas. Nevertheless, Aguayo et al

(2007) find that in poor and rural areas there is no gender bias for provision of education to sons and daughters 12 to 18 years old. And they find that in urban areas, there tends to in fact exist a gender bias towards girls in well off families so that boys tend to achieve less years of schooling than girls (Aguayo et al 2007). Hence:

Hypothesis 2A (H2A): Although increased remittances will lead to increased spending on education, there will not be a difference in the amount of money spent on girls' versus boys' education per household in remittance receiving households.

Hypothesis 2B (H2B): There will be a difference in the amount spent per education in rural versus urban households.

Some scholars believe that aiming resources towards women may deliver stronger development impacts because women tend to be more concerned than men about children's health and education (Armendariz 2006). Therefore, gender may play a key role in remittance allocation, especially because when it concerns remittances, women "to different degrees, have the responsibility for deciding how the money is used" (Garcia and Paiewonsky 2006, 16). Since social construction places the responsibility of caring for the family and household in the women's hands, if they have the freedom to decide how to use the remittances, then one would suspect that they would tend to use those funds for goods that inherently improve the well-being of the family (Garcia and Paiewonsky 2006). Hence:

Hypothesis 2C (H2C): In households that receive remittances and the head of household is a female, more money will be spent on children's education.

C. Food Spending and Nutrition and the Effect of Remittances

As discussed in the previous section, there is some research suggesting that when women are the heads of households they focus on the family's basic needs more so than men. It has specifically been suggested that women allocate more resources towards the food needs of the family (Onyango et al 1994). Through his case studies, Blumberg (1995) found that mothers' incomes tend to be more closely related to children's nutrition and women tend to contribute a higher proportion of their income to family subsistence, holding back less for personal consumption. In a case study in Kenya, Onyango et al (1994) found that female headed households had greater dietary diversity, which is central to good nutrition, and higher monthly per capita expenditure on food, suggesting a larger emphasis on healthy eating. Similarly, Kennedy and Peters (1992) found that the proportion of income controlled by women has a positive and significant effect on the caloric intake of the household. Considering that 7 out of 10 remittance recipients are female, this could mean that more tends to be spent on food in remittance receiving households, which could potentially reflect on the increased nutrition intake of those households (Zarate-Hoyos 2005). Hence:

Hypothesis 3A (H3A): Since a larger proportion of remittance receiving households are headed by women, remittance receiving households will spend more on food.

Hypothesis 3B (H3B): When focusing on remittance receiving households, those that are headed by a female will spend more on food than those headed by a male.

V. Data

This paper uses the dataset Encuesta Nacional de Ingresos y Gastos de los Hogares (National Household Survey of Income and Spending, ENIGH) from Mexico from the year 2008. The survey for the dataset was carried out by the Instituto Nacional de Estadistica, Geografia e Informatica (National Statistical Institute, INEGI) between August 21 and November 17 of 2008. Households that participated in the survey were interviewed in person over seven consecutive days.

The data is divided into thirteen datasets, seven of them focused on the household level and six of them looking at the household population level. The household level data examines: general characteristics of the household and home; household spending; financial and capital transactions; daily spending on food, drinks, tobacco, and public transportation; household spending with a credit card; non monetary household income; and a compiled list of the principle household variables taken from the other six datasets. The household population datasets investigate: sociodemographic and occupational characteristics of household members; education spending per household member; income generated by every member of the household; activity status and employment characteristics of the household members aged 12 and over; income from and spending on agricultural businesses owned by the household; and income from and spending on non-agricultural businesses owned by the household. The datasets that are used in this paper are the compiled list of principle household variables that is a compilation of the other six household datasets, the sociodemographic and occupational characteristics of household members, and the education spending per household member.

The dataset contains information on 29,468 households and on a total of 118,927 household members, and is representative of the whole population. Of these households, 1,756 receive remittances, and while some of the analysis focuses on all of the households, much of the analysis focuses only on those households that receive remittances. Table 1[1] compares some general characteristics concerning remittance receiving and non-remittance receiving households. It is important to note that on average, remittance receiving households tend to have a lower income than non-remittance receiving families. Also, of remittance receiving families, a much larger proportion tends to be located in cities with a population smaller than 2,500, while over half of the non-remittance receiving families live in cities with a population larger than 100,000. In addition, more than three quarters of the heads in non-remittance receiving households are male, while almost half of remittance receiving families have a female head of household. The head of household in remittance receiving families tends to be slightly older and less educated than that of non-remittance receiving families.

[1] These general characteristics were analyzed in a regression that looked at factors which affected whether or not a household received remittances. It was found that there was a negative correlation with the gender of the head of household, so that a male head of household decreases the chance that the household receives remittances. Age significantly increases the chances that a household receives remittances. Also, the higher the education level the smaller the chance that the household receives remittances. The higher the number of children the more likely the household receives remittances, while the number of adults in the household negatively influences remittances. Finally, the higher the income level, the lower the chances that the household receives remittances. All of these variables were found to be significant (p=0.000 for all).

Table 1: Characteristics of Remittance Receiving and Non-Remittance Receiving Households

	No Remittances	*Remittances*	*Total*
Num of Observations	27,712	1,756	29,468
Avg Total Income (pesos)	39515.56	29732.43	38932.58
Avg Income w/out Remittances (pesos)	39515.56	23434.17	38557.27
Avg Amount of Remittances	0	6298.27	375.31
Avg Age of Household Head	47.90	51.86	48.14
Avg Num of Residents	4.03	4.19	4.04
Avg Num of Adults	2.48	2.39	2.48
Avg Num of Girls 0-18 years old	0.76	0.88	0.76
Avg Num of Boys 0-18 years old	0.79	0.92	0.79
Avg Spent on Food (pesos)	5441.26	5192.92	5426.46
Avg Spent on Grains (pesos)	1168.92	1248.20	1173.65
Avg Spent on Meat (pesos)	1289.87	1129.92	1280.34
Avg Spent on Milk (pesos)	758.73	706.23	755.60
Avg Spent on Eggs (pesos)	216.72	214.52	216.59
Avg Spent on Veggies (pesos)	687.00	731.61	689.66
Avg Spent on Fruits (pesos)	252.32	212.87	249.97
Female	23%	46%	25%
Male	77%	54%	75%
Head of HH W/out Education	9%	20%	10%
Head of HH w/ Primary Education	39%	53%	40%
Head of HH w/ Secondary Education	26%	18%	25%
Head of HH w/ Preparatory Education	12%	6%	12%
Head of HH w/ Professional and Post Grad Education	14%	4%	14%
Big City	51%	24%	49%
Medium City	16%	16%	16%
Small City	12%	14%	12%
Rural area	21%	45%	23%

HH=Household

VI. Empirical Methods

This section is divided up into the three research questions looked at in this paper, and explains the regressions that were run to analyze each question.

A. Effect of Children's Gender on Remittances Received

To explore the effect of the gender of the children[2] in the household on the amount of remittances received by the household three different regressions were run, restricting the dataset to just those households that receive remittances.

The first regression examines the effect of total number of boys and total number of girls on the amount of remittances sent back.

(1) $$remit = \alpha + \beta_1 totboy + \beta_2 totgirl + \beta_3 adults + \beta_4 income + \beta_5 gender + \beta_6 age + \sum_{j=1}^{j=4} \gamma_j edu_j + \sum_{k=1}^{k=3} \delta_k city_k + \mu$$

In this equation, the dependent variable *remit* is the total amount of remittances in pesos received by the household in the past trimester. The independent variables that we are focusing on, *totboy* and *totgirl*, are the total number of boys in the household and the total number of girls in the household. *Adults* is the number of adults in the household, *income* is the household income in the last trimester excluding remittances, *gender* is a dummy variable for the head of household gender with 0 signifying female and 1 signifying male, and *age* is the age of the head of household in years. $\sum_{j=1}^{j=4} \gamma_j edu_j$ stands for a set of five dummy variables that represent the education level of the head of household. These five levels are: no education, some or completed primary education,

[2] Children was defined as those residents in the household under 19 years of age.

some or completed secondary education, some or completed preparatory education, and some or completed professional or postgraduate education.[3] In the regression the no education dummy variable is omitted and only the other four are included, which means that the regression indicates whether the coefficients on the four dummy variables are significantly different from having no education. $\sum_{k=1}^{k=3} \delta_k \, city_k$ stands for a set of four dummy variables that represent the size of the city in which the households are located. The four variables are big city (population larger than 100,000), medium city (population between 15,000 and 99,999), small city (population between 2,500 and 14,999) and rural area (population less than 2,500). In the regression the variable rural area is omitted, therefore the regression will show whether the coefficients on the other three variables are significantly different from the coefficient on rural area. Finally, μ is the error term.

The second model examines the effect that changing the fraction of boys in the household or the fraction of girls in the household has on the amount of remittances sent back.

(2) $$remit = \alpha + \beta_1 fracboys + \beta_2 fracgirls + \beta_3 adults + \beta_4 children + \beta_5 income + \beta_6 gender + \beta_7 age + \sum_{j=1}^{j=4} \gamma_j edu_j + \sum_{k=1}^{k=3} \delta_k city_k + \mu$$

In this equation *remit* is again the amount of remittances received by the household in the past trimester. *Fracboys* is the number of boys in the household divided by the total number of residents in the household. *Fracgirls* is the number of girls divided by the total number of residents in the household. *Children* is the total number of children in the household. All of the other variables are the same as those in the previous equation.

[3] Professional and postgraduate were combined because both contained a very small sample size.

The third model that looks at gender tries to determine the effect of having just boys versus having just girls, having both or having no children, to see how these might affect the amount of remittances received.

