



HAL
open science

Private Income Transfers and Development : three Applied Essays on Latin America

Carolina Alban Conto

► **To cite this version:**

Carolina Alban Conto. Private Income Transfers and Development : three Applied Essays on Latin America. Economics and Finance. Université Paris sciences et lettres, 2018. English. NNT : 2018PSLEH006 . tel-03163274

HAL Id: tel-03163274

<https://theses.hal.science/tel-03163274>

Submitted on 9 Mar 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

THÈSE DE DOCTORAT

de l'Université de recherche Paris Sciences et Lettres
PSL Research University

Préparée à l'École des hautes études en sciences sociales

Transferts Privés de Revenus et Développement: Trois Essais
Appliqués à l'Amérique Latine

Ecole doctorale n°465

ECOLE DOCTORALE ECONOMIE PANTHEON SORBONNE

Spécialité Analyse et Politique Economiques

COMPOSITION DU JURY :

M. GALLEGO Juan Miguel
Universidad del Rosario, rapporteur

M. PARIENTÉ William
Université Catholique de Louvain,
rapporteur

M. HERRERA Javier
IRD, Membre du jury

Mme. LAMBERT Sylvie
INRA et PSE, Membre du jury

**Soutenue par MARIA
CAROLINA ALBAN CONTO
le 12 janvier 2018**

Dirigée par Flore **GUBERT**

Para mis hijos.

"It is hard to understand how a compassionate world order can include so many people afflicted by acute misery, persistent hunger and deprived and desperate lives, and why millions of innocent children have to die each year from lack of food or medical attention or social care. This issue, of course, is not new, and it has been a subject of some discussion among theologians. The argument that God has reasons to want us to deal with these matters ourselves has had considerable intellectual support. As a nonreligious person, I am not in a position to assess the theological merits of this argument. But I can appreciate the force of the claim that people themselves must have responsibility for the development and change of the world in which they live. One does not have to be either devout or non devout to accept this basic connection. As people who live-in a broad sense-together, we cannot escape the thought that the terrible occurrences that we see around us are quintessentially our problems. They are our responsibility-whether or not they are also anyone else's. As competent human beings, we cannot shirk the task of judging how things are and what needs to be done. As reflective creatures, we have the ability to contemplate the lives of others. Our sense of behavior may have caused (though that can be very important as well), but can also relate more generally to the miseries that we see around us and that lie within our power to help remedy. That responsibility is not, of course, the only consideration that can claim our attention, but to deny the relevance of that general claim would be to miss something central about our social existence. It is not so much a matter of having the exact rules about how precisely we ought to behave, as of recognizing the relevance of our shared humanity in making the choices we face."

— Amartya Sen, *Development as Freedom*

Acknowledgement

Fourteen years ago, being recently graduated as a sociologist, I made the decision to train also as an economist. I did it for admiration to the inspired work of several academics, policy makers and friends. It has been an exciting adventure, full of learnings and satisfactions. Today, I want to thank all those who have accompanied me on this path, for believing in me and giving me the strength not to lose the north.

My mom, Stella, an inspiring woman determined to make the world a place where truth and justice prevail. My dad, Virgilio, whose example of responsibility and rigor has been determinant to always want to give more. My brother Juan David, my biggest fan and the most loving uncle, model of tenacity and perseverance. My sister Mariajosé, example of discipline, strength and partner in thousands of adventures. Mi grandfather Juan, the most obliging man I have ever met whose unconditional love will always be part of me. Mi grandmother Raquel, an attentive, loving and dedicated woman.

Living away from home, for so many years, would not have been possible if I had not found my great love on the way. Quentin Roquigny, thank you for sharing all my dreams, for a life full of joy, for our children and... also for teaching me French and maths.

My children, my biggest wish, since always in my thoughts, have been the inspiration behind this journey. My desire is that you flourish in freedom, choosing at every moment the life you value the most. I will work on that forever, hopefully hand in hand.

Since my arrival to PSE, Flore Gubert, my PhD advisor, became a guide and a mentor. Flore, I am extremely grateful for your patience and advice. I hope that this work reflects the time you dedicated to help me with this research project, your always-relevant comments and your valuable instruction.

My thanks go also to Juan Miguel Gallego and William Parienté for agreeing to write a report on this dissertation. Your comments have been very valuable and I feel honored by the interest you have shown on this work.

I would also like to thank Javier Herrera and Sylvie Lambert, agreeing to be members of my jury, and to Karen Macours, for being part of my thesis committee, given me insightful comments to improve the quality of my research.

I am very grateful to all the professors I had at PSE, training me, and my peers, with dedication and passion, in development and applied economics: Luc Behagel, Sandra E. Black, François Bourguignon, Denis Cogneau, Esther Duflo, Marc Gurgand, Sylvie Lambert, Eric Maurin, Barbara Petrongolo, Thomas Piketty, Oliver Vanden Eynde and Theodora Xenogiani, among others.

I also want to extend my thanks to the researchers at DIAL, who embraced me with open arms and helped inspiring much of this work: Lisa Chauvet, Mohammed Ali Marouani, Sandrine Mesplé-Somps, Jean-Noël Senne and Gilles Spielvogel.

Million thanks to all the friends I made on this road and to whom I will never be able to compensate enough for their company, support, solidarity and generosity: Jaime Ahcar, Oscar Barrera, Marie Boltz-Laemmel, Irene Clavijo, Virginie Comblon, Anda David, Ricardo Estrada, Marin Ferry, Nicolas Frémeaux, Andrea Garnero, Nathalie Guilbert, Kenneth Hounghbedji, Hernán Jaramillo, Seeun Jung, Estelle Koussoube, Diana M. López, Dimitris Mavridis, Marion Mercier, Björn Nilsson, Cristina Pombo, Carlos Sepúlveda, Arthur Sylve, Delia Visan and Claire Zanuso.

Finally, a sincere thanks to PSE, the AFD and COLFUTURO whose fundings were decisive for my masters and doctoral studies in France.

Agradecimiento

Hace catorce años, estando recién graduada como socióloga, tomé la decisión de formarme también como economista. Lo hice por admiración hacia el trabajo inspirador de varios académicos, hacedores de política pública y amigos. Ha sido una aventura emocionante, llena de aprendizajes y satisfacciones. Hoy, quiero agradecer a todos aquellos que me han acompañado en este camino, por creer en mi y darme la fortaleza para no perder el norte.

Mi mamá, Stella, una mujer inspiradora, determinada a hacer del mundo un lugar donde prevalezca la verdad y la justicia. Mi papá, Virgilio, cuyo ejemplo de responsabilidad y rigor ha sido clave para querer siempre dar más. Mi hermano Juan David, mi más grande fan y el tío más amoroso, modelo de tenacidad y perseverancia. Mi hermana Mariajosé, ejemplo de disciplina, fortaleza y cómplice en miles de aventuras. Mi abuelo Juan, el hombre más servicial que he conocido, cuyo amor incondicional siempre estará presente en mí. Mi abuela Raquel, una mujer atenta, amorosa y dedicada.

Vivir lejos de casa, durante tantos años, no hubiera sido posible si no hubiera encontrado a mi gran amor en el camino. Quentin Roquigny, gracias por compartir todos mis sueños, por una vida llena de alegría, por nuestros hijos y... también por enseñarme francés y matemática.

Mis hijos, mi mayor anhelo, desde siempre en mis pensamientos, han sido la inspiración de este viaje. Mi deseo es que florezcan en libertad, eligiendo en todo momento la vida que más valoran. Trabajaré en eso siempre, ojalá de su mano.

Desde mi llegada a PSE, Flore Gubert, mi directora de tesis, se convirtió en mi guía y mentora. Flore, estoy extremadamente agradecida por tu paciencia y consejos. Espero que este trabajo refleje el tiempo que dedicaste a ayudarme en este proyecto de investigación, tus comentarios siempre relevantes y tus valiosas enseñanzas.

También doy las gracias a Juan Miguel Gallego y William Parienté por aceptar escribir un reporte sobre esta disertación. Sus comentarios han sido muy valiosos y me siento muy honrada por el interés que han demostrado en este trabajo.

Agradezco igualmente a Javier Herrera y Sylvie Lambert, quienes aceptaron ser miembros de mi jurado, y a Karen Macours, por haber sido parte de mi comité de tesis y darme comentarios esclarecedores para mejorar la calidad de mi investigación.

Estoy muy agradecida con todos los profesores que tuve en PSE, quienes me formaron, a mi y a mis pares, con dedicación y pasión, en economía del desarrollo y economía aplicada: Luc Behagel, Sandra E. Black, François Bourguignon, Denis Cogneau, Esther Duflo, Marc Gurgand, Sylvie Lambert, Eric Maurin, Barbara Petrongolo, Thomas Piketty, Oliver Vanden Eynde y Theodora Xenogiani, entre otros.

También quiero extender mi agradecimiento a los investigadores de DIAL, quienes me acogieron con los brazos abiertos y ayudaron a inspirar gran parte de este trabajo: Lisa Chauvet, Mohammed Ali Marouani, Sandrine Mesplé-Somps, Jean-Noël Senne y Gilles Spielvogel.

Millones de gracias a todos los amigos que hice en este camino, a quienes nunca podré retribuir lo suficiente por su compañía, apoyo, solidaridad y generosidad: Jaime Ahcar, Oscar Barrera, Marie Boltz-Laemmel, Irene Clavijo, Virginie Comblon, Anda David, Ricardo Estrada, Marin Ferry, Nicolas Frémeaux, Andrea Garnero, Nathalie Guilbert, Kenneth Houngbedji, Hernán Jaramillo, Seeun Jung, Estelle Koussoube, Diana M. López, Dimitris Mavridis, Marion Mercier, Björn Nilsson, Cristina Pombo, Carlos Sepúlveda, Arthur Sylve, Delia Visan y Claire Zanuso.

Finalmente, un sincero agradecimiento a PSE, a la AFD y a COLFUTURO, cuya financiación fue decisiva para mis estudios de maestría y doctorado en Francia.

Abstract

For decades, economists have been interested in studying why and how agents support each others, giving a special place to the analysis of private income transfers. Recent applications include very diverse topics such as: the analysis of capital accumulation, social cohesion and solidarity, market insurance and interest rates, risk-coping strategies against negative shocks and government policies.

The present dissertation analyzes how inter-household transfer decisions, international remittances and intra-household transfers contribute to shape five fundamental aspects of development: (i) social interactions, (ii) market and household work, (iii) spending patterns, (iv) nutrition and (v) health.

Three research questions are addressed using applied data from Colombia, Ecuador and Peru, and multiple econometric techniques. First, is there a relationship between inter-household transfer dynamics and distance between donors and receivers? Second, do remittances asymmetrically shape labor supply responses depending on people's characteristics? Third, do intra-household transfers influence spending patterns, nutrition and health outcomes?

Results suggest that private income transfers play a key re-distributive role, shaping agents' living standards and improving individual and social well-being. In contexts of economic deprivation, where social safety nets are scarce, informality is at stake, institutions are highly fragmented and the public sector is weak, money and in-kind help from other households or individuals constitute crucial livelihood strategies to get through the economic world. Thus, enhancing our understanding of this dimension of social behaviors is a must.

Keywords: Private income transfers; Personal Income, Wealth, and Their Distributions; Altruism; Remittances; Children; Economics of the Elderly; Time Allocation and Labor Supply; Health and Economic Development; Provision and Effects of Welfare Programs

JEL Classification: D31, D64, F24, J13, J14, J22, I15, I38

Contents

Acknowledgement	5
Agradecimiento	7
Abstract	9
List of Figures	13
List of Tables	16
Introduction	1
1 Private Income Transfers, Information Asymmetry and Distance. Theory and Evidence from Colombia	7
1.1 Introduction	8
1.2 Literature Review	11
1.2.1 Theoretical Background	11
1.2.2 Empirical Evidence	13
1.3 Information Asymmetry and Distance	15
1.4 <i>Familias en Acción</i>	25
1.4.1 Characteristics of the Program	25
1.4.2 Data	27
1.5 Sample Characteristics and Empirical Strategy	29
1.5.1 Descriptive Statistics	29
1.5.2 Empirical Strategy	31
1.6 Results	33
1.6.1 Main Estimates	33
1.6.2 Identification Threats	36
1.6.3 Social Well-being	39
1.7 Conclusions	40
1.8 Figures and Tables	41
2 Remittances and Labor Supply in the Hearth of Ecuadorian Migrants	57
2.1 Introduction	58
2.2 Data and Descriptive Statistics	61
2.2.1 Data	61
2.2.2 Descriptive Statistics	63
2.3 The 2008 Global Economic Crisis	64
2.4 Empirical Strategy	68
2.4.1 Identification Strategy	68
2.4.2 Quantile Regression	70
2.5 Results	71
2.5.1 Remittances and Unemployment Abroad	71
2.5.2 Individual Labor Supply	72

2.6	Potential Threats to the Exclusion Restriction	75
2.6.1	Return Migration and Re-migration	75
2.6.2	Selection in Migration Patterns	77
2.6.3	Confounding Macroeconomic Variables	78
2.6.4	Sample Attrition	79
2.7	Conclusions	83
2.8	Figures and Tables	85
	Appendix	119
3	Intra-household Income Transfers and its Effects on Children’s Nutrition and Health in Peru	133
3.1	Introduction	134
3.2	Background	139
3.2.1	Peru’s Elderly Population	139
3.2.2	<i>Pensión 65</i>	140
3.3	Data and Descriptive statistics	143
3.3.1	Households with Children under 5 y/o	143
3.3.2	Children under 5 y/o	144
3.4	Empirical Strategy	146
3.5	Results	149
3.5.1	Household Monetary Spending	149
3.5.2	Children’s Nutrition and Health	152
3.5.3	Sensitivity Tests	153
3.5.4	Validity Analysis	154
3.5.5	Potential Confounding Factors	157
3.6	Conclusions	158
3.7	Tables and Figures	159
	Appendix	195
	Conclusion	201
	Bibliography	203

List of Figures

1.1	Perceived Actual Income and Distance	41
1.2	Frequency of Private Transfer Transactions	45
2.1	Rotating Panel Sample Design ENEMDU 2005-2009	85
2.2	Unemployment Rates in Selected Countries 2005q4 - 2010q4	90
2.3	Unemployment Rate in Spain 2003q1 - 2013q4	90
2.4	Unemployment in the United States 2002m12-2013m12	91
2.5	Remittances Received in Ecuador by Country of Origin - 2003q1 - 2013q4	92
2.6	Distribution of Remittances 2007 - 2008	94
2.7	Distribution of Time Allocation to Market Work 2007 - 2008	95
2.8	Distribution of Time Allocation to Household Work 2007 - 2008	95
2.9	Unemployment Coefficients - First Stage Households with Migrants	96
2.10	Labor Participation - Individuals Aged 5 y/o and Over Remittances Coefficients (Second Stage)	97
2.11	Time Allocation to Market Work - Individuals Aged 5 y/o and Over Remittances Coefficients (Second Stage)	98
2.12	Time Allocation to Household Work - Individuals Aged 5 y/o and Over Remittances Coefficients (Second Stage)	99
2.13	Labor Supply - Children Remittances Coefficients (Second Stage)	100
2.14	Labor Supply - Adult Men Remittances Coefficients (Second Stage)	101
2.15	Labor Supply - Adult Women Remittances Coefficients (Second Stage)	102
2.16	Labor Supply - Adults Over 60 y/o Remittances Coefficients (Second Stage)	103
2.17	Return Migration to Ecuador	104
2.18	Evolution of Macroeconomic Variables in Ecuador (2000 - 2010)	110
3.1	<i>Pensión 65</i> Eligibility Rule	160
3.2	<i>Pensión 65</i> Coverage 2011- 2015	164
3.3	Distribution of Participants by <i>Pensión 65</i> Effective Coverage Date	165
3.4	McCrary Tests	169
3.5	Discontinuity of Program Participation	170
3.6	Discontinuity in Household Spending	171
3.7	Discontinuity in Children Outcomes	179
A-3.1	Affiliation to Contributory Pensions in Peru	196

List of Tables

0.1	Colombia, Ecuador and Peru Comparative Indicators 2015	4
1.1	Summary of Predictions	19
1.2	Sample Composition by Municipality Treatment Status	41
1.3	Socioeconomic Characteristics of the Sample (2002)	42
1.4	Incidence and Value of Private Transfer Transactions (2002)	43
1.5	Multiple Transfer Transactions (2002) Incidence (d)	46
1.6	Evolution of Transfer Transactions 2002 - 2003	47
1.7	Household Baseline Characteristics by Treatment Status (2002)	49
1.8	Baseline Transfer Transactions by Treatment Status (2002)	50
1.9	<i>Familias en Acción</i> Estimates on Transfers-in	52
1.10	<i>Familias en Acción</i> Estimates on Transfers-out	53
1.11	Hh Characteristics by the Geographic and Social Distance of Transfer Donors	54
1.12	Hh Characteristics by Geographic and Social Distance of Transfer Receivers	55
2.1	Sample Composition	85
2.2	Household Characteristics (2007)	86
2.3	Individual Characteristics (2007)	87
2.4	Characteristics of International Migrants (2007)	88
2.5	Distribution of Migrants by Destination Country and Unemployment Rate	89
2.6	Evolution of Remittances and Labor Supply 2007 - 2008	93
2.7	International Migrants by Country of Residence	105
2.8	Households by Country of Residence of Migrants	106
2.9	Individuals by Country of Residence of Migrants	108
2.10	Determinants of Non-attrition Households and Individuals Surveyed in 2007	111
2.11	Estimations of Non-attrition, Unemployment and Remittances Households Surveyed in 2007	112
2.12	Non-attrition and Labor Supply Individuals Surveyed in 2007	114
2.13	Labor Supply Outcomes (Individuals > 5 y/o) and Unemployment by Remittances Status	115
2.14	Households Surveyed in September - December 2007 First and Second Stage Regressions	116
2.15	IPW-Correction Estimates First and Second Stage Regressions	117
A-2.1	Remittances Regressions - First Stage and Extensive Margin Households with Migrants	119
A-2.2	Labor Supply - Individuals Aged 5 y/o and Over Remittances Coefficients (Second Stage)	120
A-2.3	Labor Supply - Children Remittances Coefficients (Second Stage)	124
A-2.4	Labor Supply - Adult Men Remittances Coefficients (Second Stage)	126
A-2.5	Labor Supply -Adult Women Remittances Coefficients (Second Stage)	128
A-2.6	Labor Supply - Adults over 60 y/o Remittances Coefficients (Second Stage)	130
3.1	Characteristics of the Elderly Population in Peru (2015)	159
3.2	Variables and Weights used in the Construction of the IFH	161

3.3	IFH Eligibility Thresholds by Cluster	164
3.4	Participation in <i>Pensión 65</i> (2015)	165
3.5	Sample Sizes	166
3.6	Summary Statistics Households with Children under 5 y/o	166
3.7	Summary Statistics Children under 5 y/o	168
3.8	Program Discontinuity at 65 y/o Participation in <i>Pensión 65</i> (LPM)	170
3.9	<i>Pensión 65</i> Estimates on Monetary Spending Households with Children under 5 y/o	176
3.10	<i>Pensión 65</i> Estimates on Monetary Spending Alternative Household Samples	177
3.11	2SLS Estimates on Household Spending	178
3.12	<i>Pensión 65</i> Estimates on Children's Nutrition and Health (OLS and 2SLS)	181
3.13	Different Bandwidth Choices Household Spending Estimates	182
3.14	Different Bandwidth Choices Children's Nutrition and Health Estimates	183
3.15	Various Polynomials Household Spending Estimates	184
3.16	Various Polynomials Children's Nutrition and Health Estimates	185
3.17	Discontinuity in Covariates and Retrospective Variables	186
3.18	"Donut-hole" Estimates on Household Spending	187
3.19	"Donut-hole" Estimates on Children's Nutrition and Health	188
3.20	Pre-program Checks on Household Spending (2009 and 2010)	189
3.21	Pre-program Checks on Children's Nutrition and Health (2009 and 2010)	190
3.22	Alternative Cut-offs Sample of Households	191
3.23	Alternative Cut-offs Sample of Children under 5 y/o	193
3.24	Program Discontinuity at 65 y/o Participation in <i>Juntos</i> (LPM)	194
A-3.1	Summary Statistics: Complete Sample of Households	197
A-3.2	Summary Statistics: Complete Sample of Children	199

Background

Transferring income, monetary or in-kind, to neighbors, colleagues, family or friends, is a very common practice, and, as such, it has been studied widely in all social sciences. Sociobiology, for instance, states that income transfers are based on the existence of common genes and seek to ensure kin selection (Hamilton, 1964; Trivers, 1971). Psychology, argues they are channels of expressing sentiments and aim, mainly, to help the others in reducing their suffering (Batson, 1991; Lewis *et al.*, 2008). Sociology, sees them as the way individuals materialize social ties (Achenbaum and Bengtson, 1993). Anthropology, regards them as a form of communication product of social norms (Schieffelin, 1980).

In economics, private transfers have been, for decades, in the heart of the most passionate debates: from the seminal work of Becker (1974), where they were considered the center of social interactions and the basis of family roles¹, to our days. Recent applications include very diverse topics such as: the analysis of capital accumulation, social cohesion and solidarity, market insurance and interest rates, risk-coping strategies against negative shocks and government policies (like pensions, land access or social subsidies), among many others.

The means and ways of income transfers are varied and, usually, hard to define. They could be monetary or in-kind; be quantifiable or not; be disinterested aids or "payments" for services; convene individuals tied by very strong blood (affinity, friendship or affection) ties, or unite completely strangers around a certain goal; be formalized in very detailed written contracts or arise spontaneously without any planning; have a very well defined counterpart or be intended with more general purposes; be part of long lasting agreements or emerge under very specific circumstances; etc.

¹He states: "The "head" of a family is defined not by sex or age, but as that member, if there is one, who transfers general purchasing power to all other members because he cares about their welfare."

The above may explain the curiosity they provoke in social scientists and, at the same time, the complexity they represent to be addressed in the rigorous way demanded today by economic theory and applied economics.

Despite the efforts, comprehensive data on private income transfers are very scarce. National accounts try to gather some information on current transfers between households, inside and outside the country. This is, for instance, the main source to measure international remittances, which explains that today we have more knowledge about this type of transfers than about the others. Nevertheless, in these figures, all the transfers delivered through informal channels (even if monetary) along with those occurring between individuals of the same family or household, are not represented.

At the micro level, some recent attempts have been made in order to better record transfers, including specialized sections in household and labor force surveys, longitudinal panels tracking households and individuals in time, matched data identifying the different parts involved in the transactions (see e.g., [Chort *et al.*, 2016](#)) and surveys tracing household sub-structures across various periods (see e.g., [Devreyer *et al.*, 2008](#)).

In this dissertation, I focus on private transfers as a driving force of income redistribution, enhancing individual and social well-being. In particular, I analyze how they contribute to shape five fundamental aspects of development: social interactions, market and household work, spending patterns, nutrition and health.

In developing countries, where a non-negligible fraction of the population lives in poverty, social safety nets rarely exist, informality is "daily bread", institutions are highly fragmented and public sector plays a minimal role, money and in-kind help from other households or individuals can be a matter of death or life. Thus, private income transfers become crucial livelihood strategies to get through the economic world.

Despite registering very modest growth rates,² Latin America³ is a region that has shown remarkable advances in poverty reduction over the last decades, with more than 40 million people moved out of poverty. The region's population living in poverty fell from 51% to 27% in 2013 ([World Bank, 2017b](#)). Furthermore, extreme poverty was cut by three, from 16% to 4.9%

²Regional average annual GDP per capita growth rate increased from 0.4% between 1998 to 2000 to 1.9% in 2000 and 4.5% in 2010. More recently, however, growth has considerably decelerated from 3.2% in 2011 to 1.6% in 2013, -1.2% in 2015 and -1.7% in 2016 ([World Bank, 2017a](#)).

³Most figures refer to Latin America and the Caribbean, +26 countries: Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

(World Bank, 2017c).

This success story is associated with an important improvement in public policies. Most countries of the region experienced large increases in social spendings⁴ and many launched an innovative agenda, led by the adoption of monetary transfers to the poor conditional on investments in human capital (CCTs) and, more recently, the implementation of non-contributory pension programs (NCPs). In 2016, CCTs operated in 17 Latin American countries, benefiting 49% of the population living in extreme poverty (approximately 135 million people). Meanwhile, NCPs were in place in 15 countries reaching 58% of the elderly in extreme poverty.

Nevertheless, major flaws still persist. Latin America continues to be the most unequal region in the world, with a regional Gini coefficient of 0.49 (ECLAC, 2017) and 10% of the population accumulating 37% of total wealth (Oxfam, 2015) in 2015. In addition, many Latin Americans are still trapped in chronic poverty⁵, i.e. had been poor since they are born, and most people coming out of poverty remain in the ranks of a "vulnerable" class with high risk of falling back⁶.

The relationship between private income transfers and the improvement of inequality and social inclusion has been very little studied in Latin America. Most of the literature focuses on remittances⁷, but evidence on the role of inter-household and intra-household transfer dynamics is scarcer.

Main Contributions

The present dissertation is an attempt to feed this debate by investigating, in three essays, three distinct faces of private income transfers in Latin America: (i) inter-household transfer decisions, (ii) international remittances and (iii) intra-household transfers.

Each essay addresses a different research question, as follows:

1. Is there a relationship between inter-household transfer dynamics and distance between donors and receivers?
2. Do remittances asymmetrically shape labor supply responses depending on people's characteristics?

⁴Government social spendings, as a percentage of GDP, increased on average from 15% in 1997 to 20% in 2014, with health and education expenditures raising from 7% to 10% (Duryea and Robles, 2016).

⁵Vakis *et al.* (2015) state that, by 2012, one in five Latin Americans, nearly 130 million people, were chronically poor.

⁶Ferreira and Bank (2012) define this "vulnerable" class as the fraction of people living between poverty and middle class standards. According to their calculations, in 2009, 37% of the Latin American population were classified in this group with a probability of falling into poverty around 10%.

⁷See, for example, Acosta *et al.* (2008); Adams and Page (2005); Amuedo-Dorantes *et al.* (2006); Fajnzylber and López (2008); McLeod and Molina (2005); Mundaca (2009); Orozco (2004).

3. Do intra-household transfers influence spending patterns, nutrition and health outcomes?

I chose to focus on three countries that share very similar characteristics, in terms of geography, demographics and recent trends in development (Table 0.1): Colombia, Ecuador and Peru. In the case of Colombia I analyze inter-household transfers in the context of a family subsidy (in the form of a CCT). In the case of Ecuador, I concentrate on international remittances after the 2008 global economic recession. Finally, in Peru I evaluate the effects of intra-household transfers given by a non-contributive pension program.

The complexity innate to any empirical approach to private income transfers, the restrictions imposed by the existing data and the desire to address these questions in a rigorous way, required me to follow different econometric techniques, such as: (i) a difference-in-difference analysis, (ii) an instrumental variable strategy and (iii) a regression discontinuity design.

Table 0.1: Colombia, Ecuador and Peru
Comparative Indicators 2015

	Colombia	Ecuador	Peru	Latin America (average)
Total population (millions)	48.2	16.1	31.4	631
Population under 14 y/o (%)	24%	29%	28%	26%
Population over 65 y/o (%)	7%	7%	7%	8%
GDP per capita growth (annual %)	2.1%	-1.3%	1.9%	-1.2%
Poverty rate (%)	29.8%	29.9%	22.3%	27% ^a
Extreme Poverty Rate (%)	5.5%	4.8%	3.0%	4.9% ^a
GNI Index	0.51	0.47	0.44	0.49 ^b

Sources: World Bank - World Development Indicators. ^bECLAC (2017). Notes: data extracted on December 9 of 2017 from <http://data.worldbank.org>. Poverty rate corresponds to the poverty headcount ratio at 5.50USD/day (2011 PPP). Extreme Poverty rate corresponds to the poverty headcount ratio at 1.90USD/day (2011 PPP). ^a 2013.

Overview of the Dissertation

The dissertation starts with an essay presenting a theoretical and empirical analysis of the relationship between private transfer decisions and positive income shocks, introducing the idea that this relationship depends as well on the distance between transfer donors and receivers. The conceptual framework incorporates the notion that information asymmetry increases with distance and encourages both donors and receivers to act strategically.

The empirical part tests the main predictions of this new conceptual framework, using evaluation data from a CCT program in Colombia, *Familias en Acción* and implementing a difference-in-difference strategy. Results provide support for the idea that benefiting from a government subsidy affects transfer decisions when donors and receivers live geographically close from

each other.

These findings challenge the existing literature on the topic by showing that, ignoring the asymmetric information component of private transfers can lead to the erroneous interpretations of the transfer-income derivatives.

The second essay investigates the relationship between labor supply decisions and negative remittances shocks, evaluating whether these responses vary across different population groups. Drawing on an unexplored data set from Ecuador and exploiting the global economic recession of 2008, findings confirm the negative correlation between unemployment abroad and remittances received back home, showing that this association is stronger at the top of the remittances distribution.

Results also suggest that this remittances contraction leads to a generalized increase in the labor supply of the overall 5-year-old-and-plus population, but suggests asymmetric responses along age and sex lines. Children adjust by increasing participation and time allocated to household work; adult men step up in both market and household participation and increase time allocated to the first; adult women do not change participation but register important gains in hours dedicated to both market and household work and, finally, adult men only increase time spent in market work activities.

The last essay exploits the expansion of a non-contributory pension program in Peru, *Pensión 65*, to investigate whether government subsidies to the elderly contribute to enhance the monetary spending of households with young children, and to what extent this is reflected in an improvement of the health and nutrition status of this population. Using a regression discontinuity design, built-on the discontinuity introduced by the age eligibility requirement of the program, I find that *Pensión 65* eligible households with young children increase monetary spendings by 75% the value of the subsidy. This additional income triggers the purchase of vegetables and grains (legumes) and increases health expenses. In parallel, co-resident children of these ages show significantly better nutrition and health outcomes.

These results are in line with previous research on the re-distributive effects of subsidies to the elderly in developing countries. Besides, it also supports the hypothesis that households do not function as unitary entities and that old-age adults can be major decision-makers, channeling investments towards young children.

Private Income Transfers, Information Asymmetry and Distance. Theory and Evidence from Colombia

Abstract

This chapter investigates the association between private transfer decisions and positive income shocks, introducing the idea that this relationship depends as well on the distance between transfer donors and receivers. First, I provide an original conceptual analysis that incorporates the notion that information asymmetry increases with distance and encourages donors and receivers to act strategically. Next, using evaluation data from a conditional cash transfer program in Colombia, *Familias en Acción*, and implementing a difference-in-difference strategy, I test the main predictions of the underlying theoretical framework. The estimates provide support for the idea that benefiting from a government subsidy affects transfer decisions when donors and receivers live geographically close from each other. This finding challenges the existing literature on the topic by showing that, ignoring the asymmetric information component of private transfers can lead to erroneous interpretations of transfer-income derivatives.

1.1 Introduction

Private transfers are crucial to understand household livelihood strategies in the developing world. In very poor contexts, where social safety nets rarely exist and public sector plays a minor role, money and in-kind help from relatives, friends and the community can be a matter of death or life. A widespread feature of the literature on private transfers is the assumption that donors have perfect information about receivers' income and vice-versa. However, this might be too strong as assumption, especially when agents involved in transfer arrangements are physically separated or are not filially related.

Despite the growing theoretical and empirical literature studying the dynamics of private transfers, very few papers analyze how these transactions are affected by information barriers. Some examples are the works of [Ambler \(2015\)](#); [Batista and Narciso \(2013\)](#); [De Weerd *et al.* \(2014\)](#); [McKenzie *et al.* \(2013\)](#); [Serror \(2015\)](#); [Seshan and Zubrickas \(2017\)](#).

In this chapter, I add to these literature by investigating to what extent distance between donors and receivers influences the responsiveness of private transfers to positive income shocks. To this end I conceptualize and empirically test the idea that donors and receivers may be geographically or socially separated and that this distance between them may affect their transfer behavior. My contribution is twofold. First, in the theoretical part, I show that the responsiveness of private transfers to income shocks depends partly on the information donors and receivers have about each other, adding an extra element of ambiguity to the existing theoretical predictions. Second, in the empirical part, I show that distance may actually encourage agents to act strategically, offsetting the truly effects of income shocks on private transfers.

Previous theoretical work on the relationship between private transfers and income focuses on analyzing its motivational structure. Examples include [Barro \(1974\)](#); [Becker \(1974\)](#); [Bernheim *et al.* \(1985\)](#); [Cox \(1987\)](#) and many others. One part of this literature argues that private transfers materialize donors' care for the well-being of receivers (altruism). Others claim that private transfers are rooted in some reciprocity agreements, in which exchange motives are at stake.

Two important implications can be drawn from this literature. The first is that the relationship between transfers-out and the donor's income is unambiguously positive, regardless of the motivations of agents (altruism or exchange).¹ The second implication is that altruistically motivated transfers should decrease with the receiver's income, as the well-being of the receiver

¹This implication holds as far as transfers are considered normal goods and donors are in need of the receivers' services.

lowers the donor's marginal utility from transferring. Alternatively, if transfers are payments made in exchange of services, this relationship becomes ambiguous. The receiver associates now a higher opportunity cost to the provision of the service, but, the donor's demand will be so inelastic that she will be willing to pay a much higher "price" in order to avoid any possible cut back.

These two implications have been empirically tested in a long series of papers and contexts. The elasticity of transfers-out to donor's income is invariably found to be positive and in most of the cases below unity.² On the contrary, the evidence on transfer responses to receiver's income shocks is mixed and sometimes inconclusive.³

The analysis presented here complements and extends this literature by considering an asymmetry of information setting in which the distance between donors and receivers is a determinant factor in the configuration of private transfer arrangements. To that end, I present an original conceptual setting, derived from a classical model of private transfers proposed by Cox (1987), in which distance generates pervasive informational problems that make the strategic behavior of donors and receivers more likely. Under this approach, the responsiveness of transfers to income depends not only on the motivation of agents but also on information deficiencies spread by the distance between them.

Then, these new predictions are tested using data collected for the evaluation of a very popular welfare program recently implemented in Colombia, *Familias en Acción*. Started in 2003 and still ongoing, *Familias en Acción* aims at increasing human capital investment in children among very poor households. The *Familias en Acción* intervention is exploited as a positive income shock potentially correlated with household transfer behavior. In concrete, I aim to analyze the associations between program eligibility and the probability and the value of private transfers-in and transfers-out, allowing the effect to differ depending on the relative distance between donors and receivers. I take advantage of the design of the program and the longitudinal nature of the dataset to build an identification strategy based on a difference-in-difference method using household fixed effects.

Interesting findings emerge from this analysis. When transfers are simply added without re-

²See for instance Arrondel and Laferrere (1998); Cox (1987, 1990); Cox *et al.* (1997); Ioannides and Kan (1999); Wolff (2006).

³For a sample of works finding a positive relationship between these two variables, see Altonji *et al.* (1995); Cox (1987); Cox and Jakubson (1995); Cox and Rank (1992); de la Briere *et al.* (2002); Frankenberg *et al.* (2002); Lucas and Stark (1985); Secondi (1997). On the contrary, some of the works finding a negative relationship are Albarran and Attanasio (2002); Clarke and Wallsten (2003); Cox *et al.* (1997); Jensen (2004); Kuhn and Stillman (2002); Maitra and Ray (2003); McGarry and Schoeni (1996); McKernan *et al.* (2005); Schoeni (1997). Finally, works finding no effect are Lillard and Willis (1997); Olinto *et al.* (2006); Teruel and Davis (2000), among others.

gard to their geographic origin and destination, they prove to be uncorrelated with the program. However, if transfers are disaggregated by the geographic distance between donors and receivers, I find appealing results. *Familias en Acción* eligibility is negatively correlated with transfers-in, as long as they come from close partners; and positively correlated with transfers-out, if these are aimed towards nearby locations. Estimates show that eligible households are 12 percentage points less likely to receive money transfers and get, on average, 7,095 COP less. Similarly, eligible households are 14 percentage points more likely to deliver money transfers to partners living nearby, transferring them, on average, 8,450 COP more. On the contrary, when agents live far from each other, the coefficient associated to the program is, throughout all the different estimations, statistically equal to zero.

Results show that being granted with a *Familias en Acción* subsidy may affect the transfer behavior of donors and receivers but only when there is geographic proximity between them. The aggregation of private transfers from different geographic origins and destinations, followed by the existing literature on the topic, may be at the root of some inconclusive empirical analysis, especially those showing no effects. Thus, ignoring this dimension of transfer transactions may lead researchers and policymakers to misinterpret the relationship between private transfers and income.

Finally, although the objective of this analysts is not directly related to the evaluation of *Familias en Acción*, these findings highlight the potential re-distributive role of this type of government subsidies. Results show that the program may partially substitute private transfers between partners living close from each other (so called crowding-out effect), by lessening the budget constraint of transfer donors and pushing targeted household to share a fraction of the program allocation with their physically closer kin and friends. Final aggregated effects will depend on information, not available in the data, related to the actual state of these donors and the characteristics of the new transfer transactions. Further investigation and more suited data, tracking all the partners involved in transfer transactions, is highly needed in order to be able to understand better these final well-being implications.

The rest of this chapter is organized as follows. Section 1.2 reviews the literature, presenting the standard models of private transfers and the existing empirical evidence on the relationship between transfers and income. Section 1.3 presents a new theoretical framework to address the role of distance as a source of information asymmetry in the configuration of the transfer-income relationship. Section 1.4 characterizes the program *Familias en Acción* and describes the data. Section 1.5 provides some descriptive statistics of the sample and the empirical strategy.

Section 1.6 presents the results and discusses the main identification threats and implications of the analysis. Section 1.7 concludes.

1.2 Literature Review

The economic literature studying private income transfers is quite broad. [Wolff \(2006\)](#) and [Cox and Fafchamps \(2008\)](#) provide a comprehensive summary, with a special emphasis on the motivational structure of transfer transactions. The objective of this section is twofold. First, I present a review of the existing theoretical literature, recalling its main conclusions and introducing the analysis of information asymmetry and distance. Second, I provide a summary of the main empirical studies addressing the relationship between transfer transactions and income levels. This section is built up from the reviews of [Wolff \(2006\)](#) and [Cox and Fafchamps \(2008\)](#).

1.2.1 Theoretical Background

The first theoretical models on private income transfers were made famous by [Barro \(1974\)](#) and [Becker \(1974, 1981\)](#). Focusing on family behavior, these works provide a conceptual framework for analyzing transfers as income sharing devices made possible by the existence of altruistic preferences. In their models, transfer donors care about the well-being of transfer receivers, so their utility depends, in part, of their own income and, in part, of these transfers. Many authors have questioned the strength of the altruistic framework to explain transfer behavior, by considering alternative motivations set apart from it. An alternative setting is thus, provided by the exchange of services model, where the donor's main interest is the consumption of services and transfers are payments to the providers ([Bernheim et al., 1985](#)).

One key question that stems from these models is, therefore, how the level of income of donors and receivers influences transfer decisions. Under pure altruism, the main testable prediction is that transfers respond positively to increases in the income of the donor and negatively to increases in the income of the receiver. Under exchange motives, although the effect of the income of the donor is the same, the effect of the income of the receiver is ambiguous. A rise in the income of the receiver might increase the implicit price of the services she provides, via an increase in the opportunity cost. Transfers would, therefore, increase or decrease depending on whether the donor's demand for these services is price inelastic or not.

A common element to both altruistic and exchange transfer models is the assumption that donors and receivers have perfect information about each other's income and resources. While

this might hold for some transfer interactions, especially in the long-term, information barriers may also exist in the configuration of the relationship between donors and receivers. If donors do not fully observe the income of receivers, for instance, they might not be in the best position to decide on an efficient transfer scheme; while receivers may have strong incentives to hide their real resources if this allows them to get more favorable outcomes.

Imperfect information is problematic, both for the theory and the empirics of private transfers, because it opens the door to strategic behavior. If donors and receivers can act strategically based on what they know, infer and expect about each others resources, existing theoretical predictions about the relationship between transfers and agents' income, may be misleading.

Recent research suggests that transfer arrangements are vulnerable to the interference of information barriers.⁴ Unlike the more traditional models of transfers (Barro, 1974; Becker, 1974, 1981; Bernheim *et al.*, 1985; Cox, 1987) this literature addresses information asymmetries, affecting transfer decision making, as a typical principal-agent problem. Under this framework, the decisions of transfer donors and receivers are mainly driven by contingent contracts, enforced through the threat of noncompliance, thus, potential punishment, enforcing these contracts, enters affecting negatively the utility function of the agents.⁵ Distance across agents makes information barriers more pronounced and strategic deviations more alike. The consequences are higher monitoring costs and more strict contracts.

The present analysis shares with this literature the interest on information asymmetries as a key component of transfer transactions, and the identification of distance as an important driver of strategic behaviors. However, it differs in the approximation used to address this problematic. While transfer contracts, enforced through the threat of a punishment cost, challenge directly the foundations of altruistic motivations, I put forward the idea that information asymmetries may arise under any transfer motive. In particular, the conceptual framework introduced below, considers transfers driven by both, altruism and the exchange of services. In addition, principal-agent models of transfer transactions, aim to analyze transfers in terms of a given

⁴Some examples are: Serror (2015); Ambler (2015); Batista and Narciso (2013); De Weerdt *et al.* (2014); McKenzie *et al.* (2013); Seshan and Zubrickas (2017).

⁵Ambler (2015), for example, introduces a model where migrants and households of origin establish a contract that specifies how much transfers will be sent and the way they should be spent. In this model, the value of transfers depends on the probability of observing the income of the migrant and the power of the household to punish her. Serror (2015), for its part, develops a framework were misrepresentations on income are due to the receiver's intention to increase transfers-in and migrants' decisions are based on unverifiable actions and outcomes. The model predicts that households of origin manipulate private information to extract rents from migrants, making it difficulty for the parties to arrive at efficient intra-household allocations. Finally, Seshan and Zubrickas (2017) present a model of remittances in exchange of participation in the financing of migration. They introduce the idea of a verification cost that captures the degree of information asymmetry between the parties. The easier it is to determine the income earned by the migrant, the less asymmetry there is. The optimal contract prescribes a threshold for remittances such that, if not met, verification is initiated.

type of agent (being truthful, value networks, etc.). Meanwhile, I pretend to conceptualize the way in which the transfers are affected by distance, assuming that the last is exogenous.

The theoretical formulation presented in this chapter is founded upon the conceptual work of Cox (1987), which is one of the first deriving analytical predictions about the correlation between transfers and agents' income. The closest proposal, to this very new framework, is, perhaps, the work of De Weerd *et al.* (2014). In this article, authors develop a model of extended family networks to predict the relationship between income, mis-perceptions of income and transfers, under three different motivations: altruism, exchange and pressure. Although this study contemplates genetic, social and physical distance between transfer donors and receivers, as potential explanations of income mis-perception, these dimensions are not formally integrated in the analytical framework by the authors.