(3) $$remit = \alpha + \beta_1 boys + \beta_2 girls + \beta_3 Both + \beta_4 adults + \beta_5 children + \beta_6 income + \beta_7 gender + \beta_8 age + \sum_{j=1}^{j=4} \gamma_j edu_j + \sum_{k=1}^{k=3} \delta_k city_k + \mu$$

In this equation, *boys* represents a dummy variable that is equal to 1 if there are only one or more boys in the household, and 0 otherwise. *Girls* is a dummy variable that is equal to 1 if there are only one or more girls in the household. *Both* is a dummy variable that is equal to 1 if the household has at least one boy and one girl. The fourth variable *none* is omitted, and it is equal to 1 if there are no children in the household and 0 otherwise. Since *none* is omitted, the coefficients on the other three variables represent whether or not those variables are statistically different from the coefficient on *none* and by how much. All of the other variables in the equation are the same as in equation 2.

B. Effect of Amount of Remittances Received on Education Spending for Children

When looking at the effect of remittances on the education spending for children[4], two issues were looked at: how the amount of remittances received affected girls versus boys, and how the gender of the head of the household affected the amount of money spent on girls' versus boys' education. Three different models were used to explore these questions.

[4] Again, children is defined as those residents in the household that are under 19 years old.

The first model focused on the amount of money spent per boy in the household and per girl in the household on education.

(4) $$Monpergirl = \alpha + \beta_1 remit + \beta_2 income + \beta_3 adults + \beta_4 children + \beta_5 gender + \beta_6 age + \sum_{j=1}^{j=4} \gamma_j edu_j + \sum_{k=1}^{k=3} \delta_k city_k + \mu$$

(5) $$Monperboy = \alpha + \beta_1 remit + \beta_2 income + \beta_3 adults + \beta_4 children + \beta_5 gender + \beta_6 age + \sum_{j=1}^{j=4} \gamma_j edu_j + \sum_{k=1}^{k=3} \delta_k city_k + \mu$$

In these regressions, *monpergirl* is the amount of money in pesos spent on education per girl in the household, and the model is restricted to those households that have at least one girl. *Monperboy* is similarly defined as the amount of money in pesos spent on education per boy in the household, and the model is again restricted to household that have at least one boy. The independent variables in the regression have all been used in regressions 1, 2 and 3. This model was first run using all the remittance receiving households with boys and all the remittance receiving households with girls. The model was then run again, restricting the regression by the different sizes of cities. This means the regression was run for those households with girls that were located in big cities, those with girls that were located in medium cities, and so on, and similarly for households with boys. Nothing else was changed in the regression except for the restriction on city size.

The next model was a very similar one, but instead of focusing on money spent on education per boy and per girl, it examined total money spent on education for all of the girls in the household and the total spent on education for all of the boys in the household. These are the two regressions that were run:

(6) $$Totedugirl = \alpha + \beta_1 remit + \beta_2 income + \beta_3 adults + \beta_4 children + \beta_5 gender + \beta_6 age + \sum_{f=1}^{f=4} \gamma_f edu_f + \sum_{k=1}^{k=3} \delta_k city_k + \mu$$

(7) $$Toteduboy = \alpha + \beta_1 remit + \beta_2 income + \beta_3 adults + \beta_4 children + \beta_5 gender + \beta_6 age + \sum_{f=1}^{f=4} \gamma_f edu_f + \sum_{k=1}^{k=3} \delta_k city_k + \mu$$

In these regressions, *totedugirl* stands for the total amount of money in pesos spent on girls' education in the household in the past month and *toteduboy* stands for the total amount of money in pesos spent on boys' education in the household in the past month. All of the other variables are the same as defined earlier in the paper.

The final model examines variables that affect total education spending, including remittances, and explores differences based on the gender of the children as well as the affect of the gender of the head of household by city size.

(8) $$Totedu = \alpha + \beta_1 totgirl + \beta_2 totboy + \beta_3 remit + \beta_4 girlremit + \beta_5 boyremit + \beta_6 income + \beta_7 adults + \beta_8 gender + \beta_9 age + \sum_{f=1}^{f=4} \gamma_f edu_f + \sum_{k=1}^{k=3} \delta_k city_k + \sum_{t=1}^{t=3} \theta_t gendercity_t + \mu$$

In this regression, *Totedu* is the total amount of money in pesos spent for both girls' and boys' education per household in the past month. *Totgirl* is the total number of girls, and *totboy* is the total number of boys. *Girlremit* is an interaction variable that consists of multiplying a dummy variable that represents whether or not there is at least one girl resident in the household times the amount of remittances the household receives. *Boyremit* is similarly defined as an interaction variable that consists of multiplying a dummy variable that represents whether or not there is at least one boy resident in the household times the amount of remittances that the household receives. These interaction variables demonstrate how having a girl or a boy and increasing the amount of remittances affects the total education spending in the household. $\sum_{i=1}^{i=3} \theta_i \, gendercity_i$ represents a set of four interaction variables that show the interaction between the gender of the head of household and the size of the city. They consist of multiplying the dummy variable for the head of household by the dummy variable for each of the four city sizes, thus showing the effect of a male versus female head of household in certain sized cities on the amount of education spending. The rural area interaction variable was omitted, so the coefficients of the other three variables that are included in the regression show how they differ from the coefficient on the gender*rural area variable. All of the other variables have already been defined.

C. Effect of Amount of Remittances Received on the Food Purchased and Nutrition

In order to analyze the effect of remittances on the food purchased and thus on nutrition, two different aspects are considered: how remittance receiving families compare with non remittance receiving families in the way they spend their money on

food and how an increase in remittances received influences the amount of money spent on different food items.

(9)

$$totfood = \alpha + \beta_1 Dremit + \beta_2 remit + \beta_3 Dremitgender + \beta_4 income + \beta_5 adults + \beta_6 gender + \beta_7 age + \beta_3 children + \sum_{j=1}^{j=4} \gamma_j edu_j + \sum_{k=1}^{k=3} \delta_k \, city_k + \sum_{i=1}^{i=4} \theta_i \, agegroup_i + \sum_{m=1}^{m=4} \rho_m childageremit_m + \mu$$

In these equations, *totfood* stands for the total amount of money spent on food items[5] in the last trimester by the household. *Dremit* is a dummy variable representing whether or not the household receives remittances, with 1 indicating that it receives remittances, and 0 indicating that it does not. *Dremitgender* is an interaction variable that consists of multiplying the dummy variable for gender of the head of household, which is coded as 1 for male and 0 for female, times the dummy variable for remittances *Dremit*.

$\sum_{i=1}^{i=4} \theta_i \, Dagegroup_i$ in the regression stands for dummy variables that divide the population of children into three age groups and by gender. The six variables are girls 0 to 6 years old, boys 0 to 6 years old, girls 7 to 12 years old, boys 7 to 12 years old, girls 13 to 18 years old and boys 13 to 18 years old. They are coded 1 if there is at least one member of the household that fits into the category and 0 if there is no one in the household that fits in that category. The variables for girls and boys 0 to 6 years old are

[5] This was calculated by subtracting the amount spent on drinks from the amount spent on food consumed inside the house.

omitted because the study considers the effect of the older children on food spending since very young children most likely would not make a big impact on food spending.

$\sum_{m=1}^{m=4} \rho_m childageremit_m$ is a series of interaction variables that consist of multiplying the dummy variable for whether or not the household receives remittances, *Dremit*, by the six different age and gender divided categories already mentioned. Thus, these interaction variables will show the effect that receiving remittances and having at least one member of the household in a certain age category has on food spending. Again, the variables for *Dremit* times the age categories girls and boys 0 to 6 were omitted.

All of the other variables in the regression are the same as in the previous regressions. Equation 9 was run using various dependent variables. It was first run using total spending on food as the dependent variable to see what influences the amount of money spent on food as a whole. The equation was then run using various food items as the dependent variables. These included all of the food categories in the survey except for several marginal ones.[6] The food categories included are grains, meat, milk, vegetables, fruits, and sugar. Equation 9 was run to find what affects total spending per household on each of these individual items.

VII. Results

The results are divided up by the three research questions, looking at the outcomes of the regressions that were run.

A. Effect of Children's Gender on Amount of Remittances Received

[6] No regressions were run to look at spending on fish, oils, eggs, tubers, coffee, and spices because very few people gave amounts that they spent on those items.

The results from the three regressions are summarized in Table 2. First, looking only at the effect of the gender of the children on the amount of remittances received, all three regressions seem to be supporting similar results.

In the first regression, the total number of boys in the household does in fact significantly impact the amount of remittances received at the 10% level[7]. Since that coefficient is positive and equal to 319.9, it suggests that for every boy added to the household, remittances increase by 319.9 pesos. The coefficient on the total number of girls is not significant though at the 10% level, which would mean that the number of girls in the household does not affect the amount of remittances.

These results seem to support hypothesis H1 that the presence of boys in the household increases the amount of remittances sent back to the household, while the presence of girls does not. An F test was run to test whether the coefficients on boys and girls are significantly different from each other. The value of the F test was small and insignificant, which means that the two coefficients are not statistically significant from each other, thus signifying that the two variables, boys and girls, should impact the amount of remittances sent by the same factor. Therefore, although it seems that the boys' variable significantly influences remittances while the girls' variable does not, it cannot be concluded with certainty that boys influence the amount of remittances sent more than girls. Nevertheless, it should be noted that although not significantly different from the girls' coefficient, the boys' coefficient is larger, and therefore if a larger sample were used, it is possible that we might see significant differences.

[7] Upon running the regression using a robust standard error, the coefficient was no longer significant, but close to being significant. See Appendix.

Table 2: Regression Results of the Effect of Children's Gender on Remittances Received

VARIABLES	(1) Remittances	(2) Remittances	(3) Remittances
Total Num Boys in HH	319.9*		
	(186.4)		
Total Num Girls in HH	186.1		
	(184.2)		
Fraction of Boys in HH		4,181**	
		(1,751)	
Fraction of Girls in HH		3,485*	
		(1,810)	
Dummy if Just Girls in HH			77.12
			(682.8)
Dummy if Just Boys in HH			662.8
			(659.0)
Dummy if Both Girls and Boys in HH			433.3
			(822.9)
Num of Adults in HH	-33.14	173.1	-44.93
	(169.8)	(191.6)	(170.8)
Num of Children in HH		-217.1	185.5
		(238.9)	(188.8)
Dummy for Head of HH Gender	-2,956***	-2,810***	-2,946***
	(404.2)	(408.7)	(404.8)
Age of Head of HH	-29.33*	-16.47	-26.51*
	(15.02)	(16.01)	(15.66)
Total Income w/out Remit.	0.0156***	0.0152***	0.0155***
	(0.00586)	(0.00586)	(0.00587)
Head of HH Primary Edu	464.0	415.6	465.0
	(517.8)	(517.3)	(517.6)
Head of HH Secondary Edu	1,274*	1,128	1,264*
	(712.2)	(714.1)	(713.9)
Head of HH Preparatory Edu	1,153	1,067	1,174
	(980.2)	(980.0)	(982.0)
Head of HH Professional or Post grad Edu	3,479***	3,450***	3,486***
	(1,147)	(1,145)	(1,147)
HH in Big City	21.00	84.04	6.969
	(517.3)	(517.7)	(518.6)
HH in Medium City	483.9	475.9	459.4
	(549.4)	(548.9)	(550.8)
HH in Small City	43.99	83.43	34.44
	(566.8)	(566.0)	(566.6)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

HH=Household

The second regression showed similar results, with even stronger evidence for the significance of the presence of boys in the household. This second regression looked at the fraction of boys and girls in the household and how that might influence the amount of remittances received. The coefficient on boys is significant at the 5% level, while the coefficient on the girls is significant this time, but only at the 10% level. Although both an increase in the fraction of girls in the household and an increase in the fraction of boys in the household would affect the amount of remittances received, it is important to note that the coefficient on the boys is more significant and larger. An F test was run to find if the coefficients on girls and boys were significantly different from each other, and it was again found that the two coefficients are not significantly different from each other. This would illustrate that boys and girls affect the amount of remittances received by the same amount. Nevertheless, it is important to note again that the coefficient on the boys is 696 pesos bigger than the coefficient on the girls, and although the difference is not significant, it supports a tendency linking the presence of boys to higher remittances than the presence of girls as this was true in all of the regressions that were run[8].

The third regression analyzes how having just boys, versus having just girls, versus having no children versus having both boys and girls, influences the amount of remittances received. The variable that is omitted is the dummy for having no children, which means the resulting coefficients in the regression are in comparison to the coefficient on having no children. None of the three dummy variables included in the regression are significant, which indicates that none of the coefficients on the three

[8] There were other regressions run, aside from the 3 shown in Table 2, and in all of them the boys' coefficient was consistently bigger than the girls' coefficient.

variables are significantly different from the coefficient on the variable for having no children. Also, upon running another F test, it was found that the coefficients on girls and boys are again not significantly different from each other. Although that is the case, it is important to point out again a tendency in higher values for boys. The coefficient on the dummy for girls is only 77.12, which suggests that compared to having no children in the house, having just girls in the house increases the amount of remittances by 77.12 pesos. On the other hand, the coefficient on boys, 662.8, is much larger, which suggests that compared to having no children in the household, having boys increases the amount of remittances by 662.8 pesos. Again, none of these are significant, but this tendency seems to be present in all of the regressions, and it is possible that if a larger sample were used there would be a significant difference between boys and girls.

Although not related directly to the question of the effect of the gender of the children, it is still interesting to note how some of the other independent variables affect the amount of remittances received. The gender of the head of household is extremely important, as it is significant at the 1% level for all three regressions and shows that when the head of household is a female, the amount of remittances increases by almost 3000 pesos. Intuitively this could make sense if one considers the fact that compared to non-remittance receiving households, many more remittance receiving households are headed by women, with the most obvious explanation being that the male in the household is working abroad and sending money back to his wife and nuclear family. Those remittance receiving households that are headed by men could potentially be cases of a wife being abroad sending money back, but there is also a chance that it might be someone abroad sending money back to a brother, uncle, father, or other non-nuclear

relative. If this were the case, it would explain why more remittances are being sent to nuclear families led by women with the husband abroad working, while the non nuclear families do not receive as much because the sender abroad wants to make sure his nuclear family is well taken care of first.

B. The Effect of Remittances on the Education Spending on Children

The three different sets of regressions that were run all demonstrate various aspects of how remittances affect education spending in the household. All three sets support the notion that remittances lead to education spending on boys, but do not lead to education spending on girls. There is also some evidence of the gender of the head of household affecting how much is spent on education.

First, looking at money spent on education per girl in the household and per boy in the household as well as the total money spent on educating all of the girls in the household and the total money spent on educating all of the boys in the household, both show similar results.

Table 3 demonstrates that the coefficient on the amount of remittances the household receives is significant at the 10% level when the dependent variable is money spent on education per boy[9]. This means that for a 1000 peso increase in remittances, there is a 2.46 peso increase in the amount of money spent on education per boy, possibly directly coming from the remittances. On the other hand, if you look at regression 1, where the dependent variable is money spent on education per girl, the coefficient on the

[9] Upon running the regression using a robust standard error, the coefficient on education per boy was no longer significant. See Appendix.

amount of remittances is not significant, suggesting that higher remittances does not influence the amount of money spent on education per girl.

The same results can be seen in regressions 3 and 4, which examine the total money spent on education for all of the girls in the household and total money spent on education for all of the boys in the household. The coefficient on the total money for boys is again significant at the 10% level and positive[10], showing that for a 1000 peso increase in remittances there is a 2.22 peso increase in the total money spent on boys' education. On the other hand, when the dependent variable is total money spent on girls' education, the coefficient on remittances is again insignificant suggesting that remittances do not affect the amount of money spent on girls' education.

There are several other compelling effects to notice in the regressions. Although the gender of the head of household does not seem to significantly affect the amount of money spent on either boys' or girls' education, there is an interesting tendency in the effect of the gender of the head of household. The coefficient on the gender for money spent per girl is -41.61 with a t value of -1.40 and a p value of 0.162; therefore, it is very close to being significant. Since the dummy variable is coded 1 for male and 0 for female, it would mean that if the head of household is female, 41.61 more pesos are spent on education for girls versus when the head of household is male. A similar trend is identified when looking at the total money spent on girls' education, where the coefficient is -25.50. The equivalent coefficients in the regressions for money spent per boy on education and for total boys' education are -4.117 and -1.665, and they are very insignificant. This suggests that when the head of household is female, it may in fact lead

[10] Upon running the regression using a robust standard error, the coefficient was no longer significant.

Table 3: Regression Results of Spending on Education in Remittance Receiving HHs

VARIABLES	(1) Money on Edu per Girl in HH	(2) Money on Edu per Boy in HH	(3) Total Money on Girl's Edu in HH	(4) Total Money on Boys Edu in HH
Dummy for Head of HH Gender	-41.61	-4.117	-25.50	-1.665
	(29.76)	(26.03)	(21.31)	(20.98)
Age of Head of HH	1.685	4.349***	0.537	3.156***
	(1.233)	(1.063)	(0.781)	(0.769)
Head of HH Primary Edu	-8.603	79.90**	-1.532	60.15**
	(40.26)	(35.10)	(26.87)	(26.46)
Head of HH Secondary Edu	62.40	135.8***	63.59*	120.1***
	(51.25)	(45.23)	(37.02)	(36.45)
Head of HH Preparatory Edu	61.81	207.2***	160.1***	170.5***
	(68.22)	(62.08)	(50.93)	(50.15)
Head of HH Prof. or Post grad Edu	274.2***	336.1***	100.7*	240.0***
	(85.21)	(73.71)	(59.71)	(58.79)
Num of Adults in HH	-9.542	-20.58*	-9.509	-12.94
	(11.84)	(10.76)	(8.814)	(8.679)
Num of Children in HH	-13.45	-3.038	40.16***	50.30***
	(9.026)	(7.807)	(6.499)	(6.399)
Amount of Remittances	0.000286	0.00246*	-0.000296	0.00222*
	(0.00179)	(0.00146)	(0.00124)	(0.00123)
Total HH Income w/out Remit.	0.00187***	0.00170***	0.00232***	0.000786***
	(0.000353)	(0.000496)	(0.000305)	(0.000300)
Dummy House in Big City	94.72**	52.27	47.07*	71.20***
	(37.82)	(32.75)	(26.86)	(26.45)
Dummy House in Medium City	93.54**	28.70	65.26**	48.35*
	(38.67)	(33.36)	(28.54)	(28.10)
Dummy House in Small City	37.06	66.32*	53.41*	50.02*
	(40.42)	(36.27)	(29.41)	(28.96)

Standard errors in parentheses

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

HH=Household

to more money being spent on the education of girls and no effect on the amount of money spent on boys. Although it is not significant with the current sample size, if a larger sample were used, it is possible that this tendency would become significant.

Another interesting effect to note in the regressions is that there is significantly more money being spent on girls' education in big cities and medium cities compared to rural areas of less than 2500 people. There are 94.72 more pesos spent per girl in big cities than in rural areas and 93.54 more pesos spent per girl in medium cities than in rural areas, and both of these numbers are significant at the 5% level, and a similar trend is found in total money spent for girls' education. This same type of disparity between different sizes of cities in the amount of money spent on boys' education is not found when looking at money spent per boy, although there is a disparity between cities in total money spent on boys' education. This could suggest that in very small towns there is still a gender bias which causes families to not spend as much money on girls' education, but in bigger cities that bias is no longer as prevalent and so more money is spent on girls' education there compared to rural areas, proving true hypothesis H2B.