1.2.2 Empirical Evidence

The empirical literature estimating the relationship between transfers and income is quite extensive (See Cox and Fafchamps, 2008 for a comprehensive summary). In congruence with standard theoretical predictions, the effect of the donor's income is, most of the time, found to be positive and in many cases below unity. On the contrary, the studies analyzing the effect of receivers' income do not prove so conclusive. The seminal work of Cox tests this relationship for a wide sample of developed and developing countries. In a study for the United States he shows that a 1% increase in the receiver's income drives a 0.53% increase of transfers-in (Cox, 1987). Using an almost identical approach, the same author finds contradictory results for Albania, Bulgaria, Colombia, Jamaica, Kazakhstan, Nepal, Nicaragua, Panama, Peru, the Philippines, Poland, Russia and Vietnam.⁶

These empirical papers are generated from a variety of datasets and econometric methods. Though rich, the vast majority is mainly based on cross-sectional data and suffers from the

⁶In their analysis of Vietnam, Cox and Jakubson (1995) show that, increasing pre-transfer income from 3,000 to 9,000 Dongs, reduces the probability of receiving a transfer by 8 percentage points. Conditional on receiving a transfer, the same boost in income would actually raise transfers received by 569,000 Dongs. In the case of Poland, Cox *et al.* (1997) find that increasing pre-transfer income from 40,000 to 70,000 Zlotys rises the probability of delivering transfer by 11 percentage points; while, increasing pre-transfer income from 20,000 to 30,000 Zlotys per month reduces this probability by 4 percentage points. The elasticity of the transfers received, at sample means, is around -0.045 Zlotys per 1 Zloty increase in pre-transfer income. Cox and Jimenez (1998) show for Peru that the probability of receiving a transfer is inversely related to the income of the receiver; but the effect on transfer values, conditional on receiving a transfer, exhibits an inverted u-shaped. A one Inti increase in income, yields a 0.16 Inti increase of transfers-in, for income levels below 2,900 Intis. At higher levels transfers-in actually decline. For the Philippines, Cox *et al.* (2004) find an elasticity of transfers of -0.39 for pre-transfer incomes below the 29th percentile. Cox and Jimenez (1998) show, for the case of Colombia, that an increase in monthly income from 2,000 to 5,000 Colombian pesos reduces the probability of net transfers received in 8 percentage points. Finally, in a cross-sectional study for 11 countries including Albania, Bulgaria, Jamaica, Kazakhstan, Nepal, Nicaragua, Panama and Russia, Cox *et al.* (2006) find that the probability of being a net receiver of private transfers declines with per capita income, with a steeper decline for households among the poorest 25%, in almost all the cases. The only exception is Kyrgyzstan.

potential endogeneity of income and other omitted variable issues. Cross-sectional studies usually identify the effect of income after controlling for household characteristics observed after the transfer occurred. However, actual income, as other contemporaneous household characteristics, may have been also affected by transfers, confounding the true effect of income changes. Moreover, if the variables conjointly influencing income and transfer behavior are unobserved, controlling for pre-transfer characteristics will not be sufficient and estimates will suffer from omitted variable bias.⁷

Due to the lack of more suitable data, studies successfully addressing these econometric issues are very scarce. To my knowledge, only a few empirical papers exploit longitudinal data to test the transfer-income relationship. McGarry (2000) uses a panel survey of the US to test the effect of income on parent-child transfer arrangements. Using family fixed-effects estimations and controlling by child-specific characteristics, she finds that moving from the lowest to the highest income category decreases the probability of receiving a transfer by 9.1 percentage points and the transfer value by 229 US Dollars. Foster and Rosenzweig (2001) use fixed-effects and instrumental variable techniques to estimate the responsiveness of transfers to profits in the context of rural India and Pakistan.⁸ They show that profits have a positive effect on net transfers-out, regardless of whether or not these transfers occur between family or non-family partners and inside or outside the village. McKernan *et al.* (2005) test the responsiveness of private transfers to microcredit programs using panel data on households in rural Bangladesh. Their village fixed-effects estimates indicate that a 100 Taka increase in women's (men's) credit, reduces transfers towards the household by 25 Taka (31 Taka).

Notwithstanding the great advance these papers represent, there are still some empirical concerns regarding the exogeneity of income or profits. Households with higher income, profits, credit or living in areas less exposed to weather shocks, might be more likely to receive private transfers but also to better anticipate and mitigate shocks. To the extent that both transfer outcomes and income measures may be affected by unobserved variables, the correlations between them cannot be interpreted in a causality way.

More recent studies exploit natural experiments generated from natural disasters and public policy interventions to better overcome this issue. Clarke and Wallsten (2003) test the effect of Hurricane Gilbert on transfers. Using household fixed-effects, they find that households got,

⁷Cox and Fafchamps (2008) claim that omitted variable bias is a major issue when transfers-in truly respond negatively to income. The authors argue that, in the case of altruistically motivated inter-generational transfers, for instance, a positive correlation between the income of the parents and the income of their children, would tend to bias estimated values of $\partial T/\partial I_r$ towards zero.

⁸In this study instrumental variables were used to deal with the potential measurement error associated to profits.

on average, 23 cents in remittances for every Jamaican Dollar of hurricane damage received. Jensen (2004) uses the post-apartheid expansion in public pension benefits to compare the difference in the value of remittances received between pensioners and non-pensioners. He finds that a one Rand increase in a parent's pension is associated with a 0.25 - 0.30 Rand reduction in remittances received from her children living abroad.

Finally, Teruel and Davis (2000) and Olinto *et al.* (2006) estimate the impact of conditional cash transfer programs on transfers received in Honduras, Nicaragua and Mexico. Their empirical strategy relies on the quasi-experimental design of these programs, wherein eligible households are randomly selected, and their evaluation datasets. The evidence is discouraging, as in most of the estimations, the authors do not find any impact. The exception is a negative small effect on the prevalence of food transfers received from NGOs in Nicaragua.

The empirical part of this chapter provides new evidence on the relationship between private transfers and income variations. Using a difference-in differences method, I evaluate the short-term implications of a subsidy from a Conditional Cash Transfer program in Colombia, called *Familias en Acción*, on the incidence and the value of private transfers-in and transfers-out. I use data from a two year panel survey (2002 and 2003) conducted on a representative sample of poor households. As the survey was designed to evaluate the program, it gathers information on households residing in treatment and control municipalities (i.e. implementing and not implementing the program) before and after it started. Unlike previous studies, I investigate how this private transfers - income relationship varies depending on the distance between donors and receivers.

1.3 Information Asymmetry and Distance

In this section, I present a theoretical framework to represent the interactions between transfer behavior and information asymmetry, motivated by distance. In particular, I aim to conceptualize the idea that distance generates information deficiencies that encourage donors and receivers to act strategically. Living far from each other (geographic distance) or having no parentage (social distance), both donors and receivers can easily hide positive income shocks and, therefore, avoid transfer cutbacks, from the receiver's perspective, or transfer pressure, from the point of view of the donor.

The positive character of the shocks is one of the key elements behind the configuration of strategic behavior due to information asymmetry and distance. Negative shocks, resulting, for instance, from natural disasters (droughts, earthquakes, etc.), are more likely to induce

individuals to communicate about them, despite the distance that may exist between transfer partners.

The start point is the model advanced by Cox (1987), where transfers are characterized by two fundamental attributes. The first one is that they are motivated by impure altruism. In contrast with the pure altruistic model (Barro, 1974; Becker, 1974, 1981), where transfers materialize the way agents value the well-being of the others, this formulation has the advantage of allowing them to act also motivated by the exchange of services (Bernheim *et al.*, 1985). This second motivation, although more complex, is better suited to model transfers in a context of asymmetric information and strategic behavior. However, altruistic motivations continue to be the keystone of transfer behavior and the reason why these transactions require a specific modeling, beyond a pure market economy setting.

In this context, services have a very particular nature. They stand for any action of assistance or work done in order to please someone, that generates income (money or in-kind) transfers, in return. Some examples are help with household chores, support in home production, lend a summer house to a neighbor, pay the rent for a student, look after a sick relative or visit an ailing friend. Although, at first sight, these exchanges may seem like a typical market transaction, they differ in several aspects.

In some instances, services are only provided to certain agents or under very specific circumstances, like taking care of a nephew or give inn to a friend during the winter. It is also very likely that they do not have market substitutes, as they usually involve affections like caring, trust, etc. In addition, very frequently, what is being exchanged and its value is not always precisely known and "payment" conditions are very uncertain, as transfers may not necessarily occur immediately, but later, or be deferred, or be indirect, or even never occur.

The second characteristic of the Cox model of transfers is that they depend, mainly, on the actual income of agents, which implicitly entails that the actual income of one agent is perfectly observable by the other.

Although I concur with the relevance of income in the determination of transfers, hereby I relax the perfect information assumption and consider, instead, that at a given distance, agents only observe the pre-shock income of the each other. As in many other economic models dealing with information asymmetry, I assume that information frictions are only problematic in the short-run, while agents find the way to address their own information requirements, and disappear in the long-term. Complete information before the shock is compatible with a long-run

equilibrium setting were information circulates well and agents know the income of the each other.

Finally, other important assumptions, present in the Cox model and here as well, are the following: (i) there is only one period, (ii) the income of agents is exogenous, (iii) agents are credit constraint, (iv) transfers are one-sided⁹ and (v) there are only two agents, one transfer donor, labeled with subscript d , and one transfer receiver, labeled with subscript r .

Under this setting and considering information asymmetry and strategic behavior, two different benchmark transfer regimes are particularly relevant. The first consists on transfers going from an impurely altruistic donor to a non-altruistic receiver. The second, on the contrary, entails transfers going from a non-altruistic donor to an altruistic receiver. The following lines provide a detailed analysis of these two regimes, in order to derive some testable predictions about the relationship between transfer behavior and income, when the last is not perfectly observable, in each context.¹⁰

Regime 1: An Impurely Altruistic Donor and a Non- Altruistic Receiver

Consider a donor whose utility depends on her own consumption C_d , the receiver's well-being V and a service S . Assuming she dominates the interaction, the maximization problem, viewed from her own perspective, will be given by Equation (1.1):

$$\text{Max}_{T, S \geq 0} U = U \left[C_d, S, V(f(C_r), S) \right] \quad (1.1)$$

where V is a function representing the well-being of the receiver given by the donor's perception of her consumption $f(C_r)$ and the service she provide S .¹¹

The donor is impurely altruistic, meaning that the receiver's well-being is an argument of her own satisfaction, so $\partial U / \partial V > 0$. However, the donor also enjoys the services provided by the receiver, i.e. $\partial U / \partial S > 0$. Note that $\partial U / \partial V$ is a measure of the intensity of the donor's altruism. Impure altruism means $0 < \partial U / \partial V < 1$, with $\partial U / \partial V \rightarrow 1$ indicating that the agent is highly

⁹Such simplification responds to the characteristics of the empirical assessment that accompanies this theoretical analysis. The data used to estimate the effect of *Familias en Acción* subsidies on transfers-in and transfers-out is extracted from a survey inquiring household about these transactions, but that does not track their counterparts. Implications of information asymmetry and distance on two-sided transfers remain however a very important question that is left for further investigations.

¹⁰One might wonder, why the cases in which both agents are impurely altruistic or non-altruistic are not addressed here. First, a regime where the donor and the receiver are both impurely altruistic implies, by construction, that each of them values, in a way, the well-being of the other. Therefore, they are more likely to reach optimal levels of transfers and services without resorting on strategic behavior. Second, a case where both agents are non-altruistic, is closer to a pure market transaction, than to an income transfer interaction.

¹¹Since services are "non-marketable", S is not part of the consumption function of the agents.

altruistic.

The receiver, for her part, is non-altruistic, so her utility $V = V(C_r, S)$ is an increasing function of her own consumption and a decreasing function of the service provided to the donor ($\partial V/\partial S < 0$). The receiver participates in the transaction if the consumption she gets is greater than the one obtained when no service is provided. This participation constraint is represented by Equation (1.2):

$$V(C_r, S) \geq V(C_r, 0) \quad (1.2)$$

Consumption functions are defined as follows. C_d , the consumption of the donor, depends positively on her actual income and negatively on transfers-out T . Assuming that the donor might suffer a positive income shock, like getting a *Familias en Acción* subsidy, her actual income will be given by her past income I_d and the value of the subsidy $\psi \geq 0$, so $C_d = I_d + \psi - T$. Similarly, $C_r = I_r + \theta + T$, with I_r standing for the receiver's past income realizations and $\theta \geq 0$ defined as the value of the subsidy.

For its part, $f(C_r)$ has two arguments: (i) the donor's perception of the receiver's actual income $h(I_r + \theta, d)$, which depends on her past income realizations I_r , θ and the distance that separates the donor and the receiver d and (ii) transfers-in T . Thus, $f(C_r) = h(I_r + \theta, d) + T$.

First order conditions, derived in Cox (1987), are outlined below. Assume that T and S are strictly positive and the receiver procures some satisfaction from the transfer-service arrangement. The optimal level of transfers equates the donor's marginal utility of consumption with her perception of the receiver's marginal utility of consumption, weighted by the intensity of her altruism:

$$U_{C_d} = U_V V_{f(C_r)}$$

At the same time, the optimal level of services matches the marginal utility they generate to the donor and the dis-utility they engender to the receiver, weighted by the altruism of the donor:

$$U_S = -U_V V_S$$

However, if T and S tend to zero, the marginal utility of consumption of the donor is higher than her perception about the marginal utility of the receiver, i.e. $U_{C_d} > U_V V_{f(C_r)}$, and the donor's utility of the service is less than the dis-utility its provision causes to the receiver, i.e. $U_S < -U_V V_S$.

How would positive income shocks influence transfer transactions in this setting? In the fol-

lowing paragraphs I analyze the configuration of transfer-income derivatives, $\frac{\partial T}{\partial I_{d,r}}$, considering different scenarios and assumptions. All the results presented below are summarized in Table 1.1.

Table 1.1: Summary of Predictions

Comparative Statics	Altruism Degree	Beneficiary of the subsidy		$\frac{\partial T}{\partial I_{d,r}}$
		Donor	Receiver	
Regime 1: an impurely altruistic donor and a non- altruistic receiver				
$\text{Max}_{T,S \geq 0} U [C_d, S, V[f(C_r), S]]$ s.t. $V(C_r, S) \geq V(C_r, 0)$				
[1]	High/Low	Yes	No	$\frac{\partial T}{\partial I_d} > 0$
[2]	High	No	Yes	$\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_r} < 0$
[3]	Low	No	Yes	$\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_r} > 0$
[4]	High/Low	No	Yes	$\lim_{d \rightarrow \infty} \frac{\partial T}{\partial I_r} = 0$
[1] & [2]	High	Yes	Yes	$\frac{\partial T}{\partial I_{d,r}} < 0$
[1] & [3]	Low	Yes	Yes	$\frac{\partial T}{\partial I_{d,r}} > 0$
[1] & [4]	High/Low	Yes	Yes	$\frac{\partial T}{\partial I_{d,r}} > 0$
Regime 2: A non-altruistic donor and an impurely altruistic receiver				
$\text{Max}_{T,S \geq 0} V [C_r, S, U[g(C_d), S]]$ s.t. $U(I_d - T, S) \geq U(I_d, 0)$				
[5]	High	No	Yes	$\frac{\partial T}{\partial I_r} > 0$
[6]	Low	No	Yes	$\frac{\partial T}{\partial I_r} > 0$
[7]	High/Low	Yes	No	$\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_d} > 0$
[8]	High/Low	Yes	No	$\lim_{d \rightarrow \infty} \frac{\partial T}{\partial I_d} = 0$
[5] & [7]	High	Yes	Yes	$\frac{\partial T}{\partial I_{d,r}} > 0$
[5] & [8]	High	Yes	Yes	$\frac{\partial T}{\partial I_{d,r}} > 0$
[6] & [7]	Low	Yes	Yes	$\frac{\partial T}{\partial I_{d,r}} > 0$
[6] & [8]	Low	Yes	Yes	$\frac{\partial T}{\partial I_{d,r}} > 0$

Three separate situations are possible, depending on who the agent affected by the shock is. Consider first a case where only the donor gets the subsidy and the income of the receiver remains constant, so $\psi > 0$ and $\theta = 0$. Given that, by construction, the receiver does not care about the situation of the donor (she is non-altruistic), comparative statics results will perfectly match those from the original Cox model¹², so:

- [1] $\frac{\partial T}{\partial I_d} > 0$. The intuition is the following. If the donor is highly altruistic, and given that the well-being of the receiver is a normal good to her, with a higher income, she will be willing to sacrifice more consumption in order to increase the well-being of the receiver. If, on the contrary, she is less altruistic, the result is the same but it is driven by a different mechanism. Suppose, as in Cox (1987), that transfers are the product of S and a unity "price" P ¹³, so that $T = SP$. Therefore, $\frac{\partial T}{\partial I_d} = \frac{\partial S}{\partial I_d} P + \frac{\partial P}{\partial I_d} S$. As the donor's utility increases with S , $\frac{\partial S}{\partial I_d} \geq 0$. In addition, given that a substitute for S might be difficult to obtain, the donor's demand will probably be inelastic, so $\frac{\partial P}{\partial I_d} \geq 0$ and thus, transfers will increase.

Assume now that the receiver is the one getting the subsidy and the income of the donor remains invariable ($\theta > 0$ and $\psi = 0$), influencing both, the well-being of the donor (Equation (1.1)), through $f(C_r)$, and the participation decision of the receiver (Equation (1.2)). The way distance affects $f(C_r)$, which goes across $h(I_r + \theta, d)$, is summarized by Equation (1.3), according to which $h(I_r + \theta, d)$ is expected to decrease with d :¹⁴

$$\frac{\partial h(I_r + \theta, d)}{\partial d} \leq 0 \tag{1.3}$$

Two opposite cases are possible. For small values of d , θ might be perfectly observable by the donor so $\lim_{d \rightarrow 0} h(I_r + \theta, d) = I_r + \theta$. An increase in the receiver's income will then lead to the predictions of the Cox model.¹⁵ That is:

- [2] If the donor is highly altruistic, $\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_r}$ is likely to be negative. The intuition, from the donor's perspective, is that, with higher income, a receiver needs smaller transfers to achieve an optimal situation.
- [3] If the donor is less altruistic, $\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_r}$ is likely to be positive. Assume, as in [1], that

¹²See Cox (1987).

¹³Indeed, P would be the value associated with providing one unit of S .

¹⁴Using this framework it is also possible to model the effects of a negative income shock. In this case $\theta < 0$ and $h(I_r + \theta, d)$ will be decreasing in d , so $\partial h(I_r + \theta, d) / \partial d \geq 0$. The whole analysis, however, might be slightly different to the one presented here, as other mechanisms might be at stake. Transfer receivers might be more interested in disclosing negative shocks to their donors, making information asymmetry less relevant and introducing other elements different than distance, like for instance access to communication technologies.

¹⁵See Cox (1987).

$T = SP$, so $\frac{\partial T}{\partial I_r} = \frac{\partial S}{\partial I_r} P + \frac{\partial P}{\partial I_r} S$. A richer receiver gets a higher dis-utility when provides services to the donor, so $\frac{\partial S}{\partial I_r} \leq 0$. In addition, $\frac{\partial P}{\partial I_r} \geq 0$, because S might be difficult to replace. The more inelastic is the donor's demand for S , the larger will be $\frac{\partial P}{\partial I_r}$, the smaller will be $\frac{\partial S}{\partial I_r}$ and the more likely will be $\frac{\partial T}{\partial I_r}$ to be positive.

As distance increases, and so do information asymmetry, θ becomes more difficult to observe, hence the donor's decision can only be based on the receiver's past income realizations¹⁶ and will not be affected by the shock: $\lim_{d \rightarrow \infty} h(I_r, d) = I_r$.¹⁷ Thus:

[4] $\lim_{d \rightarrow \infty} \frac{\partial T}{\partial I_r} = 0$, regardless of the level of altruism of the donor.

Finally, consider that the donor and the receiver can get both, simultaneously, the subsidy and that its value is the same.¹⁸ Three situations are possible.

The first combines comparative statics [1] and [2], that is $\frac{\partial T}{\partial I_d} > 0$ and $\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_r} < 0$, in a context where the donor is highly altruistic. The donor is expected to give more value to the well-being of the receiver and the dis-utility that causes her to provide services, so $\frac{\partial T}{\partial I_{d,r}}$ will be more likely to be negative.

The second results from the association between comparative statics [1] and [3], that is $\frac{\partial T}{\partial I_d} > 0$ and $\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_r} > 0$, in a scenario where the donor is less altruistic. As both agents have incentives to increase transfers, total effect on transfers will be unambiguously positive, so $\frac{\partial T}{\partial I_{d,r}} > 0$.

The last situation is a mix of comparative statics [1] and [4], that is $\frac{\partial T}{\partial I_d} > 0$ and $\lim_{d \rightarrow \infty} \frac{\partial T}{\partial I_r} = 0$. In this situation distance between agents is large ($d \rightarrow \infty$), meaning that information asymmetry might be at stake. However, remember that, by construction, only the receiver has incentives to act strategically by hiding her new state. The most likely result will be $\frac{\partial T}{\partial I_{d,r}} > 0$, although two different mechanisms might be behind.

To summarize, if the donor is highly altruistic, the receiver may opt for hiding her new income so $\frac{\partial T}{\partial I_d} > 0$ will prevail. The explanation is that, otherwise, she risks a reduction of T (like in [2]). If, on the contrary, the donor is not altruistic enough, the receiver will be better off by

¹⁶Remember that perfect past information between the donor and the receiver is supported by the assumption that, before the shock, agents are in a long-run equilibrium setting where information circulates well.

¹⁷Figure 1.1 provides an illustration of this formulation. The curve $h(I_r + \theta, d)$ represents the donor's perception of the receiver's actual income as a function of distance. By contrast, the dash lines represent two cases of reference where distance does not influence information flows between the donor and the receiver. The first (red dashed line), is a case where the receiver's after-shock income is completely unobserved by the donor (so the only information available is pre-shock income) and the second (purple dashed line), is a case where the receiver's after-shock income is perfectly observed by the donor.

¹⁸To simplify the analysis.

revealing she is getting the subsidy. This way she can be properly compensated for the higher dis-utility she gets now when providing S (like in [3]).

Regime 2: A Non-Altruistic Donor and an Impurely Altruistic Receiver

Assume now that the receiver is impurely altruistic and is the one leading the interaction. From her view, the optimization problem, is the following. She maximizes a utility function represented by Equation (1.4):

$$\text{Max}_{T, S \geq 0} V = V[C_r, S, U(g(C_d), S)] \quad (1.4)$$

and the donor's participation constraint is:

$$U(I_d - T, S) \geq U(I_d, 0) \quad (1.5)$$

where $g(C_d)$, defined as $g(C_d) = j(I_d + \psi, d) - T$, represents the receiver's perception of the donor's consumption and all the other parameters and variables are defined as above.

From the receiver's perspective, $0 < \partial V / \partial U < 1$ and $\partial V / \partial S < 0$. The donor, for its part, is non-altruistic so her utility is $U = U(I_d - T + S)$ and she enjoys the services offered by the receiver, so $\partial U / \partial S > 0$.

Victorio and Arnott (1993) derive the first order conditions for an interior solution ($T > 0$ and $S > 0$). At the maximum, the transfer matches the receiver's marginal utility of consumption with her perception of the donor's. Optimal services, for its part, equal the receiver's dis-utility of provision with the perception she has about the marginal utility they represent for the donor:

$$\begin{aligned} V_{C_r} &= V_U U_{g(C_d)} \\ -V_S &= V_U U_S \end{aligned}$$

In order to elaborate on the effect of positive income shocks on transfers and derive the main comparative statics results for this case (also summarized in Table 1.1), I consider the following three scenarios.

First, only the receiver gets the subsidy (i.e. $\theta > 0$ and $\psi = 0$). Since the donor does not get any utility from the well-being of the receiver, comparative statics results will be given by the degree of altruism of the latter. Thus:

[5] If the receiver is highly altruistic, the sign of $\frac{\partial T}{\partial I_r}$ will be positive. Remember that $T = SP$

and $\frac{\partial T}{\partial I_r} = \frac{\partial S}{\partial I_r} P + \frac{\partial P}{\partial I_r} S$. The receiver gives an important weight to the utility of the donor, so she might be willing to increase the provision of services, even at the expense of her own consumption (i.e. $\frac{\partial S}{\partial I_r} > 0$).

- [6] If the receiver is less altruistic, $\frac{\partial T}{\partial I_r}$ will also be positive. Although the receiver values more the dis-utility of providing services (i.e. $\frac{\partial S}{\partial I_r} \leq 0$), the donor's demand is very inelastic (i.e. $\frac{\partial P}{\partial I_r} \geq 0$). Thus, the final effect will depend on the price P the donor is willing to pay in order to avoid an, otherwise imminent, cut back of S .

Second, only the donor is granted with the subsidy (i.e. $\psi > 0$ and $\theta = 0$). Thus, the comparative statics will be driven by $g(C_d)$. Here, as well, $j(I_d + \psi, d)$ is expected to be decreasing in d , so:

$$\frac{\partial j(I_d + \psi, d)}{\partial d} \leq 0 \quad (1.6)$$

For small values of d and a perfectly observable shock ψ , $\lim_{d \rightarrow 0} j(I_d, d) = I_d + \psi$. Thus:

- [7] $\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_d} > 0$. Since the donor is not altruistic, one expect her to prefer keep the subsidy. However, given that the receiver leads the game, and she knows about the subsidy, she will offer more S or increase P , depending on how altruist she is.

For a greater distance separating the donor and the receiver, the after shock income of the first becomes fuzzy, making her past income the only available source of information to determine the optimum level of transfers. That is, $\lim_{d \rightarrow \infty} j(I_d, d) = I_d$ ¹⁹. Thus:

$$[8] \lim_{d \rightarrow \infty} \frac{\partial T}{\partial I_d} = 0$$

Finally, both the donor and the receiver get the subsidy (i.e. $\psi > 0$ and $\theta > 0$). Four situations, product of combining comparative static results [5] to [8], are then possible. Start by analyzing a matching between [5] and [7], that is $\frac{\partial T}{\partial I_r} > 0$ and $\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_d} > 0$, in a context where the receiver is highly altruistic. As both agents have incentives to increase transfers $\frac{\partial T}{\partial I_{d,r}}$ will be unambiguously positive.

Turn now to the couple formed by [5] and [8], i.e. $\frac{\partial T}{\partial I_r} > 0$ and $\lim_{d \rightarrow \infty} \frac{\partial T}{\partial I_d} = 0$, still with a highly altruistic receiver.

Note first that under this configuration $d \rightarrow \infty$ and the donor has the ability to hide her new income state. However, this might not be in her interest given that the receiver is willing, in any event, to increase the provision of services and the donor will be also happy to be able to

¹⁹See Figure 1.1 for an illustration of this result where the curve $j(I_d + \psi, d)$ represents the receiver's perception of the donor's actual income as a function of distance.

consume more of them. So, the donor will certainly reveal her new income state and $\frac{\partial T}{\partial I_{d,r}} > 0$.

Another possibility will arise from the combination of [6] and [7], which is given by $\frac{\partial T}{\partial I_r} > 0$ and $\lim_{d \rightarrow 0} \frac{\partial T}{\partial I_d} > 0$ in the case of a less altruistic receiver. Given that the receiver is expected to give more value to the dis-utility associated to the provision of services, she will push for a decrease of transfers. However, at the same time, the donor's demand might be so inelastic that a "price" effect will certainly prevail and $\frac{\partial T}{\partial I_{d,r}}$ might end up being positive.

Finally, let's analyze the pair [6] and [8], i.e. $\frac{\partial T}{\partial I_r} > 0$ and $\lim_{d \rightarrow \infty} \frac{\partial T}{\partial I_d} = 0$ for a less altruistic receiver. Although in this situation the distance that separates agents is important, the donor does not have any incentive to hide her new income state, as in the [5] and [8] combination. So the most likely result will be $\frac{\partial T}{\partial I_{d,r}} > 0$.

Main Predictions

Table 1.1 summarizes the comparative statics of the relationship between private transfers and income, in a context of positive income shocks and information asymmetry related to distance, derived from two different regimes: (i) transfers going from an impurely altruistic donor to a non-altruistic receiver and (ii) transfers going from a non-altruistic donor to an impurely altruistic receiver.

The distance between the donor and the receiver increases the uncertainty about the income of the other part of the transaction, hindering an optimal decision making on transfers. Agents will decide to act strategically, by hiding positive income shocks, depending on the motivation of their counterpart and the elasticity of the donor's demand for services.

What would be the distance threshold after which information asymmetry affects transfer decision making? Consider **Regime 1** and a situation where the shock only concerns the receiver. Assume the donor knows $I_r + \theta$ with probability $p(d)$ and thinks after-shock income is still I_r with probability $1 - p(d)$, with $p(d)$ being a decreasing function of d . Assuming $h(I_r + \theta, d)$ takes an exponential function, it can be rewritten as Equation (1.7):

$$\begin{aligned} h(I_r + \theta, d, \sigma) &= p(d) (I_r + \theta) + (1 - p(d)) (I_r + \theta) \\ &= \exp(-d/\sigma) (I_r + \theta) + [\exp(-d/\sigma) (I_r + \theta)] \end{aligned} \quad (1.7)$$

where σ is the parameter that characterizes the distance from which information asymmetry impacts transfers. If for example $d = \sigma$ the donor will know $I_r + \theta$ with probability $\exp(-1) = 0.37$, and observe I_r instead with probability $1 - \exp(-1) = 0.67$.

After this threshold σ a transfer donor might not notice that the actual income of the receiver has increased and she needs less transfers in order to get the same well-being. Thus, the observed effect of the shock will be zero. On the contrary, before σ , the donor will be able to better adjust transfers-out without affecting the satisfaction of the receiver but increasing his own well-being.²⁰

Symmetrically, under **Regime 2**, with an income shock concerning only the donor, there is a distance threshold τ after which the receiver cannot verify the donor's new state and adjust the provision of services to a more convenient arrangement. So $j(I_d + \psi, d)$, will be given by Equation (1.8):²¹

$$\begin{aligned} j(I_d + \psi, d, \tau) &= p(d) (I_d + \psi) + (1 - p(d)) (I_d + \psi) \\ &= \exp(-d/\psi) (I_d + \psi) + [\exp(-d/\tau) (I_d + \psi)] \end{aligned} \quad (1.8)$$

The empirical section that follows investigates the potential values of σ and τ using two different definitions of distance. The first, geographic distance, is built according to the relative location of donors and receivers and the second, social distance, is characterized according to the relationship between the donor, or the receiver and the household head. With this analysis, it is not intended to question the validity of other mechanisms in the configuration of the transfer-income relationship, but it is suggested that information asymmetry and distance explain part of the variability of transfer behavior.

1.4 *Familias en Acción*

1.4.1 Characteristics of the Program

Familias en Acción, which translates as Families in Action, is a program launched in Colombia in 2003, aimed to provide conditional cash transfers to very poor households.²² It consists of two core components: a health and nutrition subsidy, allocated to households with children aged 0 to 6 years old, and an educational subsidy which targets children between 7 and 17 y/o. The health and nutrition allocation was fixed in 2003 at 46,500 Colombian Pesos - COP (18 US Dollars) per family per month.²³

²⁰Note that the same conclusion can be derived from a situation where the shock touches simultaneously both agents.

²¹Here again, the same conclusion will be driven if both agents get the subsidy simultaneously.

²²*Familias en Acción* was inspired by the CCT *Progresa* in Mexico (now called *Oportunidades*).

²³The 2002 exchange rate corresponds to approximately 2,500 COP per US Dollar.

On the other hand, the educational transfer depends on the number of school-age children in the household. By 2003 this allocation reached 14,000 COP (6 US Dollars) per child per month in primary school and 28,000 COP (12 US Dollars) per child per month in secondary school by month. The average monthly subsidy in the data is 54,106 COP (22 US Dollars), nearly 11% of the average household monthly income, with half of the beneficiary households receiving at least 46,500 COP (19 US Dollars). The minimum value is 14,000 and it goes up to 116,500, for a household receiving the nutritional allocation plus the educational subsidy for 3 children in primary and 3 in secondary.²⁴ As for other similar programs, *Familias en Acción* subsidies required households to fulfill certain requirements, such as assist regularly to health-care checks and attend school.²⁵

The implementation of the program started in 1999 and took place in two stages. First, households were targeted geographically on the basis of fulfilling the following criteria: (i) having fewer than 100,000 inhabitants, (ii) not belonging to a region receiving aid after the 1995 earthquake, (iii) not being a department capital, (iv) having basic education and health infrastructure and (v) having a bank.²⁶

Next, based on a complete register of its residents, each qualifying municipality, identified the eligible households on the basis of two requirements: (i) having children aged 0 to 17 y/o and (ii) being in extreme poverty, according to a welfare classification system known as SISBEN.²⁷ These conditions had to be fulfilled first, by the 31st of December of 1999, and then, before the beginning of the program.

In order to receive the subsidy, households from eligible municipalities had to be registered in advance. This process started in late 2000 but most households registered between February and March of 2002. According to the *Familias en Acción* evaluation data, by the end of 2002 almost 92% of the eligible households from treatment municipalities was actually registered.²⁸

The program was fully in operation in all targeted municipalities by the beginning of 2003. Al-

²⁴ Author's calculations using the *Familias en Acción* survey, 2002 - 2003. These figures are based in the last payment received reported by the households in the survey.

²⁵ In practice, subsidies are contingent on verification of attendance certificates by the municipal coordination offices and the regional and national coordination units, every two months.

²⁶ 691 municipalities, out of 1,024, qualified.

²⁷ SISBEN, which translates as Selection System of Identifying and Selecting beneficiaries, is a system routinely used to evaluate the quality of life of Colombian households. It gathers information on 5 main dimensions: health status, education, housing, access to public services and social vulnerability (exposure to risks and security conditions). From these data, households are classified in one out of 6 levels. Level 1 corresponds to the most deprived group.

²⁸ Those who were not yet registered argue they did not complete the paperwork on time (37%), were not aware of the program or did not know they were eligible (36%) and did not have the time and the money to fulfill the conditions (8.3%), among other reasons.

though payments were supposed to begin by this date, in half of the treatment municipalities²⁹ they started earlier, between the end of 2001 and the beginning of 2002.³⁰ This situation was due to two reasons. First, because one of the main goals of the program was to alleviate the effects of the deep recession that touched the country in 1998 - 2001, so it was important to distribute the subsidies in the shortest time frame possible. Second, because the government was keen to start the implementation before the presidential elections took place, the 26th of May of 2002.

By 2003, the program reached 365,000 households showing large positive effects. Existing work suggest the program succeeded in raising household consumption, increasing school enrollment rates, diminishing child labor participation and improving health and nutrition outcomes (Attanasio *et al.*, 2012, 2010, 2006; Attanasio and Mesnard, 2006).

1.4.2 Data

The empirical analysis uses the first two rounds of the data collected to evaluate the *Familias en Acción* program³¹ These surveys were implemented between June and October of 2002 and July and November of 2003 on a panel of 11,462 households. The design consisted on constructing a representative stratified sample of treatment municipalities and to choose a group of control municipalities, as similar as possible but that were not implementing the program.³²

This process had two phases. In the first phase, the municipalities³³ were grouped by the number of eligible households, in order to randomly select a representative stratified sample of treatment municipalities. Then, 25 strata were defined based on the region and an index of health and education infrastructure. Control municipalities were chosen within each strata in order to be comparable to treatment ones in terms of the population, the area and an index of quality of life. They satisfied most of the eligibility requirements of the program, except the presence of a bank. The final samples consists of 122 municipalities, 57 treatment and 65 control.³⁴

In the second phase, for each municipality, approximately 100 eligible households were ran-

²⁹Named Treatment with Payment - TCP.

³⁰According to program officials, these early started municipalities (TCP) were selected by the order in which the paperwork was administrated in the central office (Attanasio *et al.*, 2010).

³¹In total four rounds of data were collected: the baseline in 2002, the first follow up in 2003, a second follow up in 2005 and a fourth one in 2011.

³²The whole process was handed by a consortium formed by the Institute for Fiscal Studies - IFS and two Colombian agencies, *Econometría*, a research Institute, and SEI, a data collection firm,

³³The exact term is not municipality but Primary Sampling Unit - PSU. However, in most cases, one PSU corresponded to one municipality.

³⁴A more detailed description of this process is contained in Attanasio *et al.* (2010, 2003); Attanasio and Mesnard (2006).

domly selected, using the information contained in the December of 1999 SISBEN registers. Although the implementation of the baseline survey³⁵ was scheduled to begin before the first payments took place, in half of the treatment municipalities the subsidies started to be delivered earlier (TCP). Fortunately, these municipalities, and their peers from the control group³⁶, can be identified in the data, so I omit them from the analysis.³⁷ This leaves a final baseline sample of 7,904 households.

The second round of the survey took place in 2003, succeeding in interviewing 6,529 households, living in 101 municipalities. Table 1.2 shows the structure of this two year sample, broken down by municipality status. Despite attrition is reasonable (18%), it might induce some selection bias in the results. The main concern is nonrandom migration, potentially correlated with treatment status. However, attrition rates by municipality treatment status show that this phenomena is not significantly different between households living in treatment and control municipalities.

In addition, there are other reasons to believe that nonrandom migration is unlikely to invalidate the results. First, recall that in order to receive the subsidy households needed to be register in a treatment municipality by 1999, so migration between surveys does not change the eligibility status of households. Moreover, migration in this context might be costly and the incentives induced by the subsidy do not seemed to be enough to compensate.³⁸

The *Familias en Acción* survey contains information on many variables. Two modules collecting retrospective information on private transfers received and delivered by the household, are particularly relevant for the analysis. The first interviews households about money and in-kind transfers received during the last twelve months from someone not living in the same household.³⁹ The second, asks the same questions but this time for transfers delivered during the last twelve months.

Interestingly enough, both modules provide disaggregated information on the geographic location of transfer donors and receivers, recorded through a variable taking four modalities: same neighborhood or sidewalk, same village/municipality, another Colombian village/municipality and a foreign country. In the same way, the survey gathers information about the relationship

³⁵Which took place during the summer of 2002.

³⁶Named Control with payment - CCP.

³⁷(In total 3,558 households were drooped for belonging to a TCP or a CCP municipality.

³⁸The average subsidy received by a household represents 11% of average income.

³⁹The exact question is: In the last 12 months, has any household member received any help in cash or in-kind from a relative, a neighbor or a friend not living in this household? When the answer is yes, the respondent is asked to report how many times in the period this help was received, its total value (in Colombian Pesos - COP), the relative location of the donor and her relationship with the household head, for a maximum of 3 different sources.

of transfer donors and receivers with the head of the household, recorded in two categories: relatives and friends.

Based on this information I built several variables recording transfer transactions. Consider the case of the value of money transfers-in. First, I construct a variable adding all the money transfers received by the household without taking into account the geographic or social distance of the donor. This variable is named "any partner". Then, I build two variables disaggregating these transfers by the geographic relative location of the donor. It should be noted that only households receiving money transfers in 2002 were considered for these variables.⁴⁰ The first variable, named "close", aggregates the transfers received from the same neighborhood or sidewalk and the same village/municipality. The second, "far", adds those received from another Colombian village/municipality and from a foreign country.

The same was done in order to built the variables disaggregating money transfers-in by the relationship of the household head with the donor. The first only adds cash transfers received from relatives and the second aggregates cash transfers received from friends.⁴¹ Then, an identical procedure was followed for in-kind and total transfers-in and for the same three categories of transfers-out. In addition, for each case, I propose a measure of incidence, i.e. the probability of receiving/giving a transfer, recorded as a dummy variable, equal to one if the household received/ delivered at least one transfer of this kind in the period, and zero otherwise.

Finally, note that in these data transfers are only observed from the point of view of one side of the transaction: the delivering or the receiving household. This means, one single household may behave sometimes as a donor and sometimes as a receiver. Unfortunately, their transfer counterparts are not tracked in the survey. The only information available about them is their relative location and their relationship with the household head.

1.5 Sample Characteristics and Empirical Strategy

1.5.1 Descriptive Statistics

Given the nature of *Familias en Acción* and the characteristics of the data, this analysis focuses on poor households living in a rural or a small urban municipality of Colombia. Table 1.3 displays some basic descriptive statistics regarding the socioeconomic characteristics of this sample before the program started (i.e. 2002). A little more than half of the households live in urban areas and 37% live in denser populated rural areas. They are, on average, composed by

⁴⁰For households not receiving any transfer this variables were recorded as missing.

⁴¹This two variables were also exclusively recorded for households receiving money transfers in 2002.

6 members and are mostly nuclear families. One in ten affirm having at least one permanent migrant, generally living in another Colombian municipality (90%).

Almost 20% of these households are headed by a single parent, most of whom are women. Household heads are on average 45 years old and one third is illiterate. Only 3% are unemployed and most work as paid employees or self-employed (38% in each case). As already mentioned, households in the sample are very poor, 89% are below the poverty line and 53% fall into the range of extreme poverty.⁴² In addition, 26% live in inadequate housing, 17% have no access to basic services, 35% live in overcrowded dwellings, 6% have at least one child aged 7 to 11 not attending school and 19% live in high economic dependence. The average monthly household income⁴³ is 496,047 COP (around 198 US Dollars) and consumption amounts to 227,780 COP (91 US Dollars). On average, households have savings for 29,995 COP (12 US Dollars) while loans amount up to 57,050 (23 US Dollars).

Private transfers are very important in this context.⁴⁴ According to Table 1.4, almost half of the households report having received a private transfer in the previous year: 20% in the case of money transfers and 39% in the case of in-kind transfers. Money transfers come mostly from relatives and represent, on average, 17% of household income. By contrast, in-kind transfers come mostly from donors living nearby and their contribution reaches 17% of total consumption.

As expected, very few households deliver money and in-kind transfers, 11% and 17% respectively, which represent, on average, 3% of total income and 4% of total consumption. This is natural, given that most households in the sample are poor and represent *Familias en Acción* eligible families. Most households privilege delivering transfers to nearby locations, specially in the case of in-kind ones. Despite its relevance, data shows that, transfers are not received and delivered in a very regular basis. In most of the cases, households are involved in transfer transactions only once or three times in the year (Figure 1.2).

Although it is not the most common trend in the data, households can be involved in several transfer transactions at the same time. Just 13% of the households simultaneously received and delivered transfers (811 cases), with only 6% of them receiving and delivering transfers from and to a close partner, and 31% receiving and delivering transfers from and to a friend. It is

⁴²The poverty and extreme line values were fixed respectively at 1,788,624 and 769,260 COP in 2002 (Attanasio *et al.*, 2004).

⁴³Adding labor, rental and retirement income.

⁴⁴Hernández Luna (2008) and Medina H. and Galván (2008) claim that private transfers are the second most relevant source of household income in Colombia, after labor and before public transfers and subsidies, and a key factor in explaining poverty alleviation and income diversification for the poorest.

also rare to receive or give transfers to more than one type of partner. From the total number of households receiving transfers, only 11% simultaneously received them from close and far locations, and 12% from relatives and friends. Similarly, from those delivering transfers, only 3% delivered them to close and far locations, and 9% to relatives and friends, at the same time (Table 1.5).

Finally, Table 1.6 presents the evolution of private transfers between 2002 to 2003. The percentage of households receiving and delivering transfers registers a general increase. In the case of transfers-in, its incidence raised in 21 percentage points, mostly driven by in-kind transfers. What is more interesting, however, is that these gains are much more important in the case of transfers involving partners living far and friends. When it comes to their values, however, the evolution path is less clear. Although aggregate transfers increased in both money and in-kind types, in some cases, these sums actually decreased (e.g. for all money transfers-in disaggregated cases and in-kind transfers-in from relatives).

Something similar is observed for transfers-out. Although the incidence of the aggregates remains stable, all the disaggregated cases registered an increase, with the most important gains observed for transfers delivered to far locations and friends.⁴⁵ This time, however, the values associated to the different geographic and social distance sub-categories, show all decreasing trends.

1.5.2 Empirical Strategy

The empirical strategy used in this chapter relies on a difference-in-difference method (DID), consisting in comparing changes in private transfer outcomes between *Familias en Acción* eligible and non-eligible households before and after the program. The empirical specification is given by Equation (1.9):

$$Y_{i,t} = \alpha_t + \eta_i + \beta P_{i,t} + \gamma R \times \alpha_t + \lambda Z \times \alpha_t + \varepsilon_{i,t} \quad (1.9)$$

where $Y_{i,t}$ denotes the transfer outcome of interest for household i in year t (for example, in the case of being participating in money transfers-in from a close partner, $Y_{i,t}$ represents a dummy variable equal to 1 if household i received a money transfer from a household from a nearby location in year t), $P_{i,t}$ is a dummy variable equal to 1 if the household i is located in a treatment municipality and 0 if it is located in a control municipality in year t , R is a set of

⁴⁵Except for in-kind transfers-out.

region dummies, Z is a set of zone type dummies (urban⁴⁶, populated center⁴⁷ and rural), α_t represents time, η_i accounts for household fixed-effects and ε_i is an error term.

To the extent that treatment status is a random event, β would yield an unbiased estimate of the average impact of *Familias en Acción* eligibility on private transfers. Although the program was not randomly assigned, its evaluation design was made in such a way that in the data, treatment and control households should be alike. Tables 1.7 and 1.8 present simple test of differences in means in order to check how different were these households before the program started.

Results suggest that treatment and control households do not differ significantly in terms of income and several measures of wealth. This indicates that selection into the program may not be so strongly linked to initial household socioeconomic differences. However, there are other dimensions about which treatment and control households do not seem to be so comparable. Eligible households are, for instance, less likely to live in urban areas; tend to have less children between 7 and 11 y/o not attending school; have less adults; have more children below 7 y/o; have younger and more literate household heads, less household heads unemployed and less household heads in self-employment; consume less and accumulate less savings (Table 1.7).

Luckily, households do not differ substantially in their participation in transfer-in and transfer-out transactions. Exceptions are money transfers-in by social distance and in-kind transfers-out towards close partners. However, in most of the cases treatment households receive and deliver smaller amounts of transfers (Table 1.8).

In order to ease up selection into treatment concerns, all the estimations include household fixed-effects (η_i), that capture those time unvarying observable and unobservable characteristics potentially correlated with program eligibility status and private transfer outcomes. In addition, estimations also include region and zone type dummies interacted with time ($\gamma R \times \alpha_t$ and $\lambda Z \times \alpha_t$), to control for unobservable time varying characteristics at these levels. However, an unbiased estimate of β still requires to fulfill other requirements, posed, for example, by the parallel trends assumption. Subsection 1.6.2 discusses this and other identification threats posed by the empirical analysis.

⁴⁶Capital cities and municipal heads.

⁴⁷Concentration of at least 20 adjacent dwellings, neighboring or attached to each other, located in the rural area of a municipality or a departmental subdivision.

1.6 Results

1.6.1 Main Estimates

Tables 1.9 and 1.10 present the β coefficients estimated from Equation (1.9) for transfers-in and transfers-out, when the dependent variables are the incidence of transfers (Columns 1 - 3) and their value (Columns 4 - 6). Panel A displays the result of a regression in which the dependent variable aggregates all the transfers received without distinguishing the geographic/social distance with the donor. Panel B presents the results of the geographic distance estimations. The first row, β_{close} , presents the results when the dependent variable aggregates transfers received from the same neighborhood, the same sidewalk and the same village/municipality.⁴⁸ The second row, β_{far} , displays the results when the dependent variable aggregates transfers received from another village/municipality and from a foreign country. The last row contains the Chi-squared and P-value for testing whether these two coefficients are different, that is $\beta_{close} - \beta_{far} = 0$.

Finally, Panel C summarizes the results when transfers-in are disaggregated by the social relationship with the donor. The first row, $\beta_{relatives}$, presents the results when the dependent variable aggregates transfers received from relatives; the second, $\beta_{friends}$, displays those received from friends; and the third row shows the results of a Chi-squared test of difference between these two coefficients ($\beta_{relatives} - \beta_{friends} = 0$). Columns break down by the three different kinds of transfers under consideration: total (Columns 1 and 4), money (Columns 2 and 5) and in-kind (Columns 3 and 6).

The independent variable is a treatment status dummy. Estimations are implemented using Linear Probability Models (LPM), in the case of incidence, and OLS, in the case of value, and include robust standard errors clustered at the municipality level and household fixed effects. Other controls are 5 region and 3 zone type dummies (urban⁴⁹, populated center⁵⁰ and rural).

Transfers-in

The first set of results describes the relationship between *Familias en Acción* and transfers received. Very important findings emerge from these estimations.

⁴⁸In the case of incidence this variable is equal to 1 if the household received at least 1 COP from one of these locations and 0 otherwise. Remember that this variable is recorded as missing if the household did not receive any transfer and that some households receive transfers from both types of partners.

⁴⁹Capital cities and municipal heads.

⁵⁰Concentration of at least 20 adjacent dwellings, neighboring or attached to each other, located in the rural area of a municipality or a departmental subdivision.

Aggregated transfers (Panel A - Table 1.9) appeared to be uncorrelated to the program, regardless the way they are measured (incidence or value) and their type (total, money or in-kind). Perfect information models of transfers would interpret this result as evidence of the unresponsiveness of transfers-in to income shocks and claim no crowding-out effect. However, considering that there may be information asymmetries influencing these transactions, other interpretations become plausible.

When transfers-in are disaggregated by the geographic distance of the donor (Panel B), money transfers received from nearby locations (in terms of both measures, incidence and value) appeared to be negatively correlated to the program, while the coefficients associated to transfers from farther locations are all statistically equal to zero. Specifically, compared to control households, *Familias en Acción* eligibles are 12 percentage points less likely to receive money transfers when they come from close locations. In addition, value estimates show that these households receive on average 7,095 COP (almost 3 US Dollars) less money transfers per month from partners living close. This amount is equivalent to 13% of the average subsidy received by a household in the data (54,106 COP, 22 US Dollars).

These findings are in line with the conceptual framework outlined in Section 1.3. Start first by analyzing the case of money transfers received from nearby locations (β_{close}). Theory predicts that, in situations where the actual state of the receiver is perfectly observable, transfers-in may decrease with positive income shocks on the receiver's side (prediction [2]), and even if these shocks simultaneously affect the donor⁵¹ (combination of predictions [1] and [2]). In the first case, if only the transfer receiver is eligible to the subsidy, the intuition is simply that, with the subsidy, the receiver is better off, and less willing to provide services to the donor, and by living close to her, the donor can easily notice that now she needs smaller transfers to achieve an optimal situation.

Now, if the case is the one of both, the receiver and the donor, being potential beneficiaries of *Familias en Acción*⁵², what would be behind β_{close} is the interaction between a receiver valuing more the dis-utility associated to providing services to the donor, and a donor wishing to get more services (prediction [1]) but altruistically enough to give more weight to the well-being of the receiver (prediction [2]).

On the other hand, in a situation where transfers come from far (β_{far}), the actual condition

⁵¹However, this is not testable given that this side of the transaction is not observed in the data.

⁵²This scenario could seem, at first sight, very likely given that this specification aggregates transfers received from the same municipality, so both agents live in a treatment municipality. However, remember that the other characteristics of the donor are unobserved in the data, then it is not possible to know if she meets the other eligibility criteria of the program.

of the receiver is less likely to be noticed by the donor. Therefore, the unresponsiveness of transfers-in to the program, observed in Table 1.9, might be explained by the faculty that distance gives the receiver to hide the subsidy (prediction [4]). Of course, if the donor were also eligible, a situation that can not be observed in the data, β_{far} would probably be positive (predictions [1] + [4]).

Attention is drawn to the fact that these results only concern money transfers. This might be related to the possibility that in-kind transfers might be motivated by other types of interactions and preferences, different from the ones originally modeled by Cox, and on which the analysis presented in this chapter is based. However, there is also the possibility that this variable is less precise given that these types of transfers are more difficult to measure.

Finally, a brief comment on estimations from Panel C, social distance. None of the coefficients, nor $\beta_{relatives}$ nor $\beta_{friends}$, are statistically significant for any of the proposed estimations. This is striking given that, many of the existing theoretical literature and empirical research on private transfers are based on family interactions. However, it might be that the relatives/friends typology is not an accurate measure of social distance and that, even if it is, this concept is much more complex to address.

Transfers-out

The second set of results refers to transfers-out in terms of *Familias en Acción* eligibility. As in the previous case, aggregate transfers-out (Panel A - Table 1.10) prove to be uncorrelated with the program. However, money transfers delivered to close locations show a positive coefficient for both measures, incidence and value (Panel B). *Familias en Acción* eligible household are 14 percentage points more likely to deliver money transfers when their counterparts live close. Furthermore, they transfer, on average, 8,452 COP (3.4 US Dollars) per month more to partners living nearby, 16% of the average *Familias en Acción* subsidy received by a household in the data (54,106 COP, 22 US Dollars). On the contrary, when donors and receivers live far from each other, the coefficients associated to the program (β_{far}) are not statistically significant in any of the estimations.⁵³

Theoretical predictions from Section 1.3, offer a good approach to explain these results. When the situation of the donor is perfectly observable by the receiver (β_{close}) and only the first is eligible for *Familias en Acción*, either she is highly altruistic, and seeks to increase the well-being of the recipient, or, she is less altruistic, but is willing to increase her demand for services or is

⁵³Note however that, in these cases, the test fails to reject the hypothesis of β_{far} equal to β_{far} .

able to pay more for them (predictions [1] and [7]). Now, if both agents are eligible, a situation not observable in the data, transfers-out will also increase because, the receiver would be likely to discount the dis-utility gain of the provision of services, via an increase of P ([1] and [3] or [5] and [7] combinations).

On the contrary, when transfers are delivered farther (β_{far}), the eligibility of the donor is unobserved by the receiver. Thus, the donor would be in the possibility of hiding the subsidy and, at least, avoid that the receiver increases the value of the services she provides. Similarly, if the receiver were eligible too, a situation that can not be observed in the data, β_{far} would also be positive, as it is in the interest of both agents to reveal their true state (pair [5] and [8]).

As in the previous case, here again, no correlation is found between the program and in-kind transfers nor between the program and transfers disaggregated by social distance.

1.6.2 Identification Threats

The results presented above suggest that positive income shocks, like government subsidies, are associated to a decrease of transfers-in and an increase of transfers-out, when transfer donors and receivers are geographically close. On the contrary, when donors and receivers live far from each other, transfers and income shocks appeared to be uncorrelated.

This subsection discusses three important identification threats that question the internal validity of these findings. First, I consider the potential violation of the parallel trend assumption. Second, I present the implications of selection in transfer partners (close/far or relatives/friends). Finally, I explain the problem of anticipation.

Parallel Trends Assumption

The key assumption behind the identification of unbiased β coefficients, from Equation (1.9), is the parallel trends assumption. It posits that, conditional on covariates, in the absence of the program, the trend in transfers-in and transfers-out would have follow the same path across treatment and control groups. Since the program was not randomly assigned, households across treatment and control municipalities are very likely to present different pre-program paths. Indeed, as shown in Tables 1.7 and 1.8, treatment and control households were different just before the program started.

Suppose, for instance, that households living in treatment municipalities, suffered more from the 1998 - 2001 recession and were more likely to lose their houses and jobs.⁵⁴ This situa-

⁵⁴Remember that treatment municipalities are differentiated from control ones, among other aspects, for having

tion could have made them more likely to receive private transfers, in order to easier mitigate the shock and recovery faster. The possibility that treatment households may exhibit higher pre-treatment transfer growth rates underlines an eventual violation of the parallel trends assumption.

In order to verify that transfers effectively follow a parallel trend in the data, the ideal would be to have information on transfer transactions from several years prior to 2002. However, *Familias en Acción* data collection started in 2002 and no retrospective information on transfers was ever collected. Looking at other potential sources of information, I noticed that data on private transfers are actually very scarce in Colombia. To my knowledge the only information of this kind, available before 2002, is the National Income and Expenditure Survey (ENIG, for its acronym in Spanish).⁵⁵ The disadvantage is, however, that this survey is only representative for the urban areas of twenty-three cities, while the *Familias en Acción* treatment status is established at the municipality level and the evaluation data, used for the analysis, covers 101.

The possible violation of the parallel trends assumption raises doubts on whether estimations presented in Subsection 1.6.1 are actually capturing the causal effect of the program alone, despite the use of time unvarying covariates (household fixed-effects). Thus, its interpretation requires caution.

Selection in Transfer Partners

The most valuable contribution of the analysis presented above is the comparison of β coefficients across transfers received (delivered) from (to) close/far locations and relatives/friends. However, for these comparisons to be causally interpretable, one may expect that the geographic and social distance between transfer donors and receivers are determined exogenously. This may be a very strong assumption given that households are most likely to decide about their transfer partners according to different considerations. Indeed, being receiving (delivering) transfers from (to) close or far locations might be due to several (observable or unobservable) household characteristics, some potentially correlated to their treatment status (representing here positive income shocks).

Tables 1.11 and 1.12 present simple tests of mean differences between households receiving (delivering) transfers from (to) close and far locations, and from (to) relatives and friends. Results suggest that households receiving (delivering) transfers from (to) close and far locations

a banks. Well, the banking system was, precisely, one of the most affected by this crisis.

⁵⁵This survey includes, in the income module, a question about transfers received (delivered) from (to) other households.

differ significantly in several characteristics; as well as those receiving (delivering) transfers from (to) relatives and friends. Good news is that all these time unvarying differences are captured by household fixed-effects (η_i).

On the other hand, there is no way to rule out other time varying confounding factors. For instance, transfers-in (transfers-out) from (to) close locations, may decrease (increase) with public subsidies, simply because this type of programs may induce households to modify their preferences.⁵⁶ Consider, for instance, a household head that, in order to fulfill with the requirements of *Familias en Acción*, assists regularly with her 4 y/o kid to health checks. She may agree to take the child of her neighbor too (i.e. service), receiving, in return, a small economic aid (i.e. transfers). Obviously, the same arrangement would not be possible with a friend living in another village. Therefore, β_{close} would tend to be positive, whereas β_{far} would tend to be statistically close to zero. However, it would be inaccurate to interpret the differentiated behavior of these two coefficients as a consequence of information asymmetry.⁵⁷

Anticipation Effects

Another problem will arise if, before the program officially started, households change their behavior in the knowledge that they were going to receive the subsidy in the future. This issue is particularly worrying in the case of *Familias en Acción* because the program was widely publicized, even before the baseline data was collected, and households were required to register earlier.⁵⁸

Attanasio et al. (2004, 2012, 2010) warn about the existence of evidence of anticipation in terms of household consumption, school enrollment and labor supply, which are directly related to the conditionalities of the program. In the case of transfers, although these dimensions are not part of the requirements of the program, households may also had changed their behavior to take more advantage of the new situation.

Knowing that the subsidy would relax their budget constraints, households may, for instance, increase transfers-out (in the case of donors) or provoke a raise of transfers-in (in the case of receivers), by offering more services or augment the monetary value of them. Anticipation effects would, therefore, tend to reduce the estimated effect of the program, thus β coefficients from Tables 1.9 and 1.10 will be downward biased.

⁵⁶Due to the requirements of the program or to its intermediate effects.

⁵⁷Other examples include eligible households spending the subsidy in financing the migration of a relative and getting back higher remittances ($\beta_{far} > 0$ and $\beta_{close} \rightarrow 0$), or asking their neighbors for an express loan to start a new business ($\beta_{close} > 0$ and $\beta_{far} \rightarrow 0$).

⁵⁸Official figures suggest that by march of 2002, 64% of the eligible households were already registered to receive the subsidy.

1.6.3 Social Well-being

The identification threats outlined above signal that, although the empirical evidence presented in this subsection illustrates well the theoretical predictions outlined in Section 1.3, according to which the responsiveness of transfers to income shocks is partly explained by information asymmetries associated to distance, one can not discard that other devices are at stake. The viability of alternative mechanisms highlights the importance of being cautious when it comes to draw strong and definitive conclusions from these findings. However, it is important to note that, by acknowledging the role that information asymmetry and distance fulfill in the configuration of private transfers, this analysis does not intend to question the legitimacy of other channels.

In addition, I am also aware of other caveats that limit the interpretation of the findings and restrict the assessment of its public policy implications. A shortfall in private transfers received and an increase of transfer pressure on *Familias en Acción* eligibles, might have very important consequences in terms of social well-being. Besides the particular implications on the expected program effects, little studied up to now, these new transfer transactions could have key redistributive impacts. Nevertheless, these effects will depend on variables over which there is no information in the data. For instance, the socioeconomic characteristics of the other sides of the transactions, e.g. the donors cutting transfers-in to *Familias en Acción* eligibles and the households receiving transfers from them, and the new transfer relationships these unobserved households could start afterwards.

By assuming, for instance, that households cutting transfers to *Familias en Acción* eligibles are, after the subsidy, comparatively poorer, i.e. $I_r + \theta > I_d^{59}$, and considering they may now start to deliver transfers to third households (subscript t) even more poor, i.e. $I_r + \theta > I_d > I_t$, the final social impact of the program can be indeed positive. On the contrary, if these households are still richer and do not engage in any new transfer transactions, this effect might be very negative. Similarly, if, thanks to the subsidy, *Familias en Acción* eligible household engage in transfer transactions with poorer households, i.e. $I_d + \psi > I_r > I_t^{60}$, the final impact will be even greater.

Unfortunately, the lack of information on these variables prevents the analysis to be more conclusive about these aggregated effects.

⁵⁹Remember that ,in this example, *Familias en Acción* eligibles, as transfer receivers, are those identified with the subscript r .

⁶⁰In this example, *Familias en Acción* eligibles, as transfer donors, are those identified with the subscript d .

1.7 Conclusions

Asymmetry of information and distance between donors and receivers has often been ignored by the theoretical and the empirical literature on private transfers. In this chapter, I contribute to fill this gap by investigating, to what extent, the relative geographic location between transfer donors and receivers, and the proximity of their parentage, determines the responsiveness of private transfers to positive income shocks. First, I present a theoretical framework to conceptualize the idea that distance generates information asymmetry that induce transfer partners to act strategically, by, for instance, hiding income gains from social programs. Then, I empirically test these predictions using longitudinal data collected for the evaluation of a very popular welfare program recently implemented in Colombia, *Familias en Acción*.

This analysis challenges the existing empirical literature on the topic by showing that ignoring the origin and destination of private transfers may lead to erroneous interpretations of the transfer-income relationship. Four important results stand out. First, I find a negative association between the incidence and the value of transfers-in and the program, when donors and receivers are physically close to each other. Similarly, transfers-out are positively correlated with the program when they are delivered to nearby locations. On the contrary, when agents live far from each other, the coefficient associated to the program is statistically equal to zero. Finally, when transfers are simply added without regard to their geographic origin and destination they also prove to be unresponsive.

In addition, these results also suggest that *Familias en Acción* subsidies may partially substitute private transfers between partners living close from each other (crowding-out effect), lessening the budget constraint of the donors and pushing targeted household to share a fraction of the program allocation with their physically closer kin and friends. Although a deeper analysis is needed in order to better assess the social well-being implications of these findings, they gives some insights about the role that private transfers, asymmetry of information and distance play in the configuration of household responses to government subsidies.

Unfortunately, the evaluation design of the program, the characteristics of the data and the endogeneity behind the choice of transfer partners, raise important identification threats that must be taken into account before drawing definitive conclusions from this analysis.

1.8 Figures and Tables

Figure 1.1: Perceived Actual Income and Distance

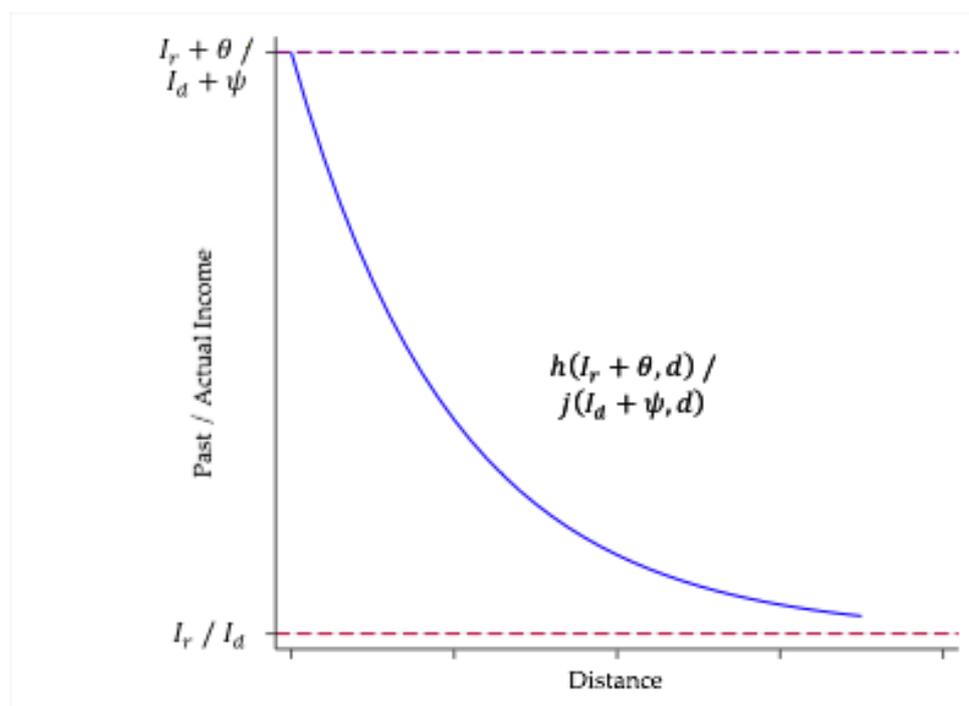


Table 1.2: Sample Composition by Municipality Treatment Status

	Surveyed in 2002	Surveyed in 2002 and 2003	Attrition Rate	
	Obs. (1)	Obs. (2)	Mean (3)	S.E. (4)
Treatment municipalities (T)	3215	2646	0.18	(0.02)
Control municipalities (C)	4689	3883	0.17	(0.02)
Difference (C) - (T)	1474	1237	-0.01	(0.03)
Total	7904	6529	0.18	(0.01)

Source: FA Surveys 2002 - 2003. Notes: Standard errors in parenthesis clustered at municipality level and means adjusted by weights. Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded.

Table 1.3: Socioeconomic Characteristics of the Sample (2002)

	Mean	S.E.
	(1)	(2)
Urban (d)	0.54	(0.04)
Populated center (d)	0.37	(0.01)
Rural (d)	0.09	(0.00)
Total hh members	6.24	(0.07)
Number of adults (18-65 y/o)	2.65	(0.04)
Number of youngsters (7 - 17 y/o)	2.17	(0.03)
Number of children (< 7 y/o)	1.23	(0.03)
Hh has more than one family (d)	0.05	(0.00)
Hh has permanent migrants (d)	0.11	(0.01)
Hh is single parenting (d)	0.18	(0.01)
Hh head age	44.68	(0.27)
Hh head is literate (d)	0.70	(0.01)
Hh head is unemployed (d)	0.03	(0.00)
Hh head is employee (d)	0.38	(0.03)
Hh head is self- employed (d)	0.38	(0.03)
Hh is poor(d)	0.89	(0.01)
Hh is extremely poor(d)	0.53	(0.02)
Hh inadequate housing (d)	0.26	(0.03)
Hh dwellings without basic services (d)	0.17	(0.02)
Hh overcrowding (d)	0.35	(0.02)
Hh truancy (d)	0.06	(0.01)
Hh high economic dependence (d)	0.19	(0.01)
Monthly hh income	496047.03	(21638.57)
Monthly per capita income	82566.33	(3644.65)
Monthly hh consumption	227780.24	(2509.63)
Monthly per capita consumption	39941.89	(469.65)
Hh monthly savings	2995.27	(1018.43)
Hh monthly loans	57050.76	(4744.35)
Observations	6529	

Source: FA Survey 2002. Notes: (d) stands for dummy variables. Standard errors are clustered at municipality level and means are adjusted by weights. All values are converted into monthly flows and 2003 COP. The exchange rate between the US Dollar and the Colombian Peso during the period of reference is about 2,500. Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded.

Table 1.4: Incidence and Value of Private Transfer Transactions (2002)

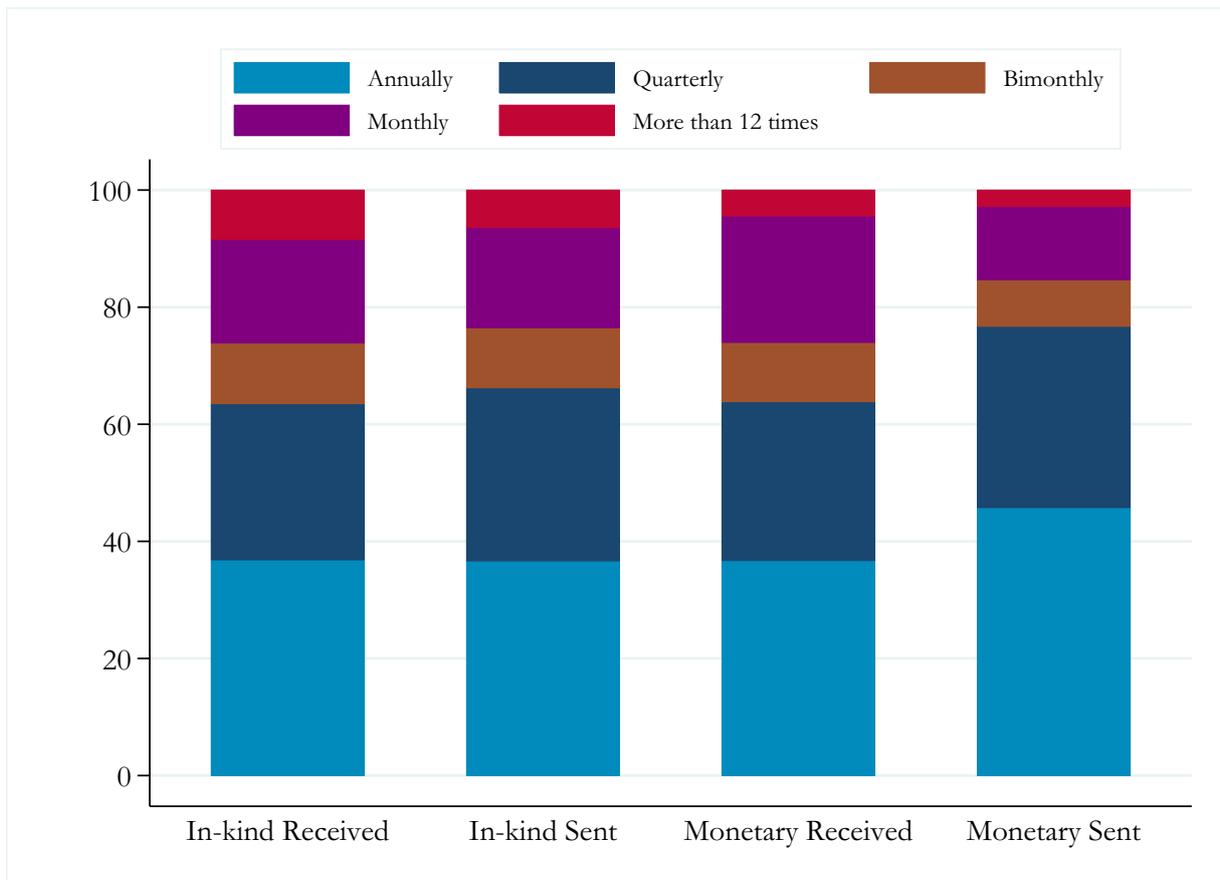
	Incidence (d)		Value		Share of income		Share of consumption	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)	Mean (5)	S.E. (6)	Mean (7)	S.E. (8)
<i>Total transfers-in</i>								
Any partner	0.47	(0.01)	12439.61	(-34325.36)	0.12	(0.58)	0.21	(0.80)
Close ^a	0.78	(0.01)	15980.47	(-34172.27)	0.09	(0.34)	0.19	(0.87)
Far ^a	0.34	(0.01)	10449.66	(-33192.74)	0.16	(0.83)	0.18	(0.33)
Relatives ^a	0.66	(0.01)	21196.04	(-45436.17)	0.15	(0.70)	0.25	(0.91)
Friends ^a	0.46	(0.01)	5293.69	(-14159.17)	0.05	(0.13)	0.10	(0.37)
<i>Money transfers-in</i>								
Any partner	0.20	(0.00)	5804.63	(-23401.12)	0.15	(0.73)	0.17	(0.29)
Close ^b	0.59	(0.01)	12167.09	(-25504.35)	0.10	(0.30)	0.14	(0.26)
Far ^b	0.47	(0.01)	17111.76	(-41306.90)	0.19	(0.97)	0.19	(0.28)
Relatives ^b	0.82	(0.01)	26037.09	(-45678.68)	0.17	(0.80)	0.18	(0.28)
Friends ^b	0.22	(0.01)	3260.34	(-11164.04)	0.07	(0.13)	0.12	(0.28)
<i>In-kind transfers-in</i>								
Any partner	0.39	(0.01)	6634.98	(-21506.72)	0.08	(0.26)	0.16	(0.81)
Close ^c	0.81	(0.01)	13011.23	(-29638.01)	0.07	(0.27)	0.17	(0.89)
Far ^c	0.24	(0.01)	3885.58	(-14063.18)	0.08	(0.22)	0.11	(0.28)
Relatives ^c	0.57	(0.01)	12252.12	(-30502.70)	0.10	(0.33)	0.21	(0.99)
Friends ^c	0.50	(0.01)	4698.92	(-12796.79)	0.04	(0.11)	0.09	(0.36)

Table 1.4 (cont.): Incidence and Value of Private Transfer Transactions (2002)

	Incidence (d)		Value		Share of income		Share of consumption	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)	Mean (5)	S.E. (6)	Mean (7)	S.E. (8)
<i>Total transfers-out</i>								
Any partner	0.23	(0.01)	3046.11	(-19022.94)	0.03	(0.08)	0.05	(0.20)
Close ^d	0.9	(0.01)	9844.55	(-24766.37)	0.03	(0.05)	0.05	(0.19)
Far ^d	0.14	(0.01)	3133.24	(-26552.39)	0.05	(0.18)	0.08	(0.26)
Relatives ^d	0.58	(0.01)	10751.26	(-37713.82)	0.04	(0.10)	0.08	(0.26)
Friends ^d	0.50	(0.01)	2319.76	(-7321.97)	0.01	(0.03)	0.02	(0.04)
<i>Money transfers-out</i>								
Any partner	0.11	(0.00)	1595.03	(-16449.58)	0.03	(0.11)	0.06	(0.25)
Close ^e	0.84	(0.01)	8916.68	(-25224.41)	0.02	(0.05)	0.05	(0.23)
Far ^e	0.18	(0.01)	5325.08	(-37246.01)	0.07	(0.22)	0.10	(0.31)
Relatives ^e	0.69	(0.02)	12947.55	(-47402.10)	0.04	(0.13)	0.08	(0.30)
Friends ^e	0.33	(0.02)	1337.69	(-4928.02)	0.01	(0.02)	0.02	(0.04)
<i>In-kind transfers-out</i>								
Any partner	0.17	(0.00)	1451.09	(-8013.36)	0.02	(0.04)	0.04	(0.07)
Close ^f	0.93	(0.01)	7722.05	(-17379.48)	0.02	(0.04)	0.04	(0.08)
Far ^f	0.08	(0.01)	818.30	(-5073.12)	0.02	(0.03)	0.03	(0.05)
Relatives ^f	0.48	(0.02)	6222.72	(-17055.56)	0.03	(0.04)	0.05	(0.10)
Friends ^f	0.55	(0.01)	2322.65	(-7247.94)	0.01	(0.02)	0.02	(0.04)
Observations	6529		6529		6529		6529	

Source: FA Survey 2002. Notes: (d) stands for dummy variables. Standard errors are clustered at municipality level and means are adjusted by weights. All values are converted into monthly flows and 2003 COP. The exchange rate between the US Dollar and the Colombian Peso during the period of reference is about 2,500. Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded. ^a Only include households receiving transfers. ^b Only include households receiving money transfers. ^c Only include households receiving in-kind transfers. ^d Only include households making transfers. ^e Only include households making money transfers. ^f Only include households making in-kind transfers.

Figure 1.2: Frequency of Private Transfer Transactions



Source: FA Survey 2002. Notes: Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded.

Table 1.5: Multiple Transfer Transactions (2002)
Incidence (d)

Transfers-in	Transfers-out		Mean (1)	S.E. (2)	Obs. (3)
<i>Aggregate transfers</i>					
No	No	Any partner	0.42	(0.01)	6529
Yes	No	Any partner	0.33	(0.01)	6529
No	Yes	Any partner	0.12	(0.00)	6529
Yes	Yes	Any partner	0.13	(0.00)	6529
<i>Disaggregated by geographic distance</i>					
Yes	Yes	Close / Far	0.63	(0.02)	849
Yes	Yes	Far / Close	0.27	(0.02)	849
Yes	Yes	Close / Close	0.06	(0.01)	849
Yes	Yes	Far / Far	0.04	(0.01)	849
<i>Disaggregated by social distance</i>					
Yes	Yes	Relatives / Friends	0.20	(0.01)	849
Yes	Yes	Friends / Relatives	0.29	(0.02)	849
Yes	Yes	Relatives / Relatives	0.20	(0.01)	849
Yes	Yes	Friends/ Friends	0.31	(0.02)	849
<i>Received from multiple partners</i>					
Yes	No	Close / Far	0.11	(0.01)	3072
Yes	No	Relatives / Friends	0.12	(0.01)	3072
<i>Delivered to multiple partners</i>					
No	Yes	Close / Far	0.03	(0.00)	1532
No	Yes	Relatives / Friends	0.09	(0.01)	1532

Source: FA Survey 2002. Notes: Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded. Standard errors are clustered at municipality level and means are adjusted by weights.

Table 1.6: Evolution of Transfer Transactions 2002 - 2003

	Incidence (d)		Value	
	2003 Mean (1)	Difference 2003-2002 Mean (2)	2003 Mean (3)	Difference 2003-2002 Mean (4)
<i>Total transfers-in</i>				
Any partner	0.67	0.21***	21172.11	10444.99***
Close ^a	0.93	0.13***	18002.93	2792.31
Far ^a	0.65	0.34***	9514.62	-914.63
Relatives ^a	0.85	0.20***	20749.62	697.65
Friends ^a	0.76	0.29***	6874.39	1232.91
<i>Money transfers-in</i>				
Any partner	0.29	0.10***	9456.34	4057.59***
Close ^b	0.87	0.28***	9156	-2285.36*
Far ^b	0.85	0.37***	11383.37	-6795.67***
Relatives ^b	0.95	0.14***	18355.76	-7749.56***
Friends ^b	0.75	0.53***	2190.05	-1345.66***
<i>In-kind transfers-in</i>				
Any partner	0.61	0.22***	11715.77	6387.40***
Close ^c	0.95	0.12***	11944.5	-1031.65
Far ^c	0.64	0.44***	3050.78	-649.49
Relatives ^c	0.81	0.26***	9516.69	-2235.82*
Friends ^c	0.81	0.29***	5573.53	576.54

Table 1.6 (cont.): Evolution of Transfer Transactions 2002 - 2003

	Incidence (d)		Value	
	2003 Mean (1)	Difference 2003-2002 Mean (2)	2003 Mean (3)	Difference 2003-2002 Mean (4)
<i>Total transfers-out</i>				
Any partner	0.26	0.01	3353.63	403.53
Close ^d	0.97	0.07***	4573.24	-5353.05***
Far ^d	0.69	0.56***	1737.91	-1469.71***
Relatives ^d	0.84	0.26***	5271.02	-5810.90***
Friends ^d	0.83	0.32***	1050.72	-1165.92***
<i>Money transfers-out</i>				
Any partner	0.13	0.01	1561.17	-158.25
Close ^e	0.96	0.13***	3065.04	-6523.62***
Far ^e	0.8	0.61***	2282.53	-2993.92***
Relatives ^e	0.92	0.26***	4960.25	-8644.72***
Friends ^e	0.85	0.48***	387.32	-954.08***
<i>In-kind transfers-out</i>				
Any partner	0.19	0.01	1792.45	561.78**
Close ^f	0.98	0.05***	2614.18	-4864.40***
Far ^f	0.76	0.69***	230.98	-483.21***
Relatives ^f	0.85	0.37***	2012.93	-3963.12***
Friends ^f	0.90	0.34***	846.85	-1384.60***
Observations	6529		6529	

Source: FA Survey 2002 - 2003. Notes: (d) stands for dummy variables. Standard errors are clustered at municipality level and means are adjusted by weights. All values are converted into monthly flows and 2003 COP. The exchange rate between the US Dollar and the Colombian Peso during the period of reference is about 2,500. Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded. ^a Only include households receiving transfers. ^b Only include households receiving money transfers. ^c Only include households receiving in-kind transfers. ^d Only include households making transfers. ^e Only include households making money transfers. ^f Only include households making in-kind transfers.

Table 1.7: Household Baseline Characteristics by Treatment Status (2002)

	Treatment (T)	Difference (T) - (C)	
	Mean (1)	Mean (2)	S.E. (3)
Urban (d)	0.44	-0.14**	(0.06)
Populated center (d)	0.43	0.10	(0.06)
Rural (d)	0.12	0.04	(0.03)
Hh is single parenting (d)	0.17	-0.01	(0.01)
Hh has permanent migrants (d)	0.12	0.01	(0.01)
Hh is poor(d)	0.91	0.03	(0.02)
Hh is extremely poor(d)	0.56	0.05	(0.04)
Hh inadequate housing (d)	0.23	-0.04	(0.04)
Hh dwellings without basic services (d)	0.17	0.01	(0.04)
Hh overcrowding (d)	0.33	-0.03	(0.04)
Hh truancy (d)	0.03	-0.04***	(0.01)
Hh high economic dependence (d)	0.18	-0.01	(0.02)
Total hh members	6.18	-0.09	(0.13)
Number of adults (18-65 y/o)	2.48	-0.23***	(0.07)
Number of youngsters (7 - 17 y/o)	2.21	0.06	(0.06)
Number of children (< 7 y/o)	1.34	0.15**	(0.06)
Hh head age	42.75	-2.66***	(0.47)
Hh head is literate (d)	0.74	0.05*	(0.03)
Hh head is unemployed (d)	0.02	-0.01*	(0.01)
Hh head is employee (d)	0.47	0.12***	(0.04)
Hh head is self- employed (d)	0.32	-0.08*	(0.05)
Monthly hh income	506844.78	-35816.13	(43268.15)
Monthly per capita income	83255.29	-2281.21	(7788.72)
Monthly hh consumption	235333.62	-25084.26*	(13774.88)
Monthly per capita consumption	40874.98	-3119.56	(2599.94)
Hh monthly savings	3767.54	-2560.82*	(1481.13)
Hh monthly loans	58585.66	-5076.35	(9903.85)
Observations	2646	6529	

Source: FA Survey 2002. Notes: (d) stands for dummy variables. Standard errors are clustered at municipality level and means are adjusted by weights. All values are converted into annual flows and 2003 COP. The exchange rate between the US Dollar and the Colombian Peso during the period of reference is about 2,500. Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded.

Table 1.8: Baseline Transfer Transactions by Treatment Status (2002)

	Incidence (d)			Value		
	Treatment (T)	Difference (T) - (C)		Treatment (T)	Difference (T) - (C)	
	Mean	Mean	S.E.	Mean	Mean	S.E.
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Total transfers-in</i>						
Any partner	0.43	-0.05	(0.04)	8474.01	-4920.15***	(1573.85)
Close	0.80	0.01	(0.03)	12110.87	-4739.52***	(1836.90)
Far	0.30	-0.01	(0.04)	7626.99	-3687.19*	(2195.42)
Relatives	0.64	0.00	(0.04)	14386.76	-8058.14**	(3142.61)
Friends	0.50	0.03	(0.05)	5375.89	-492.00	(1077.32)
<i>Money transfers-in</i>						
Any partner	0.18	-0.01	(0.02)	4121.09	-2286.80**	(1040.46)
Close	0.63	0.06	(0.05)	9852.74	-1959.4	(1853.40)
Far	0.42	-0.08	(0.06)	12676.85	-8389.43**	(3685.69)
Relatives	0.76	-0.07**	(0.03)	18645.78	-11322.25***	(3922.77)
Friends	0.28	0.08**	(0.03)	3883.8	951.69	(905.36)
<i>In-kind transfers-in</i>						
Any partner	0.35	-0.05	(0.04)	4352.91	-2633.34***	(888.18)
Close	0.83	0.00	(0.03)	9703.52	-4670.60**	(2003.97)
Far	0.20	0.00	(0.03)	2729.56	-479.08	(717.99)
Relatives	0.55	-0.01	(0.05)	7873.07	-4291.43**	(1836.03)
Friends	0.53	0.02	(0.05)	4563.15	-1021.84	(1261.78)

Table 1.8 (cont.): Baseline Transfer Transactions by Treatment Status (2002)

	Incidence (d)			Value		
	Treatment (T)		Difference (T) - (C)	Treatment (T)		Difference (T) - (C)
	Mean (1)	Mean (2)	S.E. (3)	Mean (4)	Mean (5)	S.E. (6)
<i>Total transfers-out</i>						
Any partner	0.24	-0.01	(0.04)	2581.06	-957.31	(732.56)
Close	0.88	-0.03	(0.03)	7016.02	-4289.68***	(1497.06)
Far	0.15	0.03	(0.03)	3609.51	924.36	(1709.81)
Relatives	0.58	0.00	(0.04)	8639.29	-2985.46	(2415.63)
Friends	0.53	0.03	(0.06)	2042.28	-535.1	(542.27)
<i>Money transfers-out</i>						
Any partner	0.11	-0.03	(0.02)	1487.08	-368.83	(654.54)
Close	0.80	-0.06	(0.05)	6975.15	-2942.68	(2230.80)
Far	0.22	0.05	(0.05)	7083.66	2849.65	(3259.90)
Relatives	0.70	0.04	(0.05)	12775.28	-21.45	(4214.40)
Friends	0.33	-0.04	(0.05)	1283.54	-181.13	(567.75)
<i>In-kind transfers-out</i>						
Any partner	0.19	0.01	(0.03)	1093.98	-588.48**	(239.11)
Close	0.91	-0.04*	(0.02)	5169.97	-3706.55***	(1351.96)
Far	0.09	0.03	(0.02)	682.1	-23.13	(364.71)
Relatives	0.5	0.01	(0.05)	3976.95	-2986.65**	(1229.76)
Friends	0.56	0.02	(0.06)	1927.51	-690.65	(577.81)
Observations	2646	6529		2646	6529	

Source: FA Survey 2002. Notes: Percentage of households are adjusted by weights. Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded.

Table 1.9: Familias en Acción Estimates on Transfers-in

	Incidence (d)			Value		
	Total (1)	Money (2)	In-kind (3)	Total (4)	Money (5)	In-kind (6)
A. Aggregate transfers						
β	0.04 (0.05)	-0.00 (0.03)	0.03 (0.05)	2760.58 (2872.76)	2214.90 (1513.45)	545.67 (1900.77)
Observations	6529	6529	6529	6468	6467	6462
B. Transfers desegregated by geographic distance						
β_{close}	-0.03 (0.02)	-0.12* (0.07)	-0.01 (0.02)	473.95 (2999.22)	-7095.45* (3757.00)	6529.71 (24684.27)
β_{far}	0.00 (0.04)	0.09 (0.10)	0.00 (0.03)	-313.71 (26131.96)	-2582.25 (58170.71)	5536.76 (18012.20)
Observations	3698	1591	3223	3664	1568	3188
χ^2 -test comparing coefficients [P-value]	0.03 [0.85]	5.72 [0.02]	1.00 [0.32]	1.77 [0.18]	6.97 [0.01]	0.00 [0.95]
C. Transfers desegregated by social distance						
$\beta_{relatives}$	-0.10 (0.09)	-0.02 (0.07)	-0.06 (0.05)	-567.34 (3023.46)	4841.73 (7555.34)	844.63 (1843.46)
$\beta_{friends}$	-0.00 (0.04)	0.02 (0.07)	-0.01 (0.04)	2760.23 (1839.48)	2084.94 (10976.16)	2084.94 (10976.16)
Observations	3698	1591	3223	3664	1568	3188
χ^2 -test comparing coefficients [P-value]	0.10 [0.75]	0.54 [0.46]	0.18 [0.67]	0.97 [0.32]	7.38 [0.01]	0.46 [0.50]

Source: FA Survey 2002 - 2003. Notes: (d) stands for dummy variables. Robust standard errors in parentheses, clustered at the municipality level and coefficients adjusted by weights. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$. Independent variables include a treatment status dummy, 5 region dummies and 3 zone type dummies (urban, populated center and rural). Incidence estimations are implemented using Linear Probability Models (LPM) and Value estimations are performed using OLS. Panel A displays β coefficients when the dependent variable aggregates all transfers-in without distinguishing the geographic/social distance of the donor. Panel B presents regression coefficients when transfers-in are disaggregated by geographic distance. Remember that only households receiving transfers are included. The first row (β_{close}), displays the β coefficient when the dependent variable aggregates transfers received from a partner located in the same neighborhood, the same sidewalk and the same municipality/village. The second (β_{far}), aggregates transfers received from another village/municipality and a foreign country. The last row contains the Chi-squared and the P-value for testing whether these two coefficients are different, that is $\beta_{close} - \beta_{far} = 0$. Panel C summarizes the results when transfers-in are disaggregated by the social relationship of the household head and the donor (only households receiving transfers are included). The first row ($\beta_{relatives}$), includes transfers received from relatives; the second, ($\beta_{friends}$) aggregates those received from friends; and the last row shows the results of a Chi-squared test of difference between these two coefficients ($\beta_{relatives} - \beta_{friends} = 0$). Incidence variables are equal to 1 if the household received at least 1 COP from the type of partner concerned (close/far or relatives/friends), and 0 otherwise. All values are converted into monthly flows and 2003 COP. The exchange rate between the US Dollar and the Colombian Peso during the period of reference is about 2,500. I exclude municipalities receiving payments before 2003. 1% top outliers of the dependent variable were trimmed in the case of value estimations.