Table 4 captures some more differences in spending on education based on the city size and the effect of remittances on education spending. When broken down by city, the amount of remittances received is significant only in a couple of cases. The amount of remittances received is significant in regression two[11], which is money spent per boy on education in rural areas, with a coefficient of 0.00219. So again, as in the case that examined the whole sample of remittance receiving families, in rural areas, when a

[11] When the regression was run using a robust standard error, the coefficient was no longer significant.

Table 4: Money Spent on Education per Girl and per Boy by City Size

	Rural area		Small City		Medium City		Big City	
VARIABLES	(1) Money per Girl on Edu	(2) Money per Boy on Edu	(3) Money per Girl on Edu	(4) Money per Boy on Edu	(5) Money per Girl on Edu	(6) Money per Boy on Edu	(7) Money per Girl on Edu	(8) Money per Boy on Edu
Head of HH Gender	-63.50**	1.858	-80.11	-92.21	70.16	74.95	-118.2	69.83
	(26.84)	(18.15)	(56.57)	(86.26)	(94.13)	(81.28)	(94.10)	(71.70)
Age of Head of HH	2.608**	0.127	0.678	5.692*	7.912**	9.790***	-3.853	6.137**
	(1.122)	(0.741)	(2.114)	(3.389)	(3.901)	(3.186)	(3.880)	(2.988)
Head of HH Primary	-14.69	1.915	46.13	90.89	199.9	248.2*	-152.2	239.8
	(29.51)	(20.03)	(76.88)	(122.1)	(167.8)	(130.8)	(207.2)	(150.6)
Head of HH Secondary	24.13	7.296	259.0***	396.9***	331.2*	291.2*	-154.0	214.0
	(42.05)	(29.23)	(96.14)	(146.8)	(187.0)	(149.0)	(223.3)	(166.6)
Head of HH Preparatory	21.49	46.75	194.4	145.2	432.1*	317.6*	-189.7	370.7**
	(72.78)	(63.86)	(137.3)	(222.3)	(224.1)	(183.8)	(238.9)	(179.0)
Head of HH Prof. or Post grad	-11.91	687.8***	-130.9	-189.0	11.88	990.4***	308.9	148.3
	(138.3)	(94.42)	(202.8)	(425.3)	(269.5)	(206.0)	(253.2)	(193.8)
Num of Adults in HH	-13.67	-11.85*	55.45**	10.13	-86.33**	-36.25	21.34	-58.73*
	(10.29)	(6.933)	(23.13)	(36.65)	(37.19)	(34.38)	(44.04)	(31.10)
Num of Children in HH	-11.06	-3.847	9.216	6.717	-17.35	-7.888	-32.07	-10.33
	(7.336)	(4.926)	(16.06)	(23.66)	(29.96)	(26.90)	(33.07)	(23.51)
Total HH Income w/out Remit.	0.00147**	0.00183***	-0.000171	0.000452	0.00755***	-7.81e-05	0.00171***	0.00287**
	(0.000662)	(0.000429)	(0.000961)	(0.00161)	(0.00215)	(0.00135)	(0.000622)	(0.00119)
Amount of Remit.	-0.000798	0.00219**	0.00629*	0.00880	0.00680	0.00640	-0.00308	-0.000170
	(0.00181)	(0.00106)	(0.00376)	(0.00657)	(0.00512)	(0.00486)	(0.00465)	(0.00326)
Observations	443	439	126	122	150	166	195	220

HH=Household

Standard errors in parentheses

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

household receives an increase in remittances of 1000 pesos, there is expected to be a 2.19 peso increase in the amount spent on boys' education. Such an increase is not seen in the regression of money per girl in rural areas, and although very small, that coefficient is in fact negative and very insignificant. So again, in rural areas there is a gender disparity in how the remittance money is spent on education, disproving hypothesis H2A.

Interestingly enough, in small cities, this disparity is reversed. We can see this in regression 3, where the coefficient is significant and positive at the 10% level,[12] showing that a 1000 peso increase in remittances leads to 6.29 pesos being spent on education per girl. On the other hand, in the regression of money spent per boy on education in small cities, the coefficient on remittances is not significant, meaning that in small cities an increase in remittances does not lead to an increase in the amount spent on education per boy. Therefore this suggests that in small cities, remittances lead to increased education spending only for girls. And yet, the coefficient for boys is close to being significant. The coefficients for amount of remittances received are insignificant for regressions 5, 6, 7, and 8. Yet in both 5 and 6 the coefficients are close to being significant. The last row in Table 4 shows the number of observations in each regression, and it can be seen that in the first two regressions there are many more observations because a large proportion of remittance receiving households are in rural areas; therefore, it is possible that if there were more observations for some of the other regressions, the remittance variable could prove to be significant, especially in regressions 4, 5, and 6.

Also, there are differences in the effect of the head of household gender on education spending by city size. In rural areas, the gender of the head of household is

[12] When the regression was rerun using a robust standard error, this coefficient was no longer significant, suggesting that such a difference between boys and girls does not exist.

significant for money spent per girl on education. The coefficient -63.50 indicates that if the head of household is female she spends 63.50 more pesos on education than if the head of household were male. There is no such effect of the head of household on the amount of money spent per boy in rural areas. In the other six regressions the coefficient is not significant, although in the small and big cities again it is large and negative for girls, and the t values for the coefficients are -1.42 and -1.26, which are close to being significant. In medium cities the coefficient is in fact positive for both girls and boys suggesting that male heads of household tend to spend more on education for the children, but the t values are very small for both of those coefficients, 0.75 and 0.92, indicating that in medium cities there is no gender effect on the amount spent on education. What these regressions suggest then is that there is a trend for women to spend more on girls' education in rural areas, small and big cities, and this is significant for rural areas and may be significant for small and big cities if the sample size were larger. This is consistent with findings that show that relative to their sons, mothers invest more in their daughters (Alderman and King 1998).

Finally, in Table 5, when looking at total education spending per household, the previous conclusions hold true. In the regression there are two interaction variables which show the effect when a household has girls on total education spending as remittances increase, and the effect when a household has boys and remittances increase. As was previously shown, when a house has boys and the amount of remittances received increases, there is an increase in the amount of money spent on education (for a 1000 peso increase in remittances there is a 7.58 peso increase in education spending).[13]

[13] When the regression was run using robust standard error, this coefficient was no longer significant, although close to being significant. See Appendix.

Table 5: Factors Affecting Total Education Spent in Household

VARIABLES	(1) Total Education Spent in Household
Total Num of Girls	74.17***
	(15.37)
Total Num of Boys	72.93***
	(15.85)
Amount of Remittances	-0.00403
	(0.00279)
GirlDummy*Remittances	0.00358
	(0.00332)
BoyDummy*Remittances	0.00758**
	(0.00337)
Dummy for Head of HH Gender	-45.96
	(43.95)
Age of Head of HH	3.211***
	(1.108)
Head of HH Primary Edu	52.80
	(39.25)
Head of HH Secondary Edu	170.9***
	(54.14)
Head of HH Preparatory Edu	331.0***
	(74.28)
Head of HH Prof. or Postgrad Edu	347.5***
	(87.24)
Dummy House in Big City	108.5**
	(53.31)
Dummy House in Medium City	65.33
	(59.17)
Dummy House in Small City	142.4**
	(65.99)
GenderofHead*Bigcity	21.82
	(71.45)
GenderofHead*Mediumcity	80.10
	(81.44)
GenderofHead*Smallcity	-68.07
	(86.37)
Total HH Income w/out Remit.	0.00292***
	(0.000424)
Constant	-298.95***
	(84.08)

HH=Household

Standard errors in parentheses

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

Considering the coefficient for households that have girls, as remittances increase, there is no significant change in spending on education since the coefficient is not significant. Yet when an F test is run to find if the coefficient on boy*remittances is significantly different from the coefficient on girl*remittances, the F test indicates that they are not significantly different. This would suggest that girls in the household and boys in the household should cause the same effect on education spending when remittances increase. Nevertheless the boy coefficient is significant and more than double the girl coefficient, so even if having girls in the household does cause the amount of spending on education to increase as remittances increase, the increase is much greater when there are boys. This illustrates an important gender disparity in how remittances are potentially used for education.

When comparing male versus female heads of households, we see that although the gender variable is not significant, it is relatively close to being significant, with a t value of -1.05. And since the coefficient is negative, though it is not significant, it suggests that a trend exists that when the head of household is a woman, she would spend more on education than if the head of household were a man. This regression was also run without including the city size effect,[14] and it was found that the coefficient on head of household gender was -49.27 and significant at the .10 level. This means that when examining all of the remittance receiving households without taking into account the city size, women spend 49.27 more pesos on education than men, and this result is statistically significant. This supports the results of studies that have found that when

[14] The regression is not included in the paper.

women are given power to control the resources of the household, more is spent on education, and it also proves true hypothesis H2C.

Looking at the effect of city size on education spending we see that there are differences between different city sizes and rural area. In a big city, households on average spend 108.5 pesos more than households in rural areas on education, and in small cities households spend on average 142.4 pesos more than rural areas. Both of these are significant, and although the coefficient on medium cities is not significant, it is still positive, showing that the trend is for rural areas to spend the least on total education.