Table 1.10: Familias en Acción Estimates on Transfers-out

	Incidence (d)			Value		
	Total (1)	Money (2)	In-kind (3)	Total (4)	Money (5)	In-kind (6)
A. Aggregate transfers						
β	0.06 (0.04)	0.04 (0.03)	0.03 (0.03)	918.78 (828.90)	517.40 (606.29)	401.38 (412.39)
Observations	6529	6529	6529	6467	6465	6465
B. Transfers disaggregated by geographic distance						
β_{close}	0.03 (0.04)	0.14* (0.08)	0.04 (0.04)	3408.74 (4746.87)	8452.05** (3358.74)	6388.89 (4994.21)
β_{far}	0.03 (0.05)	0.15 (0.14)	0.03 (0.05)	2037.45 (1494.43)	1789.96 (4308.10)	-692.05 (1051.97)
Observations	1589	763	1167	1563	747	1141
χ^2 -test comparing coefficients [P-value]	0.78 [0.38]	0.32 [0.57]	0.00 [0.99]	0.24 [0.63]	0.00 [0.95]	0.18 [0.67]
C. Transfers disaggregated by social distance						
$\beta_{relatives}$	-0.06 (0.05)	0.06 (0.09)	0.03 (0.06)	4282.32 (3902.00)	8476.99 (5905.67)	4547.54 (3076.43)
$\beta_{friends}$	0.03 (0.07)	-0.01 (0.12)	-0.06 (0.07)	1120.99 (1330.31)	1765.02 (1389.72)	1148.66 (1896.60)
Observations	1589	763	1167	1589	763	1167
χ^2 -test comparing coefficients [P-value]	0.00 [0.96]	1.02 [0.31]	0.00 [0.98]	0.02 [0.88]	0.03 [0.86]	0.01 [0.94]

Source: FA Survey 2002 - 2003. Notes: (d) stands for dummy variables. Robust standard errors in parentheses, clustered at the village level and coefficients adjusted by weights. *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$. Independent variables include a treatment status dummy, 5 region dummies and 3 zone type dummies (urban, populated center and rural). Incidence estimations are implemented using Linear Probability Models (LPM) and Value estimations are performed using OLS. Panel A displays β coefficients when the dependent variable aggregates all transfers-out without distinguishing the geographic/social distance of the receiver. Panel B presents regression coefficients when transfers-out are disaggregated by the geographic distance of the receiver. Remember that only households delivering transfers are included. The first row (β_{close}), displays the β coefficient when the dependent variable aggregates transfers delivered to a partner located in the same neighborhood, the same sidewalk and the same municipality/village. The second (β_{far}), aggregates transfers delivered to another village/municipality and a foreign country. The last row, contains the Chi-squared and P-value for testing whether these two coefficients are different, that is $\beta_{close} - \beta_{far} = 0$. Panel C summarizes the results when transfers-out are disaggregated by the social relationship between the household head and the receiver (only households delivering transfers are included). The first row ($\beta_{relatives}$), includes transfers delivered to relatives; the second ($\beta_{friends}$), aggregates those delivered to friends; and the last row, shows the results of a Chi-squared test of difference between these two coefficients ($\beta_{relatives} - \beta_{friends} = 0$). Incidence variables are equal to 1 if the household delivered at least 1 COP from the type of partner concerned (close/far or relatives/friends), and 0 otherwise. All values are converted into monthly flows and 2003 COP. The exchange rate between the US Dollar and the Colombian Peso during the period of reference is about 2,500. I exclude municipalities receiving payments before 2003. 1% top outliers of the dependent variable were trimmed in the case of value estimations.

Table 1.11: Hh Characteristics by the Geographic and Social Distance of Transfer Donors

	Difference Far - Close ^a		Difference Friends - Relatives ^b	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)
Urban (d)	0.03	(0.04)	-0.03	(0.04)
Populated center (d)	0.01	(0.04)	-0.00	(0.04)
Rural (d)	-0.04*	(0.02)	0.03**	(0.01)
Total Hh members	-0.08	(0.13)	-0.25**	(0.12)
Number of adults (18-65 years old)	-0.18*	(0.10)	-0.08	(0.08)
Number of youngsters (7 - 17 years old)	0.22***	(0.06)	-0.10**	(0.04)
Number of children (< 7 years old)	-0.02	(0.09)	-0.18***	(0.07)
Hh has more than one family (d)	-0.01	(0.02)	-0.01	(0.01)
Hh has permanent migrants (d)	-0.06***	(0.02)	0.02	(0.02)
Hh is single parenting (d)	-0.03	(0.03)	0.01	(0.02)
Hh head age	-5.52***	(0.87)	2.97***	(1.02)
Hh head is literate (d)	0.03	(0.02)	-0.03	(0.03)
Hh head is unemployed (d)	0.03*	(0.01)	0.00	(0.01)
Hh head is employee (d)	0.14***	(0.03)	-0.11***	(0.03)
Hh head is self-employed (d)	-0.06***	(0.02)	0.01	(0.03)
Hh is poor(d)	0.06***	(0.02)	-0.01	(0.02)
Hh is extremely poor(d)	0.05*	(0.03)	0.01	(0.03)
Hh inadequate housing (d)	0.06*	(0.03)	-0.06*	(0.03)
Hh dwellings without basic services (d)	-0.04	(0.03)	0.00	(0.02)
Hh overcrowding (d)	0.10***	(0.03)	-0.06**	(0.02)
Hh truancy (d)	0.02*	(0.01)	(0)	(0.02)
Hh high economic dependence (d)	-0.03	(0.02)	0.02	(0.02)
Monthly per capita income	-82458.17**	(39182.91)	256.19	(32983.72)
Monthly Hh income	-12395.32**	(5624.78)	5317.42	(4719.83)
Monthly Hh consumption	-33799.65***	(11053.25)	23072.37**	(9931.90)
Monthly per capita consumption	-5073.49***	(1559.57)	5826.13***	(1873.95)
Hh monthly savings	15381.35	(9573.59)	2469.48	(13314.36)
Hh monthly loans	-150660.50	(104412.02)	92515.50	(68967.70)
Observations	2728 (Close=2040)		2683 (Relatives=1644)	

Source: FA Survey 2002. Notes: Only households receiving transfers are included. ^a 344 households (representing 11.2% of the households receiving transfers) receiving transfers simultaneously from close and far locations are excluded. ^b 389 households (representing 12.6% of the households receiving transfers) receiving transfers simultaneously from relatives and friends are excluded. (d) stands for dummy variables. Standard errors are clustered at municipality level and means are adjusted by weights. All values are converted into monthly flows and 2003 COP. The exchange rate between the US Dollar and the Colombian Peso during the period of reference is about 2,500. Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded.

Table 1.12: Hh Characteristics by Geographic and Social Distance of Transfer Receivers

	Difference Far - Close		Difference Friends - Relatives	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)
Urban (d)	-0.08*	(0.05)	0.04	(0.03)
Populated center (d)	0.09**	(0.05)	-0.05	(0.04)
Rural (d)	-0.01	(0.03)	0.01	(0.02)
Total Hh members	-0.30	(0.27)	-0.46**	(0.21)
Number of adults (18-65 years old)	-0.16	(0.15)	-0.22**	(0.10)
Number of youngsters (7 - 17 years old)	0.17	(0.11)	-0.09	(0.09)
Number of children (< 7 years old)	-0.22	(0.16)	-0.11	(0.09)
Hh has more than one family (d)	0.02	(0.02)	0.02	(0.01)
Hh has permanent migrants (d)	-0.10***	(0.04)	-0.00	(0.03)
Hh is single parenting (d)	-0.08**	(0.04)	-0.03	(0.02)
Hh head age	-2.65*	(1.47)	-2.65***	(0.92)
Hh head is literate (d)	0.09**	(0.04)	0.06	(0.04)
Hh head is unemployed (d)	0.02**	(0.01)	0.01	(0.01)
Hh head is employee (d)	-0.02	(0.07)	0.04	(0.05)
Hh head is self-employed (d)	-0.03	(0.07)	-0.02	(0.05)
Hh is poor(d)	-0.02	(0.04)	-0.02	(0.03)
Hh is extremely poor(d)	0.06	(0.04)	-0.06**	(0.03)
Hh inadequate housing (d)	-0.06	(0.08)	0.01	(0.04)
Hh dwellings without basic services (d)	0.02	(0.04)	-0.00	(0.02)
Hh overcrowding (d)	0.09**	(0.05)	0.04	(0.03)
Hh truancy (d)	0.01	(0.02)	0	(0.01)
Hh high economic dependence (d)	-0.05	(0.04)	-0.01	(0.03)
Monthly per capita income	28437.41	(37056.93)	20397.95	(45377.09)
Monthly Hh income	5603.07	(7528.98)	12995.48*	(7577.55)
Monthly Hh consumption	-7785.64	(15815.95)	29893.02***	(10604.28)
Monthly per capita consumption	-556.86	(2446.23)	8854.71***	(1920.27)
Hh monthly savings	-41404.79	(42673.94)	15698.14	(22257.63)
Hh monthly loans	45089.73	(300137.67)	21242.10	(216807.78)

Source: FA Survey 2002. Notes: Only households delivering transfers are included. ^a 61 households (representing 4.1% of the households sending transfers) receiving transfers simultaneously from close and far locations are excluded. ^b 122 households (representing 7.9% of the households sending transfers) delivering transfers simultaneously from relatives and friends are excluded. (d) stands for dummy variables. Standard errors are clustered at municipality level and means are adjusted by weights. All values are converted into monthly flows and 2005 COP. The exchange rate between the US Dollar and the Colombian Peso during the period of reference is about 2,500. Municipalities that started payments before 2003 (TCP) and their peers from the control group (CCP) are excluded.

Remittances and Labor Supply in the Hearth of Ecuadorian Migrants

Abstract

This chapter investigates the relationship between labor supply decisions and negative remittances shocks and evaluates how these responses vary across different population groups. Drawing on a previously unexplored data set from Ecuador and exploiting the global economic recession of 2008, findings confirm the negative correlation between unemployment abroad and remittances received back home, showing that this association is stronger at the top of the remittances distribution. Estimates also suggest that this remittances contraction lead to a generalized increase in the labor supply of the overall 5-years-old-and-plus population, but suggest asymmetric responses depending on their individual characteristics (age and sex). Children adjusted by increasing participation and time allocated to household work; adult men step up in both market and household participation and increase time allocated to the first; adult women do not change participation but register important gains in hours dedicated to both market and household work and, finally, adult men only augment time spent in market work activities. These results are consistent with non-unitary household models and shed new light on the distributional effects of international remittances on local labor supply.

2.1 Introduction

How do labor supply decisions respond to remittances shocks? Do these responses vary along age and sex lines? Understanding the relationship between remittances and the labor supply of receiving households is of key importance given the large and rapidly increasing size of remittance flows. Remittances remain a key source of earnings in developing countries, exceeding official development assistance and earnings from exports in many cases. Despite the growing literature investigating the relationship between remittances and labor, very little is known about the differentiated effects depending on age and sex characteristics.

In this chapter I aim to shed light on this topic by investigating how unexpected changes in international remittances affect labor supply decisions within the household in Ecuador. In particular, I analyze changes in labor participation and working hours across children, adult men, adult women and old adults, due to a cut down in remittances received from some of the countries hosting Ecuadorian migrants.

Studies successfully analyzing the relationship between remittances and labor supply are scarce due to the the lack of suitable data and the endogenous nature of remittances and labor decisions. Some examples are [Yang \(2006\)](#), [Amuedo-Dorantes and Pozo \(2006\)](#) and [Alcaraz *et al.* \(2010\)](#). Although these works substantially differ in terms of the empirical strategy, all have in common the use of individual level longitudinal data and most find a negative relationship between remittances and labor supply. For instance, [Yang \(2006\)](#) investigates the impact of the 1997 Asian crisis on the number of working hours of children aged 10 to 21 years old in the Philippines. Using an IV strategy and household fixed-effects, he finds that an increase in remittances, equivalent to 10% of initial household income, leads to a decline in mean hours worked of 2.9, for the 17-21 years old, and of 0.6, for the 10-16 years old.

[Amuedo-Dorantes and Pozo \(2006\)](#) analyze the relationship between remittances and labor outcomes across working age men and women in rural and urban Mexican areas. According to their IV - Tobit results, a 100 peso increase in remittances is associated with a 32 hours/month (15%) reduction in the formal sector, a 11 hours/month (5%) decrease in self-employment, a 30 hours/month (14%) raise in urban informal work and a 28 hours/month (13%) increase in rural informal sector across men. On the contrary, among women, the same increase in remittances is associated with a 6 hours/month (4%) reduction in non-paid employment and with a fall of 12 hours/month (7%) in formal work. Finally, [Alcaraz *et al.* \(2010\)](#) study the effect of the 2008 recession in the United States, on Mexican children aged 12 to 16 years old. Their main finding

is an increase of 12.3 percentage points in the probability of work of children living in rural areas.

This chapter contributes to expand this literature by exploiting a plausible exogenous and heterogeneous variation in remittances observed after the 2008 recession that hit some of the countries hosting Ecuadorian migrants. Between the last quarter of 2007 and the last quarter of 2008, global unemployment rates boost by 5 and 2 percentage points in the two main destinations of Ecuadorian migrants, i.e. Spain and the United States. Over the same time period, by contrast, in other important destinations like the UK, Colombia, Italy, Canada and Chile, unemployment rates increased much less (between 1 and 0.3 percentage points), while in other hosting countries like Germany, Brazil, Venezuela and Argentina they actually fell (by 1, 0.8, 0.7 and 0.3 percentage points respectively). The data suggests that households with former members living in countries that saw more intense unemployment rate shocks, experienced greater decreases in remittances received.

Due to strong data limitations, studies assessing the impact of the 2008 recession on remittances receiving households in Ecuador are, to my knowledge, nonexistent, and very few investigate these events on other Latin-American countries. Some examples are the study of *Alcaraz et al. (2010)* for Mexico and the one by *Arango Thomas et al. (2015)* for Colombia.¹ In this chapter I fill this gap by using data from an unexplored source, a sample of the 2007 and the 2008 December rounds of the Ecuadorian Labor Force Survey (ENEMDU) that tracks households and individuals just before and after the onset of the global recession. These data are also unique as they provide information on time allocated to market and household work² for all household members, including children over 5 years old, which allows me to have a more comprehensive view of labor dynamics in a country in which the work of children is a major policy concern.³

Drawing on the longitudinal nature of the data I build an identification strategy based on comparing the change in household remittances, generated by unemployment rate shocks in some of the countries hosting Ecuadorian migrants, with two types of outcomes: labor participation and time allocated (hours/week). To account for the potential endogeneity of remittances

¹*Arango Thomas et al. (2015)* exploit the heterogeneity of emigration rates across Colombian regions to evaluate the effect of unemployment in Spain and the United States, during the 2008 crisis, on remittances and labor force participation. They find that an increase in unemployment in these two countries reduces the probability and the amount of remittances received by a household in a municipality with high emigration rates, increasing also the probability of labor force participation. On the contrary, no effect is found in municipalities with smaller emigration rates.

²The inclusion of household work is key to shed light on age and sex differences, as children, adult women and old adults might be disproportionately assigned to these tasks (*Edmonds, 2006; Soares et al., 2012*).

³According to the National Institute of Statistics of Ecuador, in 2006, 17% of the children aged 5 to 17 years old were involved in labor activities (*INEC, 2009*).

with respect to these labor supply indicators I instrument the change in household remittances with the unemployment growth rate in the countries hosting Ecuadorian migrants, observed between the last quarter of 2007 and the last quarter of 2008.⁴ I also include individual fixed-effects and control for a set of individual and household time varying characteristics, potentially correlated with the outcomes.

These regressions are estimated using Quantile Regression models, although OLS results are always presented for comparison purposes. The intuition behind is the following. The distribution of household remittances and time allocated to labor are both skewed right and have (at least) one mass point at zero. For a long time, this type of variables, often called Limited Dependent Variables - LDVs, have disturbed econometricians, generating great debates about the best way to model their interactions. Many textbooks argue that OLS regressions are inappropriate and nonlinear models such Tobit must be preferred. However, the most recent literature claims that these Tobit-type models may not be worth the trouble at least when it comes to deal with LDVs (Angrist and Pischke, 2009).

Beyond this debate, the truth is that OLS regressions limit the analysis to average effects, which in the case of skewed distributions can lead to miss very interesting results. Quantile Regression models are an alternative way to modeling the effects of any given variable at the different moments of the distribution of outcomes. I take advantage of this type of models to estimate, for instance, how unemployment abroad, due to the global crisis, shaped households in a distinctive manner, depending on the level of remittances received, or how such remittances shocks had differentiated effects throughout the whole working time distributions.

First stage results show a negative correlation between unemployment in the countries hosting Ecuadorian migrants and remittances received back home, that strengthens at the top of the distribution, that is, among households receiving more transfers. As for second stage results, full sample estimates confirm that individuals effectively increase labor supply to face remittances contractions, when unemployment boosts in the countries hosting their relatives. Adjustments include both market and household work and combine bringing new participants to these activities and increasing dedication.

Estimates also suggest that the 2008 recession lead to a generalized increase of labor supply among the four groups under analysis: children, adult men, adult women and old adults. Nevertheless, results suggest striking qualitative differences. Adult men are the only ones

⁴This empirical strategy is in the spirit very close to the one used by Yang (2006) to analyze the effect of the Asian crisis on child labor outcomes in the Philippines.

increasing participation in market work (by 4 percentage points after a remittances contraction of 100 US Dollars) and children is the only group recording new entries into household work (almost 2 percentage points).

Besides labor participation, several groups show a generalized tendency to augment the time allocated to these activities. In the case of market work, adult men register an increase of 6.5 hours/week, concentrated at the very bottom of the working time distribution (percentile 0.10); adult women record gains of 3.2 and 6.6 hours/week, settled at the top (percentiles 0.80 and 0.90); and old adults exhibit a 5.3 boost also at the top (percentile 0.80). Similarly, three groups enhance time spent in household work. Children and women show positive effects at the bottom half of the distribution, between percentiles 0.30 to 0.50, (the first register gains from 0.3 to 0.6 hours/week and the second from 2.4 to 2.6). On the contrary, adult men exhibit an increase of 1.7 at the median and an increase of 2.2 at percentile 0.70.

The contributions of this analysis to the literature are threefold. First, it presents new insights to feed the debate on the economic consequences of migration and remittances across different types of individuals (distinct across age and sex lines). Second, it contributes to the understanding of the consequences of one of the major macroeconomics events of the last years in the developed world, the 2008 global recession, by exploring how it also spread to developing countries. Third, it adds to the empirical discussion around the more accurate way to estimate models involving Limited Dependent Variables, like remittances and time allocation to labor, by confirming the added value of Quantile Regression analysis.

The structure of the chapter is as follows. Section 2.2 features the data and displays some descriptive statistics. Section 2.3 presents the main characteristics of the 2008 global economic recession. Section 2.4 explains the empirical strategy. Section 2.5 summarizes the results. Section 2.6 addresses some potential threats to the exclusion restriction. Section 2.7 concludes.

2.2 Data and Descriptive Statistics

2.2.1 Data

Data on Ecuadorian migrants are very scarce. This chapter uses a unique dataset built up from the 2007 and 2008 December rounds of the *Encuesta Nacional de Empleo, Desempleo y Subempleo* (ENEMDU). The ENEMDU is a nationally representative survey, conducted quarterly by the National Statistics Institute of Ecuador (INEC). It includes information on several household characteristics (including international migrants and remittances), labor supply and many

other variables related to household members aged 5 and over. The ENEMDU is administered quarterly and uses a 2-2-2 rotating panel sample design composed by 4 equally sized groups of dwellings that is completely refreshed every two years (Figure 2.1). This particular design implies that each rotating group remains in the sample for two consecutive rounds, then takes a break of two rounds and finally re-enters the sample for the last two rounds.

This scheme ensures that one half of the dwellings remain in the sample between two consecutive rounds and that the whole sample of a given round (e.g. December of 2007) completely overlaps with the sample of dwellings surveyed in the same round of the following year (e.g. December of 2008). For a sample of dwellings, those located in the major urban domains⁵, the National Statistics Institute of Ecuador identifies whether a given household was interviewed in several rounds, based on different characteristics of the dwelling and the household (including the name of the household head). Then, they match individuals (within households) on the basis of age, sex and the relationship with the household head. The result is an individual level database that records Ecuadorian households and its members in different points in time. I take advantage of this particular design to analyze the evolution of households and individuals living in Ecuador, over a 12-months period, from December of 2007 to December of 2008.

The ENEMDU database contains information on many variables. Of particular interest for this chapter are: the country of residence of international migrants, only available for households reporting at least one member living abroad in December of; the amount of remittances received by each household during the last 30 days preceding the survey (and corresponding in this case to the month of November) and individual labor outcomes (for all the individuals aged 5 years old and over), like hours/week in market and household work, both referring to “last week”.

Table 2.1 describes the sample structure. Since this chapter seeks to analyze the labor supply effects of remittances shocks, generated by the escalation of unemployment in some of the countries hosting Ecuadorian migrants, the sample is restricted to the households reporting at least one member living abroad in December of. In total, 652 households and 2,421 individuals fulfill this condition, representing 8.1 and 6.3% of the population of reference.^{6,7}

Given the matching nature of the data, in particular the fact that tracking relies on household

⁵127 out of the 187 urban villages surveyed are represented in this sample.

⁶The population of reference corresponds to 9,747 households and 38,049 individuals living in one of the 127 urban villages selected by the INEC to build the ENEMDU matching sample.

⁷The percentage of households with members abroad in the whole urban ENEMDU sample is equal to 7.8%. The corresponding figure for rural households is 5.5%.

and individual characteristics, rather than on identification codes, and that no effort is put on re-contacting them, attrition between surveys is not negligible. 547 households (84%) and 1,758 individuals (73%) were re-interviewed in December of 2008. Despite attrition being quite comparable with studies using similar data (e.g. Yang, 2006), it might induce some selection bias in the results. The main source of bias is the possibility of nonrandom migration, as it might be correlated with changes in remittances and labor outcomes. Subsection 2.6.4 analyzes in detail this issue.

2.2.2 Descriptive Statistics

Ecuador is a middle-income country located in northwestern South America and bordered by the Pacific Ocean to the west. It has a population of 14 million, of which 7% are indigenous and 60% live in urban areas. This chapter focuses on Ecuadorian children, adult men, adult women and old adults, living in households where at least one member resides abroad, living in one of the three major urban domains of the country.⁸ As Table 2.1 shows, 60% of the households are located in the Sierra, 35% in the Coast and 6% in the Amazon. Although these households are well distributed throughout all the provinces of the country, three stand out for being also those historically recording the greatest migration rates of the country: Azuay (18% of the households), Guayas (12%) and Cañar (12%).

Table 2.2 provides some descriptive statistics regarding of the sample. Households are composed, on average, by 3.7 members and report having 1.5 members living abroad. Almost half are single parenting and 37% are headed by a woman. Household heads are on average 54.6 years old and have 9.4 years of education. The average monthly income per capita is 599 US Dollars (measured in November of 2007)⁹ and comes mostly from labor. According to national standards, 5% of the households are classified as poor.¹⁰

Remittances prove to be, not only a major, but also a regular income source. 38% of the households report having received international remittances in the month of November, with an average amount of 263 US Dollars (11% of total household income).¹¹ 83% of the receiving households state have been getting remittances for at least one year and most report using these transfers to cover for rent, food, clothing and transportation expenses (83%) or to use them to pay for health care services (46%) and education (29%).

Table 2.3 presents some baseline characteristic at the individual level, including the full sample

⁸Remember that the matching procedure used to build this dataset was implemented only in 127 urban villages

⁹Income adds labor, rental, retirement and remittances.

¹⁰The monthly per capita poverty line value for this year was fixed at 56.6 US Dollars.

¹¹686 US Dollars if only receivers are considered

(individuals over 5 years old) and four different groups: children (aged 5 - 19 years old), adult men (aged 20 - 60 years old), adult women (20 - 60 years old) and old adults (over 60 years old). The largest group is children (33% of the sample), followed by men and women (22% each) and old adults (17%). The average age in the full sample is 36.2 years old: children are on average 12, men, 38; women, 41, and old adults, almost 70. 54% of the sample is composed by females, who represent 50% of children and old adults. Average education is 9.3 years and, as expected, men are the more educated, with 12 years; followed by women, 11.4; children, 6.8, and old adults 6.4.

Half of the sample participates in market work with an average of 20 hours/week. Unsurprisingly, the largest participation and time allocation to these activities is observed among adult men: 85% and 38 hours/week. They are followed by women, 60% and 23 hours/week; old adults, 52% and 20 and, at last, children, with only 17% of participation and 4.5 hours/week. On the contrary, 78% of the sample participates in household work with an average of 15 hours/week. The participation of women is almost 100%, 98%, with an average of nearly 30 hours/week spent in these activities. The second place is for old adults (80% of participation and 15 hours/week), followed by men (68% and 6.5 hours/week). Finally, very close to men, 63% of the children participate in these tasks, dedicating them, on average, 7 hours/week.

Finally, Tables 2.4 and 2.5 characterize household members living overseas in 2007, i.e. international migrants. Ecuador is a major emigration country, with approximately one million nationals living in OECD countries (mainly Spain, the United States, Italy, Canada and Chile) and an emigration rate of 10%.¹² Households report in total 817 international migrants.¹³ They are, on average, 34 years old, 53% are females and they have 12 years of education (almost 3 more than household heads). In terms of affiliation, most migrants are the son/daughter of the household head (61%) or their spouse (12%). At the moment of the survey, 84% were working and 34% sent remittances last November. Regarding emigration, figures show that two thirds of them left Ecuador between 2000 and 2007, 32% left their children at home and mostly moved due to labor motivations (80%). In line with OECD figures, most of these migrants were living in Spain (44%), the United States (36%) and Italy (11%).

2.3 The 2008 Global Economic Crisis

The dispersed location of migrants, observed in the Ecuadorian case, may be very convenient in order to explore whether or not the 2008 global economic crisis, observed in some of these

¹²These figures correspond to 2005/2006 statistics accessed on February 10 2015 from the following link: www.oecd.org/els/mig.

¹³Remember that a household has on average 1.5 migrants living abroad.

host countries, hit all origin households evenly.

Between 2008 and 2009 a global recession struck nearly all advanced economies¹⁴, with 29 out of the 34 OECD countries being in recession by the last quarter of 2008.¹⁵ Finland, Ireland, New Zealand, Portugal and Sweden experienced the first slowdown during the first quarter of 2008; Austria, Chile, France, Germany, Hungary, Italy, Japan, Luxembourg, the Netherlands, Spain, Turkey and the United Kingdom during the second; Belgium, Denmark, Estonia, Greece, Mexico, Slovenia and the United States during the the third quarter and Canada, the Czech Republic, Iceland, Israel and Switzerland during the last quarter of this year.¹⁶

The 2008 global recession had profound impacts on employment.¹⁷ However, labor markets adjusted in very different ways across countries. Although most economies saw a relatively small decline in labor input (total hours worked), in the United States and Spain, for instance, it fell sharply and even faster than output. These two countries also suffered major labor force participation and employment declines, in contrast with Germany, Japan and other European countries which opted for cuts in working hours. The different adjustment patterns in terms of labor input, working hours and participation, damped (or amplified) the unemployment effects of the recession. While many European countries did not experience any unemployment effect, in Spain and the United States, where the decline in output was below-average, the rise in unemployment was much higher than average. On the contrary, in Germany, output declined much more and the unemployment rate actually fell.

Unemployment took effect earlier in countries like Spain, where the unemployment rate rose by 5 percentage points between the last quarter of 2007 and the last quarter of 2008, the United States with a growth of 2 percentage points and Ireland, who experienced an increase of 3 percentage points, among others.¹⁸ OECD studies¹⁹ suggest the most affected by the crisis were the youth²⁰, the low-skilled²¹, workers holding temporary contracts²² and workers of certain industries, like construction (specially in Ireland and Spain) and automobiles (mainly

¹⁴The technical indicator of a recession used in this chapter is two consecutive quarters of negative economic growth as measured by a country's quarter-on-quarter change of seasonally adjusted real GDP.

¹⁵The exceptions are Australia, Korea, Norway (who entered the recession in the first quarter of 2009), Poland and the Slovak Republic.

¹⁶Data comes from *OECD.Stat*, accessed on February 11 of 2015.

¹⁷Between the last quarter of 2007 and the last quarter of 2008, the average OECD unemployment rate increased from 5.5 to 6.3%.

¹⁸Data comes from *OECD.Stat*, accessed on February 11 of 2015.

¹⁹See for example *OECD (2010)*.

²⁰On average, employment for youth fell by around 7%, nearly four times the declines in overall employment in the whole OECD area.

²¹For example, in Spain employment of workers with up to lower-secondary education fell by 10% in 2009, compared to a fall of around 1% among tertiary qualified workers

²²Temporary employment fell by more than 8% in the year up to the 3rd quarter of 2008 in Spain, and employment in temporary work agencies fell by 10% over the same period in France.

in the United States).²³ Similarly, the slowdown disproportionately affected immigrants who became more likely to bear the brunt of rising unemployment. Over this period (from 2008 to 2012), the unemployment rate of the foreign-born rose by 5 percentage points, while among the native-born the increase was more modest (3 percentage points).²⁴

Figure 2.2 displays quarterly unemployment rates for selected major locations of Ecuadorian immigrants (normalized to 1 in 2007q4). Two striking features come out from this graph. The first is the trend shift observed from the first quarter of 2008 in several countries. The second is the heterogeneity in the intensity of the responses, which suggest that the crisis did not hit all labor markets evenly. Most salient unemployment jumps were observed in Spain and in the United States, the two countries with the largest inflows of Ecuadorian migrants prior to the crisis.

In the same line, Figures 2.3 and 2.4 break the unemployment rate in Spain and in the United States into 3 groups: native-born, foreign-born and Ecuadorian/Latino immigrants. The most remarkable feature is the spread of the gap between Ecuadorian/Latino immigrants and the native-born from the very first moments of the economic downturn. In Spain, the unemployment rate of Ecuadorian immigrants increased by 10.6 percentage points between the last quarter of 2007 and the first quarter of 2008, whereas in the case of natives, the jump was only 4.5 percentage points.²⁵ Similarly, in the United States, the unemployment rate variation among Latino immigrants was two times the upsurge among the native-born.²⁶

Rising foreign-born unemployment in OECD economies might translate in a decline in employment opportunities and earnings, affecting remittances received back home.²⁷ Although the impact of unemployment on remittances is indeed complex to estimate, global figures suggests that remittances flows to developing countries began to slow down from the second half of 2008 (Sirkeci *et al.*, 2012) onwards. In the case of Ecuador, total remittances started to decrease

²³Post from the International Migration Division of the OECD. Extracted from: <http://www.oecd.org/migration/migrationpickingupbutrisingunemploymenthurtingimmigrants.htm> (accessed on February 12 of 2015).

²⁴Talk by Stefano Scarpetta, head of the OECD's Employment Division, about the effects of the crisis on jobs. Extracted from: <http://www.oecd.org/els/emp/impactoftheeconomiccrisisonemploymentandunemploymentintheocdcountries.htm> (accessed on February 12 of 2015).

²⁵In order to determinate the statistical significance of the difference in the evolution of the unemployment rates of these two groups, the following regression was implemented: $UR_{it} = \varphi_0 + \varphi_1 P_{ct} + \varphi_2 G_{it} + \varphi_3 P_{it} G_{it} + \xi_{it}$ is the unemployment rate of group i in period t , P_{ct} is a dummy variable equal to 0 for the last quarter of 2007 and equal to 1 for the last quarter of 2008 and G_{it} is a dummy variable equal to 0 for native born and 1 for Ecuadorian immigrants. The parameter of interest φ_3 accounts for the difference in the evolution of the unemployment rates of these two groups. The coefficient is equal to 6.79 and has a standard error of 0.68, meaning it is significantly different from zero at a significance level of 0.10.

²⁶However, in this case, the difference is not statistically different.

²⁷Standard models of private transfers state that remittances decrease with real resources of senders like Cox and Fafchamps (2008) and Wolff (2006).

from the first quarter of 2008, reaching a contraction of 20% (200,000 US Dollars) between the last quarter of 2007 and the last quarter of 2008. Even so, disaggregate figures point to significant differences across remitting countries. Remittances received from the United States and Spain decrease sharply, while those from Italy, Mexico and Germany, actually increased (Figure 2.5).

In line with these aggregate strides, Table 2.6 suggests that households from the sample suffered a major remittance contraction between 2007 and 2008. The percentage of those receiving remittances dropped by 13 percentage points and the average amount cut down by 123 US Dollars (or 125 if only receivers are taken into account). In addition, as Figure 2.6 (Graph A) shows, remittances fell at almost all the percentiles of the distribution, from the 62th percentile. For instance, while in 2007, 75% of the households received less than 437 US Dollars, in 2008, the same fraction of the population received less than 40, so 10 times less.

As with any other negative income shock, a remittances curtail may force households to adapt by changing consumption patterns, increasing borrowing or rising labor supply, among others. Concerning the last mechanism, standard labor supply models suggest that, all else equal, a negative non-labor income contraction of this kind may lessen financial constraints, lowering the reservation wage and rising both the employment likelihood and the amount of hours dedicated to work (Killingsworth, 1983).

Table 2.6 presents the evolution of average participation and time allocated to market and household work, for the full sample of individuals and the four groups of interest. Although market labor supply is, in all cases, higher in 2008 than in 2007, t-test results show that most of the variations were not statistically significant. For its part, household work statistics suggest only two differences, in terms of hours/week of children and participation of old adults.

Beyond these mean differences, quantile plots, presented in Figure 2.7 (Graph A) and Figure 2.8 (Graph A), offer the possibility to compare, for the whole sample of individuals over 5 y/o, the evolution of labor supply at different percentiles of the distribution. The number of hours spent in these activities increases from percentile 0.50 to percentile 0.70, in the case of market work, and between percentiles 0.50 and 0.90, in the case of household chores.

The empirical assessment that follows aims at analyzing the relationship between these two phenomena. More precisely, it seeks to evaluate the association between a household remittances contraction, associated to unemployment shocks in the countries hosting international migrants during the 2008 global financial crisis, on individual labor supply.

2.4 Empirical Strategy

2.4.1 Identification Strategy

To analyze how variations in household remittances imply adjustments in the labor supply of its members, one might estimate the following fixed-effects regression across the whole sample of individuals and each of the groups of analysis: children, adult men, adult women and old adults:

$$Y_{it} = \alpha_i + \lambda_t + \beta_{ht}Rem + \delta_{ht}S + \rho_{it}X + \varepsilon_{it} \quad (2.1)$$

where Y_{iht} represents the outcome of interest for individual i in household h at period t . That is, participation and hours/week spent in market and household work. α_i is the individual fixed-effect. λ_t accounts for the year effect. Rem_{ht} measures the amount of remittances received, at the household level.²⁸ S_{ht} denotes a set of time varying household characteristics including composition (number of children under 5 years old, number of children between 5 and 19 years old, number of men between 20 and 60 y/o., number of women between 20 and 60 y/o and number of adults over 60) and household head characteristics (age, age squared, years of education and a dummy equal to 1 if the household head is female). X_{it} is the set of individual characteristics (age, age squared and years of education). Finally, ε_{it} represents the error term.

The main identification assumption for an unbiased estimate of β_{ht} the amount of remittances, received in the month preceding the survey, is exogenous to the change in last week labor supply. However, this might be too strong as assumption, taking into account the potential time varying unobserved components of labor supply decisions, potentially correlated with changes in remittances, and the reverse effect of these labor supply adjustments on remittances. Concerning the first problem, omitted variable bias, one might think on the variation in any household unobserved characteristic (e.g. money consciousness, risk taking nature or simple differences in household resources, tastes and labor market opportunities, among others) that enables members to work more regardless of any trend in remittances received.

Regarding the second potential source of endogeneity, reverse causality, the problem arises because while remittances may impact the labor supply decisions of receiving household members, it is also true that labor supply decisions of individuals in the receiving household may drive migrants' remitting patterns. As such, the causality might run in both directions. A standard solution to these problems is the use of instrumental variables, that is, those observ-

²⁸I favor the use of the value of remittances, rather than the incidence, given that the first shows greater variability in the data. In the results section (2.5.1), I analyze the relationship between unemployment and the probability of receiving remittances (i.e. extensive margin) anyway.

able covariates that may affect household remittances but have no direct effect on labor supply outcomes.

The existing literature on the determinants of private transfers highlights the role of donor's income and wealth.²⁹ Taking into account that donor's income partially depends on its success in the labor market, migrant's employment status might be a good measure of the effect of income on remittance habits. However, as the ENEMDU survey only measures migrant's employment status in the 2007 wave, I use the unemployment rate variation between the last quarter of 2007 and the last quarter of 2008 in the countries hosting household's migrant in 2007 as a proxy.

The equations using unemployment rate variation as an instrument for remittances shocks, takes the following form:

$$Y_{it} = \alpha_i + \lambda_t + \beta_{ht}\hat{Rem} + \delta_{ht}S + \rho_{it}X + \varepsilon_{it} \quad (2.2)$$

where \hat{Rem}_{ht} is the predicted change in remittances received and other variables are defined as above. The first stage regression is defined as follows:

$$Rem_{ht} = \eta_h + \phi_t + \gamma_{ct}Une + \nu_{ht}S + \mu_{ht} \quad (2.3)$$

η_h is the household fixed-effect, ϕ_t accounts for the year effect, Une measures the unemployment rate in the countries hosting household migrants and μ_{ht} is the error terms. Note that in order to ease the interpretation, in second stage regressions, first stage predicted remittances \hat{Rem}_{ht} are multiplied by minus one so they can be read as negative shocks.

Before going ahead, it is important to make some precisions about the variable unemployment rate. The first is that it refers to total unemployment and not to foreign born unemployment, which is, unfortunately, only available for some OECD countries. The second is that data on migrants and the data on remittances are not directly linked in the survey, as they correspond to two different sections of the questionnaire. Finally, as there are some households that report migrants in more than one location, in these cases I took the average unemployment rate.

Unemployment abroad might be a good instrument for remittances received assuming that it reflects the income generating opportunities of migrants, and hence is likely to be associated with their likelihood to remit. It also has to be uncorrelated with the labor supply decisions of household members back in Ecuador (exclusion restriction). Section 2.6 discusses in detail this

²⁹See Cox and Fafchamps (2008) for a comprehensive summary.

assumption and some potential cases of violation.

As in any instrumental variable framework, it should be taken into account that results from these two-stages specifications are only informative about the relationship of remittances and labor supply outcomes on the subpopulation of compliers (Imbens and Angrist, 1994). That is, those individuals who adjust labor supply because they experienced a negative remittances shock due to the increase of unemployment in the countries hosting their migrants.

Although in this case it is not simple to define the characteristics of this group, the following analyzes lead to think that they should belong to households receiving remittances in 2007 (see Subsection 2.6.3 and Table 2.13), with migrants living, mainly, in Spain, the United States, Italy and the United Kingdom (Table 2.5).

2.4.2 Quantile Regression

Equations (2.2) and (2.3) have in common that remittances (Rem_{ht}) and two of the variables that characterize labor supply income (Y_{it}), i.e. time allocation to market work and time allocation to household work, are nonnegative and have at least one mass point at zero (See in Figure 2.6 - Graph B the distribution plot of remittances, in Figure 2.7 - Graph B the histogram of time allocation to market work and in Figure 2.8 - Graph B the histogram of time allocation to household work).³⁰ The econometric analysis of these variables (LDVs) presents special challenges for the usual Ordinary Least Square models. In particular, while OLS are good to estimate average effects, they will not capture the effect of the regressor of interest at other values of the distribution situated away from the mean.

Angrist and Pischke (2009) suggest as an alternative the use of a Quantile Regression model. Quantile Regression is a powerful tool, widely used in applied econometrics for modeling the effects of any given variable along the entire distribution of outcomes. In the particular case studied in this chapter, Quantile Regression can be used to analyze how unemployment abroad, due to the global crisis, shaped households in a distinctive manner, depending on the level of remittances received. Similarly, this method can give some interesting insights about the way such remittances shocks may had differentiated effects throughout the whole market and household working time distributions.

Equations (2.2') and (2.3') present the Quantile Regression transformations of Equation (2.2),

³⁰In the case of market work, this variable also exhibits a mass point at 40 hours/week, the maximum weekly working time allowed by the legislation without extra-hours payments.

for time-allocation outcomes, and Equation (2.3):

$$Y_{itp} = \alpha_i + \lambda_{tp} + \beta_{htp} \hat{R}em + \delta_{htp} S + \rho_{itp} X + \varepsilon_{itp} \quad (2.2')$$

$$Rem_{htp} = \eta_{hp} + \phi_{tp} + \gamma_{ctp} Une + \nu_{htp} S + \mu_{htp} \quad (2.3')$$

where superscript p refers to a percentile of the distribution of the dependent variable, so $p = 0.10$ describes the lower decile of Y_{it} given $\hat{R}em$ (or Rem given Une), while $p = 0.50$ is the conditional median and $p = 0.90$ represents the conditional value of Y_{it} (or Rem) below which 90% of the observations are found.³¹ The Estimations were implemented following [Parente and Santos Silva \(2016\)](#) and using the STATA routine `qreg2` written by [Machado et al. \(2017\)](#).³²

2.5 Results

2.5.1 Remittances and Unemployment Abroad

This section presents the results associated to the estimation of Equation (2.3') for the 547 households that compose the sample of analysis. In addition to serve as a basis for the second stage estimation of labor supply, these results give some insights about the relationship between the unemployment rate variation in the countries hosting Ecuadorian migrants and remittances reported by their families back in Ecuador.

Figure 2.9 plots the unemployment rate coefficients derived from Quantile Regressions at the 65th to the 95th percentiles and OLS modeling, when the dependent variable is the value of remittances received.³³ Coefficients are significantly negative at almost all the percentiles of the remittances distribution and slightly higher at the top. This finding means that households receiving more remittances are the most concerned with rising unemployment in the countries

³¹Some examples of studies implementing similar two-stage Quantile Regression analysis are: [Abadie et al. \(2002\)](#) about the impact of job training on earnings; [Chernozhukov and Hansen \(2008\)](#), that estimates the demand elasticities for fish in New York; [Girma and Kedir \(2005\)](#), on the impact of schooling on the distribution of wages in Ethiopia; [Ma and Koener \(2006\)](#), on the effect of class size on the performance of Dutch primary school students; [Schmillen and Umkehrer \(2013\)](#), about the effect of early-career unemployment on its persistent over the professional career; [Chernozhukov et al. \(2015\)](#), that estimates household expenditure on alcohol; [Kowalski \(2016\)](#), on the price elasticity of expenditure on medical care; [Mendolia et al. \(2016\)](#), about the effect of average peer ability on individual educational outcomes at the end of high school; and [Balestra and Backes-Gellner \(2017\)](#), that estimates returns to education in Switzerland.

³²[Parente and Santos Silva \(2016\)](#) extend the traditional Quantile Regression estimator of [Ma and Koener \(2006\)](#) allowing for heteroskedasticity and intra-cluster correlation. Fixed-effects are approximated using the the Mundlak-Chamberlain device, as in [Mundlak \(1978\)](#), [Chamberlain \(1982\)](#) and [Wooldridge \(2010\)](#). Finally, given that second stage models, Equation (2.3) and (2.3'), include a variable constructed from a parameter estimated in the first stage, Equation (2.2'), $\hat{R}em$, the variance-covariance matrices of the resulting estimates were obtained using the correction procedure proposed by [Karaca-Mandic and Train \(2003\)](#) to deal specifically with data at different levels of aggregation in two-stage settings.

³³Complete estimations, including the whole set of household time varying covariates, are presented in Table A-2.1 of the Appendix.

hosting their migrants. A 1% increase in the unemployment rate abroad, is associated with remittances cutbacks of 16 US Dollars, at the percentile 65_{th}; 55, at the percentile 75_{th}; and 62, at the percentile 85_{th}.³⁴ In contrast, OLS estimations drive a unique negative average decrease of 28 US Dollars.

With regard to the participation of households in remittances transactions (i.e. extensive margin), Table A-2.1 shows that the probability of receiving remittances is also negatively correlated with unemployment abroad. A 1% increase in the unemployment rate is associated with a 3 pp decrease in the likelihood of receiving remittances.

2.5.2 Individual Labor Supply

Equation (2.2') evaluates the effects of remittance contractions, associated to exogenous unemployment shocks, on market and household work (participation and time allocation). Participation³⁵ is estimated using Linear Probability Models - LPM, and time allocation is estimated using both OLS and Quantile Regression.

Firstly, I report and comment results for the full sample of individuals (5 years old and over) and then I focus on analyzing how they vary across the four groups of interest: adult men (between 20 - 60 years old), adult women (20 - 60 y/o), children (5 - 19 y/o) and old adults (over 60 y/o).

Full Sample

Figures 2.10 - 2.12 and Table A-2.2 of the Appendix present estimation results for the whole sample of individuals aged 5 years old and over. The variable of interest, remittances received, is predicted from Equation (2.3') using OLS and Quantile Regression techniques, at three different percentiles of the remittances distribution: 0.65, 0.75 and 0.85. In this way, labor supply effects can be evaluated according to the level of remittances received by the household.

In the case of market work, estimates suggest that remittances shocks are positively correlated with both participation and time allocation. Results on participation are reported in Figure 2.10-Graph A. When confronted to a remittances contraction of 100 US Dollars, individuals from households at the percentile 65_{th} of the remittances distribution increase participation by 6.5 percentage points. The effect declines at the top of the remittances distribution, to 1.8 (percentile 0.75) and 1.6 (percentile 0.85) percentage points. At the average, by contrast, the effect is of 3.7 pp.

³⁴Although the coefficient declines to -23 at the percentile 95_{th}, this result is not statistically significant.

³⁵Dummy variable equal to 1 if the individual spend at least one hour in these activities and 0 otherwise.

Time allocation effects are summarized in Figure 2.11. Graph A provides regression results for remittances predicted using OLS, whereas Graphs B - D present results for remittances predicted from a Quantile Regression model at three different percentiles: 65%, 75% and 85%. Two constants arise. First, coefficients are consistently larger at percentile 0.65. Second, at a given remittances prediction percentile, the largest effects are observed at the top of the working time distribution. For simplicity, take as an example Figure 2.11 - Graph C (remittances predicted at percentile 0.75). The effect of a remittances variation of -100 US Dollars on time allocated to market work ranges from 1.15 hours/week, at percentile 0.40; to 1.34, at the median; 1.5, at percentile 0.60; and 2.45, at top 0.90.

Participation in household work shows a very similar pattern increasing by 7.4 percentage points for individuals at the bottom of the remittances distribution (percentile 0.65), 2.1, for those at percentile 0.75, and 1.9, for those at 0.85 (Figure 2.10 - Graph B). On the other hand, the average (OLS) effect is 4.1 pp. For its part, time allocation coefficients follow an increasing pattern reaching its maximum at percentiles 0.60 and 0.70. Taking the case of remittances predicted at percentile 0.75, a -100 US Dollars contraction has an effect of 0.74 hours/week, at percentile 40%; then it increases to 0.98, at the median; to stacked in 1.46, at percentiles 0.60 and 0.70; to finally decrease to 1.46, at percentile 0.80 (Figure 2.12 - Graph C).

To summarize, results confirm that individuals effectively increase labor supply to face remittances contractions, when unemployment boosts in the countries hosting their relatives. Adjustments include both market and household work and combine bringing new participants to these activities and increasing dedication.

The novelty is that, beyond classic OLS modeling, the Quantile Regression framework proposed here, allows to decompose the effects throughout the entire remittances and time allocation distributions. This analysis provides evidence that individuals from households receiving less remittances, are more exposed to labor supply adjustments, and also that the magnitude of the impact varies at the different points of the time allocation distribution. In the case of market work, larger time allocation effects are reserved for individuals at the top of the distribution; whereas time spent in household work increases more above the median (percentiles 0.60, 0.70 and 0.80).

The rest of the section explores how these results compare across four different groups of individuals: children (between 5 and 19 y/o), adult men (from 20 to 60 years old), adult women and old adults (over 60). For the sake of simplicity, this part of the analysis is limited to remittances predicted by OLS and Quantile Regression Models at the 75th percentile of the distribution.

Children (5 - 19 y/o)

Figure 2.13 provides estimation results for the sample of children between 5 and 19 years old.³⁶ The adjustment in terms of labor supply for this group is given exclusively via their involvement in household work with the main effect observed in terms of participation: A remittances cutback of -100 US is associated to + 3.4 percentage points in their probability to participate in these tasks. In addition, some small, but non negligible gains, from 0.35 to 0.65 hours/week, are observed at percentiles 0.30 to 0.50 of the time allocation distribution.

Adult Men (20 - 60 y/o)

As seen in Figure 2.14 men between 20 and 60 years old register important labor supply adjustments.³⁷ In terms of market work, they experience a gain of 4.3 percentage points in participation, resulting from the same 100 US Dollars decline in remittances received. Furthermore, at the lowest part of the distribution, they also increase time dedicated to these activities by 6.54 hours/week. With respect to household work, although adult men do not change participation, they spend more hours in these tasks at two points of the distribution: at the median, where they experience a gain of 1.69 hours/week, and at percentile 0.70, where the gain is slightly higher, 2.21 hours/week.

Adult Women (20 - 60 y/o)

Adult women results are presented in Figure 2.15.³⁸ Estimates suggest the upsurge in the time allocated to both, market and household work, without involving any adjustment in terms of participation. The interesting thing is that while the effect on market work applies only at the top of the working time distribution, the household work effect is concentrated at the bottom half. A 100 US Dollars remittances contraction, leads women, at percentiles 0.80 and 0.90 to increase dedication to market work by 3.20 and 6.61 hours/week, respectively. On the contrary, the same contraction entails around 2.5 more hours/week allocated to household work, at the lowest percentiles of the distribution (starting at percentile 0.30).

Old adults (over 60 y/o)

Adults over 60 years old are those experiencing less changes in terms of labor supply, with the only significant coefficient observed for time spent in market work at percentile 0.80 and

³⁶ β coefficients are also displayed in Table A-2.3 of the Appendix.

³⁷ β coefficients are also displayed in Table A-2.4 of the Appendix.

³⁸ β coefficients are also displayed in Table A-2.5 of the Appendix.

reflecting 5.33 more hours/week allocated to these activities (Figure 2.16).³⁹

2.6 Potential Threats to the Exclusion Restriction

The identification of Equations (2.2) and (2.2') may potentially yield biased estimates of β if unemployment abroad is correlated with any factor directly affecting labor supply in Ecuador, other than through its impact on remittances. This section discusses four different scenarios in which this assumption may not hold.

2.6.1 Return Migration and Re-migration

One possible source of violation of the exclusion restriction is return migration. High unemployment in their country of residence might induce migrants to return back to Ecuador which might, in turn, affect household labor allocation arrangements. For instance, return migrants might be willing to support household work, freeing time for the left behind to increase their participation in market work. On the contrary, migrants might have acquired some skills abroad that make them good candidates for the local labor market, being able to release their relatives from these activities when coming back home. Finally, in the case they have accumulated some savings, they might be more inclined to start their own business at return and maybe include their relatives in these projects.

Although empirical evidence on the effect of the global crisis on return migration is very scarce, some descriptive studies (For instance [Boccagni, 2011](#); [Boccagni and Lagomarsino, 2011](#); [Mercier et al., 2016](#)) and official figures suggest that the number of Ecuadorians going back home in the years of the global crisis was not negligible. The 2010 Ecuador census found almost 64,000 individuals who had lived overseas in 2005, half in Spain and one-quarter in the United States, and the *Secretaría Nacional del Migrante* reported, in early 2013, assistance of more than 40,000 Ecuadorians, in their return, since 2008.

As a matter of fact, during this period, both countries, Ecuador and Spain launched special programs to promote voluntary return. Ecuador created, in January of 2008, a return plan offering tax exemptions, funds for micro businesses (*Fondo para el retorno digno y sostenible "El Cucayo"*), housing subsidies (*Bono de vivienda*), special counselling, reintegration into the education and health systems and even a new bank (*Banco del migrante*) to promote the productive investment of migrants' savings.

The return plan promoted by Spain, started in November of 2008 and seek to encourage the

³⁹ β coefficients are also displayed in Table A-2.6 of the Appendix.

return of non-EU legal immigrants who had lived in Spain for more than six months, were eligible for unemployment benefits and were citizens of countries with bilateral social security agreements like Ecuador. It provided these immigrants with a departure cash bonus including a one-way ticket home, 50 euros per person for travel expenses and, for those immigrants with unemployment benefits, 40% of the payment before departure and the remainder in the home country. In return, migrants had to give up work and residence permits and not reenter the country for the next three years.

Existing studies evaluating both Ecuadorian and Spanish voluntary return programs agree on their relatively modest results, specially during the first years of its implementation. Among the 58,000 Ecuadorian migrants that were eligible for unemployment benefits in January of 2008, only 2% applied to benefit from the Spanish voluntary return program as of June of 2009 (Jokisch, 2014; McCabe *et al.*, 2009; Plewa, 2012). In the same line, among the 87,000 potential beneficiaries identified for the Ecuadorian program, only 10% applied before November of 2009 (Schurr and Stolz, 2010).

Figure 2.17 shows that, even if the onset of the recession may have brought some returns, the number of entries of native-born to Ecuador started to grow after 2008 and burst as from 2010. Similarly, with respect to out-migration from the mayor countries hosting Ecuadorian migrants, available figures on the number of Ecuadorian-born registered in Spain and living in the US (Figure 2.17) still show a positive trend between 2007 and 2008 and only started to decrease by 2010 - 2011. This pattern may indicate that Ecuadorian migrants took some time in realize the long lasting effects of the global crisis and postponed their return until they knew there was no turning back. In addition, the fact of being far from their homeland, may had reduced the return likelihood as it becomes more costly and lowers their chances of coming back later-on.

As return migration, there is also the possibility that Ecuadorian migrants have re-migrated to third countries in order to mitigate the negative effects of the crisis on remittances. Although this hypothesis is not supported either by out-migration figures (Figure 2.17) or in the trend observed in the way remittances evolve in the data (Figure 2.5 and Table 2.6), if possible, re-migration, to cover remittances contractions, would indicate that the true effect of unemployment on remittances could be even greater than the one documented in Subsection 2.5.1.

2.6.2 Selection in Migration Patterns

Migrants at different destinations and their relatives back home are likely to differ from one another in many ways and some of these differences may be correlated with unemployment in the host countries. For instance, stronger economies, better prepared to deal with shocks, may attract more skilled migrants, coming from wealthier households, with higher chances to succeed in terms of labor market integration and less difficulties in times of a recession. On the contrary, more fragile countries, may attract less educated, ambitious and motivated migrants, with fewer chances to succeed the hard times.

In this view, an increase in the labor supply of their relatives back in Ecuador, seen as the consequence of immigrants facing higher unemployment rates and households dealing with negative remittances shocks, could simply be reflecting the selectivity of immigrants at destinations. In order to explore these issues, Table 2.7 - 2.9 present 2007 descriptive statistics of migrants, their households and their relatives back in Ecuador, broken down by the three hosting countries in 2007: Spain, the US and Italy.

T-tests reveal major differences in several characteristics of immigrants: those who live in the US are more likely to be female; those who live in Italy have on average 1.4 more years of education (compared to those in Spain), those in Spain are 5 percentage points more likely to be working (compared to those in the US), those in the US are more likely to have migrated before the year 2000 and those in Spain are more likely to have migrated for work.

Households in Ecuador are also significantly different depending on the country in which their migrants reside, in the average number of migrants, slightly higher in the US than in Spain; the education of the household head, 2 years higher for those with migrants in Italy compared to those with migrants in Spain; the time receiving remittances, greater among households with migrants in the US; and the use of remittances to cover health expenses, more frequent for households with migrants in Spain.

Finally, large differences are also observed in the characteristics of migrants' relatives in Ecuador. In terms of their demographic characteristics, for instance, among children between 5 and 19 years old, those reporting migrants in Spain are more likely to be female; men between 20 and 60 years old with migrants in the US are almost 2 years more educated than their counterparts with migrants in Spain; and old adults with migrants in Italy are 3 years older than those with migrants in Spain.

Concerning labor supply, many differences also stand out: individuals with migrants in the US,

including adult men and women (20 - 60 y/o), are more likely to participate in market work than individuals with migrants in Spain. However, in the case of children (5 - 19 y/o), those reporting the higher market participation rates are those with migrants in Italy. Individuals with migrants in the US, men, women and old adults included, are also the ones that record the greatest number of hours dedicated to market work. In the case of household work, except for old adults, the largest participation rate is observed among those with migrants in Italy.⁴⁰ Finally, the ones reporting the higher number of hours spent in these activities are those with migrants in Italy, for men, and in Spain, for women.

Despite the fact that this looks like a very complex issue, remember that first stage regressions include household fixed-effects and second stage regressions include individual fixed-effects, which help to reinforce the exclusion restriction, specially when it comes to address potential time unvarying factors.

2.6.3 Confounding Macroeconomic Variables

The exclusion restriction can be also be violated if the recession that hit nearly all the developed countries between 2008 and 2009, impacted the Ecuadorian labor market, through a channel other than remittances.

For instance, the contraction of external financing (like private trade finance), the decline of commodity prices (notably petroleum) or the reduction of the demand of exports. Figure 2.18 displays graphs for selected macroeconomic indicators of Ecuador during these years. After the 1999 financial crisis that ended up with the country substituting its currency with US dollars, from 2000 to 2008, Ecuador grew steadily recording annual growth rates between 1 (in 2000) and 8% (in 2004). Negative growth rates were only recorded up to the third and fourth quarters of 2009 (-1.24% and -0.54%, respectively). As a consequence, exports, specially petroleum, fell, leading to the first current account deficit in several years.

The government faced the recession through expansionary fiscal policy, including expanding access to housing finance (with a plan announced in late 2009), keeping interest rates low and limiting the amount of bank reserves that could leave the country. These events may also have affected the evolution of the local labor market. Indeed, unemployment rate registers some volatility during these years with a 1.24 percentage points increase between 2007 and 2008, followed by a 0.84 percentage points fall between 2008 and 2009.

Two tests were implemented in order to evaluate the potential influence of these alternative

⁴⁰The participation rate of old adults is significantly higher among those with migrants in the US.

channels on previous results. The first consists in estimating directly the effect of unemployment abroad Une on the whole set of labor supply outcomes Y_{it} , as shown by Equations (2.4) and (2.4):

$$Y_{it} = \zeta_i + \vartheta_t + \kappa_{ct}Une + \psi_{ht}S + \omega_{it}X + \epsilon_{it} \quad (2.4)$$

$$Y_{itp} = \zeta_i + \vartheta_{tp} + \kappa_{ctp}Une + \psi_{htp}S + \omega_{itp}X + \epsilon_{itp} \quad (2.4')$$

However, instead of running these estimations on the entire sample of individuals over 5 years old reporting at least one migrant abroad, they were implemented, separately, among those receiving $Rem(d) = 1$ and those not receiving remittances $Rem(d) = 0$ in the period. Table 2.13 reports the results of this exercise including also a Chi-squared test comparing κ coefficients across both sub-samples, i.e. $H_0 : \kappa_{ct(Rem=0)} - \kappa_{ct(Rem=1)} = 0$.

In the case of the sub-sample receiving remittances $Rem(d) = 0$, none of the labor supply outcomes show to be directly correlated with unemployment in the countries hosting migrants. On the contrary, most estimates on the sub-sample of individuals receiving remittances prove to be correlated with unemployment abroad. The above is an indication that the relationship between labor outcomes and unemployment abroad is likely to occur through the action of remittances shocks.

The second test consist in evaluating Equations (2.2), (2.2'), (2.3) and (2.3') across the subsamples of households and individuals registering international migrants in the December round of the 2007 ENEMDU survey, that were also interviewed in the September round⁴¹ (i.e. Panels I and J in Figure 2.1). That is, just some months before the first signs of the crisis were observed.

Table 2.14 summarizes the results. First-stage estimations suggest that, at that time, household remittances and unemployment variations abroad were uncorrelated. Similarly, second stage estimations show that, in this time, individual labor supply was also unresponsive to changes in household remittances. Therefore, in the absence of the 2008 global recession, Ecuadorian households with international migrants, do not show signs of have suffered remittances cut-backs due to unemployment shocks abroad; nor their members of have had to adjust labor supply accordingly.

2.6.4 Sample Attrition

Another potential main threat to the exclusion restriction is non-random sample attrition. As mentioned in Section 2.2, within the initial 2007 sample, 16% of the households and 27% of

⁴¹These data were collected between July and September of 2007.

the individuals over 5 y/o were not re-interviewed in 2008. Table 2.1 displays attrition rates by region, province and individual level sub-sample. It shows that attrition rates are lower among households in the Amazonian region and in the Provinces of Bolivar, Loja and Morona Santiago. At the individual level, the highest attrition rate is observed among children under 5 years old, almost 50%, while the lowest is observed for women.

Attrition is an important threat to identification for at least two reasons. First, it may be correlated with remittances if, for example, the households more affected by unemployment shocks abroad are the ones that leave the sample. Second, it may be correlated with labor supply outcomes. The most likely reason to attrit is migration, either of the whole household or of a given household member. Labor outcomes would depend on whether they had moved to more or less favored areas, had migrated for working reasons or had been fostered to relatively wealthy households (in the case of children).

Lets think, for instance, on households who depend heavily on remittances whose relatives abroad were strongly hit by unemployment, to the point they cut down the amount of money they send home. These households may had decided to send their children to live with more wealthier relatives, preventing them to be pushed to work. In this case, the true effect of a remittances negative shocks would be smaller than regression estimates presented in Section 2.5 (upward biased). Or, it could be the case that, in order to face the shock, these children may had move to more dynamic zones where they can easily increase market work supply, in which case, estimates would be downward biased.

In order to investigate this issue, first i look at the determinants of attrition through a two-stage procedure. In the first stage I estimate a remittances model for the complete sample of households present in the 2007 wave of the survey (Equation (2.3)). Covariates are baseline unemployment rate in the countries hosting migrants and other household characteristics. Estimations were done using OLS and clustering standard errors according to the location of migrants in 2007. Results, displayed in the first column of Table 2.10, suggest 2007 unemployment rate is not correlated with remittances.

Next, using the predicted value of remittances, derived from this first stage equation, I estimate, at the individual level, a Linear Probability Model where the dependent variable is a dummy equal to 1 if the individual was interviewed in the two waves of the survey, and 0 otherwise.⁴² Estimates for the entire sample and the four groups of interest are displayed in Columns 2 - 6

⁴²Covariates are individual and household characteristics and standard errors are clustered at the household level and according to the location of migrants in 2007.

of Table 2.10. They show that remittances are uncorrelated with the likelihood of attrition, thus, attrition on observables may not be a threat for the estimations presented in Section 2.5.

To further assess the existence of an attrition bias, I also explore the correlation between attrition and the outcomes used in the analysis: unemployment, remittances received and participation and time allocation to market and household work. To do so, I first regress each of these variables on a dummy for non-attrition and some baseline covariates, and then, I add the full set of non-attrition - covariates interactions.⁴³ This test was performed, first, at the household level for unemployment and remittances⁴⁴, and, then, at the individual level for labor supply outcomes.⁴⁵

Table 2.11 presents the household level results when the outcome variables are unemployment abroad and remittances received in 2007. Estimates show that non-attrition is positively correlated with 2007 unemployment and negatively correlated with baseline remittances. The probability of being recontacted is higher among households whose members abroad were exposed to higher unemployment rates in 2007 and lower for households receiving more remittances in this year. The different joint significance tests reject the null hypothesis that the non-attrition interaction coefficients are equal to zero, indicating that covariates significantly differ between attriters and non-attriters.

Individual level results, for each of the four labor supply variables and the five concerned groups, are displayed in Table 2.12. Estimations concerning the full sample of individuals aged 5 years old and more, show that non-attrition is negatively correlated with time allocated to both market and household work, and positively correlated with participation in household work. This implies that individuals working more hours are more likely to attrit and individuals participating in household chores have more chances to be recontacted in 2008. A similar pattern is observed for the sample of children between 5 and 19 years old, with the difference that, for this group of individuals, the correlation between non-attrition and participation in market work is also significant and negative, thus, participating in market work decreases the probability of non-attrition.

Regressions for the group of adult men show also a significantly positive correlation between non-attrition and participation in market and household work, and a negative correlation with time allocated to these tasks. Among adult women non-attrition is positively correlated with

⁴³This test is known as the BGLW test and was proposed by *Beckett et al. (1988)*.

⁴⁴These estimations are done using OLS models and robust standard errors clustered according to the location of migrants in 2007.

⁴⁵Estimations were done using OLS and robust standard errors clustered at the household level and according to the location of migrants in 2007.

participation in market and household work and time allocated to this last activity. Finally, in the case of old adults, non attrition is positively correlated with participation and negatively correlated with working time variables. In all these cases F-tests of the joint significance of non-attrition interaction terms indicate that the slope of the coefficients differs between attritors and non-attritors. This implies that attrition, due to selection on observables, fails to reject the absence of a bias, challenging the validity of the results presented in Section 2.5.

Non-random attrition is a very difficult problem to solve, even when tests suggest the absence of bias due to selection problems based on observables, as this does not discharge the presence of selection patterns based on unobservables. For this reason, it is highly recommended to strive in managing attrition during the data collection process, by careful identifying and tracking households and individuals between the waves of longitudinal surveys (See for instance the works of [Duflo *et al.*, 2008](#); [Vaillant, 2010](#)). Unfortunately, as I pointed out in Section 2.2, in the surveys used in this analysis no follow-up effort was made, limiting considerably the solutions that can be raised in order to address this problem.

Among the different econometric methods that exist to handle these issues ex-post, Inverse Probability Weighting (IPW) offers a technique that works under relatively weaker assumptions. [Fitzgerald *et al.* \(1998\)](#) and [Wooldridge \(2010\)](#) show that Inverse probability weighting (IPW) provides consistent estimates in the linear regression setting, under the basic assumption that the probability of found and reinterviewed is driven by observable characteristics. I use this method to re-estimate Equations (2.2) and (2.3) and compare the results with those obtained in Section 2.5.

The procedure is the following. First, considering the complete sample of households surveyed in 2007, I calculate the probability of non-attrition using a Linear Probability Model, where the dependent variable is a dummy equal to 1 if the respondent is present in the two waves of the survey and covariates are the unemployment rate in the countries hosting Ecuadorian migrants and a set of household characteristics (including household composition and household head characteristics). The weight of each observation is given by the inverse of the predicted probability. Then, I re-estimate Equation (2.2) for the complete sample of households present in the two waves using a Weighted Least Squares Model.

New IPW (first stage) estimates are presented in the first column of Table 2.15. I also include the results of a Chi-squared test of the difference between these new IPW unemployment coefficients and those from OLS regressions that do not account for attrition (Table A-2.1). Applying the inverse probability weights to the full sample of households leads to higher point estimates,

suggesting that earlier estimates appear to underestimate the effect of unemployment abroad on household remittances. However Chi-squared difference test shows that these coefficients are not statistically different from each other.

Next, I calculate the probability of non-attrition for the individual sample, using, as covariates, remittances predicted from a household level equation including the full sample of households surveyed in 2007⁴⁶, individual characteristics (age, age squared, years of education and a dummy equal to 1 for female) and household covariates. Then, I re-estimate Equation (2.3), at the individual level, across the five groups of interest, including those present in the two waves and weighting these observations by the inverse of the predicted probability of non-attrition (using a Least Squares Model). Covariates include remittances predicted from new IPW first stage estimates (Table 2.15 - Column 1), individual characteristics, and household covariates.

New IPW second stage estimates are presented in Columns 2 - 5 of Table 2.15. Market work coefficients from IPW corrected remittances estimates are, in most cases, higher than those from regressions not accounting for attrition. The opposite is observed for household work, except for a couple of outcomes (i.e. time allocated of children and participation of women). These results suggest that initial estimates actually overestimate the relationship of remittances and labor supply and underestimate the association between remittances and household work. However, none of the Chi-squared difference test provide evidence that these coefficients are statistically different from each other, which may be an indication that attrition on observables may not be a threat for the estimates presented in Section 2.5. The above notwithstanding, the risk of attrition biases based on unobservable characteristics can not be completely ruled out.

2.7 Conclusions

Much has been said about how the 2008 global crisis affected international migrants and their families back home. However, very few studies provide evidence on the differenced effect of this event on individual labor supply. This chapter sheds light on this topic by analyzing the impact of remittances cut backs on labor participation and working hours, across Ecuadorian residents differentiated in terms of age and sex. To this end I use a novel dataset that matches Ecuadorian households and individuals just before and after the onset of the global recession, built from the 2007 and 2008 December rounds of the Labor Force Survey (ENEMDU).

To address the potential endogeneity of remittance receipts, I take advantage of the heterogeneity generated by the diverse location of Ecuadorian household members living abroad. I exploit

⁴⁶Where the dependent variable is remittances received in 2007 and covariates are the unemployment rate in the countries hosting Ecuadorian migrants in 2007 and household baseline characteristics.

this variation by implementing instrumental variable regressions, using as an instrument the unemployment rate variation in the countries hosting Ecuadorian migrants. The estimations are performed using Linear Probability Models and Quantile Regression analysis, when dependent variables are limited dependent (i.e. remittances and time allocated to labor). The last method allows me to evaluate these relationships along the entire remittances and working time distributions, carrying on an analysis beyond average effects.

Findings confirm the negative correlation between unemployment rates in the countries hosting Ecuadorian migrants and remittances received back in Ecuador, showing that this association is stronger at the top of the remittances distribution. Estimates also suggest that this remittances contraction leads to a generalized increase in the labor supply of the overall 5 years and plus population.

However, the most appealing finding is that these events contributed to widen age and sex differences in the allocation of labor supply, suggesting striking differences in the way children, adult men, adult women and old adults, deal with these phenomena. In terms of labor participation, adult men were the only group increasing participation in market work and children the only ones recording new entries to household work.

Then, when it comes to time allocation to market work, the greatest gains are observed among adult men at the bottom 10% of the working time distribution (6.6 hours/week), adult women at the top 90% (6.5 hours/week) and old adults at percentile 0.80 (5.3 hours/week). Similarly, three groups enhance time spent in household work. Both, children and women show positive effects at the bottom half of the distribution, between percentiles 0.30 to 0.50. For its part, the effect observed among old adults concentrates at the median and at percentile 0.70.

Taken together, these findings draw one major conclusion, that, in order to respond to negative income shocks, such as those experienced in Ecuador as a consequence of the high unemployment faced by international migrants and the contraction of remittances received, household members back in Ecuador adjust their labor supply in a differentiated way, according to age and sex characteristics.

Certainly, this is not the only plausible explanation. In particular, the validity of the empirical analysis presented along this chapter could be easily challenged if the exclusion restriction assumption, associated with the instrumental variable chosen, i.e. unemployment abroad, is violated. This does not imply however that the results presented here are misleading, but they must be interpreted with caution.

2.8 Figures and Tables

Figure 2.1: Rotating Panel Sample Design
ENEMDU 2005-2009

Sep-05	dec-05	Mar-06	Jun-06	Sep-06	dec-06	Mar-07	Jun-07	Sep-07	dec-07	Mar-08	Jun-08	Sep-08	dec-08	Mar-09
A	A	C	Y	A	A	C	G	G	I	K	G	G	I	K
B	B	D	Z	B	B	D	H	H	J	L	H	H	J	L
Y	C	E	E	Y	C	E	E	I	K	M	M	I	K	M
Z	D	F	F	Z	D	F	F	J	L	N	N	J	L	N

Source: INEC Ecuador. Notes: Each letter denominates a panel grouping 25 percent of the dwellings sampled in each round.

Table 2.1: Sample Composition

	Surveyed in 2007 and 2008		Surveyed in 2007	Attrition Rate
	Freq. (1)	% (2)	Freq. (3)	% (4)
<i>Households</i>	547		652	16.1%
<i>Region</i>				
Sierra	326	59.6%	389	16.2%
Cost	189	34.6%	228	17.1%
Amazonia	32	5.9%	35	8.6%
<i>Province</i>				
Azuay	100	18.3%	115	12.8%
Guayas	64	11.7%	85	24.5%
Cañar	66	12.1%	78	15.4%
El oro	54	9.9%	61	11.5%
Loja	41	7.5%	44	6.8%
Tungurahua	29	5.3%	36	19.4%
Los Rios	28	5.1%	33	15.1%
Manabi	24	4.4%	27	11.0%
Imbabura	21	3.8%	24	12.5%
Esmeraldas	19	3.5%	22	13.6%
Chimborazo	12	2.2%	15	20.1%
Bolívar	12	2.2%	12	0.1%
Morona Santiago	11	2.0%	12	8.4%
Cotopaxi	8	1.5%	12	33.4%
<i>Individuals</i>	1758		2421	27.4%
Children under 4 y/o	90	5.1%	168	46.4%
Children btw. 5 - 19 y/o	522	29.7%	735	29.0%
Adult men (20 - 60 y/o)	364	20.7%	490	25.7%
Adult women (20 - 60 y/o)	498	28.3%	647	23.0%
Old adults (> 60 y/o)	284	16.2%	381	25.5%

Source: Matching ENEMDU, December 2007 - December 2008. Notes: Attrition rate is the proportion lost to follow up.

Table 2.2: Household Characteristics (2007)

	Surveyed in 2007 and 2008		Surveyed in 2007		Mean Differences	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)	Mean (5)	S.E. (6)
<i>Composition</i>						
Total hh members	3.76	(0.09)	3.71	(0.08)	0.04	(0.12)
Total hh members over 5 y/o	3.48	(0.08)	3.46	(0.07)	0.03	(0.10)
Children under 5 y/o	0.27	(0.03)	0.26	(0.02)	0.01	(0.04)
Children between 5 and 19 y/o	1.10	(0.05)	1.13	(0.05)	-0.02	(0.07)
Adult men (20 - 60 y/o)	0.76	(0.03)	0.75	(0.03)	0.01	(0.05)
Adult women (20 - 60 y/o)	1.02	(0.03)	0.99	(0.03)	0.03	(0.05)
Old adults (> 60 y/o)	0.60	(0.03)	0.58	(0.03)	0.02	(0.04)
International migrants	1.49	(0.04)	1.48	(0.04)	0.01	(0.03)
<i>Socioeconomic characteristics</i>						
Age of the hh head	54.66	(0.64)	53.83	(0.60)	-0.03	(0.03)
Single parenting (d)	0.49	(0.02)	0.52	(0.02)	-0.01	(0.03)
Female hh head (d)	0.37	(0.02)	0.38	(0.02)	-0.23	(0.41)
Years of education of the hh head	9.38	(0.30)	9.61	(0.28)	13.35	(167.03)
Total income	2355.51	(123.84)	2342.16	(112.30)	0.19	(39.38)
Total income per capita	598.84	(29.52)	598.65	(26.23)	0.00	(0.01)
Poor (d)	0.05	(0.01)	0.05	(0.01)	40.98	(164.95)
Labor income	2092.02	(122.35)	2051.04	(110.86)	-0.02	(0.03)
<i>Remittances</i>						
Received remittances (d)	0.38	(0.02)	0.41	(0.02)	-27.63	(25.72)
Amount of remittances received	263.49	(18.33)	291.12	(17.85)	-29.94	(41.17)
Amount of remittances received ^a	686.34	(29.96)	716.28	(27.92)	-0.55	(0.48)
Number of payments received ^a	7.16	(0.32)	7.71	(0.34)	0.00	(0.03)
Time receiving remittances ^a						
Less than 1 year	0.13	(0.02)	0.13	(0.02)	-0.01	(0.04)
Between 1 and 3 years	0.30	(0.03)	0.31	(0.03)	0.00	(0.04)
Between 4 and 6 years	0.30	(0.03)	0.30	(0.03)	0.00	(0.03)
More than 6 years	0.23	(0.03)	0.22	(0.03)	0.01	(0.05)
Use of remittances ^a						
Support basic expenses	0.83	(0.03)	0.83	(0.02)	0.01	(0.05)
Health services	0.46	(0.03)	0.46	(0.03)	-0.05	(0.04)
Education	0.29	(0.03)	0.34	(0.03)	-0.02	(0.03)
Savings	0.11	(0.02)	0.12	(0.02)	0.00	(0.03)
Settle debt	0.09	(0.02)	0.08	(0.02)	0.01	(0.02)
Housing	0.07	(0.02)	0.06	(0.02)	0.00	(0.01)
Invest in a business	0.02	(0.01)	0.02	(0.01)	0.01	(0.05)
Observations	547		652			

Source: Matching ENEMDU, December 2007 - December 2008. Notes: (d) stands for dummy variables. ^a Receiving households only. Income adds labor, rental, retirement and remittances, received last November, converted to 2008 US Dollars. Remittances refer also to last November inflows converted to 2008 US Dollars. *p<0.1, **p<0.05, ***p<0.01.

Table 2.3: Individual Characteristics (2007)

	Surveyed in 2007 and 2008		Surveyed in 2007		Mean Differences	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)	Mean (5)	S.E. (6)
<i>Full sample (> 5 y/o)</i>						
Age	36.20	(0.53)	35.35	(0.46)	0.85	(0.70)
Female (d)	0.54	(0.01)	0.54	(0.01)	0.00	(0.02)
Years of education	9.27	(0.16)	9.39	(0.14)	-0.12	(0.21)
Participates in market work (d)	0.51	(0.01)	0.49	(0.01)	0.02	(0.02)
Hours of market work	20.13	(0.58)	20.08	(0.68)	0.05	(0.94)
Participates in household work (d)	0.78	(0.01)	0.76	(0.01)	0.01	(0.01)
Hours of household work	14.94	(0.44)	14.17	(0.37)	0.76	(0.57)
<i>Children btw. 5 - 19 y/o</i>						
Age	12.42	(0.19)	12.59	(0.16)	-0.16	(0.24)
Female (d)	0.50	(0.02)	0.53	(0.02)	-0.02	(0.03)
Years of education	6.81	(0.18)	7.00	(0.15)	-0.19	(0.24)
Participates in market work (d)	0.17	(0.02)	0.16	(0.01)	0.01	(0.02)
Hours of market work	4.48	(0.53)	4.50	(0.46)	-0.02	(0.71)
Participates in household work (d)	0.63	(0.02)	0.64	(0.02)	-0.01	(0.03)
Hours of household work	6.92	(0.51)	6.50	(0.39)	0.42	(0.63)
<i>Adult men (20 - 60 y/o)</i>						
Age	37.87	(0.69)	36.73	(0.59)	1.13	(0.91)
Years of education	12.13	(0.37)	12.35	(0.32)	-0.21	(0.49)
Participate in market work (d)	0.85	(0.02)	0.85	(0.02)	-0.00	(0.02)
Hours of market work	38.39	(1.15)	38.41	(0.97)	-0.01	(1.50)
Participate in household work (d)	0.68	(0.02)	0.67	(0.02)	0.01	(0.03)
Hours of household work	6.59	(0.45)	6.46	(0.39)	0.13	(0.59)
<i>Adult women (20 - 60 y/o)</i>						
Age	41.23	(0.57)	39.92	(0.51)	1.31*	(0.77)
Years of education	11.38	(0.32)	11.75	(0.28)	-0.37	(0.43)
Participate in market work (d)	0.60	(0.02)	0.59	(0.02)	0.01	(0.03)
Hours of market work	23.17	(1.06)	24.70	(1.86)	-1.53	(2.32)
Participate in household work (d)	0.98	(0.01)	0.97	(0.01)	0.00	(0.01)
Hours of household work	29.59	(0.93)	28.68	(0.80)	0.91	(1.22)
<i>Old adults > 60 y/o</i>						
Age	68.97	(0.43)	69.74	(0.38)	-0.77	(0.57)
Female (d)	0.50	(0.03)	0.51	(0.03)	-0.01	(0.04)
Years of education	6.44	(0.32)	6.18	(0.27)	0.26	(0.42)
Participate in market work (d)	0.52	(0.03)	0.49	(0.03)	0.03	(0.04)
Hours of market work	20.14	(1.40)	18.69	(1.19)	1.46	(1.83)
Participate in household work (d)	0.80	(0.02)	0.77	(0.02)	0.04	(0.03)
Hours of household work	14.67	(0.90)	14.25	(0.77)	0.42	(1.18)

Source: Matching ENEMDU, December 2007 - December 2008. Notes: (d) stands for dummy variables. *p<0.1, **p<0.05, ***p< 0.01.

Table 2.4: Characteristics of International Migrants (2007)

	Mean (1)	S.E. (2)
<i>Socioeconomic Characteristics</i>		
Age	34.06	(0.44)
Female (d)	0.53	(0.02)
Years of education	11.97	(0.21)
Has tertiary education (d)	0.23	(0.01)
Son / daughter of the hh head (d)	0.61	(0.02)
Spouse of the hh head (d)	0.12	(0.01)
Parent of the hh head (d)	0.06	(0.01)
Son / daughter in law of the hh head (d)	0.03	(0.01)
Grandson of the hh head (d)	0.03	(0.01)
Is working (d)	0.84	(0.01)
Sent remittances last November (d)	0.34	(0.02)
<i>Migration</i>		
Left Ecuador before 1994 (d)	0.13	(0.01)
Left Ecuador between 1995 and 1999 (d)	0.19	(0.01)
Left Ecuador between 2000 and 2007 (d)	0.66	(0.02)
Left children in Ecuador (d)	0.32	(0.02)
Adduce labor motivations (d)	0.79	(0.01)
Adduce family motivations (d)	0.12	(0.01)
Observations	817	

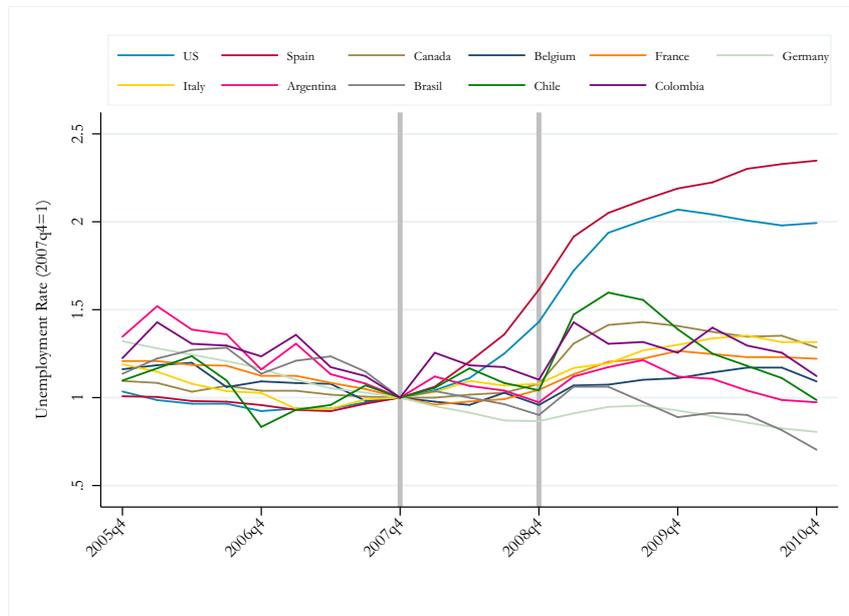
Source: Matching ENEMDU, December 2007 - December 2008. Notes: (d) stands for dummy variables.

Table 2.5: Distribution of Migrants by Destination Country and Unemployment Rate

	Proportion (%)	Unemployment Rate (%)	
	2007 (1)	2007 (2)	2008 (3)
Spain	44.19%	9%	14%
United States	35.86%	5%	7%
Italy	11.26%	6%	7%
Germany	1.47%	8%	7%
Canada	1.10%	6%	6%
Venezuela	0.98%	7%	6%
Belgium	0.73%	7%	7%
Cuba	0.61%	2%	2%
United Kingdom	0.61%	5%	6%
Other European countries	0.61%	7%	7%
Colombia	0.37%	10%	11%
Bolivia	0.24%	5%	3%
Brazil	0.24%	8%	7%
France	0.24%	8%	8%
Greece	0.24%	8%	8%
Ukraine	0.24%	6%	6%
Chile	0.12%	7%	7%
Guatemala	0.12%	3%	3%
Honduras	0.12%	3%	3%
Mexico	0.12%	4%	4%
Paraguay	0.12%	6%	6%
Switzerland	0.12%	4%	3%
Russia	0.12%	6%	6%
Other African countries	0.12%	9%	10%
Observations	817		

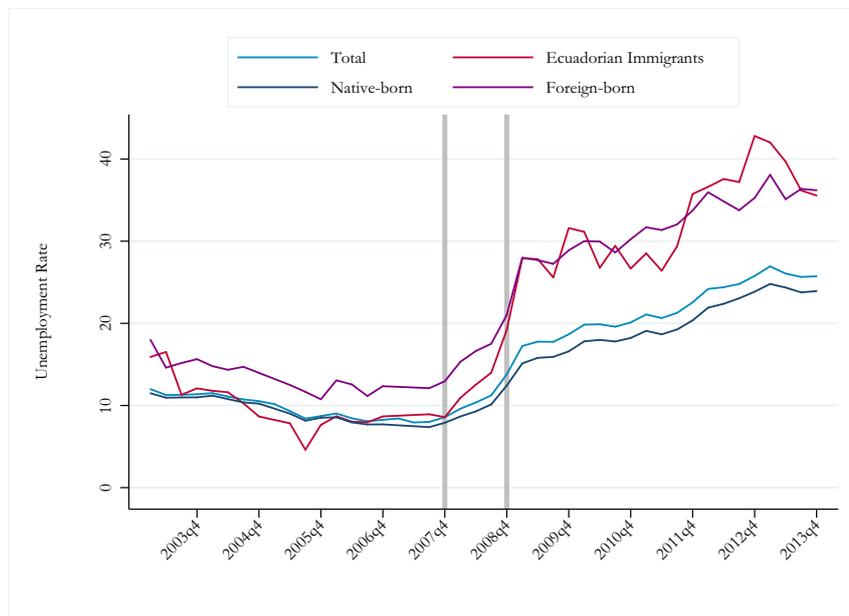
Source: Location of Ecuadorian migrants is taken from Matching ENEMDU, December 2007 - December 2008 and Unemployment rates come from OECD.Stat (accessed on February 11 of 2015).

Figure 2.2: Unemployment Rates in Selected Countries
2005q4 - 2010q4



Source: OECD.Stat and CEPALSTAT (accessed on February 11 of 2015). Notes: Countries hosting Ecuadorian migrants in 2007. Unemployment rates are normalized to 1 in 2007q4.

Figure 2.3: Unemployment Rate in Spain
2003q1 - 2013q4



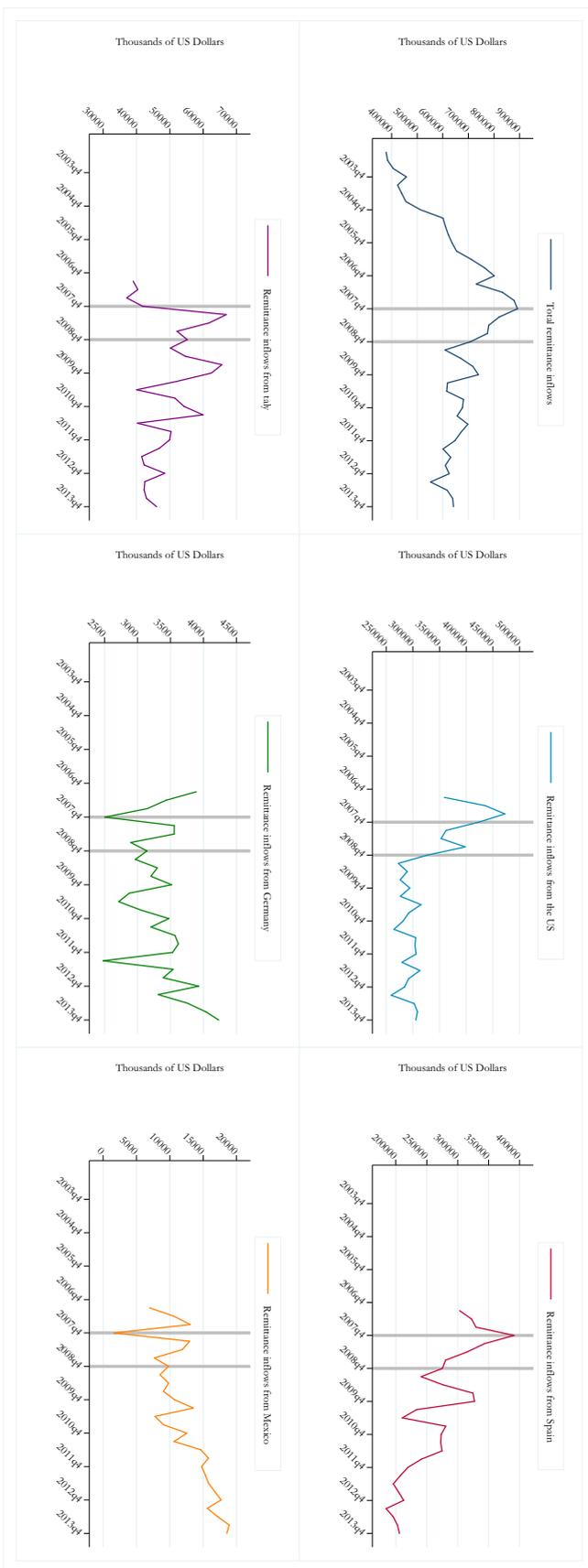
Source: Source: Unemployment Rates (quarterly basis) are taken from the Instituto Nacional de Estadística (INE), Encuesta de Población Activa (EPA) - Serie histórica. Notes: The shaded areas correspond to the last quarter of 2007 and the last quarter of 2008.