The interaction variables between the gender of the head of household and the city size show whether or not there is a difference between the cities in the difference between genders.[15] As Table 5 indicates, none of the three coefficients on the interaction variables are significant. This shows that any difference that might exist due to the gender of the head of household in a rural area is similar to the difference that might exist in any of the other three city sizes. To further test this, individual regressions were run that included all of the variables except for the city and interaction variables, and the regressions were restricted by city size. When this was done, in small, medium, and big cities the gender of the head of household did not have a significant impact on total education spending. In rural areas, though, there was a significant effect. The coefficient on gender of the head of household was -58.13 (SE=25.51, $p<.05$). This illustrates that in rural areas, if the head of household is female on average she spends 58.13 pesos more than a male head of household spends on education, holding everything else constant.

[15] For example, if data showed that there is a difference between men and women in small cities, is there a similar difference in rural areas, or is this difference only found in small cities.

C. The Effect of Remittances on Food Spending and Nutrition

When looking at the effect of remittances on food spending, which may possibly reflect on the nutrition intake of families, remittance receiving families are compared to non-remittance receiving families in their food spending, and an analysis is conducted of how the gender of the head of household affects food spending in remittance and non-remittance receiving households. This section begins with an explanation of the general trends in what affects food spending, which can be seen in Table 6. Then it discusses more specifically the effect of the gender of the head of household, and ends with a look at the effects of the gender of the children in the different age groups.

Looking at some of the descriptive variables included, it seems that total food spending and on specific categories of foods consistently increases as the age of the head of household increases. Only for grains is the age not statistically significant at all. As expected, amount spent on food increases significantly when there are more adults as well as more children in the household. When considering the education level of the head of household, higher levels of education lead to an increase in spending on food for most food categories. It is possible that higher levels of education tend to suggest that the households are economically better off, and the head of household might have a better understanding of nutrition and the strategic importance of fruits and vegetables and meat. This is supported in the data where increased education leads to a significant increase in meat and fruits among other categories. It is also interesting that for spending on sugar, increased education in fact leads to less money being spent on sugar. This again possibly supports the idea that higher education leads to increased knowledge of nutrition.

Table 6: Regression Results for Money Spent on Food Items

VARIABLES	(1) Tot Food Spending	(2) Grains	(3) Meat	(4) Milk
Dummy for Head of HH gender	150.7***	40.92***	28.04	-40.34***
	(45.32)	(11.55)	(17.14)	(11.60)
Dummy for Receives Remit.	266.6*	29.47	76.87	99.23**
	(156.3)	(39.85)	(59.13)	(40.01)
DremitGender	-511.4***	28.92	-258.9***	-83.93**
	(158.4)	(40.37)	(59.90)	(40.53)
Dgirl7to12	371.2***	122.6***	120.6***	3.688
	(54.48)	(13.89)	(20.61)	(13.95)
Dboy7to12	399.0***	129.5***	132.6***	20.31
	(53.52)	(13.64)	(20.24)	(13.70)
Dgirl13to18	557.6***	138.8***	192.8***	-11.06
	(51.53)	(13.14)	(19.49)	(13.19)
Dboy13to18	523.9***	160.9***	180.5***	-11.38
	(46.34)	(0.00230)	(11.87)	(12.97)
DremitDgirl7to12	306.0*	65.03	-18.85	0.457
	(184.8)	(47.12)	(69.91)	(47.31)
DremitDboy7to12	-199.9	-17.89	-87.38	-2.225
	(185.7)	(47.33)	(70.23)	(47.53)
DremitDgirl13to18	-119.2	-21.88	-92.99	-73.59
	(181.9)	(46.38)	(68.81)	(46.57)
DremitDboy13to18	171.0	-30.13	153.7**	-46.24
	(178.5)	(45.51)	(67.53)	(45.70)
Age of Head of HH	10.59***	0.337	2.986***	2.644***
	(1.463)	(0.373)	(0.553)	(0.374)
Num of Adults in HH	991.3***	223.5***	313.0***	98.28***
	(16.75)	(4.269)	(6.335)	(4.287)
Num of Children in HH	296.5***	95.69***	16.55**	74.27***
	(21.15)	(5.391)	(7.999)	(5.413)
Amount of Remit.	0.0362***	0.00783***	0.0127***	0.00603**
	(0.00947)	(0.00241)	(0.00358)	(0.00242)
Total income w/out Remit	0.00835***	0.000248***	0.00229***	0.00145***
	(0.000301)	(7.67e-05)	(0.000114)	(7.70e-05)
Head of HH Primary Edu	792.1***	79.97***	291.6***	211.9***
	(65.99)	(16.82)	(24.96)	(16.89)
Head of HH Secondary Edu	1,788***	170.5***	625.8***	477.6***
	(73.85)	(18.82)	(27.93)	(18.90)
Head of HH Preparatory Edu	1,940***	108.4***	710.2***	567.5***
	(85.14)	(21.70)	(32.20)	(21.79)
Head of HH Prof or Post grad	2,604***	108.1***	783.9***	746.5***
	(83.32)	(21.24)	(31.52)	(21.33)
Constant	-197.7*	187.8***	-372.8***	-133.0***
	(116.9)	(29.81)	(44.22)	(29.93)

HH=Household

Standard errors in parentheses

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

Table 6 Cont: Regression Results for Money Spent on Food Items

VARIABLES	(5) Fruits	(6) Vegetables	(7) Sugar
Dummy for Head of HH	-10.25*	42.69***	12.22***
	(6.065)	(8.418)	(2.006)
Dummy for Receives Remit.	11.55	68.87**	1.148
	(20.92)	(29.04)	(6.919)
DremitGender	-49.41**	-67.34**	-0.672
	(21.19)	(29.42)	(7.009)
Dgirl7to12	25.43***	45.93***	-0.0244
	(7.291)	(10.12)	(2.412)
Dboy7to12	10.54	31.40***	-1.886
	(7.163)	(9.942)	(2.369)
Dgirl13to18	21.35***	100.4***	4.290*
	(6.897)	(9.573)	(2.281)
Dboy13to18	-16.38**	75.03***	3.845*
	(6.779)	(9.410)	(2.242)
DremitDgirl7to12	1.694	71.00**	10.61
	(24.74)	(34.33)	(8.182)
DremitDboy7to12	43.11*	-88.46**	9.722
	(24.85)	(34.49)	(8.219)
DremitDgirl13to18	-16.75	8.805	3.324
	(24.35)	(33.79)	(8.053)
DremitDboy13to18	26.77	5.081	-2.237
	(23.89)	(33.16)	(7.902)
Age of Head of HH	2.722***	1.379***	0.282***
	(0.196)	(0.272)	(0.0647)
Num of Adults in HH	27.01***	139.1***	4.223***
	(2.241)	(3.111)	(0.741)
Num of Children in HH	4.640	45.56***	11.32***
	(2.830)	(3.929)	(0.936)
Amount of Remit.	0.00257**	0.00378**	-5.77e-06
	(0.00127)	(0.00176)	(0.000419)
Total income w/out Remit	0.00107***	0.000569***	0.000130***
	(4.03e-05)	(5.59e-05)	(1.33e-05)
Head of HH Primary Edu	60.90***	21.91*	-13.21***
	(8.831)	(12.26)	(2.921)
Head of HH Secondary Edu	150.5***	38.91***	-28.70***
	(9.883)	(13.72)	(3.269)
Head of HH Preparatory Edu	174.7***	-0.917	-35.21***
	(11.39)	(15.82)	(3.769)
Head of HH Prof or Post grad	340.9***	38.52**	-34.35***
	(11.15)	(15.48)	(3.688)
Constant	-127.4***	72.34***	18.77***
	(15.65)	(21.72)	(5.175)

HH=Household

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

An increase in remittances and an increase in income both cause a significant increase in money spent on food in general and on all of the different food categories. There are two compelling effects that should be noticed. First, the coefficients on the remittance variable are larger than the coefficients on the income variable, suggesting that higher remittances actually cause a greater change in the amount spent on food than a higher income, which is a bit surprising. Specifically, in terms of total money spent on food, for every extra 1000 pesos of remittances received, there is an increase of 30.62 pesos spent on food, while for every 1000 pesos of extra income, there is only an increase of 8.35 pesos spent on food, which accounts for a major difference. This might suggest that remittances are largely going straight towards helping fund the cost of food, enabling those families to spend more on food and attain a higher quality diet. When examining how much the different food items increase, meat seems to see the biggest increase due to higher remittances. As protein is very important and sometimes difficult to obtain, especially for poorer families that cannot afford a lot of meat, and keeping in mind the general statistics which showed that remittance receiving families tend to be poorer, there is a possibility that increased remittances could be leading to more nutritious diets. This would support the idea of remittances helping with development, if more being spent on food correlates with better nutrition, and better nutrition correlates with more development. On the other hand, this could also support the idea that remittances only go towards increased consumption by the family, and are not saved or invested, and thus in that sense they cannot be used as agents of development for the communities as a whole.

The other effect to note is that increased remittances lead to significant increases in spending in every category except for sugar, in which case the coefficient is actually

negative, although insignificantly so. Considering the massive problem of diabetes in Mexico where it is the fifth most important cause of death, and identifying sugar as a potential factor leading to diabetes, this is an important finding as it shows that although increased income leads to increased spending on sugar, increased income from remittances does not (Phillips and Salmeron 1992). Therefore again this would support the possible view that the remittance money is going towards a better diet that includes more protein and nutrients from fruits and vegetables, but does not also necessarily mean increases in some of the food items that are not as good for health such as sugar.

In order to analyze the effect of the gender of the household on the amount spent on food and how that is affected by whether or not the household receives remittances, it is challenging to see the full effect in Table 6 because there are interaction variables. This means that to see the actual effect of gender and whether or not the house receives remittances, it is necessary to add together some of the coefficients. In Table 7 that effect is made more apparent. Table 7 takes the coefficients of the gender of the head of household and remittances from Table 6 and puts them in a more clearly understood form.