Figure 2.4: Unemployment in the United States
2002m12-2013m12



Source: Unemployment rates (monthly basis) are taken from the Bureau of Labor Statistics of the United States and based on data from the Current Population Survey. Notes: The shaded areas correspond to October 2007 and October of 2008. Native-born and foreign-born series are only available from 2007m1.

Figure 2.5: Remittances Received in Ecuador by Country of Origin - 2003q1 - 2013q4



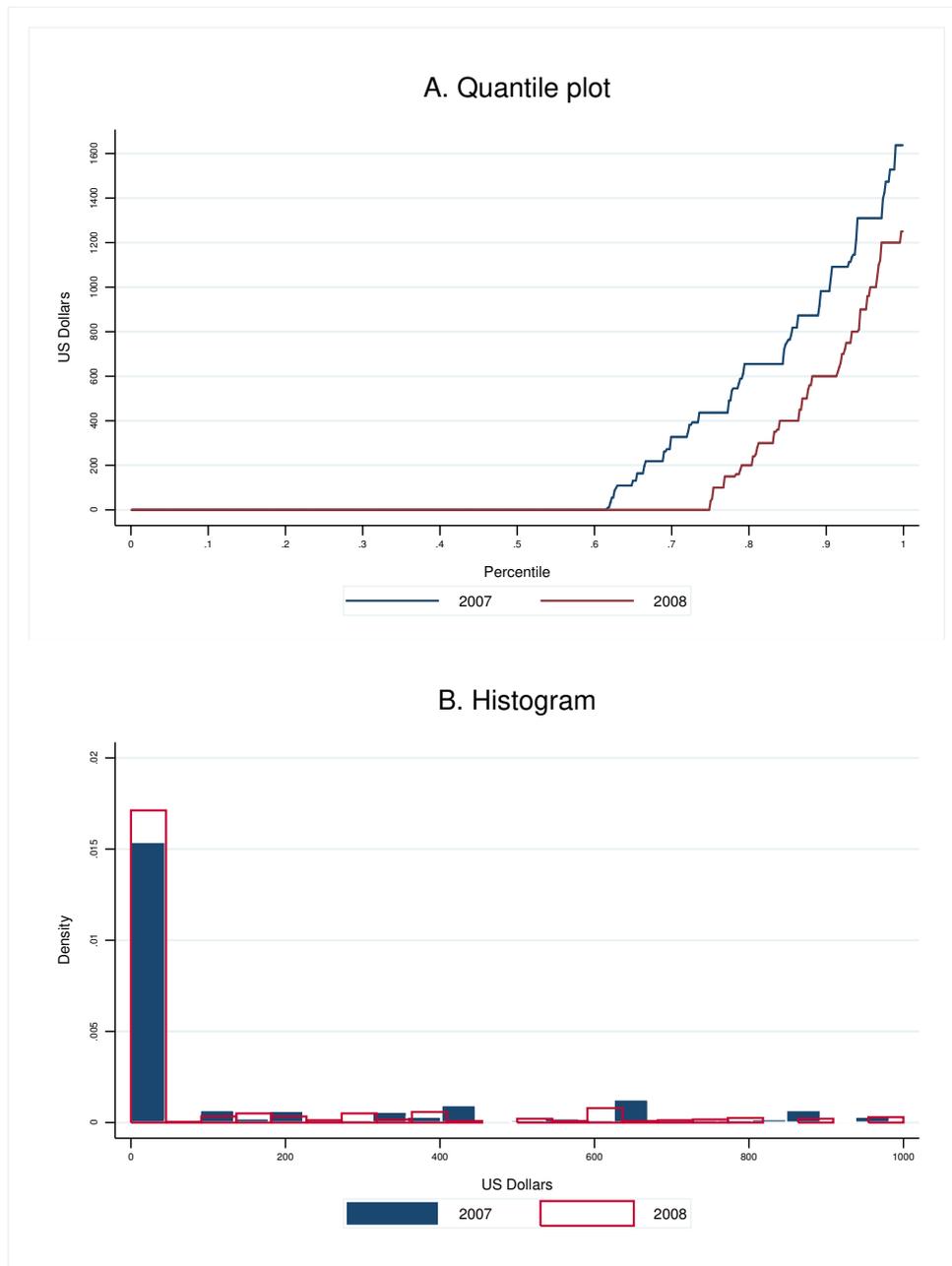
Sources: Banco Central del Ecuador. Notes: The shaded areas correspond to the last quarter of 2007 and the last quarter of 2008. Figures broken down by country of origin are only available from 2007q1.

Table 2.6: Evolution of Remittances and Labor Supply
2007 - 2008

	2007			2008			Difference 2008-2007	
	Mean (1)	S.E. (2)	Obs (3)	Mean (4)	S.E. (5)	Obs (6)	Mean (7)	S.E. (8)
<i>Remittances</i>								
Received remittances (d)	0.38	(0.02)	547	0.25	(0.02)	547	-0.13***	(0.03)
Amount of remittances received	263.49	(18.33)	547	140.55	(12.84)	547	-122.95***	(22.38)
Amount of remittances received ^a	686.34	(29.96)	210	561.17	(30.14)	137	-125.17***	(44.37)
<i>Labor supply</i>								
<i>Full sample (> 5 y/o)</i>								
Participate in market work (d)	0.51	(0.01)	1668	0.53	(0.01)	1668	0.03	(0.02)
Hours of market work	20.13	(0.58)	1668	22.02	(0.59)	1668	1.89**	(0.83)
Participate in household work (d)	0.78	(0.01)	1668	0.76	(0.01)	1668	-0.01	(0.01)
Hours of household work	14.94	(0.44)	1668	15.81	(0.43)	1668	0.88	(0.61)
<i>Children (5 - 19 y/o)</i>								
Participate in market work (d)	0.17	(0.02)	522	0.20	(0.02)	522	0.03	(0.02)
Hours of market work	4.48	(0.53)	522	6.51	(0.68)	522	2.04**	(0.86)
Participate in household work (d)	0.63	(0.02)	522	0.66	(0.02)	522	0.03	(0.03)
Hours of household work	6.92	(0.51)	522	8.11	(0.51)	522	1.19*	(0.72)
<i>Adult men (20 - 60 y/o)</i>								
Participate in market work (d)	0.85	(0.02)	364	0.87	(0.02)	364	0.02	(0.03)
Hours of market work	38.39	(1.15)	364	39.29	(1.09)	364	0.90	(1.58)
Participate in household work (d)	0.68	(0.02)	364	0.64	(0.03)	364	-0.04	(0.04)
Hours of household work	6.59	(0.45)	364	7.64	(0.57)	364	1.05	(0.73)
<i>Adult women (20 - 60 y/o)</i>								
Participate in market work (d)	0.60	(0.02)	498	0.63	(0.02)	498	0.03	(0.03)
Hours of market work	23.17	(1.06)	498	25.20	(1.06)	498	2.02	(1.50)
Participate in household work (d)	0.98	(0.01)	498	0.97	(0.01)	498	-0.00	(0.01)
Hours of household work	29.59	(0.93)	498	30.49	(0.80)	498	0.90	(1.23)
<i>Old adults > 60 y/o</i>								
Participate in market work (d)	0.52	(0.03)	284	0.54	(0.03)	284	0.02	(0.04)
Hours of market work	20.14	(1.40)	284	22.79	(1.49)	284	2.64	(2.04)
Participate in household work (d)	0.73	(0.03)	284	0.80	(0.02)	284	0.07**	(0.04)
Hours of household work	14.67	(0.90)	284	14.71	(0.94)	284	0.04	(1.30)

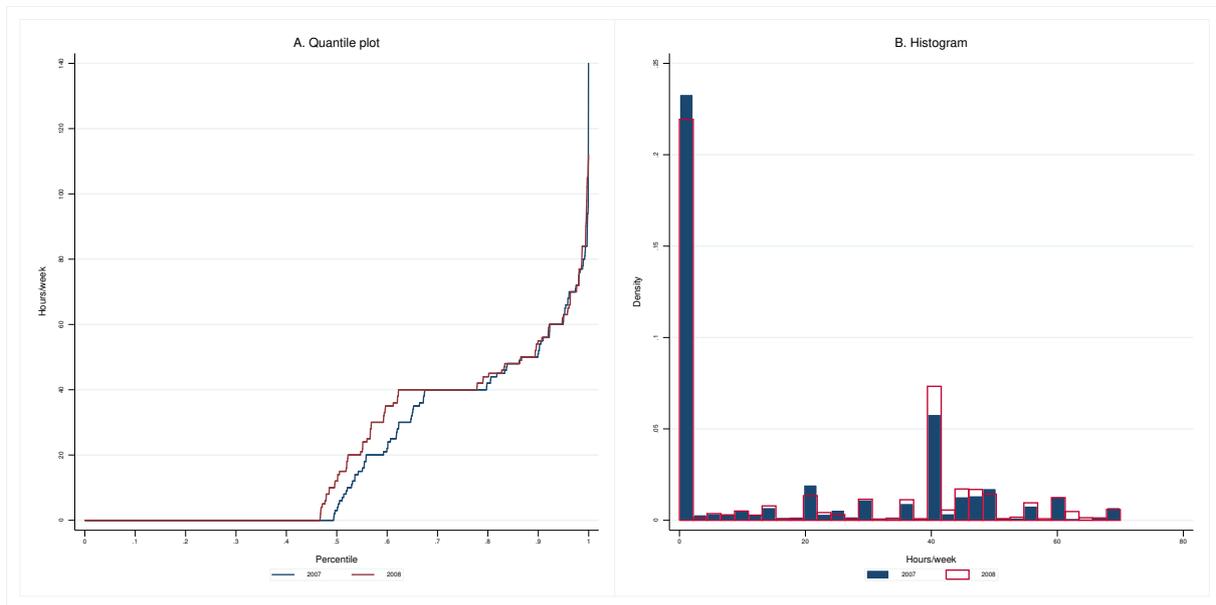
Source: Matching ENEMDU, December 2007 - December 2008. Notes: (d) stands for dummy variables. ^a Receiving households only. Remittances refer to last November inflows converted to 2008 US Dollars. *p<0.1, **p<0.05, ***p<0.01.

Figure 2.6: Distribution of Remittances
2007 - 2008



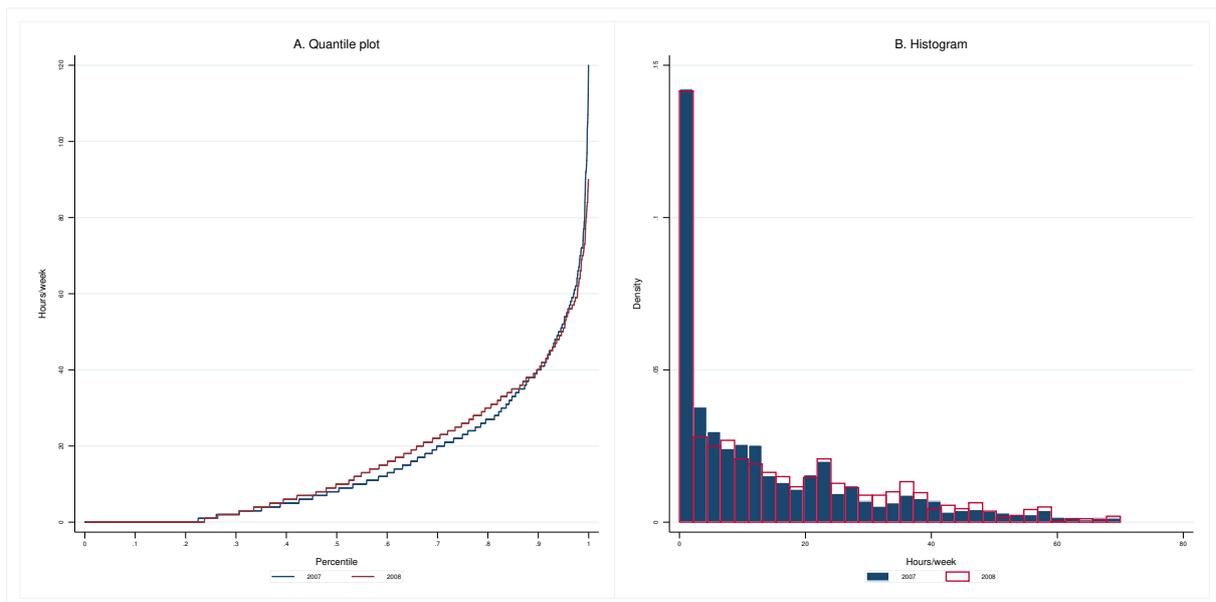
Source: Matching ENEMDU, December 2007 - December 2008.

Figure 2.7: Distribution of Time Allocation to Market Work
2007 - 2008



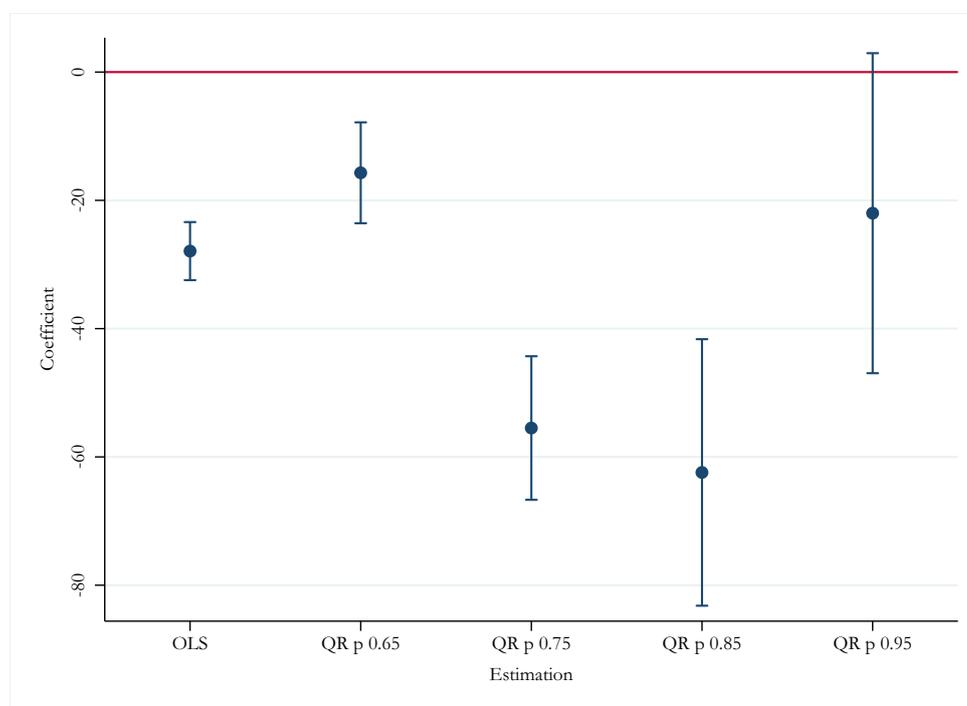
Source: Matching ENEMDU, December 2007 - December 2008.

Figure 2.8: Distribution of Time Allocation to Household Work
2007 - 2008



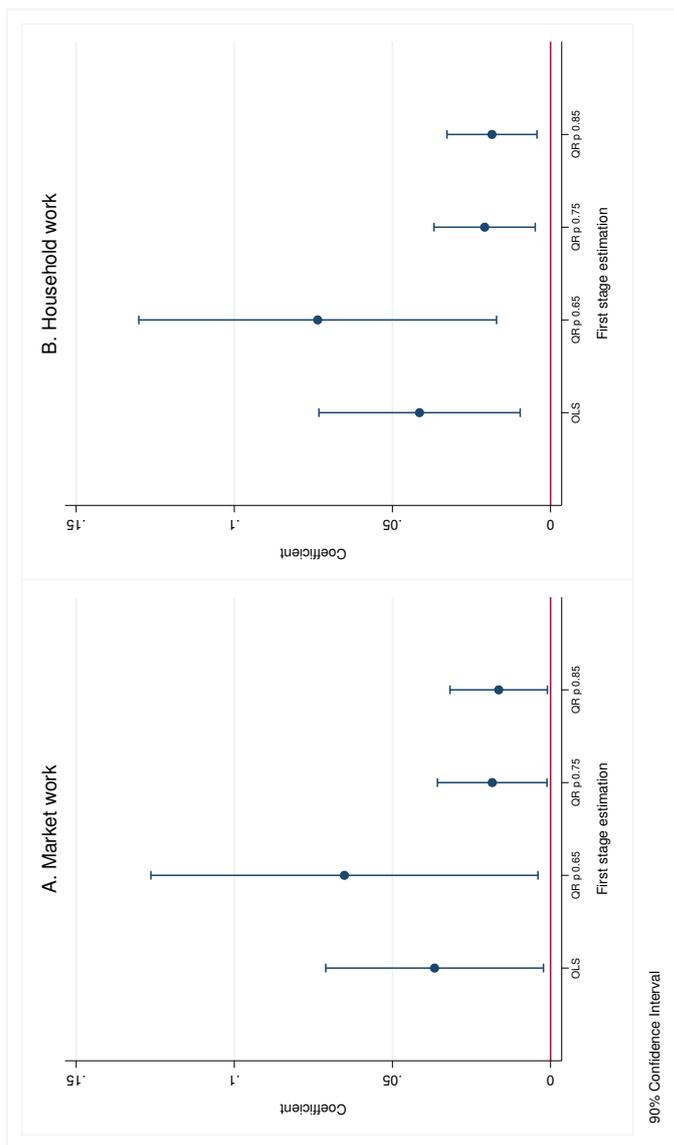
Source: Matching ENEMDU, December 2007 - December 2008.

Figure 2.9: Unemployment Coefficients - First Stage
Households with Migrants



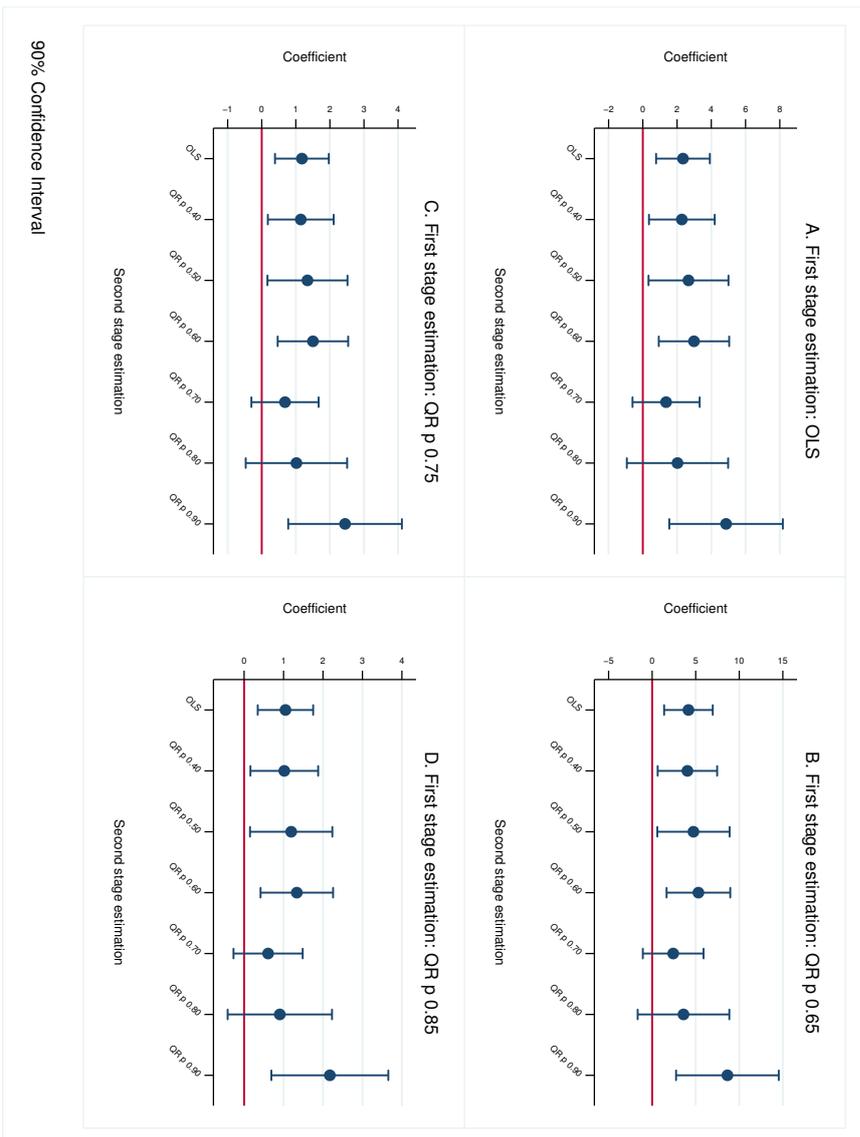
Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of households reporting at least one member living abroad in 2007. Dots represent γ coefficients (point estimates) from Equations (2.3) - OLS and (2.3') - Quantile Regression at percentiles 0.65, 0.75 and 0.85. Vertical spikes are 90% confidence intervals. Dependent variable is the value of remittances received. 1% top outliers of the dependent variable were trimmed. All regressions include household time varying covariates. Robust Standard errors are clustered according to the location of migrants in 2007.

Figure 2.10: Labor Participation - Individuals Aged 5 y/o and Over
Remittances Coefficients (Second Stage)



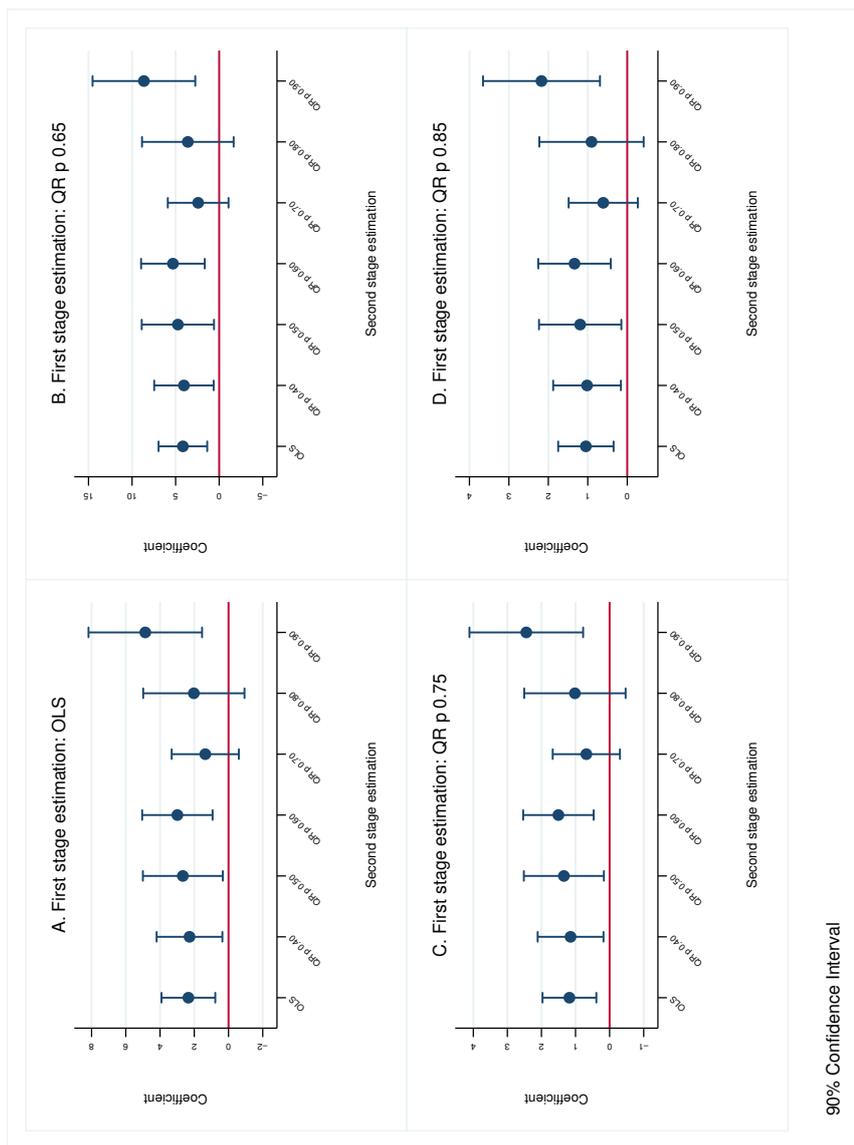
Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of individuals (aged 5 y/o and over) from households reporting at least 1 member living abroad in 2007. Dots represent β coefficients (point estimates) from Equation (2.2) - LPM. Vertical spikes are 90% confidence intervals. Dependent variable is a dummy equal to 1 if the individuals worked at least 1 hour in the period of reference (last week). Remittances received are estimated from Equations (2.3) - OLS and (2.3') - Quantile Regression at percentiles 0.65, 0.75 and 0.85), and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual time varying characteristics. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007.

Figure 2.11: Time Allocation to Market Work - Individuals Aged 5 y/o and Over
Remittances Coefficients (Second Stage)



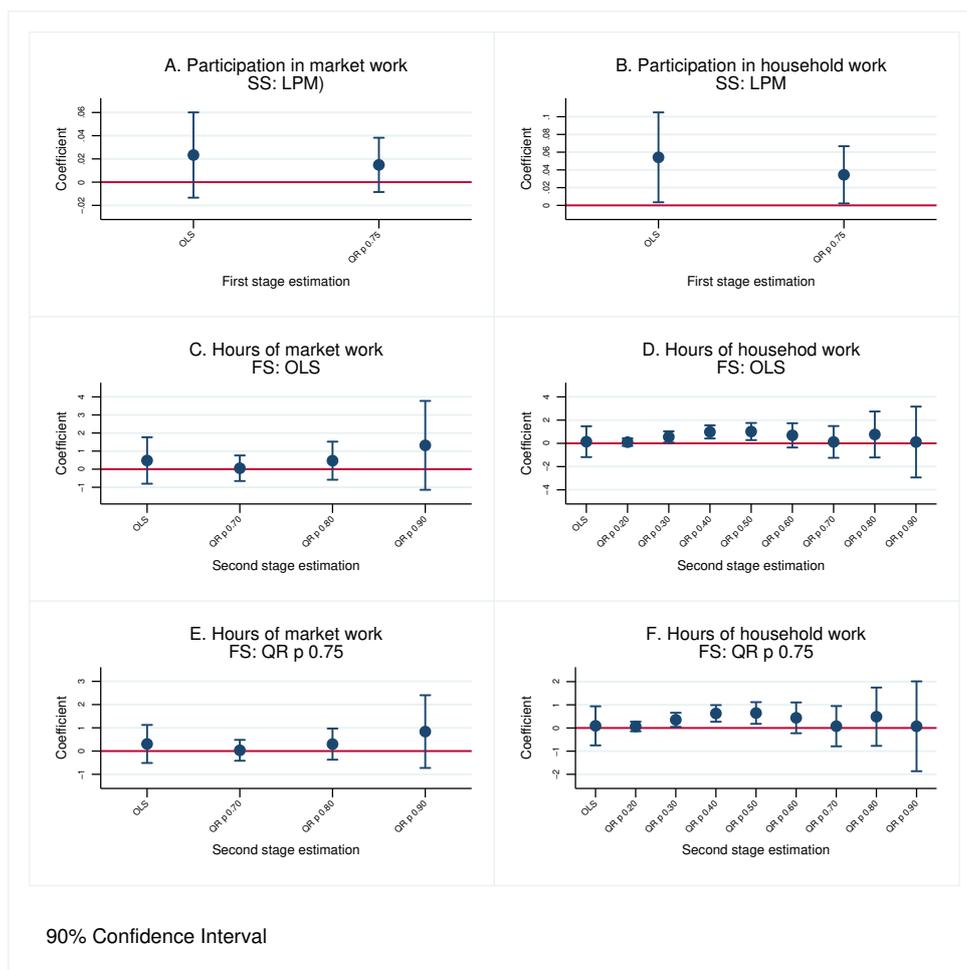
Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of individuals (aged 5 y/o and over) from households reporting members living abroad in 2007. Dots represent β coefficients (point estimates) from Equations (2.2) and (2.7) - Quantile Regression at percentiles 0.40 - 0.90. Vertical spikes are 90% confidence intervals. Dependent variable is the hours per week allocated to market work. Remittances received are estimated from Equation (2.37) - OLS and Quantile Regression at percentiles 0.65, 0.75 and 0.85, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual time varying characteristics. 1% top outliers of the dependent variable were trimmed. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007.

Figure 2.12: Time Allocation to Household Work - Individuals Aged 5 y/o and Over
Remittances Coefficients (Second Stage)



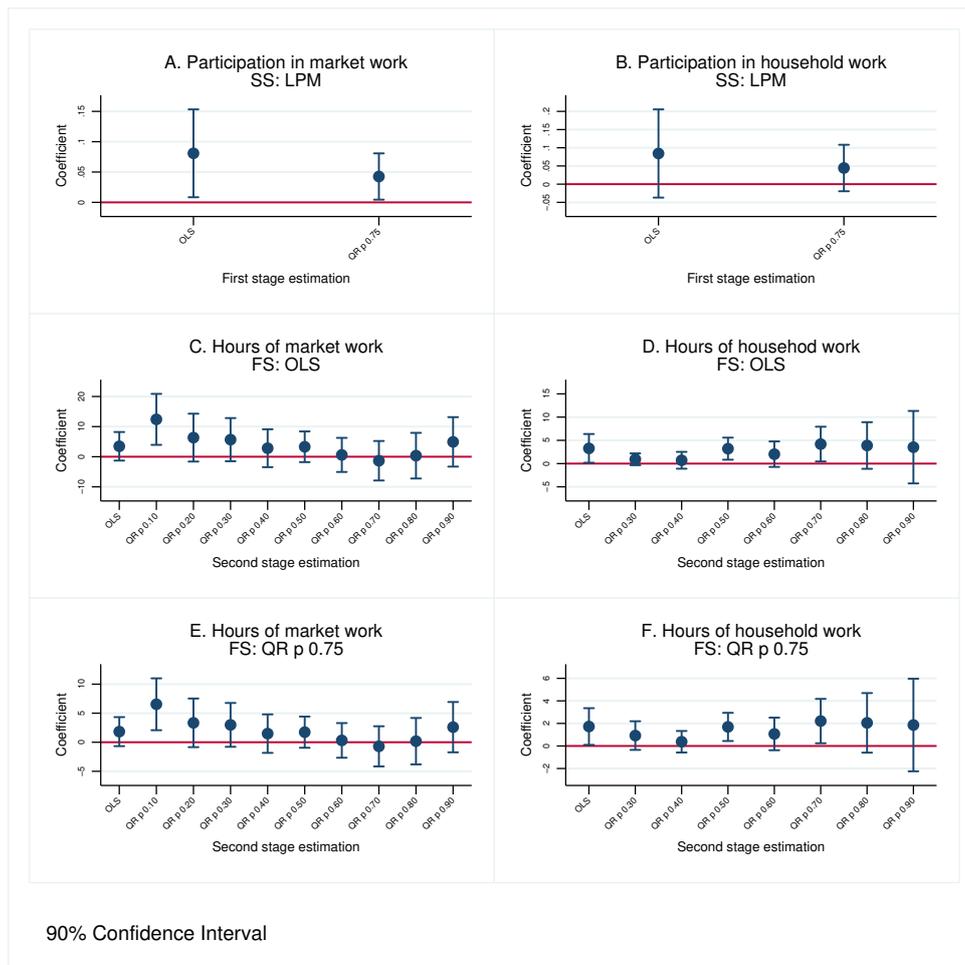
Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of individuals aged 5 y/o and over from households reporting members living abroad in 2007. Dots represent β coefficients (point estimates) from Equations (2.2) and (2.2') - OLS and Quantile Regression at percentiles 0.10 - 0.90. Dependent variable is the hours per week allocated to market work. Remittances received are estimated from Equation (2.3') - OLS and Quantile Regression at percentiles 0.65, 0.75 and 0.85, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual time varying characteristics. 1% top outliers of the dependent variable were trimmed. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007.

Figure 2.13: Labor Supply - Children Remittances Coefficients (Second Stage)



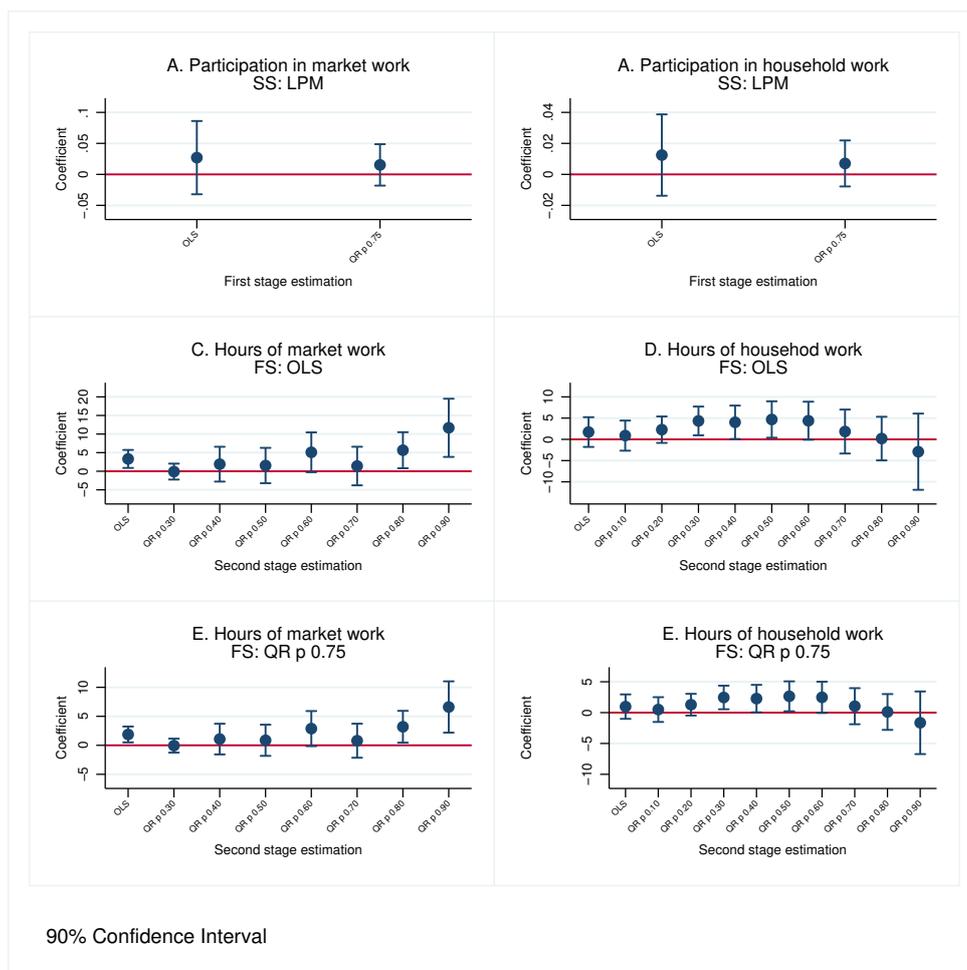
Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of children aged btw. 5 - 19 y/o from households reporting at least 1 member living abroad in 2007. In Graphs A and B, dots represent β coefficients (point estimates) from Equation (2.2) - LPM, where the dependent variable is a dummy equal to 1 if the individuals spent at last 1 hour in market / household work in the period of reference (last week). Remittances received are estimated from Equations (2.3) - OLS and (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. In Graphs C and D, dots represent β coefficients (point estimates) from Equation (2.2) - OLS and (2.2') - Quantile Regression at percentiles 0.70 - 0.90 and 0.20 - 0.90, respectively. The dependent variable is the number of hours per week allocated to market / household work in the period of reference (last week). Vertical spikes are 90% confidence intervals. Remittances received are estimated from Equation (2.3) - OLS, and multiplied by minus one so they can be read as negative shocks. In Graphs E and F, dots represent β coefficients (point estimates) from Equations (2.2) - OLS and (2.2') - Quantile Regression at percentiles 0.70 - 0.90 and 0.20 - 0.90, respectively. The dependent variable is the number of hours per week allocated to market / household work in the period of reference (last week). Vertical spikes are 90% confidence intervals. Remittances received are estimated from Equation (2.3) - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual time varying characteristics. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. 1% top outliers of the dependent variable were trimmed in Graphs C and D.

**Figure 2.14: Labor Supply - Adult Men
Remittances Coefficients (Second Stage)**



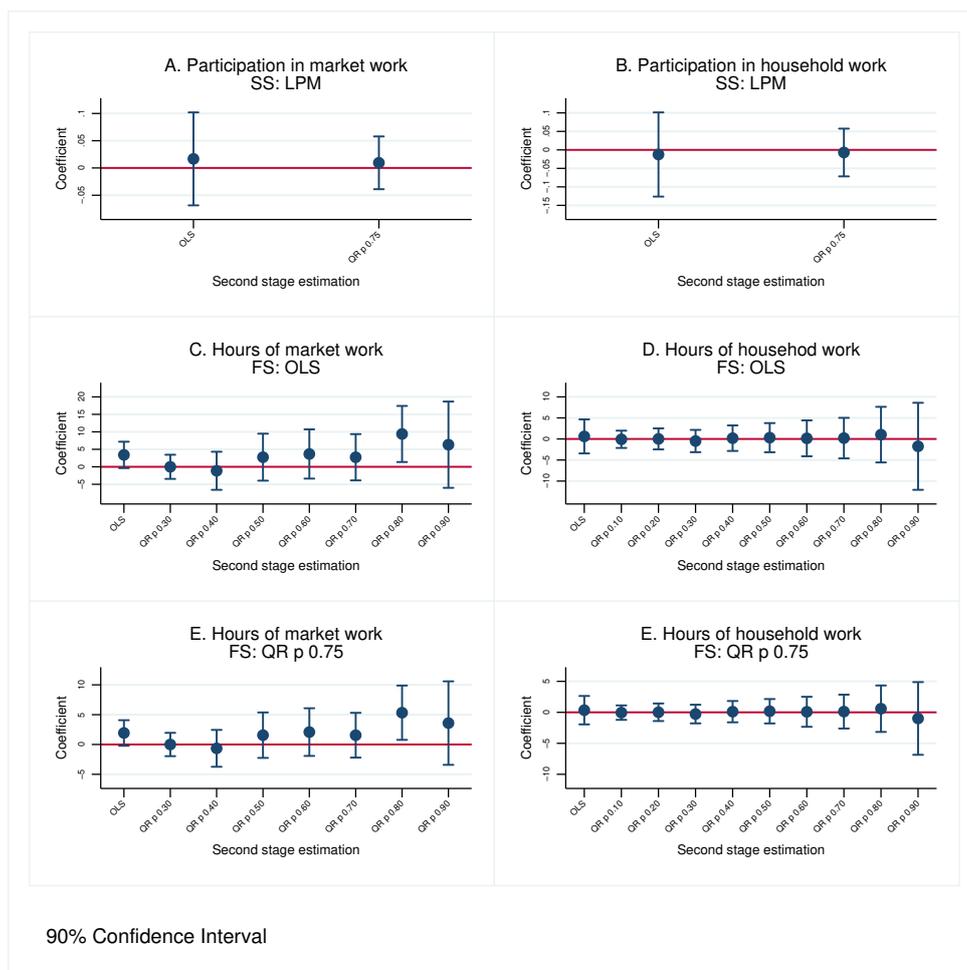
Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of men aged btw. 20 - 60 y/o from households reporting at least 1 member living abroad in 2007. In Graphs A and B, dots represent β coefficients (point estimates) from Equation (2.2) - LPM, where the dependent variable is a dummy equal to 1 if the individuals spent at last 1 hour in market / household work in the period of reference (last week). Remittances received are estimated from Equations (2.3) - OLS and (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. In Graphs C and D, dots represent β coefficients (point estimates) from Equation (2.2) - OLS and (2.2') - Quantile Regression at percentiles 0.10 - 0.90 and 0.30 - 0.90, respectively. The dependent variable is the number of hours per week allocated to market / household work in the period of reference (last week). Vertical spikes are 90% confidence intervals. Remittances received are estimated from Equation (2.3') - OLS, and multiplied by minus one so they can be read as negative shocks. In Graphs E and F, dots represent β coefficients (point estimates) from Equations (2.2) - OLS and (2.2') - Quantile Regression at percentiles 0.10 - 0.90 and 0.30 - 0.90, respectively. The dependent variable is the number of hours per week allocated to market / household work in the period of reference (last week). Vertical spikes are 90% confidence intervals. Remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual time varying characteristics. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. 1% top outliers of the dependent variable were trimmed in Graphs C and D.

**Figure 2.15: Labor Supply - Adult Women
Remittances Coefficients (Second Stage)**



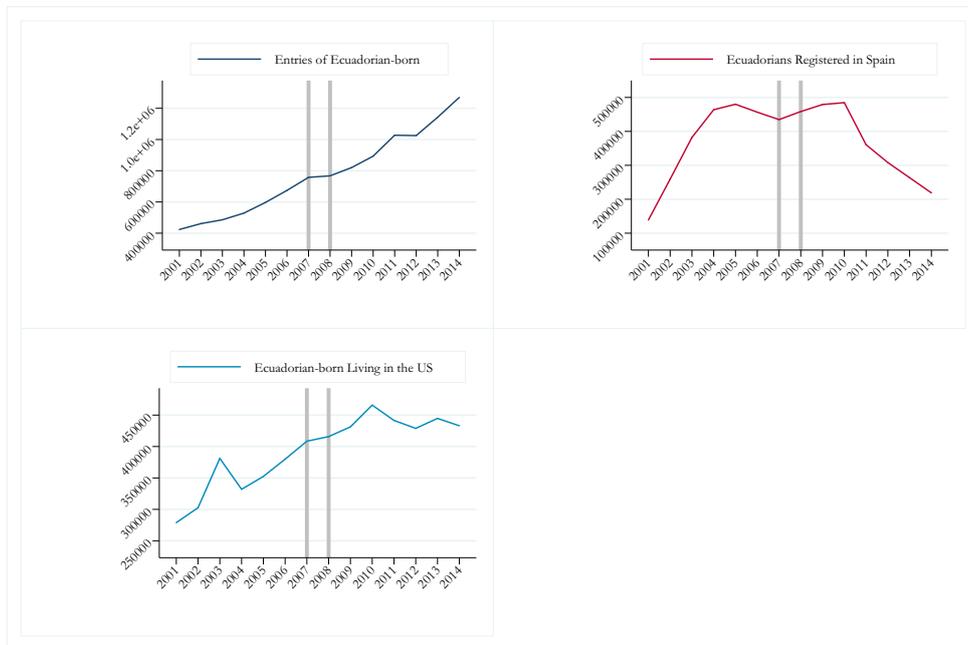
Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of women aged btw. 20 - 60 y/o from households reporting at least 1 member living abroad in 2007. In Graphs A and B, dots represent β coefficients (point estimates) from Equation (2.2) - LPM, where the dependent variable is a dummy equal to 1 if the individuals spent at last 1 hour in market / household work in the period of reference (last week). Remittances received are estimated from Equations (2.3) - OLS and (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. In Graphs C and D, dots represent β coefficients (point estimates) from Equation (2.2) - OLS and (2.2') - Quantile Regression at percentiles 0.30 - 0.90 and 0.10 - 0.90, respectively. The dependent variable is the number of hours per week allocated to market / household work in the period of reference (last week). Vertical spikes are 90% confidence intervals. Remittances received are estimated from Equation (2.3') - OLS, and multiplied by minus one so they can be read as negative shocks. In Graphs E and F, dots represent β coefficients (point estimates) from Equations (2.2) - OLS and (2.2') - Quantile Regression at percentiles 0.30 - 0.90 and 0.10 - 0.90, respectively. The dependent variable is the number of hours per week allocated to market / household work in the period of reference (last week). Vertical spikes are 90% confidence intervals. Remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual time varying characteristics. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. 1% top outliers of the dependent variable were trimmed in Graphs C and D.