The four possible combinations of gender and remittances are male/no remit, female/no remit, female/remit, and male/remit. The female/no remit is omitted, therefore the coefficients on the other three are comparative to that one. When the head of household is male and does not receive remittances, there tends to be more spent on food in general, and specifically more spent on grains, vegetables, and sugar. Although more is spent on food in general, considering more is also spent on sugar which could be potentially harmful due to the significant problem of diabetes in Mexico, it is important

Table 7: Effects of Gender of Head of HH in Remittance and Non Remittance Receiving HH

	Tot Food	Grains	Meat	Milk	Fruits	Vegetables	Sugar
Male, No remit	150.7***	40.92***	28.04	-40.34***	-10.25*	42.69***	12.22***
	(45.32)	(11.55)	(17.14)	(11.6)	(6.065)	(8.418)	(2.006)
Female, Remit	266.6*	29.47	76.87	99.23**	11.55	68.87**	1.148
	(156.3)	(39.85)	(59.13)	(40.01)	(20.92)	(29.04)	(6.919)
Male, Remit	-94.1	99.31***	-154.03***	-25.04	-48.36***	44.22	12.696**
	(133.485)	(34.029)	(50.490)	(34.180)	(17.864)	(24.797)	(5.908)
Test							
Fremit=Mremit	-360.7***	-69.84	-230.86***	-124.27***	-59.66***	-24.65	11.54
	(152.126)	(38.781)	(57.541)	(38.939)	(20.359)	(28.259)	(6.733)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

HH=Household

to question whether more spending by the male head helps to increase the nutritional value of the household's diet.

Considering males who do receive remittances, for total food, the amount they spend does not differ significantly from the amount women without remittances spend. The coefficient is negative, suggesting that men with remittances might spend even less than women who do not receive remittances and thus spend less than men who do not receive remittances. This seems slightly strange, especially since previously it was observed that increased remittances cause increased spending on food. This effect does appear when considering women because women who receive remittances spend 266.6 more pesos on total food than women who do not receive remittances. These relationships in total food hold for some of the other items, though not for all. Remittance receiving men do spend less than non remittance receiving women on meat and fruits, but they spend more on grains and sugar. Again, when thinking about the influence on nutrition, this might be something to examine more closely because it may indicate that when women are the heads of households they spend more food money on items that are

considered more nutritious. We also see that the trend of women who receive remittances spending more than women who do not receive remittances holds true for the other items as well, though it does not seem to be significant for grains, meat, or fruits.

Finally, when considering the effect of the gender of the household, the most important row to look at in Table 7 is the last one, which shows the outcomes of a test that was conducted to find if there is a difference between how much male heads of household spend on food versus female heads of household in remittance receiving households. As can be seen, women spend significantly more on total food, and breaking it down, they spend more on meat, milk, and fruits, and though the coefficient is not significant, it is also negative for vegetables, suggesting that they also spend more on vegetables. The coefficient on sugar is not significant but it is positive and extremely close to being significant, with a t value of 1.71, which would again support the idea of men spending more on sugar than women, leading to potentially negative impacts on health and development.

Therefore, in non-remittance receiving households, the results do not completely support the notion that when control is put in the hands of women (such as when they are the head of household), they tend to spend more on the well being of the family, such as spending more on food. Although our results show that to be true for milk and fruits, for everything else, male heads of households actually spend more. But in remittance receiving households, we see that the outcomes found in previous literature that support this idea of women spending more on food and nutrition, do in fact hold true. This also suggests a compelling dynamic in which the fact that households are receiving remittances may be transforming relationships or possibly the outlook of the women who

often times become the heads of households when their husbands go to work abroad and begin to send back remittances. Although the data here does not indicate causation, it does imply this possible tendency and consequent change that might be occurring, which could be interesting to study further.

Looking at the gender and age of the children and their effect on spending on food, there are some significant results. For each regression concerning food, F tests were run to see if the coefficients on boys and girls ages 7 to 12 were significantly different from each other and to see if the coefficients on boys and girls ages 13 to 18 were significantly different from each other. F tests were also run to see if the remittance*gender interaction variables are significantly different from each other. For total food spending, the only significant difference was between the interaction variables for girls and boys 7 to 12. When looking at that case, we see that the coefficient on DremitDgirl7to12 (meaning if the household receives remittances and there is at least one girl between the ages of 7 and 12 inclusive) is significant and positive, meaning that in that case the amount of money spent on food increases substantially. Also, the F test showed that when the girl coefficient was compared to the boy one they were significantly different ($F=3.29$, $p<0.1$). This result seems to indicate that in remittance receiving households, the presence of girls 7 to 12 increases the amount spent on food significantly compared to boys of that age. For meat, there was a significant difference between the interaction variables for girls 13 to 18 and boys 13 to 18 ($F=5.67$, $p<0.05$). The coefficient on the boy interaction variable is 153.7 and significant, meaning that having remittances and boys in that age group increases the amount spent on meat significantly. It is interesting that this gender difference in the amount spent on meat

occurs only in remittance receiving households and not in non-remittance receiving households.

For fruits and vegetables, it seems that in general the household spends more money on them if there are girls in the household versus if there are boys. Specifically, the coefficients on girls 13 to 18 and boys 13 to 18 for fruits are significant and have opposite signs, showing that if there are girls that age, more money is spent on fruits, while if there are boys that age, less money is spent on fruits. The two coefficients are also significantly different from each other ($F=16.53$, $p<0.001$), showing that there is a difference in spending on fruit depending on the gender of the children ages 13 to 18. Also, although there is not a statistical difference between the coefficient on girls 7 to 12 and boys 7 to 12, they are very close to being significantly different ($F=2.61$, $p=0.106$), and again the coefficient on girls is higher and significant (25.43), while the coefficient on boys is lower and non significant (10.54). There are no differences in the interaction variables though, meaning that if remittances are received that does not lead to money being spent differently on fruits based on gender differences. For vegetables, the coefficients on girls and boys 13 to 18 are statistically significant and significantly different from each other ($F=3.89$, $p<0.05$). This again illustrates that more money is spent on vegetables when girls of that age group are part of the household. Also, the interaction variables show that there is a significant difference between girls and boys ages 7 to 12 in remittance receiving households ($F=9.46$, $p<0.01$). It is notable that the coefficient on girls for the interaction variable for vegetables is significant and positive, while the coefficient on boys is significant and negative, and this large gender difference

is only present in remittance receiving households. There are no gender differences for grains, milk, or sugar in remittance or non remittance receiving households.[16]

VIII. Discussion

The results from the three aspects of remittances and gender that were explored do in fact show that gender discrepancies exist, and these could have various implications for growth and development.

Although the results of the three regressions that examine to what extent the gender of the children in the household affects the amount of remittances sent back proved inconclusive, there was a definitive trend in all three which showed that households with more boys tended to receive more remittances. It may be true that if the sample size were larger, this effect would become more apparent. It is also important to consider the fact that from this survey it is hard to know the relationship of the children to the person working abroad and sending back remittances. If it were possible to focus on and analyze the effect when it is a male sending back remittances to his nuclear family and it was known exactly how many sons and daughters he had, then an effect might become more apparent. As it is though, in this dataset it is very possible that if a household consists of a large extended family, there may be 10 children, even though only a couple or none of them might be the children of the person working abroad. Because of these limitations, our results are limited, though there is a very strong tendency indicating households with boys receive more remittances.

[16] For milk, if children ages 0 to 6 are included as well as the interaction terms, we see that there is almost a significant difference between girls and boys both when just looking at the gender ($F=2.29$, $p=0.1303$) and when looking at the interaction terms ($F=2.32$, $p=0.127$). The coefficients show that in remittance receiving households more is spent on milk if there are girls and less is spent on milk if there are boys, which is the opposite from the effect in non remittance receiving households.

What this could mean for development is that remittances sent back may in fact be intensifying the gender gap. As households with more boys receive more money, they are afforded more opportunities to use that money for schooling and for potential investment opportunities. At the same time, those households with more girls would receive less money from remittances, leaving the girls with fewer opportunities. In this way, remittances may be leading to an amplified gender gap in remittance receiving households, and considering that those houses receiving remittances have been growing steadily, greater gender inequality may appear in the future. Gender inequality is clearly an impediment to economic growth and development, and as such, remittances may in fact be hindering development in Mexico, and possibly in other countries as well if similar effects exist.

This notion of remittances leading to gender inequality is further reinforced by the exploration of the effect of remittances on education spending. All three of the models support the idea that remittances are used to help fund education for boys in the household but not necessarily for girls. In terms of examining how much is spent in general on education for boys and girls in different sized towns, it is also very clear that in bigger cities, more is spent on girls' education, while in rural areas of less than 2500 people, gender stereotypes seem to still be prevalent and much less is spent on girls' education. Considering almost half of the households that receive remittances are in these rural areas, it would mean that a large portion of them probably only use the money to help fund boys' education and not girls' education. Again, this provokes more gender inequality, which in the long term could have negative consequences for development.

Another important finding, though, was that there is a strong trend showing that when the head of household is a woman, she tends to spend more money on girls' education. Considering that almost half of remittance receiving households (46%) have a female head of household, it is possible that a balancing effect may be occurring, where although in rural areas more money is being spent on boys' education than on girls' education, since many of these families are headed by women, they will actually spend more money on girls' education. If this were happening, then a big discrepancy between boys and girls would not occur and remittances may not have such a negative impact on development in the long run.

The most ambiguous results were obtained in the third section that looked at the effect of remittances on food spending, and thus potentially on nutrition. Although I found there to be differences between remittance receiving and non remittance receiving households, and especially some effects broken down by gender and age group, they were not very consistent. In general it seemed that the interaction variable between remittances and gender proved consistently significant and positive meaning that in remittance receiving households when the head of the household was a woman it increased spending on total food and on individual item expenditures. Also, for most categories the coefficient on the remittances variable tended to be significant and positive, suggesting that increased remittances leads to increased spending on food items. As for the gender differences by age category, although there were some individual interesting results, there does not seem to be an overwhelming trend.

Therefore, when looked at as a whole, what can be taken away from the seven regressions on food is that remittances do tend to increase the amount of money spent on

food items which could lead to families having more food and better nutrition, which may be very helpful for development in the long run. This effect is especially true when the head of household is a woman because the increase in money spent towards food is much more dramatic, and since almost half of the remittance receiving households have a female head, this may signify nutrition improving for many families and leading to further development.

IX. Conclusion

In order to understand the development impact of remittances, looking at it through a gender perspective is important because remittances have a multitude of gender implications that are directly connected to their overall development effect. This study focused on three particular aspects of gender and remittances, finding results that both support and refute the literature on remittances being a tool that fosters development. This study found that increased remittances led to increased spending on education and food items, both of which may contribute to development. Yet there were also trends suggesting that more remittances flowed into households with boys, remittances contributed to education spending for boys but not for girls, and there were some gender differences in spending on food in remittance receiving households. In these ways, remittances seem to be increasing the gender gap, and considering the negative consequences of gender inequality on development, remittances may have a net negative impact on development.

Although this study did not find a significant gender effect when looking at the effect of the gender of the children on the amount of remittances sent back, it did find a tendency in that direction, supporting results from previous studies done by Lundberg

and Rose (2002) and Choit et al (2007). Nevertheless, since no significant difference was found between girls and boys in their effect on the amount of remittances received by the household, it would be necessary to verify this trend through a larger study sample, or through a study sample that can directly identify which children in the household belong to the migrant who is sending remittances back.

Studying how remittances affect education spending on boys and girls, the results go against previous studies of gender disparity in education in Mexico (Parker and Pederzini 2001, Aguayo et al 2007), showing that there is a significant gender disparity, with remittances going towards boys' education instead of girls' education. It would be interesting to try to track the long term effects of this to see if this disparity in the use of remittances leads to long term negative consequences. With education, the results also confirm previous studies (Armendariz 2006, Garcia and Paiewonsky 2006) that have shown that compared to men, when women are given control over resources they tend to spend them more on the well-being of the family. The results add to these studies though by indicating that at least when it comes to education, women actually spend significantly more on girls' education compared to men who are the heads of households. Such a significant increase in spending on education is not seen with boys. Therefore, when the woman is the head of the household, she helps to balance out some of the gender disparities that exist, putting in more resources into her daughters' education.

This study found some notable results concerning food spending, remittances and gender. It was found that increased remittances lead to increased spending on food, and the increase was different for various food categories. Therefore, a next step would be to explore whether increases in certain food categories cause a significant enough change in

the diets of remittance receiving families to alter their overall nutritional intake, and if that change is positive or negative. Analyzing the effect of the gender of the household in the whole sample size, the results did not support previous literature showing that when women are given control of the households they spend more on food then men because it was found that men actually spend more on food (Onyango et al 1994, Blumberg 1995, Kennedy and Peters 1992). Yet in remittance receiving households women did spend more money on food, supporting this previous literature. It is therefore necessary to examine this difference between remittance receiving and non remittance receiving households to determine what is the cause behind the change in women's spending, and whether it is related directly to the remittances or to external factors. Finally, although differences in food spending were found based on the age and gender of the children, it would be necessary to fully analyze the social and biological factors that might be causing this, before any conclusions can be reached.

The results as a whole suggest that remittances do have gender implications, and therefore any policies concerning remittances should take these factors into account. Such policies might include providing more incentives to encourage families to send girls to school, especially in rural areas, thus countering the gender disparity that might be occurring in education due to remittances. In addition, creating more programs to provide education on nutrition and healthy eating, especially targeting male heads of households, and integrating such nutrition programs into schools may be beneficial. Through such policies, it can be possible to address some of these gender disparities that remittances might be leading to, thus not allowing remittances to augment the gender gap, and instead helping to channel remittances towards increased development in Mexico.

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Appendix

Table 8: Regression Results of the Effect of Children's Gender on Remittances Received (Using Robust Standard Error)

VARIABLES	(1) Remittances	(2) Remittances	(3) Remittances
Total Num Boys in HH	319.9		
	(199.6)		
Total Num Girls in HH	186.1		
	(198.2)		
Fraction of Boys in HH		4,181**	
		(1,787)	
Fraction of Girls in HH		3,485*	
		(1,828)	
Dummy if Just Girls in HH			77.12
			(692.1)
Dummy if Just Boys in HH			662.8
			(692.8)
Dummy if Both Girls and Boys in HH			433.3
			(842.7)
Num of Adults in HH	-33.14	173.1	-44.93
	(181.8)	(194.9)	(183.8)
Num of Children in HH		-217.1	185.5
		(217.2)	(186.1)
Dummy for Head of HH Gender	-2,956***	-2,810***	-2,946***
	(387.2)	(380.0)	(381.8)
Age of Head of HH	-29.33*	-16.47	-26.51
	(16.04)	(18.51)	(18.06)
Total Income w/out Remit.	0.0156*	0.0152	0.0155
	(0.00944)	(0.00945)	(0.00952)
Head of HH Primary Edu	464.0	415.6	465.0
	(505.9)	(499.4)	(502.3)
Head of HH Secondary Edu	1,274	1,128	1,264
	(812.9)	(795.6)	(810.8)
Head of HH Preparatory Edu	1,153	1,067	1,174
	(1,057)	(1,050)	(1,051)
Head of HH Professional or Post grad Edu	3,479**	3,450**	3,486**
	(1,580)	(1,583)	(1,583)
HH in Big City	21.00	84.04	6.969
	(560.8)	(564.0)	(565.4)
HH in Medium City	483.9	475.9	459.4
	(526.9)	(526.6)	(531.5)
HH in Small City	43.99	83.43	34.44
	(455.6)	(457.1)	(459.0)
Constant	7,891***	6,172***	7,612***
	(1,237)	(1,608)	(1,443)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Regression Results of Spending on Education in Remittance Receiving HHs (Using Robust Standard Error)

VARIABLES	(1) Money on Edu per Girl in HH	(2) Money on Edu per Boy in HH	(3) Total Money on Girl's Edu in HH	(4) Total Money on Boys Edu in HH
Dummy for Head of HH Gender	-41.61	-4.117	-25.50	-1.665
	(28.10)	(24.68)	(21.31)	(21.20)
Age of Head of HH	1.685	4.349***	0.537	3.156***
	(1.850)	(1.527)	(0.814)	(1.081)
Head of HH Primary Edu	-8.603	79.90***	-1.532	60.15***
	(31.33)	(26.56)	(17.18)	(20.92)
Head of HH Secondary Edu	62.40	135.8***	63.59*	120.1***
	(58.46)	(43.89)	(37.72)	(37.98)
Head of HH Preparatory Edu	61.81	207.2***	160.1**	170.5***
	(65.82)	(72.53)	(78.92)	(55.09)
Head of HH Prof. or Post grad Edu	274.2	336.1*	100.7	240.0*
	(181.1)	(178.7)	(100.1)	(126.6)
Num of Adults in HH	-9.542	-20.58**	-9.509	-12.94*
	(9.501)	(9.365)	(9.613)	(7.721)
Num of Children in HH	-13.45*	-3.038	40.16***	50.30***
	(7.213)	(5.656)	(6.647)	(7.279)
Amount of Remittances	0.000286	0.00246	-0.000296	0.00222
	(0.00190)	(0.00190)	(0.00124)	(0.00174)
Total HH Income w/out Remit.	0.00187***	0.00170**	0.00232***	0.000786
	(0.000367)	(0.000757)	(0.000752)	(0.000596)
Dummy House in Big City	94.72**	52.27	47.07*	71.20**
	(39.25)	(41.21)	(27.49)	(34.49)
Dummy House in Medium City	93.54**	28.70	65.26**	48.35*
	(39.70)	(28.77)	(30.73)	(27.22)
Dummy House in Small City	37.06	66.32*	53.41**	50.02*
	(27.68)	(36.92)	(25.02)	(26.86)
Constant	29.91	-199.7**	-62.49	-254.9***
	(97.30)	(84.35)	(58.46)	(76.99)

Robust standard errors in parentheses

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

Table 10: Money Spent on Education per Girl and per Boy by City Size (Using Robust Standard Error)