**Figure 2.16: Labor Supply - Adults Over 60 y/o
Remittances Coefficients (Second Stage)**



Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of individuals over 60 y/o from households reporting at least 1 member living abroad in 2007. In Graphs A and B, dots represent β coefficients (point estimates) from Equation (2.2) - LPM, where the dependent variable is a dummy equal to 1 if the individuals spent at last 1 hour in market / household work in the period of reference (last week). Remittances received are estimated from Equations (2.3) - OLS and (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. In Graphs C and D, dots represent β coefficients (point estimates) from Equation (2.2) - OLS and (2.2') - Quantile Regression at percentiles 0.30 - 0.90 and 0.10 - 0.90, respectively. The dependent variable is the number of hours per week allocated to market / household work in the period of reference (last week). Vertical spikes are 90% confidence intervals. Remittances received are estimated from Equation (2.3') - OLS, and multiplied by minus one so they can be read as negative shocks. In Graphs E and F, dots represent β coefficients (point estimates) from Equations (2.2) - OLS and (2.2') - Quantile Regression at percentiles 0.30 - 0.90 and 0.10 - 0.90, respectively. The dependent variable is the number of hours per week allocated to market / household work in the period of reference (last week). Vertical spikes are 90% confidence intervals. Remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual time varying characteristics. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. 1% top outliers of the dependent variable were trimmed in Graphs C and D.

Figure 2.17: Return Migration to Ecuador



Sources: Entries of Ecuadorian-born come from INEC Ecuador, *Anuario de Entradas y Salidas Internacionales* 2006 and 2014. Ecuadorians registered in Spain come from *Padrón Municipal* 2001 - 2014 (accessed from <http://www.ine.es/> on February 11 of 2015). Ecuadorian-born living in the US come from U.S. Census Bureau, American Community Surveys (ACS) 2001-2015 (accessed from IPUMS-USA on February 11 of 2015). Notes: The shaded areas correspond to the years 2007 and 2008.

Table 2.8: Households by Country of Residence of Migrants

	Spain		US		Italy		Differences					
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)	Mean (5)	S.E. (6)	Mean (7)	S.E. (8)	Mean (9)	S.E. (10)	Mean (11)	S.E. (12)
<i>Composition</i>												
Total hh members	3.81	(0.12)	3.81	(0.15)	3.56	(0.30)	-0.00	(0.19)	-0.25	(0.32)	-0.25	(0.34)
Total hh members over 5 y/o	3.53	(0.11)	3.53	(0.13)	3.30	(0.26)	0.01	(0.17)	-0.23	(0.28)	-0.23	(0.30)
Children under 5 y/o	0.28	(0.04)	0.27	(0.05)	0.26	(0.09)	-0.01	(0.06)	-0.03	(0.10)	-0.02	(0.10)
Children between 5 and 19 y/o	1.12	(0.08)	1.12	(0.10)	1.16	(0.19)	-0.00	(0.12)	0.05	(0.20)	0.05	(0.22)
Men btw. 20 - 60 y/o	0.79	(0.05)	0.78	(0.06)	0.70	(0.12)	-0.00	(0.08)	-0.09	(0.13)	-0.09	(0.14)
Women btw. 20 - 60 y/o	1.05	(0.05)	1.02	(0.06)	0.88	(0.11)	-0.03	(0.08)	-0.17	(0.13)	-0.14	(0.14)
Old adults (> 60 y/o)	0.57	(0.05)	0.61	(0.06)	0.56	(0.12)	0.04	(0.07)	-0.02	(0.12)	-0.05	(0.14)
International migrants	54.44	(0.86)	54.26	(1.16)	52.86	(2.43)	-0.18	(1.41)	-1.58	(2.32)	-1.40	(2.65)
<i>Socioeconomic characteristics</i>												
Age of the hh head	0.50	(0.03)	0.49	(0.04)	0.60	(0.08)	-0.01	(0.05)	0.11	(0.08)	0.12	(0.08)
Single parenting (d)	0.38	(0.03)	0.41	(0.04)	0.35	(0.07)	0.04	(0.05)	-0.03	(0.08)	-0.06	(0.08)
Hh head is female (d)	8.70	(0.40)	9.13	(0.53)	10.70	(1.01)	0.43	(0.65)	1.99*	(1.06)	1.56	(1.20)
Years of education of the hh head												
Total income	2241.94	(163.54)	2392.00	(226.51)	2208.13	(413.07)	150.06	(272.22)	-33.81	(433.42)	-183.87	(505.65)
Total income per capita	561.81	(39.92)	604.95	(50.61)	576.69	(76.16)	43.14	(63.77)	14.88	(102.33)	-28.26	(110.11)
Poor (d)	0.05	(0.01)	0.05	(0.02)	0.02	(0.02)	-0.00	(0.02)	-0.03	(0.04)	-0.03	(0.04)
Labor income	1953.53	(161.43)	2129.50	(222.93)	1886.33	(401.53)	175.96	(268.32)	-67.21	(426.85)	-243.17	(496.70)

Table 2.8 (cont.): Households by Country of Residence of Migrants

	Spain			US			Italy			Differences																																
	Mean	S.E.	(1)	Mean	S.E.	(2)	Mean	S.E.	(3)	Mean	S.E.	(4)	Mean	S.E.	(5)	Mean	S.E.	(6)	Mean	S.E.	(7)	Mean	S.E.	(8)	Mean	S.E.	(9)	Mean	S.E.	(10)	Mean	S.E.	(11)	Mean	S.E.	(12)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)							
<i>Remittances</i>																																										
Received remittances (d)	0.41	(0.03)	0.41	(0.04)	0.44	(0.08)	-0.01	(0.05)	0.03	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)	0.04	(0.08)				
Amount of remittances received	288.41	(27.40)	262.51	(31.57)	321.81	(69.81)	-25.90	(42.06)	33.40	(72.72)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)	59.30	(73.04)		
Amount of remittances received ^a	696.53	(41.19)	647.28	(51.50)	728.30	(96.37)	-49.25	(65.50)	31.77	(105.51)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)	81.02	(112.32)		
Number of payments received ^a	7.24	(0.46)	7.12	(0.55)	8.20	(1.07)	-0.12	(0.71)	0.96	(1.17)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)	1.08	(1.20)		
<i>Time receiving remittances^a</i>																																										
Less than 1 year	0.17	(0.04)	0.08	(0.03)	0.16	(0.09)	-0.09*	(0.05)	-0.01	(0.09)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)	0.08	(0.08)		
Between 1 and 3 years	0.32	(0.05)	0.23	(0.05)	0.53	(0.12)	-0.09	(0.07)	0.21*	(0.12)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)	0.29**	(0.11)		
Between 4 and 6 years	0.39	(0.05)	0.18	(0.05)	0.26	(0.10)	-0.21***	(0.07)	-0.12	(0.12)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)	0.09	(0.10)
More than 6 years	0.07	(0.02)	0.47	(0.06)	0.21	(0.10)	0.40***	(0.06)	0.14**	(0.07)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)	-0.26**	(0.13)		
<i>Use of remittances^a</i>																																										
Support basic expenses	0.84	(0.04)	0.82	(0.05)	0.79	(0.10)	-0.02	(0.06)	-0.05	(0.09)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)	-0.03	(0.10)		
Health services	0.54	(0.05)	0.40	(0.06)	0.37	(0.11)	-0.14*	(0.08)	-0.17	(0.12)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)	-0.03	(0.13)		
Education	0.26	(0.04)	0.33	(0.06)	0.37	(0.11)	0.06	(0.07)	0.10	(0.11)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)	0.04	(0.12)		
Observations	256		180		43																																					

Source: Matching ENEMDU, December 2007 - December 2008. Notes: (d) stands for dummy variables. ^a Receiving households only. Income adds labor, rental, retirement and remittances, received last November, converted to 2008 US Dollars. Remittances refer also to last November inflows converted to 2008 US Dollars. *p<0.1, **p<0.05, ***p<0.01.

Table 2.9: Individuals by Country of Residence of Migrants

	Spain			US			Italy			Differences																															
	Mean	S.E.	(1)	Mean	S.E.	(2)	Mean	S.E.	(3)	Mean	S.E.	(4)	Mean	S.E.	(5)	Mean	S.E.	(6)	Mean	S.E.	(7)	Mean	S.E.	(8)	Mean	S.E.	(9)	Mean	S.E.	(10)	Mean	S.E.	(11)	Mean	S.E.	(12)					
<i>Individuals aged 5 y/o and over</i>																																									
Age	35.97	(0.77)		35.62	(0.90)		35.53	(2.06)		-0.35	(1.18)		-0.44	(2.06)		-0.09	(2.15)																								
Female (d)	0.56	(0.02)		0.53	(0.02)		0.51	(0.04)		-0.03	(0.03)		-0.05	(0.05)		-0.02	(0.05)																								
Years of education	8.86	(0.22)		9.24	(0.28)		9.22	(0.54)		0.37	(0.35)		0.36	(0.57)		-0.02	(0.65)																								
Participate in market work (d)	0.47	(0.02)		0.57	(0.02)		0.50	(0.04)		0.10***	(0.03)		0.04	(0.05)		-0.06	(0.05)																								
Hours of market work	18.52	(0.84)		22.48	(1.00)		17.33	(1.91)		3.96***	(1.30)		-1.19	(2.20)		-5.15***	(2.33)																								
Participate in household work (d)	0.77	(0.02)		0.78	(0.02)		0.84	(0.03)		0.02	(0.02)		0.08*	(0.04)		0.06	(0.04)																								
Hours of household work	15.58	(0.68)		14.14	(0.71)		14.57	(1.60)		-1.44	(0.99)		-1.01	(1.78)		0.43	(1.69)																								
Observations	763			583			127																																		
<i>Children btw. 5 - 19 y/o</i>																																									
Age	12.63	(0.27)		12.22	(0.33)		11.98	(0.59)		-0.41	(0.42)		-0.66	(0.68)		-0.24	(0.73)																								
Female (d)	0.56	(0.03)		0.45	(0.04)		0.39	(0.07)		-0.11**	(0.05)		-0.18**	(0.08)		-0.07	(0.08)																								
Years of education	7.02	(0.25)		6.54	(0.31)		7.07	(0.67)		-0.48	(0.40)		0.05	(0.66)		0.53	(0.71)																								
Participate in market work (d)	0.15	(0.02)		0.19	(0.03)		0.30	(0.07)		0.04	(0.04)		0.15**	(0.06)		0.11	(0.07)																								
Hours of market work	4.04	(0.76)		5.02	(0.97)		5.25	(1.43)		0.97	(1.22)		1.21	(1.88)		0.23	(2.10)																								
Participate in household work (d)	0.63	(0.03)		0.62	(0.04)		0.82	(0.06)		-0.02	(0.05)		0.18**	(0.08)		0.20**	(0.08)																								
Hours of household work	7.55	(0.82)		6.98	(0.88)		5.20	(1.01)		-0.57	(1.21)		-2.35	(1.96)		-1.78	(1.86)																								
Observations	240			183			44																																		
<i>Men btw. 20 - 60 y/o</i>																																									
Age	37.86	(1.06)		37.55	(1.13)		39.67	(2.59)		-0.30	(1.56)		1.81	(2.97)		2.11	(2.87)																								
Years of education	11.13	(0.48)		12.82	(0.67)		10.83	(1.21)		1.69**	(0.81)		-0.29	(1.36)		-1.98	(1.66)																								
Participate in market work (d)	0.79	(0.03)		0.91	(0.03)		0.83	(0.08)		0.12***	(0.04)		0.04	(0.09)		-0.08	(0.07)																								
Hours of market work	35.35	(1.72)		40.86	(1.85)		35.79	(4.38)		5.52**	(2.54)		0.45	(4.84)		-5.07	(4.72)																								
Participate in household work (d)	0.64	(0.04)		0.72	(0.04)		0.88	(0.07)		0.08	(0.05)		0.24**	(0.10)		0.16	(0.10)																								
Hours of household work	6.26	(0.63)		5.75	(0.67)		11.25	(2.46)		-0.51	(0.93)		4.99***	(1.91)		5.50***	(1.88)																								
Observations	168			132			24																																		

Table 2.9 (cont.): Individuals by Country of Residence of Migrants

	Spain			US			Italy			Differences																																				
	Mean	S.E.	(1)	Mean	S.E.	(2)	Mean	S.E.	(3)	Mean	S.E.	(4)	Mean	S.E.	(5)	Mean	S.E.	(6)	Mean	S.E.	(7)	Mean	S.E.	(8)	Mean	S.E.	(9)	Mean	S.E.	(10)	Mean	S.E.	(11)	Mean	S.E.	(12)										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)									
<i>Women btw. 20 - 60 y/o</i>																																														
Age	41.84	(0.83)	39.96	(0.98)	39.59	(2.34)	-1.88	(1.28)	-2.24	(2.28)	-0.36	(2.36)																																		
Years of education	11.10	(0.44)	10.61	(0.55)	11.81	(1.14)	-0.49	(0.70)	0.71	(1.20)	1.20	(1.30)																																		
Participate in market work (d)	0.55	(0.03)	0.69	(0.04)	0.59	(0.08)	0.14***	(0.05)	0.04	(0.09)	-0.10	(0.09)																																		
Hours of market work	20.63	(1.51)	26.69	(1.80)	22.73	(4.00)	6.06***	(2.34)	2.10	(4.10)	-3.96	(4.28)																																		
Participate in household work (d)	0.97	(0.01)	0.97	(0.01)	1.00	(0.00)	0.00	(0.02)	0.03	(0.03)	0.03	(0.03)																																		
Hours of household work	30.88	(1.39)	27.43	(1.51)	29.76	(3.56)	-3.45*	(2.07)	-1.12	(3.75)	2.33	(3.64)																																		
Observations	233		170		37																																									
<i>Old adults (> 60 y/o)</i>																																														
Age	68.07	(0.61)	69.18	(0.69)	71.27	(2.47)	1.11	(0.92)	3.20*	(1.77)	2.09	(1.87)																																		
Female (d)	0.48	(0.05)	0.56	(0.05)	0.50	(0.11)	0.09	(0.07)	0.02	(0.12)	-0.06	(0.12)																																		
Years of education	5.10	(0.33)	7.06	(0.56)	7.41	(1.17)	1.96***	(0.62)	2.31**	(0.92)	0.35	(1.31)																																		
Participate in market work (d)	0.49	(0.05)	0.59	(0.05)	0.41	(0.11)	0.10	(0.07)	-0.08	(0.12)	-0.18	(0.12)																																		
Hours of market work	19.81	(2.23)	23.02	(2.39)	12.27	(3.72)	3.21	(3.28)	-7.54	(5.48)	-10.75**	(5.35)																																		
Participate in household work (d)	0.81	(0.04)	0.85	(0.04)	0.59	(0.11)	0.04	(0.05)	-0.22**	(0.10)	-0.26***	(0.09)																																		
Hours of household work	14.98	(1.39)	15.78	(1.55)	11.41	(3.66)	0.79	(2.08)	-3.57	(3.62)	-4.37	(3.70)																																		
Observations	122		98		22																																									

Source: Matching ENEMDU, December 2007 - December 2008. Notes: (d) stands for dummy variables. *p<0.1, **p<0.05, ***p<0.01.

Source: Banco Central de Ecuador.

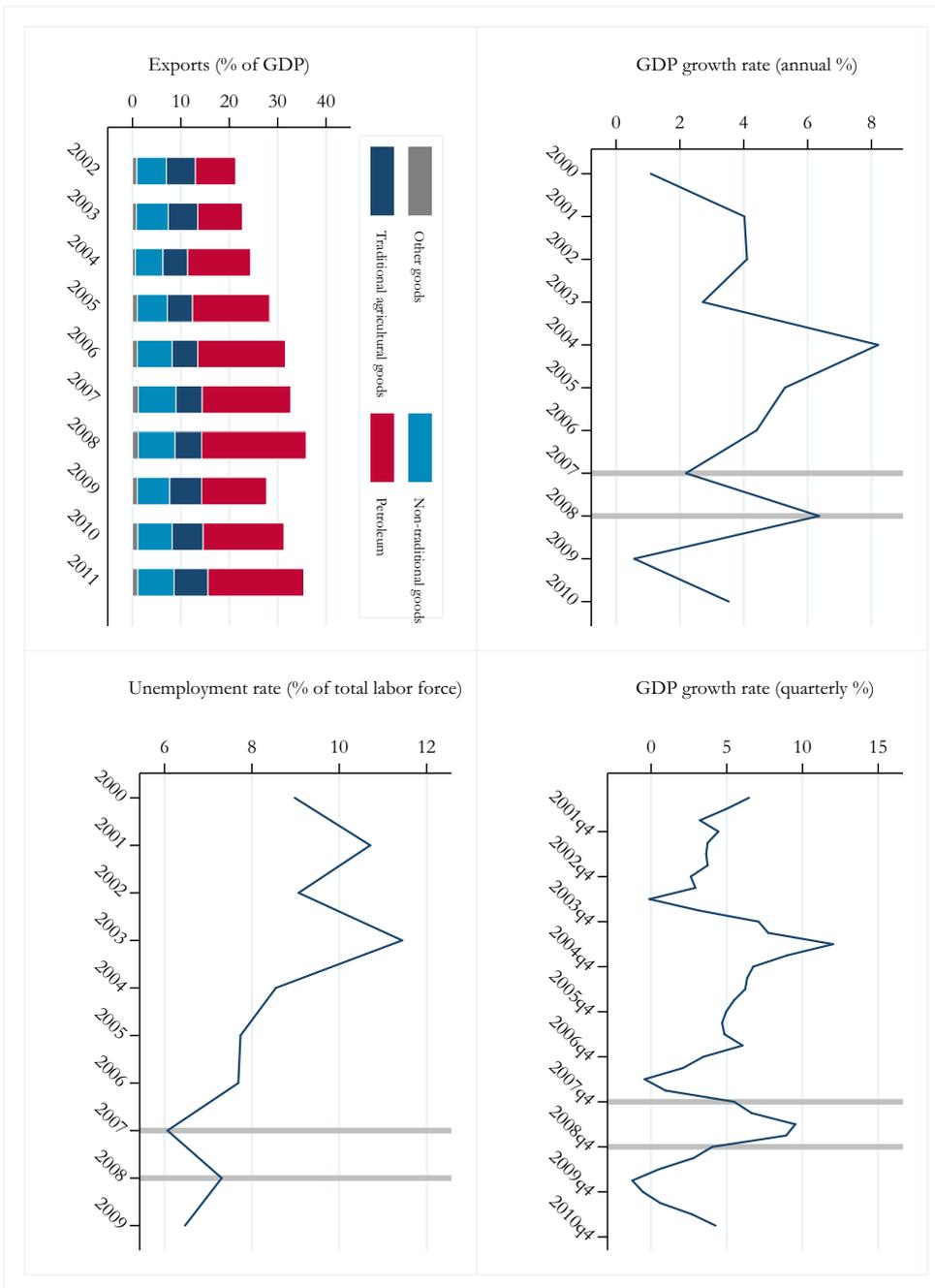


Figure 2.18: Evolution of Macroeconomic Variables in Ecuador (2000 - 2010)

**Table 2.10: Determinants of Non-attrition
Households and Individuals Surveyed in 2007**

	First stage: OLS ^a		Second Stage: LPM ^g			
	Households (1)	Individuals > 5 y/o ^b (2)	Children (5 - 19 y/o) ^c (3)	Adult Men (20 - 60 y/o) ^d (4)	Adult Women (20 - 60 y/o) ^e (5)	Old Adults (> 60 y/o) ^f (6)
Unemployment rate (%)	4.34 (6.21)	-	-	-	-	-
Remittances received	-	-0.04 (0.11)	-0.04 (0.21)	-0.11 (0.16)	0.11 (0.28)	-0.24 (0.18)
Female (d)	-	-0.01 (0.02)	-0.05 (0.03)	0.00 (0.00)	0.00 (0.00)	-0.05 (0.06)
Age	-	0.01*** (0.00)	-0.01 (0.03)	0.01 (0.01)	0.00 (0.01)	-0.18*** (0.05)
Age squared	-	-0.00** (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)
Years of education	-	-0.00* (0.00)	-0.00 (0.01)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.01)
Children under 4 y/o	-21.77 (31.75)	-0.00 (0.03)	-0.01 (0.13)	0.01 (0.04)	0.03 (0.07)	-0.07 (0.06)
Children btw. 5 - 19 y/o	93.20*** (14.02)	0.03 (0.10)	0.02 (0.19)	0.05 (0.09)	-0.09 (0.25)	0.16 (0.15)
Men btw. 20 - 60 y/o	-2.57 (10.07)	-0.02 (0.01)	-0.01 (0.03)	0.01 (0.07)	-0.01 (0.03)	0.01 (0.03)
Women btw. 20 - 60 y/o	0.40 (24.14)	-0.00 (0.01)	0.04 (0.04)	0.02 (0.04)	-0.02 (0.04)	-0.00 (0.05)
Adults over 61 y/o	74.68* (42.29)	-0.05 (0.08)	-0.06 (0.15)	-0.02 (0.09)	-0.19 (0.20)	0.21 (0.15)
Age of the hh head	-5.20*** (1.91)	0.00 (0.01)	-0.00 (0.01)	0.00 (0.01)	0.01 (0.02)	0.01 (0.00)
Years of education of the hh head	4.07* (2.13)	-0.00 (0.00)	-0.01 (0.01)	0.00 (0.00)	-0.01 (0.01)	0.03 (0.02)
Female hh head (d)	148.27*** (40.56)	-0.01 (0.16)	-0.06 (0.36)	0.05 (0.19)	-0.18 (0.36)	0.14 (0.11)
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	277.01*** (77.21)	0.79** (0.34)	1.10 (0.67)	0.75* (0.44)	0.28 (1.09)	7.14*** (1.91)
Observations	652	2253	735	490	647	381

Source: ENEMDU, December 2007. Notes: (d) stands for dummy variables. Notes: ^a Sample of households reporting at least 1 member living abroad in 2007. Dependent variable is the value of remittances received in 2007. 1% top outliers of the dependent variable were trimmed. All regressions include household and individual time varying characteristics. Robust Standard errors are clustered according to the location of migrants in 2007. *p<0.1, **p<0.05, ***p<0.01. ^b Sample of individuals (aged 5 y/o and over) from households reporting at least 1 member living abroad in 2007. ^c Sample of children (btw. 5 - 19 y/o) from households reporting at least 1 member living abroad in 2007. ^d Sample of men (btw. 20 - 60 y/o). ^e Sample of women (btw. 20 - 60 y/o). ^f Sample of adults (over 60 y/o). ^g Dependent variable is a dummy equal to 1 if the individual was interviewed in the two waves of the survey and 0 otherwise. Remittances received are estimated from Equations 2 - OLS (Column 1) and multiplied by minus one so they can be read as negative shocks.

Table 2.11: Estimations of Non-attrition, Unemployment and Remittances Households Surveyed in 2007

	Unemployment rate		Remittances	
	(1)	(2)	(3)	(4)
Non-attrition (d)	0.31**	-0.98	-1.10**	-3.50
	(0.12)	(0.80)	(0.53)	(2.16)
F-test of joint significance of interaction terms without the constant [P-value]		125.64		2490.77
		[0.00]		[0.00]
F-test of joint significance of interaction terms with the constant [P-value]		268.16		30503.18
		[0.00]		[0.00]
Observations	652	652	652	652

Source: ENEMDU, December 2007. Notes: (d) stands for dummy variables. Sample of households reporting at least one member living abroad in 2007. Dependent variable is a dummy equal to 1 if the individual was interviewed in the two waves of the survey and 0 otherwise. Columns 1 and 2 include as covariates unemployment rate in the countries hosting Ecuadorian migrants and household time varying characteristics. Columns 3 and 4 include as covariates remittances received and household time varying characteristics. Columns 2 and 4 also include the interactions between the non-attrition dummy and the full set of covariates and report the results of a F-test of joint significance of these terms. The null hypothesis that the non-attrition interaction coefficients are equal to zero. Robust Standard errors are clustered according to the location of migrants in 2007. *p<0.1, **p<0.05, ***p< 0.01.

Table 2.12 (cont.): Non-attrition and Labor Supply
Individuals Surveyed in 2007

	Market work				Household work			
	Participation		Time Allocation		Participation		Time Allocation	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Adult Women (20 - 60 y/o)</i>								
Non-attrition (d)	0.23** (0.11)	-1.91*** (0.36)	-10.79 (9.25)	-13.69*** (3.29)	0.59*** (0.08)	-0.15 (0.45)	8.60*** (2.41)	-30.65 (38.29)
F-test of joint significance of interaction terms without the constant [P-value]		24.46 [0.00]	28.77 [0.00]	59.21 [0.00]	36.82 [0.00]	2434.91 [0.00]	35.39 [0.00]	184.69 [0.00]
F-test of joint significance of interaction terms with the constant [P-value]		28.21 [0.00]	59.21 [0.00]	647 [0.00]	647 [0.00]	647 [0.00]	647 [0.00]	647 [0.00]
Observations	647	647	647	647	647	647	647	647
<i>Old adults (> 60 y/o)</i>								
Non-attrition (d)	0.08* (0.05)	0.58 (2.25)	-14.33*** (3.84)	33.63* (18.07)	0.35*** (0.05)	-1.24 (2.22)	-6.46** (2.66)	-18.42*** (5.74)
F-test of joint significance of interaction terms without the constant [P-value]		65.66 [0.00]	132.15 [0.00]	2169.54 [0.00]	161.30 [0.00]	251.74 [0.00]	400.11 [0.00]	761.37 [0.00]
F-test of joint significance of interaction terms with the constant [P-value]		53.36 [0.00]	2169.54 [0.00]	381 [0.00]	381 [0.00]	381 [0.00]	381 [0.00]	381 [0.00]
Observations	381	381	381	381	381	381	381	381

Source: ENEMDU, December 2007. Notes: (d) stands for dummy variables; Samples of individuals living in households reporting at least one member living abroad in 2007. Columns 1 and 2 include as covariates a dummy equal to 1 if the individual spent at least 1 hour in market work and 0 otherwise and individual and household time varying characteristics. Columns 3 and 4 include as covariates hours per week allocated to market work and individual and household time varying characteristics. Columns 5 and 6 include as covariates a dummy equal to 1 if the individual spent at least 1 hour in household work and 0 otherwise and individual and household time varying characteristics. Columns 7 and 8 include as covariates hours per week allocated to household work and individual and household time varying characteristics. Columns 2, 4 and 6 also include the interactions between the non-attrition dummy and the full set of covariates and report the results of a F-test of joint significance of these terms. The null hypothesis that the non-attrition interaction coefficients are equal to zero. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. *p<0.1, **p<0.05, ***p<0.01.

Table 2.13: Labor Supply Outcomes (Individuals > 5 y/o) and Unemployment by Remittances Status

	Hhs not receiving remittances ($Rem = 0$)				Hhs receiving remittances ($Rem = 0$)				χ^2 -test remittances coefficients [P-value]			
	Market work		Household work		Market work		Household work		Market work		Household work	
	Participation (d)	Time allocation (2)	Participation (d)	Time allocation (4)	Participation (d)	Time allocation (6)	Participation (d)	Time allocation (8)	Participation (d)	Time allocation (10)	Participation (d)	Time allocation (12)
LPM												
κ	0.011 (0.010)	-	0.007 (0.006)	-	0.011** (0.008)	-	0.010* (0.006)	-	0.19 [0.025]	-	2.80 [0.09]	-
κ	-	0.72 (0.51)	-	0.57 (0.38)	-	0.82** (0.38)	-	0.39** (0.18)	-	0.33 [0.00]	-	1.23 [0.02]
OLS												
κ	-	0.72 (0.51)	-	0.57 (0.38)	-	0.82** (0.38)	-	0.39** (0.18)	-	0.33 [0.00]	-	1.23 [0.02]
Quantile Regression												
$\kappa_{p0.40}$	-	1.11 (0.69)	-	0.18 (0.17)	-	-0.03 (0.16)	-	0.90** (0.45)	-	0.79 [0.37]	-	2.46 [0.01]
$\kappa_{p0.50}$	-	0.81 (0.65)	-	0.30 (0.19)	-	-0.00 (0.29)	-	1.17*** (0.44)	-	0.21 [0.65]	-	1.12 [0.29]
$\kappa_{p0.60}$	-	0.53 (0.53)	-	0.59 (0.41)	-	0.76* (0.39)	-	1.20*** (0.46)	-	0.66 [1.57]	-	2.02 [0.10]
$\kappa_{p0.70}$	-	0.79 (0.52)	-	0.53 (0.53)	-	0.84** (0.39)	-	1.08* (0.57)	-	0.87 [0.03]	-	0.09 [0.77]
$\kappa_{p0.80}$	-	0.58 (0.83)	-	0.64 (0.62)	-	0.71* (0.38)	-	-0.11 (0.88)	-	0.37 [2.14]	-	1.44 [0.57]
$\kappa_{p0.90}$	-	0.82 (0.82)	-	1.13 (0.83)	-	0.69* (0.38)	-	0.32 (1.50)	-	0.65 [0.96]	-	0.24 [0.56]
Observations	1079	1066	1079	1066	661	1066	654	1066	654	1066	1066	1066

Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of households reporting at least 1 member living abroad in 2007. Columns 1 - 4 present unemployment rate coefficients estimated from Equations (2.4) and (2.4'), among households not receiving remittances in 2007 ($Rem(d) = 0$). Similarly, columns 5 - 8 present unemployment rate coefficients estimated from the same equations but among households receiving remittances in 2007 ($Rem(d) = 1$). Columns 9 - 12 present χ^2 and P-value for testing whether each pair of coefficients $\kappa_{ct}(Rem(d)=0)$ and $\kappa_{ct}(Rem(d)=1)$ are statistically different. In the even columns the dependent variable is a dummy equal to 1 if the individuals spent at least 1 hour in market / household chores in the period of reference (last week) and in the odd columns it is the hours per week allocated to these activities. Remittances received are estimated from Equation (2.3) - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual level time varying covariates. Robust Standard errors, in parentheses, are clustered according to the location of migrants in 2007. (d) stands for dummy variables. *p<0.1, **p<0.05, ***p<0.01.

Table 2.14: Households Surveyed in September - December 2007
First and Second Stage Regressions

	First stage		Second stage		
	Remittances received	Market work		Household work	
		Participation (d)	Time allocation	Participation (d)	Time allocation
	(1)	(2)	(3)	(4)	(5)
Households					
<i>Unemployment rate (%)</i>					
OLS					
γ_{ols}	49.58 (36.13)	-	-	-	-
Quantile Regression					
$\gamma_{p0.65}$	13.29 (20.85)	-	-	-	-
$\gamma_{p0.75}$	34.04 (47.76)	-	-	-	-
$\gamma_{p0.85}$	72.31 (59.75)	-	-	-	-
$\gamma_{p0.95}$	26.53 (29.15)	-	-	-	-
Observations	191	-	-	-	-
Individuals > 5 y/o					
<i>Remittances received (predicted)</i>					
LPM					
β	-	0.017 (0.011)	-	0.002 (0.014)	-
OLS					
β	-	-	5.60 (5.11)	-	-1.26 (4.45)
Quantile Regression					
$\beta_{p0.50}$	-	-	5.01 (3.41)	-	2.41 (17.98)
$\beta_{p0.60}$	-	-	2.39 (2.59)	-	1.13 (2.19)
$\beta_{p0.70}$	-	-	2.22 (3.34)	-	3.10 (3.26)
$\beta_{p0.80}$	-	-	1.57 (4.62)	-	-4.65 (3.5)
$\beta_{p0.90}$	-	-	1.82 (5.98)	-	-2.34 (4.54)
Observations	-	539	533	539	533

Source: Matching ENEMDU, September - December 2007. Notes: ^a Sample of households surveyed in September and December of 2007 and reporting at least 1 member living abroad in December. ^b Sample of individuals over 5 y/o surveyed in September and December of 2007 and reporting at least 1 member living abroad in December. Column 1 presents γ coefficients estimated from Equation (2.3) using OLS and Equation (2.3') using Quantile Regression at percentiles 0.65, 0.75, 0.85 and 0.95. Columns 2 - 5 summarize second stage estimations of labor supply outcomes and remittances received (Equation (2.2) using OLS / LPM and Equation (2.2') using Quantile Regression p 0.40 - p 0.90). Remittances are predicted from Equation (2.3') at percentile 0.75 and multiplied by minus one so they can be read as negative shocks. In Columns 2 and 4 dependent variable is a dummy equal to 1 if the individuals spent at least 1 hour in market / household chores in the period of reference (last week) and in Columns 3 and 5 it is the hours per week allocated to these activities. All regressions include household and individual level time varying covariates. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. *p<0.1, **p<0.05, ***p<0.01.

Table 2.15: IPW-Correction Estimates
First and Second Stage Regressions

	First stage: OLS	Second stage: LPM / OLS			
	Remittances received	Market work		Household work	
	(1)	Participation (d)	Time allocation	Participation (d)	Time allocation
	(1)	(2)	(3)	(4)	(5)
Households^a					
Unemployment rate (%)	-28.78*** (3.14)	-	-	-	-
Observations	1094	-	-	-	-
χ^2 -test unemployment coefficients [P-value]	1.86 [0.17]	-	-	-	-
Individuals > 5 y/o^b					
Remittances received	-	0.040* (0.020)	2.34** (0.92)	0.040** (0.019)	1.27 (0.89)
Observations	-	3336	3336	3336	3336
χ^2 -test remittances coefficients [P-value]	-	1.647 [0.199]	0.00 [0.97]	0.367 [0.545]	1.91 [0.17]
Children (5 - 19 y/o)^c					
Remittances received	-	0.023 (0.022)	0.53 (0.72)	0.053* (0.030)	0.24 (0.77)
Observations	-	1044	1044	1044	1044
χ^2 -test remittances coefficients [P-value]	-	0.022 [0.882]	0.20 [0.66]	4.945 [0.621]	9.60 [0.20]
Adult men (20 - 60 y/o)^d					
Remittances received	-	0.091** (0.049)	4.30 (3.04)	0.069 (0.075)	3.10* (1.88)
Observations	-	728	728	728	728
χ^2 -test remittances coefficients [P-value]	-	3.992 [0.460]	2.06 [0.15]	1.055 [0.304]	0.24 [0.62]

Table 2.15 (cont.): IPW-Correction Estimates
First and Second Stage Regressions

	First stage: OLS		Second stage: LPM / OLS		
	Remittances received	Market work		Household work	
		(1)	Participation (d) (2)	Time allocation (3)	Participation (d) (4)
Adult women (20 - 60 y/o)^e					
Remittances received	-	0.034 (0.035)	3.51** (1.44)	0.013 (0.017)	1.58 (2.07)
Observations	-	996	996	996	996
χ^2 -test remittances coefficients [P-value]	-	1.641 [0.200]	0.37 [0.54]	0.023 [0.880]	0.53 [0.47]
Old adults(> 60 y/o)^f					
Remittances received	-	0.022 (0.049)	3.42† (2.21)	-0.011 (0.067)	0.20 (2.53)
Observations	-	568	568	568	568
χ^2 -test remittances coefficients [P-value]	-	0.104 [0.747]	0.00 [0.98]	0.011 [0.915]	1.26 [0.26]

Source: Matching ENEMDU, December 2007 - December 2008. Notes: ^a Sample of households reporting at least 1 member living abroad in 2007. ^b Sample of individuals over 5 y/o living in households reporting at least 1 member living abroad in 2007. ^c Sample of children btw. 5 and 19 y/o living in households reporting at least 1 member living abroad in 2007. ^d Sample of men btw. 20 and 60 y/o living in households reporting at least 1 member living abroad in 2007. ^e Sample of women btw. 20 and 60 y/o living in households reporting at least 1 member living abroad in 2007. ^f Sample of adults over 60 y/o living in households reporting at least 1 member living abroad in 2007. Column 1 presents unemployment rate coefficient estimated from Equation (2.3) using OLS. Columns 2 - 5 summarize Second stage (LPM / OLS) estimations of labor supply outcomes and remittances received (Equation (2.2)), predicted from Equation (2.3) using OLS and multiplied by minus one so they can be read as negative shocks. In Columns 2 and 4 the dependent variable is a dummy equal to 1 if the individuals spent at least 1 hour in market / household chores in the period of reference (last week). In Columns 3 and 5 the dependent variable is the hours per week allocated to these activities. All regressions include household and individual level time varying covariates. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. Observations are weighted by the inverse of the predicted probability of non-attrition. At the bottom of the table I report the results of a χ^2 -test of the difference between these new IPW remittances coefficients and the ones not accounting for attrition (Tables A-2.2 - A-2.6). The null hypothesis is that the coefficients are not different from each other. (d) stands for dummy variables. *p<0.1, **p<0.05, ***p<0.01. † P-value = 0.122

Appendix

Table A-2.1: Remittances Regressions - First Stage and Extensive Margin Households with Migrants

	Value ^a				OLS	Participation
	Quantile Regression					(d) ^b
	p 0.65 (1)	p 0.75 (2)	p 0.85 (3)	p 0.95 (4)	(5)	LPM (6)
Unemployment rate (%)	-15.70*** (4.78)	-55.50*** (6.80)	-62.42*** (12.62)	-22.00† (15.15)	-27.91*** (2.67)	-0.03*** (0.00)
Children under 4 y/o	-16.80 (12.39)	-119.54 (78.01)	-95.11 (62.51)	109.59 (186.04)	-74.92*** (15.79)	-0.11*** (0.01)
Children btw. 5 - 17 y/o	17.55 (20.43)	61.37 (57.94)	38.44 (69.10)	164.91** (82.72)	60.43 (40.71)	0.06 (0.05)
Men btw. 20 - 60 y/o	17.71 (27.78)	62.60** (26.87)	44.22 (107.06)	78.12 (145.49)	21.85 (31.06)	-0.04 (0.04)
Women btw. 20 - 60 y/o	4.74 (19.05)	54.09 (62.88)	92.90 (115.79)	80.38 (138.09)	41.26 (27.33)	0.02 (0.03)
Adults over 60 y/o	7.20 (50.47)	-47.62 (170.80)	-195.55 (189.21)	337.88* (188.68)	-50.15 (90.80)	0.14*** (0.05)
Age of the hh head	-3.82 (4.21)	-7.52 (6.72)	-10.29*** (3.75)	-2.08 (2.49)	-7.50*** (2.06)	-0.01*** (0.00)
Years of education of the hh head	27.89 (196.27)	-135.96 (267.07)	-100.75 (153.45)	-54.35 (336.83)	-48.43 (107.50)	-0.05 (0.04)
Female hh head (d)	2.24 (1.54)	1.28 (2.57)	-8.45 (6.10)	-1.48 (22.91)	-1.22 (2.98)	0.00 (0.00)
Observations	541	541	541	541	541	547
R ²	0.07	0.09	0.10	0.05	0.11	0.10

Source: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of households reporting at least one member living abroad in 2007. ^a Dependent variable is the value of remittances received. ^b Dependent variable is a dummy equal to 1 if the household received remittances. All regressions include household level covariates. (d) stands for dummy variables. Robust Standard errors (in parenthesis) are clustered according to the location of migrants in 2007. In Columns 2 to 5, 1% top outliers of the dependent variable were trimmed. *p<0.1, **p<0.05, ***p<0.01. † P-value = 0.147.

Table A-2.2: Labor Supply - Individuals Aged 5 y/o and Over
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
A. First stage: OLS				
<i>Second Stage: LPM</i>				
β	0.037* (0.021)	- -	0.041** (0.019)	- -
<i>Second Stage: OLS</i>				
β	-	2.34** (0.95)	-	1.39 (0.91)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	-	-	-	0.16 (0.23)
$\beta_{p0.20}$	-	-	-	0.36 (0.51)
$\beta_{p0.30}$	-	-	-	0.18 (0.66)
$\beta_{p0.40}$	-	2.28* (1.17)	-	1.47* (0.79)
$\beta_{p0.50}$	-	2.67* (1.42)	-	1.95** (0.78)
$\beta_{p0.60}$	-	2.99** (1.25)	-	2.91*** (0.76)
$\beta_{p0.70}$	-	1.36 (1.19)	-	2.90*** (0.95)
$\beta_{p0.80}$	-	2.03 (1.80)	-	2.81** (1.26)
$\beta_{p0.90}$	-	4.86** (2.02)	-	0.34 (2.02)
B. First stage: Quantile Regression p 0.65				
<i>Second Stage: LPM</i>				
β	0.065* (0.037)	- -	0.074** (0.034)	- -
<i>Second Stage: OLS</i>				
β	-	4.17** (1.70)	-	2.47 (1.61)

Table A-2.2 (cont.): Labor Supply - Individuals Aged 5 y/o and Over
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	-	-	-	0.28 (0.40)
$\beta_{p0.20}$	-	-	-	0.64 (0.91)
$\beta_{p0.30}$	-	-	-	0.33 (1.18)
$\beta_{p0.40}$	-	4.05* (2.08)	-	2.62* (1.41)
$\beta_{p0.50}$	-	4.74* (2.52)	-	3.46** (1.38)
$\beta_{p0.60}$	-	5.31** (2.22)	-	5.17*** (1.35)
$\beta_{p0.70}$	-	2.42 (2.12)	-	5.15*** (1.70)
$\beta_{p0.80}$	-	3.60 (3.20)	-	4.99** (2.25)
$\beta_{p0.90}$	-	8.64** (3.58)	-	0.61 (3.60)
C. First stage: Quantile Regression p 0.75				
<i>Second Stage: LPM</i>				
β	0.018* (0.011)	-	0.021** (0.010)	-
<i>Second Stage: OLS</i>				
β	-	1.18** (0.48)	-	0.70 (0.46)

Table A-2.2 (cont.): Labor Supply - Individuals Aged 5 y/o and Over
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	-	-	-	0.08 (0.11)
$\beta_{p0.20}$	-	-	-	0.18 (0.26)
$\beta_{p0.30}$	-	-	-	0.09 (0.33)
$\beta_{p0.40}$	-	1.15* (0.59)	-	0.74* (0.40)
$\beta_{p0.50}$	-	1.34* (0.71)	-	0.98** (0.39)
$\beta_{p0.60}$	-	1.50** (0.63)	-	1.46*** (0.38)
$\beta_{p0.70}$	-	0.68 (0.60)	-	1.46*** (0.48)
$\beta_{p0.80}$	-	1.02 (0.90)	-	1.41** (0.64)
$\beta_{p0.90}$	-	2.45** (1.01)	-	0.17 (1.02)
D. First stage: Quantile Regression p 0.85				
<i>Second Stage: LPM</i>				
β	0.016* (0.009)	-	0.019** (0.009)	-
<i>Second Stage: OLS</i>				
β	-	1.05** (0.43)	-	0.62 (0.41)

**Table A-2.2 (cont.): Labor Supply - Individuals Aged 5 y/o and Over
Remittances Coefficients (Second Stage)**

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	-	-	-	0.07
	-	-	-	(0.10)
$\beta_{p0.20}$	-	-	-	0.16
	-	-	-	(0.23)
$\beta_{p0.30}$	-	-	-	0.08
	-	-	-	(0.30)
$\beta_{p0.40}$	-	1.02*	-	0.66*
	-	(0.52)	-	(0.35)
$\beta_{p0.50}$	-	1.19*	-	0.87**
	-	(0.63)	-	(0.35)
$\beta_{p0.60}$	-	1.34**	-	1.30***
	-	(0.56)	-	(0.34)
$\beta_{p0.70}$	-	0.61	-	1.30***
	-	(0.53)	-	(0.43)
$\beta_{p0.80}$	-	0.91	-	1.25**
	-	(0.80)	-	(0.57)
$\beta_{p0.90}$	-	2.17**	-	0.15
	-	(0.90)	-	(0.90)

Source: Matching ENEMDU, December 2007 - December 2008. Notes: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of individuals (aged 5 y/o and over) living in households reporting at least 1 member living abroad in 2007. ^a Dependent variable is a dummy equal to 1 if the individuals worked at least 1 hour in the period of reference (last week). ^b Dependent variable is the hours per week allocated to market work. ^c Dependent variable is a dummy equal to 1 if the individuals spent at least 1 hour in household chores the period of reference (last week). ^d Dependent variable is the hours per week allocated to household work. Panel A, remittances received are estimated from Equation (2.3) - OLS, and multiplied by minus one so they can be read as negative shocks. In Panel B, remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.65, and multiplied by minus one so they can be read as negative shocks. In Panel C, remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. In Panel D, remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.85, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual time varying covariates. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. In Columns 2 and 4 1% top outliers of the dependent variable were trimmed. (d) stands for dummy variables. *p<0.1, **p<0.05, ***p<0.01.