	Rural area		Small City		Medium City		Big City	
VARIABLES	(1) Money per Girl on Edu	(2) Money per Boy on Edu	(3) Money per Girl on Edu	(4) Money per Boy on Edu	(5) Money per Girl on Edu	(6) Money per Boy on Edu	(7) Money per Girl on Edu	(8) Money per Boy on Edu
Head of HH Gender	-63.50	1.858	-80.11	-92.21	70.16	74.95	-118.2	69.83
	(43.01)	(16.47)	(63.71)	(92.35)	(62.80)	(57.05)	(109.2)	(74.34)
Age of Head of HH	2.608	0.127	0.678	5.692	7.912*	9.790**	-3.853	6.137
	(2.316)	(0.625)	(1.487)	(3.446)	(4.448)	(3.821)	(4.819)	(4.643)
Head of HH Primary	-14.69	1.915	46.13	90.89	199.9**	248.2***	-152.2	239.8*
	(22.26)	(17.46)	(50.77)	(100.2)	(91.13)	(86.94)	(161.2)	(144.0)
Head of HH Secondary	24.13	7.296	259.0***	396.9***	331.2**	291.2**	-154.0	214.0
	(28.37)	(27.41)	(82.83)	(148.6)	(167.4)	(118.6)	(184.4)	(158.2)
Head of HH Preparatory	21.49	46.75	194.4	145.2	432.1**	317.6***	-189.7	370.7**
	(62.48)	(102.7)	(159.1)	(112.8)	(180.6)	(119.4)	(186.7)	(164.8)
Head of HH Prof. or Post grad	-11.91	687.8	-130.9	-189.0	11.88	990.4*	308.9	148.3
	(46.58)	(575.2)	(108.9)	(196.4)	(175.0)	(539.2)	(277.7)	(177.4)
Num of Adults in HH	-13.67	-11.85	55.45**	10.13	-86.33*	-36.25	21.34	-58.73**
	(9.385)	(8.111)	(24.54)	(47.01)	(48.44)	(23.31)	(35.66)	(26.25)
Num of Children in HH	-11.06*	-3.847	9.216	6.717	-17.35	-7.888	-32.07	-10.33
	(6.397)	(3.370)	(15.22)	(20.08)	(16.42)	(16.69)	(29.48)	(24.54)
Total HH Income w/out Remit.	0.00147**	0.00183*	-0.000171	0.000452	0.00755	-7.81e-05	0.00171***	0.00287**
	(0.000686)	(0.00104)	(0.00107)	(0.00209)	(0.00545)	(0.00173)	(0.000265)	(0.00134)
Amount of Remit.	-0.000798	0.00219	0.00629	0.00880	0.00680*	0.00640*	-0.00308	-0.000170
	(0.00170)	(0.00220)	(0.00625)	(0.0136)	(0.00376)	(0.00340)	(0.00390)	(0.00243)
Constant	27.65	37.27	-155.0	-314.7*	-398.9	-561.8**	572.8	-262.9
	(46.34)	(44.71)	(113.0)	(168.9)	(296.0)	(238.4)	(384.5)	(326.9)
Observations	443	439	126	122	150	166	195	220

Robust standard errors in parentheses

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

Table 11: Factors Affecting Total Education Spent in Household (Using Robust Standard Error)

VARIABLES	(1) Total Education Spent in Household
Total Num of Girls	74.17***
	(18.94)
Total Num of Boys	72.93***
	(17.80)
Amount of Remittances	-0.00403
	(0.00251)
GirlDummy*Remittances	0.00358
	(0.00491)
BoyDummy*Remittances	0.00758
	(0.00461)
Dummy for Head of HH Gender	-45.96
	(30.70)
Age of Head of HH	3.211**
	(1.307)
Head of HH Primary Edu	52.80*
	(29.83)
Head of HH Secondary Edu	170.9***
	(53.25)
Head of HH Preparatory Edu	331.0***
	(98.01)
Head of HH Prof. or Postgrad Edu	347.5**
	(154.1)
Dummy House in Big City	108.5*
	(63.41)
Dummy House in Medium City	65.33
	(51.27)
Dummy House in Small City	142.4
	(90.64)
GenderofHead*Bigcity	21.82
	(85.23)
GenderofHead*Mediumcity	80.10
	(85.64)
GenderofHead*Smallcity	-68.07
	(97.32)
Total HH Income w/out Remit.	0.00292***
	(0.000530)
Constant	-299.0***
	(95.71)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12: Regression Results for Money Spent on Food Items

VARIABLES	(1) Tot Food Spending	(2) Grains	(3) Meat	(4) Milk
Dummy for Head of HH Gender	150.7***	40.92***	28.04*	-40.34***
	(43.56)	(10.62)	(16.18)	(10.93)
Dummy for Receives Remit.	266.6*	29.47	76.87	99.23***
	(138.7)	(38.94)	(54.98)	(36.22)
DremitGender	-511.4***	28.92	-258.9***	-83.93**
	(144.1)	(45.11)	(56.78)	(36.80)
Dgirl7to12	371.2***	122.6***	120.6***	3.688
	(60.12)	(16.41)	(22.51)	(15.14)
Dboy7to12	399.0***	129.5***	132.6***	20.31
	(58.35)	(15.37)	(21.79)	(14.92)
Dgirl13to18	557.6***	138.8***	192.8***	-11.06
	(57.25)	(15.50)	(21.55)	(14.03)
Dboy13to18	523.9***	160.9***	180.5***	-11.38
	(55.84)	(14.47)	(20.80)	(13.96)
DremitDgirl7to12	306.0*	65.03	-18.85	0.457
	(180.2)	(67.19)	(70.29)	(45.10)
DremitDboy7to12	-199.9	-17.89	-87.38	-2.225
	(177.9)	(57.98)	(72.78)	(45.19)
DremitDgirl13to18	-119.2	-21.88	-92.99	-73.59
	(173.3)	(58.68)	(67.47)	(44.88)
DremitDboy13to18	171.0	-30.13	153.7**	-46.24
	(174.5)	(52.72)	(72.04)	(42.93)
Age of Head of HH	10.59***	0.337	2.986***	2.644***
	(1.496)	(0.364)	(0.536)	(0.360)
Num of Adults in HH	991.3***	223.5***	313.0***	98.28***
	(27.27)	(5.411)	(9.374)	(5.851)
Num of Children in HH	296.5***	95.69***	16.55*	74.27***
	(27.45)	(7.324)	(9.376)	(6.191)
Amount of Remit.	0.0362***	0.00783***	0.0127***	0.00603**
	(0.0108)	(0.00299)	(0.00431)	(0.00300)
Total income w/out Remit	0.00835***	0.000248**	0.00229***	0.00145***
	(0.00181)	(0.000120)	(0.000524)	(0.000345)
Head of HH Primary Edu	792.1***	79.97***	291.6***	211.9***
	(60.25)	(19.44)	(22.55)	(13.53)
Head of HH Secondary Edu	1,788***	170.5***	625.8***	477.6***
	(78.46)	(20.92)	(28.05)	(17.75)
Head of HH Preparatory Edu	1,940***	108.4***	710.2***	567.5***
	(99.75)	(23.01)	(34.85)	(23.22)
Head of HH Prof or Post grad	2,604***	108.1***	783.9***	746.5***
	(147.9)	(23.78)	(46.68)	(31.68)
Constant	-197.7	187.8***	-372.8***	-133.0***
	(123.2)	(31.14)	(43.16)	(28.97)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12 Cont: Regression Results for Money Spent on Food Items

VARIABLES	(5) Fruits	(6) Vegetables	(7) Sugar
Dummy for Head of HH	-10.25*	42.69***	12.22***
	(5.933)	(8.021)	(1.758)
Dummy for Receives Remit.	11.55	68.87**	1.148
	(16.39)	(29.31)	(6.560)
DremitGender	-49.41***	-67.34**	-0.672
	(17.63)	(31.08)	(7.118)
Dgirl7to12	25.43***	45.93***	-0.0244
	(7.257)	(10.91)	(3.290)
Dboy7to12	10.54	31.40***	-1.886
	(7.059)	(10.46)	(3.114)
Dgirl13to18	21.35***	100.4***	4.290*
	(6.957)	(10.50)	(2.415)
Dboy13to18	-16.38**	75.03***	3.845
	(6.682)	(10.18)	(2.959)
DremitDgirl7to12	1.694	71.00*	10.61
	(20.66)	(40.83)	(10.94)
DremitDboy7to12	43.11**	-88.46**	9.722
	(21.47)	(36.29)	(11.76)
DremitDgirl13to18	-16.75	8.805	3.324
	(20.47)	(38.41)	(10.51)
DremitDboy13to18	26.77	5.081	-2.237
	(19.55)	(37.42)	(9.413)
Age of Head of HH	2.722***	1.379***	0.282***
	(0.202)	(0.267)	(0.0879)
Num of Adults in HH	27.01***	139.1***	4.223***
	(3.389)	(4.089)	(1.607)
Num of Children in HH	4.640*	45.56***	11.32***
	(2.808)	(4.739)	(1.718)
Amount of Remit.	0.00257**	0.00378*	-5.77e-06
	(0.00128)	(0.00216)	(0.000594)
Total income w/out Remit	0.00107***	0.000569***	0.000130
	(0.000242)	(0.000147)	(0.000137)
Head of HH Primary Edu	60.90***	21.91*	-13.21***
	(7.037)	(12.74)	(4.726)
Head of HH Secondary Edu	150.5***	38.91***	-28.70***
	(9.965)	(14.20)	(6.209)
Head of HH Preparatory Edu	174.7***	-0.917	-35.21***
	(12.77)	(16.26)	(7.566)
Head of HH Prof or Post grad	340.9***	38.52**	-34.35***
	(20.15)	(18.69)	(12.74)
Constant	-127.4***	72.34***	18.77**
	(15.64)	(22.04)	(7.537)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13: Effects of Gender of Head of HH in Remittance and Non Remittance Receiving HH (Using Robust Standard Error)

	Tot Food	Grains	Meat	Milk	Fruits	Vegetables	Sugar
Male, No remit	150.7***	40.92***	28.04*	-40.34***	-10.25*	42.69***	12.22***
	(43.56)	(10.62)	(16.18)	(10.93)	(5.933)	(8.021)	(1.758)
Female, Remit	266.6*	29.47	76.87	99.23***	11.55	68.87**	1.148
	(138.7)	(38.94)	(54.98)	(36.22)	(16.39)	(29.31)	(6.560)
Male, Remit	-94.1	99.31***	-154.03***	-25.04	-48.36***	44.22	12.696*
	(116.113)	(36.21)	(43.18)	(29.56)	(14.72)	(27.91)	(8.55)
Test Fremit=Mremit	-360.7***	-69.84	-230.86***	-124.27***	-59.66***	-24.65	11.54
	(152.126)	(38.781)	(57.541)	(38.939)	(20.359)	(28.259)	(6.733)

Standard errors in parentheses

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

HH=Household