Table A-2.3: Labor Supply - Children
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
A. First stage: OLS				
<i>Second Stage: LPM</i>				
β	0.023 (0.022)	- -	0.054* (0.031)	- -
<i>Second Stage: OLS</i>				
β	- -	0.48 (0.78)	- -	0.14 (0.81)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.20}$	- -	- -	- -	0.10 (0.29)
$\beta_{p0.30}$	- -	- -	- -	0.55* (0.29)
$\beta_{p0.40}$	- -	- -	- -	0.99*** (0.34)
$\beta_{p0.50}$	- -	- -	- -	1.02** (0.45)
$\beta_{p0.60}$	- -	- -	- -	0.69 (0.64)
$\beta_{p0.70}$	- -	0.05 (0.43)	- -	0.12 (0.83)
$\beta_{p0.80}$	- -	0.47 (0.64)	- -	0.76 (1.20)
$\beta_{p0.90}$	- -	1.32 (1.49)	- -	0.11 (1.85)

**Table A-2.3 (cont.): Labor Supply - Children
Remittances Coefficients (Second Stage)**

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
B. First stage: Quantile Regression p 0.75				
<i>Second Stage: LPM</i>				
β	0.015 (0.014)	- -	0.034* (0.020)	- -
<i>Second Stage: OLS</i>				
β	- -	0.31 (0.50)	- -	0.09 (0.51)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.20}$	- -	- -	- -	0.06 (0.13)
$\beta_{p0.30}$	- -	- -	- -	0.35* (0.18)
$\beta_{p0.40}$	- -	- -	- -	0.63*** (0.22)
$\beta_{p0.50}$	- -	- -	- -	0.65** (0.28)
$\beta_{p0.60}$	- -	- -	- -	0.44 (0.40)
$\beta_{p0.70}$	- -	0.03 (0.27)	- -	0.08 (0.53)
$\beta_{p0.80}$	- -	0.30 (0.41)	- -	0.49 (0.77)
$\beta_{p0.90}$	- -	0.84 (0.95)	- -	0.07 (1.18)
Observations	516	511	516	511

Source: Matching ENEMDU, December 2007 - December 2008. Notes: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of children aged btw. 5 - 19 y/o from households reporting at least 1 member living abroad in 2007. ^a Dependent variable is a dummy equal to 1 if the individuals worked at least 1 hour in the period of reference (last week). ^b Dependent variable is the hours per week allocated to market work. ^c Dependent variable is a dummy equal to 1 if the individuals spent at least 1 hour in household chores the period of reference (last week). ^d Dependent variable is the hours per week allocated to household work. In Panel A, remittances received are estimated from Equation (2.3) - OLS, and multiplied by minus one so they can be read as negative shocks. In Panel B, remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual level time varying covariates. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. In Columns 2 and 4 1% top outliers of the dependent variable were trimmed. (d) stands for dummy variables. *p<0.1, **p<0.05, ***p<0.01.

Table A-2.4: Labor Supply - Adult Men
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
A. First stage: OLS				
<i>Second Stage: LPM</i>				
β	0.081*	-	0.084	-
	(0.044)	-	(0.074)	-
<i>Second Stage: OLS</i>				
β	-	3.47	-	3.27*
	-	(2.88)	-	(1.88)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	-	12.40**	-	-
	-	(5.15)	-	-
$\beta_{p0.20}$	-	6.34	-	-
	-	(4.83)	-	-
$\beta_{p0.30}$	-	5.67	-	0.92
	-	(4.35)	-	(0.77)
$\beta_{p0.40}$	-	2.82	-	0.71
	-	(3.82)	-	(1.10)
$\beta_{p0.50}$	-	3.30	-	3.21**
	-	(3.10)	-	(1.44)
$\beta_{p0.60}$	-	0.60	-	2.02
	-	(3.44)	-	(1.67)
$\beta_{p0.70}$	-	-1.34	-	4.19*
	-	(3.99)	-	(2.27)
$\beta_{p0.80}$	-	0.35	-	3.89
	-	(4.61)	-	(3.05)
$\beta_{p0.90}$	-	4.93	-	3.53
	-	(5.00)	-	(4.74)

Table A-2.4 (cont.): Labor Supply - Adult Men
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
B. First stage: Quantile Regression p 0.75				
<i>Second Stage: LPM</i>				
β	0.043*	-	0.044	-
	(0.023)	-	(0.039)	-
<i>Second Stage: OLS</i>				
$\beta_{p0.10}$	-	1.83	-	1.73*
	-	(1.52)	-	(0.99)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	-	6.54**	-	-
	-	(2.71)	-	-
$\beta_{p0.20}$	-	3.34	-	-
	-	(2.55)	-	-
$\beta_{p0.30}$	-	2.99	-	0.49
	-	(2.29)	-	(0.41)
$\beta_{p0.40}$	-	1.49	-	0.38
	-	(2.02)	-	(0.58)
$\beta_{p0.50}$	-	1.74	-	1.69**
	-	(1.63)	-	(0.76)
$\beta_{p0.60}$	-	0.32	-	1.07
	-	(1.81)	-	(0.88)
$\beta_{p0.70}$	-	-0.71	-	2.21*
	-	(2.10)	-	(1.20)
$\beta_{p0.80}$	-	0.18	-	2.05
	-	(2.43)	-	(1.61)
$\beta_{p0.90}$	-	2.60	-	1.86
	-	(2.63)	-	(2.50)
Observations	360	351	360	351

Source: Matching ENEMDU, December 2007 - December 2008. Notes: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of men aged btw. 20 - 60 y/o from households reporting at least 1 member living abroad in 2007. ^a Dependent variable is a dummy equal to 1 if the individuals worked at least 1 hour in the period of reference (last week). ^b Dependent variable is the hours per week allocated to market work. ^c Dependent variable is a dummy equal to 1 if the individuals spent at least 1 hour in household chores the period of reference (last week). ^d Dependent variable is the hours per week allocated to household work. In Panel A, remittances received are estimated from Equation (2.3) - OLS, and multiplied by minus one so they can be read as negative shocks. In Panel B, remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual level time varying covariates. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. In Columns 2 and 4 1% top outliers of the dependent variable were trimmed. (d) stands for dummy variables. *p<0.1, **p<0.05, ***p<0.01.

Table A-2.5: Labor Supply -Adult Women
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
A. First stage: OLS				
<i>Second Stage: LPM</i>				
β	0.027 (0.036)	- -	0.012 (0.016)	- -
<i>Second Stage: OLS</i>				
β	- -	3.31** (1.47)	- -	1.72 (2.13)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	- -	- -	- -	0.88 (2.16)
$\beta_{p0.20}$	- -	- -	- -	2.28 (1.89)
$\beta_{p0.30}$	- -	-0.10 (1.30)	- -	4.34** (2.06)
$\beta_{p0.40}$	- -	1.90 (2.85)	- -	4.02* (2.39)
$\beta_{p0.50}$	- -	1.53 (2.89)	- -	4.67* (2.61)
$\beta_{p0.60}$	- -	5.09 (3.25)	- -	4.38 (2.73)
$\beta_{p0.70}$	- -	1.40 (3.15)	- -	1.84 (3.15)
$\beta_{p0.80}$	- -	5.65* (2.95)	- -	0.18 (3.12)
$\beta_{p0.90}$	- -	11.68** (4.76)	- -	-2.91 (5.45)

Table A-2.5 (cont.): Labor Supply -Adult Women
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
B. First stage: Quantile Regression p 0.75				
<i>Second Stage: LPM</i>				
β	0.015 (0.020)	- -	0.007 (0.009)	- -
<i>Second Stage: OLS</i>				
β	- -	1.87** (0.83)	- -	0.97 (1.20)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	-	- -	- -	0.50 (1.22)
$\beta_{p0.20}$	-	- -	- -	1.29 (1.07)
$\beta_{p0.30}$	- -	-0.06 (0.73)	- -	2.45** (1.16)
$\beta_{p0.40}$	- -	1.07 (1.61)	- -	2.27* (1.35)
$\beta_{p0.50}$	- -	0.87 (1.63)	- -	2.64* (1.47)
$\beta_{p0.60}$	- -	2.88 (1.84)	- -	2.48 (1.54)
$\beta_{p0.70}$	- -	0.79 (1.78)	- -	1.04 (1.78)
$\beta_{p0.80}$	- -	3.20* (1.67)	- -	0.10 (1.77)
$\beta_{p0.90}$	- -	6.61** (2.69)	- -	-1.65 (3.09)
Observations	493	489	493	489

Source: Matching ENEMDU, December 2007 - December 2008. Notes: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of women aged btw. 20 - 60 y/o from households reporting at least 1 member living abroad in 2007. ^a Dependent variable is a dummy equal to 1 if the individuals worked at least 1 hour in the period of reference (last week). ^b Dependent variable is the hours per week allocated to market work. ^c Dependent variable is a dummy equal to 1 if the individuals spent at least 1 hour in household chores the period of reference (last week). ^d Dependent variable is the hours per week allocated to household work. In Panel A, remittances received are estimated from Equation (2.3) - OLS, and multiplied by minus one so they can be read as negative shocks. In Panel B, remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual level time varying covariates. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. In Columns 2 and 4 1% top outliers of the dependent variable were trimmed. (d) stands for dummy variables. *p<0.1, **p<0.05, ***p<0.01.

Table A-2.6: Labor Supply - Adults over 60 y/o
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
A. First stage: OLS				
<i>Second Stage: LPM</i>				
β	0.017 (0.052)	- -	-0.012 (0.069)	- -
<i>Second Stage: OLS</i>				
β	- -	3.40 (2.30)	- -	0.61 (2.46)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	- -	- -	- -	-0.08 (1.25)
$\beta_{p0.20}$	- -	- -	- -	0.02 (1.52)
$\beta_{p0.30}$	- -	-0.00 (2.10)	- -	-0.49 (1.61)
$\beta_{p0.40}$	- -	-1.14 (3.31)	- -	0.19 (1.84)
$\beta_{p0.50}$	- -	2.75 (4.08)	- -	0.31 (2.11)
$\beta_{p0.60}$	- -	3.67 (4.28)	- -	0.15 (2.59)
$\beta_{p0.70}$	- -	2.73 (4.02)	- -	0.21 (2.93)
$\beta_{p0.80}$	- -	9.39* (4.88)	- -	1.03 (4.01)
$\beta_{p0.90}$	- -	6.32 (7.50)	- -	-1.74 (6.29)

Table A-2.6 (cont.): Labor Supply - Adults over 60 y/o
Remittances Coefficients (Second Stage)

	Market work		Household work	
	Participation (d) ^a (1)	Time allocation ^b (2)	Participation (d) ^c (3)	Time allocation ^d (4)
B. First stage: Quantile Regression p 0.75				
<i>Second Stage: LPM</i>				
β	0.009 (0.029)	- -	-0.007 (0.039)	- -
<i>Second Stage: OLS</i>				
β	- -	1.93 (1.30)	- -	0.35 (1.39)
<i>Second Stage: Quantile Regression</i>				
$\beta_{p0.10}$	- -	- -	- -	-0.05 (0.71)
$\beta_{p0.20}$	- -	- -	- -	0.01 (0.86)
$\beta_{p0.30}$	- -	-0.00 (1.19)	- -	-0.28 (0.91)
$\beta_{p0.40}$	- -	-0.65 (1.88)	- -	0.11 (1.04)
$\beta_{p0.50}$	- -	1.56 (2.32)	- -	0.18 (1.19)
$\beta_{p0.60}$	- -	2.08 (2.43)	- -	0.08 (1.47)
$\beta_{p0.70}$	- -	1.55 (2.28)	- -	0.12 (1.66)
$\beta_{p0.80}$	- -	5.33* (2.77)	- -	0.58 (2.28)
$\beta_{p0.90}$	- -	3.59 (4.26)	- -	-0.99 (3.57)
Observations	281	277	281	277

Source: Matching ENEMDU, December 2007 - December 2008. Notes: Matching ENEMDU, December 2007 - December 2008. Notes: Sample of adults over 60 y/o from households reporting at least 1 member living abroad in 2007. ^a Dependent variable is a dummy equal to 1 if the individuals worked at least 1 hour in the period of reference (last week). ^b Dependent variable is the hours per week allocated to market work. ^c Dependent variable is a dummy equal to 1 if the individuals spent at least 1 hour in household chores the period of reference (last week). ^d Dependent variable is the hours per week allocated to household work. In Panel A, remittances received are estimated from Equation (2.3) - OLS, and multiplied by minus one so they can be read as negative shocks. In Panel B, remittances received are estimated from Equation (2.3') - Quantile Regression at percentile 0.75, and multiplied by minus one so they can be read as negative shocks. All regressions include household and individual level time varying covariates. Robust Standard errors, in parentheses, are clustered at the household level and according to the location of migrants in 2007. In Columns 2 and 4 1% top outliers of the dependent variable were trimmed. (d) stands for dummy variables. *p<0.1, **p<0.05, ***p<0.01.

Intra-household Income Transfers and its Effects on Children's Nutrition and Health in Peru

Abstract

This chapter exploits the expansion of a non-contributory pension program in Peru, *Pensión 65*, to investigate whether government subsidies to the elderly contribute to enhance the monetary spending of households with young children, and to what extent this is reflected in an improvement of the health and nutrition status of this population. Using a regression discontinuity design, built on the discontinuity introduced by the age eligibility requirement of the program, I find that *Pensión 65* eligible households with young children increase monetary spending by 75% the value of the subsidy. This additional income shows up in more purchases of vegetables and grains (legumes) and an increase of health expenses. In parallel, co-resident children of these ages show significantly better nutrition and health outcomes. These findings are in line with previous research on the re-distributive effects of subsidies to the elderly in developing countries, supporting the hypothesis that households do not function as unitary entities and old-age adults can be major decision-makers playing a key role in channeling investments towards young children.

3.1 Introduction

Low levels of investment in children have far-reaching consequences for development. Child malnutrition is a very serious health problem in developing countries, and the main cause of child mortality (Bank, 2006). For survivors, inadequate nutrition and diseases during early childhood carry long-term effects on physical development and cognitive skills, and therefore impact their productivity later in life.¹ In developing countries, income constraints are expected to play an essential role in determining the quantity, the quality and the diversity of food spending and access to health care services. At the same time, research has shown that cash transfer programs are effective ways to improve children's nutrition and health.²

Still, little evidence exists documenting the relationship between household spending composition and children outcomes, and studies simultaneously assessing the impact of cash transfers on both are very scarce. In this chapter, I seek to contribute to this discussion by investigating whether an old-age cash transfer program implemented in Peru improves monetary spending of households with young children, and to what extent it enhances the nutrition and health outcomes of this population.

The intervention, known as *Programa Nacional de Asistencia Solidaria - Pensión 65*, is an ambitious government initiative targeted to extremely poor adults over 65 years old with no access to the contributory pension system. It was launched in 2011 covering only 20% of the Peruvian districts and 7% of the eligible population. However, it expanded rapidly, and by the end of 2013 it was fully operating in most of the territory, with 64% of the eligible population receiving the subsidy by the end of 2015.³ The program fixed payments at 125 Soles per adult per month (approximately 24 US Dollars), which is equivalent to 23% of the per capita national household expenditure and represents two times the pension income received by an average 65 year old in Peru.

Despite the relevance of this policy, very few studies are known to relieve its impacts. Galiani and Gertler (2016) evaluate the effects of *Pensión 65* on various dimensions of user well-being (like labor supply, health status, income and consumption), using a regression discontinuity

¹See Balazs *et al.* (1986); Barker (1990), Case and Paxson (2008), Fernald *et al.* (2008), Grantham-McGregor *et al.* (2017), Kremer and Miguel (2004), Case and Paxson (2008) and Strauss and Thomas (1998) among others.

²See for instance: Ahmed *et al.* (2009) and Baulch (2011) on Bangladesh; S Morris *et al.* (2004) on Brazil; Attanasio *et al.* (2005) on Colombia; ? and Case and Paxson (2008) on Ecuador; S Morris *et al.* (2004) on Honduras; Sinha and Yoong (2009) on India; Behrman and Hoddinott (2005), Fernald *et al.* (2008), Gertler (2004) and JA *et al.* (2004) on Mexico; Macours *et al.* (2012) and Maluccio and Flores (2005) on Nicaragua; Himaz (2008) on Sri Lanka and Duflo (2000, 2003) and Agüero *et al.* (2006) on South Africa. Manley (2012) review the findings from these studies.

³Author calculations based on official coverage reports and total eligible population according to 2015 *Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza (ENAHOG - 2015)*.

design based on the discontinuity generated by the poverty index of households that defines, among other factors, eligibility. Results show that the program reduces depression and hours of paid work and increases household consumption by 40%, of which 67% in food. In addition, the works of [Novella and Olivera \(2014\)](#) and [Olivera and Zuluaga \(2014\)](#), present the program characteristics in a comparative way and its expected effects in terms of mental health.

Programs like *Pensión 65* have become an extremely important policy measure to improve the quality of life of old-age adults in the developing world. Many other Latin-American countries have recently launched this type of initiatives in order to address low contributory pension coverage and old-age poverty issues. Beyond these objectives, alleviating the liquidity constraints of the elderly population might also have re-distributive effects on co-resident relatives and friends. Especially so in countries where it is common that old-age adults live in extended households with their children and grandchildren.

Cash transfers to the elderly might impact children's nutrition and health by allowing households to spend additional income on more nutritious foods and health care, and by inducing changes in the way intra-household resources are allocated. The identification of these effects represents an empirical challenge because households with age-eligible members, might be wealthier, better endowed with genetics and have more appropriate nutrition habits and health practices.

I address this issue by implementing a regression discontinuity analysis that exploits the fact that program eligibility exhibits a discontinuity at the age of 65 years old. Households where the oldest member is 64 y/o and those where the oldest member is 65 y/o are assumed to be almost identical except for the fact that the last are eligible to receive a *Pensión 65* subsidy. Note that this strategy is very similar to the one followed by [Galiani and Gertler \(2016\)](#). However, while I use a discontinuity rule based on age eligibility, their design is based on the household poverty index. Although, this variable is also a determinant factor of household eligibility, I consider their choice more noisy because this same index is used by the Peruvian government to assign many other social programs.

A large number of studies have assessed the effects of old-age cash transfers on poverty⁴, resource allocation⁵, living arrangements⁶, labor supply⁷, household technical efficiency⁸, mi-

⁴See [Barrientos \(2005\)](#) for a discussion.

⁵For instance [Case et al. \(1996\)](#), [Maitra and Ray \(2003\)](#), [Martinez \(2009\)](#) and [Galiani et al. \(2016\)](#).

⁶References include [Edmonds et al. \(2005\)](#), [Manacorda and Moretti \(2005\)](#) and [de Oliveira and Kassouf \(2012\)](#).

⁷For example [Bertrand et al. \(2003\)](#), [de Carvalho Filho \(2008\)](#), [Hosegood et al. \(2009\)](#), [Galiani et al. \(2016\)](#) and [de Oliveira and Kassouf \(2012\)](#).

⁸See [Lovo \(2011\)](#).

gration⁹, users health¹⁰ and children outcomes like nutrition, health¹¹, child labor¹² and schooling¹³. Most have found, not only that these programs are effective in tackling poverty and improving the quality of life of the elderly, but also that they have important spillover effects within the household.

In the specific case of spending and consumption patterns and its relationship with children nutrition and health outcomes, existing research generally studies both issues separately. In addition to [Galiani and Gertler \(2016\)](#), five other papers stand out for an empirical analysis of the relationship between elderly cash transfers and household spending/consumption. In a preeminent article about the expansion of the South African pension system in the early 1990's, [Case et al. \(1996\)](#) analyze its effects on household spending patterns. The authors find positive effects on food and schooling, but no effect on health. In addition, arguing that beneficiary households are predominantly poor and that in South Africa the fraction of children living with a pensioner is quite high, they claim that these results are evidence of the re-distributive effectiveness of the program.

Also in the context of the South African pension reform, [Maitra and Ray \(2003\)](#) analyze changes in the composition of household spending. Unlike [Case et al. \(1996\)](#), they find no impact in any of the 11 categories analyzed, including food, health and education. Furthermore, their results question the re-distributive effects of the program by showing that the amount of pension received decreases with the number of children in the household. [Fan \(2010\)](#) studies the effects of an important pension reform in the mid 90s in Taiwan, that introduced a monthly pension of NT\$3,000 to adults over 65 years old not receiving pensions from social insurance. He finds that a 1 NT dollar granted raises household consumption by 41 cents.

In the Latin American context, besides [Galiani and Gertler \(2016\)](#), there are, to my knowledge, only two studies of this type. [Martinez \(2009\)](#) presents an evaluation of the *Bono Solidario - BONOSOL*, an old-age cash program in Bolivia very similar to *Pensión 65*. The author finds a positive effect on food consumption, equivalent to 97% of the program annuity, for the whole population sample, and 165%, for the sub-sample of poor rural households. Households also increase spending on medical services like doctor visits and medicines.

Finally, [Galiani et al. \(2016\)](#) evaluate the Mexican program *Adultos Mayores*, a cash transfer scheme targeting to rural adults over 70 years old. They find that the program is associated

⁹For instance [Posel et al. \(2006\)](#).

¹⁰See [Atalay and Barrett \(2012\)](#) and [Galiani and Gertler \(2016\)](#).

¹¹For example [Duflo \(2000, 2003\)](#), [Case \(2001\)](#) and [Case and Menendez \(2007\)](#).

¹²See [Edmonds \(2006\)](#), [de Oliveira and Kassouf \(2012\)](#) and [de Carvalho Filho \(2012\)](#) among others.

¹³References include [Hamoudi et al. \(2005\)](#) [Edmonds \(2006\)](#), [de Carvalho Filho \(2012\)](#) and [Gutierrez et al. \(2015\)](#).

with an increase in household consumption of 23%. Authors affirm that, as, almost without exception, adults over 70 years in rural Mexico live with another relative, this rise in household consumption is evidence that beneficiaries share the transfers with their families.

As it was mentioned before, none of these articles directly evaluates the program effects on children's nutrition and health. A reasonable number of studies have addressed this question in the case of South Africa. The most influential is, perhaps, the work of Duflo (2000, 2003), where she evaluates the impact of this reform on grandchildren's weight for height and height for age. She finds that pensions received by women have a positive impact on girls under 5 years old. Point estimates are 1.16 standard deviations on height for age and 1.19 on weight for height, two years after the reform. In contrast, no effect is found on boys and for pensions received by men.

Case (2001) reaches similar results, although she uses a different dataset and another identification strategy. In this case, however, positive health outcomes extend also to co-resident adults and boys and are not exclusively driven by elderly women. As an added value, this study uses qualitative information¹⁴ to investigate the mechanisms through which pension income fosters health outcomes. The analysis suggests that these households have better sanitation facilities and are less likely to skip meals and reduce the size of their meals.

This conclusion is confirmed by Case and Menendez (2007) in an evaluation of pension beneficiaries and their co-resident prime-aged adults and children. Using a survey applied to a very specific sample of 290¹⁵ households in the rural sub-district of Limpopo Province (South Africa), the authors show that the presence of a pensioner improves child food security, by diminishing the probability of skipping meals due to income constraints.

The analysis presented in this chapter adds to this literature in two ways. First, unlike earlier similar studies, it attempts to explicitly map the relationship between cash transfers targeted to the elderly, household spending patterns and the nutrition and health status of very young children. Given that no data are available to address both questions simultaneously, I separate the analysis in two parts. I start by investigating the relationship of *Pensión 65* with the monetary spending of households with children under 5 years old, using the 2015 round of the national household survey, *Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza (ENAH)*.

¹⁴Interviews to pensioners about their perception and behavior after receiving retirement payments, such as: "What did you start doing differently when you received your pension?" and "In what ways did your life become better when your pension started, if any?", among others.

¹⁵This design included 124 households with and 166 without at least one age-eligible older adult.

Then, I examine the association of the program on the nutritional and health status of this population (children under 5 y/o), based on the 2015 demographic and health survey, *Encuesta Demográfica y de Salud Familiar (ENDES)*. This way I can provide some understanding of the transmission mechanisms from cash transfers to the elderly towards the improvement of children's health. More precisely, I directly test the specific role of changes in nutrition and health spending, a channel frequently mentioned, but little studied, in the existing literature on the subject.

The second contribution is related to the fact that the empirical literature documenting the effects of old-age transfers on children's health is almost exclusively about the South African pension reform. A case which is very difficult to extrapolate. This analysis will, therefore, help to improve the external validity of this literature, applying a very similar strategy to a completely different context.

Results suggest that *Pensión 65* eligible households with young children increase monetary spending by 75% of the value of the transfer. This additional income shows up in more purchases of vegetables and grains (legumes) and an increase of health expenses. In parallel, co-resident children of these ages show significantly better nutrition and health outcomes, such as: weight for age (1.47 standard deviations higher), weight for height (1.35 sd higher), height for age (1 sd higher) and body mass index (1.15 sd higher). In addition, their probability of suffering from underweight is 39 percentage points less and their likelihood of mild anemia - 35.

In line with previous research on the re-distributive effects of subsidies to the elderly in developing countries¹⁶ and with the evaluations of other cash transfer programs recently implemented in Peru¹⁷, these findings tend to support the hypothesis that income constraints play a key role in determining the well-being of poor households with very young children. In addition, they constitute new evidence that households do not function as unitary entities¹⁸, and that old-age adults have major decision-making abilities and play a key role in channeling investment towards young children.

The rest of the chapter is organized as follows. Section 3.2 describes the setting of *Pensión 65*, presenting the context and the main characteristics of the program. Section 3.3 outlines the data and provides some descriptive statistics of the samples. Section 3.4 presents the empiri-

¹⁶See [Martinez \(2009\)](#) and [Duflo \(2000, 2003\)](#) among others.

¹⁷For instance [Perova and Vakkis \(2009\)](#).

¹⁸Reference on non-unitary household models includes [Bourguignon et al. \(1993\)](#), [Browning and Chiappori \(1998\)](#) and [Blundell et al. \(2005\)](#).

cal strategy, a regression discontinuity design based on age eligibility. Section 3.5 reports the main findings, presents some sensitivity and validity tests and discusses potential confounding factors. Section 3.6 concludes.

3.2 Background

This section presents some key information to better contextualize *Pensión 65*. It first outlines the main traits of Peru's elderly population and then presents the characteristics of the program.

3.2.1 Peru's Elderly Population

The elderly population in Peru has increased by 65% in the last 15 years, whereas total population has grown 20% during the same period. By 2015, 7% of the total population was 65 or older, numbering more than two million individuals, and 2 in 5 households had at least one adult in this age group. Estimates by the *Instituto Nacional de Estadística - INEI* predict that this population will reach 9 million by 2050.¹⁹

Table 3.1 summarizes some basic statistics describing with more details this population, extracted from the 2015 of the ENAHO. These figures indicate that in Peru, most of the 65-years-old-and-plus adults live in urban areas (80%), with more than one third concentrated in Lima. Elderly households are composed, on average, of 3 members: only 0.35 children under 5 y/o and almost 2 adults over 55 y/o (counting herself). These old-age adults are, on average, 74 years old and, due to the widening sex gap in terms of life expectancy in favor of women, more than half are females. Very worrying is the fact that 40% of these households live in extreme poverty, whereas the same figure is 31% at the national level. This is evidence that for Peru, as it is the case of most developing countries, poverty is a big concern when it comes to the elderly population.²⁰

Although older people are generally less likely to participate in the labor force, about 45% of the individuals of this sub-sample are employed, most of them in the informal sector.²¹ Similarly, 6 in 10 do not have access to formal health insurance, meaning that a big part of them is not protected against health risks, which tends to be very high at these age levels. With regards to pension coverage, only 36% affirm to be affiliated to a contributory regime, with half of them

¹⁹See INEI (2015).

²⁰The definition of extreme poverty used for these calculations, and throughout this entire article, draws on the one employed by the Peruvian household targeting system to evaluate welfare and provide social benefits, i.e. the *Sistema de Focalización de Hogares (SISFOH)*. This definition is explained in detail in the next section.

²¹This rate is 70% among the 15-65-years-old.

claiming been actually receiving pension income (24%). The average amount received in the last year was 790 Soles, slightly less than the monthly minimum wage in Peru, which was 850 in 2015. Peru's contributory pension system is an employment based regime, in which only individuals with a stable formal job take part. In consequence, there is a direct association between pension coverage and labor informality. By 2015, Peru was among the first countries in the region in terms of informality, with 73% of total employment in this sector.²²

3.2.2 *Pensión 65*

General Characteristics

In order to address, at the same time, low pension coverage and old-age poverty issues, in 2011, the government of Peru launched an initiative called *Programa Nacional de Asistencia Solidaria - Pensión 65*, a cash transfer program, addressed to extremely poor elders (over 65 years old) with no access to the contributory regime.²³ This program was inspired by the non-contributory pension schemes created in other countries of the region since the beginning of the nineties, like the *Benefício de Prestação Continuada* (Brazil, 1996), *The Bono Solidario - Bonosol* (Bolivia, 1997), the *Pensión Básica Solidaria de Vejez* (Chile, 2008) and the *Programa Colombia Mayor* (Colombia, 2013).²⁴

The *Pensión 65* allocation was fixed at 125 Soles per month (24 US Dollars), representing 23% of national expenditure per capita, and included bi-monthly payments received through the agencies of the National Bank (*Banco de la Nación*), for beneficiaries living close to urban centers, or through securities transportation companies, for the population living in more remote areas.

Even though the subsidy does not have any conditionality associated, it also included two complementary actions. The first was granting beneficiaries with free access to health care services and implementing a specific health agenda targeted to the elderly. The second was a strategy to integrate more the elders in the community, through the recognition of their ancestral knowledge.²⁵

²² Author's calculation using the 2015 ENAHO.

²³ A pilot version (*Bono Gratitud*) was launched in July 2010 covering 21,783 beneficiaries in the departments of Apurímac, Ayacucho, Callao, Huancavelica and the district of Lima.

²⁴ For a more comprehensive list see the *Base de datos de programas de protección social no contributiva en América Latina y el Caribe* published by the ECLAC and available in <http://dds.cepal.org/bdps/>

²⁵ Some examples include the publication *Vidas*, a book made with the objective of visualizing this population, the traveling photographic exhibition *Ciudadanos* and the national contest *Los abuelos ahora*, which seeks that primary school children perform works where the protagonists are the elderly.

Beneficiary Selection Process

Beneficiaries are identified by program officials and recorded in a list published every two months at the district level. To qualify for the program, individuals need to fulfill the following criteria: (i) being 65 years old and more, (ii) being living in extreme poverty conditions, (iii) having a valid ID, (iv) not being receiving pension income and (v) not being benefiting from any government social program, other than health insurance - SIS, literacy programs, food assistance programs, the national program of direct support to the poorest - *Juntos* or any program part of the comprehensive plan for reparations - PIR.

The identification of 65 years old individuals living in extremely poor households is made accordingly to a welfare evaluation and classification system known as SISFOH, that is used to identify potential beneficiaries of different social programs and government subsidies in Peru. It is based on a general household census (*Padrón General del Hogares - PGH*), built from three different sources: (i) administrative records of income earners of the formal sector of the economy, (ii) the censuses of households living in poverty (*Bolsones de pobreza*), refreshed every three years in urban areas and four years in rural areas, and (iii) system of household registration on demand.

The classification process, represented graphically in Figure 3.1, uses three different filters: (i) labor income, (ii) a composite household index of quality of life and (iii) water and electricity consumption. When at least one household member works in the formal sector, the first identification criteria is labor income. If household monthly labor income is greater than 1,500 Soles (570 US Dollars) the household is automatically classified as not poor. On the contrary, if the household is below 1,500, a quality of life index, the *Índice de Focalización de Hogares - IFH*, is evaluated. The IFH index is built using a set of variables weighted according to three geographic areas: Metropolitan Lima, other urban areas and all rural areas (Table 3.2).²⁶

These weights are used to build a raw index PI_{hj} for each household h in cluster j .²⁷ Considering, for example, a household in Lima, cooking with carbon, using water from a pipe and living in a house made of wood, the first three addends of this index would be -0.33, -0.41 and -0.48. Then, the following equation, Equation (3.1), was applied, in order to standardized the

²⁶The selection of these variables and the calculation of the weights was done by the Peruvian Ministry of Finance using data from the 2009 ENAHO and includes two steps. The first was to identify the correlations between a set of candidate explanatory variables and poverty (based on a Sommers test). The second was to implement a Principal Component Analysis to select the items explaining more variation.

²⁷Clusters were built by program authorities to group homogeneous geographic zones (by department, region and domain) in terms of their own poverty lines. The 15 clusters are presented in Table 3.3. Cluster 2, for instance, includes the rural and sylvan areas of the departments of Ayacucho, Junin, Loreto, Puno, San Martin and Ucayali and the rural, northern highlands of the departments of Cajamarca and Lambayeque.

values of the index between 0 and 100:

$$PI_{hj} = 100 * \frac{PI_{hj} - PI_{hj}^{min}}{PI_{hj}^{max} - PI_{hj}^{min}} \quad (3.1)$$

Extreme poverty is determined by comparing the standardized index of each household with the corresponding cluster threshold (Table 3.3). Households with an index below or equal to the threshold were classified as eligible. If, on the contrary, the IFH value was above the threshold, eligibility was decided on the basis of water and electricity consumption. A household was then eligible if water and electricity expenditures were below 20 and 25 Soles per month, respectively.²⁸ Finally, if no member was working in the formal sector, poverty classification was based only on the value of the IFH index and water and electricity spending, or, only IFH if no information on the last criteria was available.

This process produces a first list of potential beneficiaries sent to district officials in order to verify that they were alive and effectively eligible (in terms of poverty). In addition, these district authorities had the mandate to ask them for a sworn statement of eligibility and an ID copy. Back in Lima, program officials implemented a very last verification crossing these lists with other administrative databases like the ones produced by the Social Security Agency (ONP), the Superintendency of Banking and Insurance (SBS), the Registry of Identification and Marital Status and the health insurance system (ESSALUD).

Program Coverage

In the first months of operation, *Pensión 65* prioritized districts with extreme poverty incidence greater than 50 % in 13 departments, covering only 377 out of 1,840 districts and 31,143 beneficiaries (corresponding to 11% of the eligible population²⁹). However, the program expanded rapidly, reaching national coverage at the end of 2013 (Figure 3.2). Calculations based on the number of beneficiaries, 501,681 individuals (MIDIS, 2016), and the total eligible population, calculated from the ENAHO (783,876), reveal that 64% of the eligible population was receiving a *Pensión 65* grant, by 2015.

It should be noted that this figure differs from the rate of 72% given by the government, that estimates the eligible population at 688,301 individuals for the same year 2015 (DGPP-MEF, 2015). The inconsistency, recognized by program officials (DGPP-MEF, 2015), is mainly due to an under-coverage problem of the general household census (*Padrón General del Hogares - PGH*)

²⁸These values correspond to 7.6 and 9.5 US Dollars.

²⁹According to program official reports, the eligible population was estimated at 280,976 in 2011.

used as the basis for the identification of potential users.³⁰ Since the PGH is one of the inputs used to target beneficiaries, this is also the main reason behind the low coverage rates of the program.

Table 3.4 and Figure 3.3 present actual program coverage, for the 65-years-old-and-plus population, according to the 2015 ENAHO. 3 in 10 adults over this age meet eligibility requirements to benefit from the program: 41% live in extremely poor households, 99% have an ID, 94% do not receive pension income and 94% do not receive any other subsidy. On average, participants affirm being benefiting from the program for the last 18 months, with the first 44% getting the allocation before January 2014 (Figure 3.3). Beneficiaries received, on average, 1,320 Soles from the program during the last year, more than two times the annual pension income of an average 65 and plus individual.

3.3 Data and Descriptive statistics

The following analysis uses data from two nationally representative surveys, collected by the National Statistical Institute of Peru (INEI). The first one, the 2015 round of the ENAHO, is used to investigate the relationship between *Pensión 65* and the spending paths of households with children under 5 years old; while the second one, the 2015 ENDES, is required to examine the association between the program and the nutritional and health status of this population.

3.3.1 Households with Children under 5 y/o

Household data from the ENAHO was collected between the months of January and December of 2015. It gathers information on household characteristics, labor participation, income, investment, consumption and, of particular relevance for this paper, expenditures, where households report all the products, goods and services purchased during the last year.³¹

As the main objective is to evaluate whether *Pensión 65* contributes to enhance the nutrition and health of young children, I focus on the sub-sample of households with members under 5 years old. In addition, given the characteristics of the program and the econometric strategy, I restrict the analysis to extremely poor households³², with at least one eligible adult (i.e. holding a National Identity Document, not receiving a pension and not receive any subsidy or

³⁰According to the Ministry of development and social inclusion, by the end of 2014, the PGH only included information about 63% of the population of Peru (DGSE-MIDIS, 2016)

³¹In the original survey, depending on the items, there are different reference periods. For instance, food spending is reported for the last 15 days, housing and personal care goods and services for the last month, clothing and footwear for the last 3 months, durables and education expenditures for the last year and so on. In order to allow comparisons, the INEI, inputs, deflates and converts all values and quantities in annual measures.

³²Extremely poor households were identified following the same process used by program officials to built the list of potential *Pensión 65* beneficiaries (Subsection 3.2.2).

government grant), having between 55 and 75 years old (i.e. 119 months bandwidth).³³ This leaves a final sample of 963 households (Table 3.5).

Outcomes of interest include: total spending broken down into 5 broad components (food, education³⁴, health services, durables³⁵ and housing³⁶), 12 food sub-categories (breads and cereals; vegetables; fruits; butter and oils; seafood; meat; milk, cheese and eggs; sugar, coffee, tea and cacao; grains³⁷; tubers; food prepared away from home; non-alcoholic beverages and alcoholic beverages) and 6 health sub-groups (consultations, medicines and treatments, tests and analysis, dentistry, ophthalmology and hospitalization and surgery).³⁸ In addition, this survey gathers very useful information on whether or not any household member received a *Pensión 65* subsidy in the last three months.

Table 3.6 presents some descriptive statistics of this sample, with the first two columns displaying mean and standard error estimates for the full sample of households with adults between 55 and 75 y/o.³⁹ 52% are located in rural areas and. They are, on average, composed, of four members, with an important representation, as expected, of children under 5 y/o and adults over 55. Household heads are, on average, 61 y/o, one third are women and they have 3.75 years of education. Their annual consumption is around 5,000 Soles (791 US Dollars) and one fifth have at least one member receiving a *Pensión 65* subsidy. Monetary expenses are about 3,000 Soles, of which 68% correspond to food expenses, 4% to health, 3% to education and 2% to housing. Most relevant food sub-categories are: breads and cereals (454 Soles); meat (317 Soles), vegetables (236 Soles); milk, cheese and eggs (205 Soles) and fruits (174 Soles).

3.3.2 Children under 5 y/o

Children data is extracted from the 2015 ENDES, a survey sampling woman of childbearing age, collected between March of 2015 and June of 2016. It collects data on several items, including a very complete module about the nutrition and health status of their children under 5 years old. Following earlier studies, children's nutrition and health is measured by the follow-

³³In Section 3.4 I give the reasons why I selected this bandwidth.

³⁴Includes tuition, uniforms, books and other supplies.

³⁵Refers to furniture and household equipment (radios, televisions, computers, blenders, etc.) acquired in the last 12 months.

³⁶Includes services, rent and imputed rent

³⁷Mainly legumes like lentils and beans.

³⁸All these variables are measured in per-capita terms.

³⁹In order to give some context to these figures and to facilitate comparisons, the Appendix presents similar tables including statistics for the complete sample surveys and shows mean difference estimates with this specific sub-sample.

ing indicators: weight for age⁴⁰; height for age⁴¹; weight for height⁴²; body mass index (BMI)⁴³; nutritional level⁴⁴ and anemia levels⁴⁵. In addition, as in the 2015 ENAHO, this survey also compiles information on whether or not household members actually benefit from *Pensión 65*.

As in the household level case, here I also restrict the analysis to children in extremely poor households⁴⁶ and living with at least one eligible adult between 55 and 75 years old. The final sample is composed of 269 children (Table 3.5).

Table 3.7 displays some descriptive statistics of the children integrating the sample (i.e. boys and girls under 5 years old, extremely poor and living in households with at least one eligible member between 55 and 75 years old). 12% live in rural households, which are composed, on average, of 6 members: 1.66 adults above 55 y/o, 1.5 adults between 20 and 54 y/o, 1 children between 6 - 14 y/o and 1.4 over 5 y/o. Household heads are, on average, aged 62 y/o, one third are women and they hold almost 3 years of education.

Children are, on average, 32.7 months old (almost 3 years) and half of them are females. Regarding their nutritional and health status, when it comes to long term measures, like weight for age (Wt/A) or height for age (Ht/A), they are, respectively, 0.49 and 1.36 standard deviations below the median of the reference population. This is not surprising considering that these two indicators reflect past deprivations and illnesses that are usually associated with poor socioeconomic conditions. More worrying, stunting incidence is around 20%, meaning that 2 of every ten children of the sample are, at least, 2 standard deviations below the median height of their age/sex group.

Specialized literature warns about the potential effects of these nutritional deficiencies. Stunting, for instance, may lead to increase morbidity and mortality, reduce cognitive and brain development or lead to have short adult stature and later chronic diseases.⁴⁷ In contrast, the positive mean z-score associated to weight for height (Wt/Ht), 0.41, a measure of short-run

⁴⁰Z-score following WHO reference standards (WHO, 2006).

⁴¹Z-score following WHO reference standards (WHO, 2006).

⁴²Z-score following WHO reference standards (WHO, 2006).

⁴³Z-score following WHO reference standards (WHO, 2006).

⁴⁴Probability of: acute malnutrition (weight for age z-score under -2 standard deviations of the median reference standard for their age), stunting (height for age z-score under -2 standard deviations of the median reference standard for their age), underweight (weight for height z-score under -2 standard deviations of the median reference standard for their age) or obesity (weight for height z-score over 2 standard deviations of the median reference standard for their age). These definitions are based on national standards (ENDES, 2014).

⁴⁵Probability of: Severe anemia (level of hemoglobin concentration of less than 7.0 g/dl), moderate anemia (level of 7.0-9.9 g/dl) or mild anemia

⁴⁶Extremely poor households were identified following a very similar process to that used by program officials to build the list of potential *Pensión 65* beneficiaries (Subsection 3.2.2). Unfortunately, this survey does not have neither information on labor income, nor information on water and electricity consumption. Thus, the identification process of the extremely poor only could followed the IFH index rule.

⁴⁷For instance Allen *et al.* (2001), WHO and UNICEF (2008) and Mongkolchaty *et al.* (2010).

nutritional status, might be reflecting recent weight gains, probably from the benefits of *Pensión 65*. Finally, prevalence estimates suggest that, although severe anemia is very rare in the sample, over 30% of the children were at least mildly anemic. Despite the fact that, on this, the WHO reports suggest that most cases of mild anemia do not cause major complications, if it is untreated, it can lead to other health problems, including delayed growth and development and infections.

3.4 Empirical Strategy

To estimate the relationship between *Pensión 65* and monetary spending and its association with the health of co-resident children, I perform a regression discontinuity analysis, consisting in comparing eligible households and eligible household members under 5 years old, across the eligibility age threshold of the program, i.e. 65 years old. The same technique has been already validated in earlier studies evaluating similar programs, like [Duflo \(2000, 2003\)](#), [Martinez \(2009\)](#), [Edmonds et al. \(2005\)](#), [Edmonds \(2006\)](#), [Galiani et al. \(2016\)](#) and [de Oliveira and Kassouf \(2012\)](#), among others.

The main analysis is based on the OLS estimation of a reduced-form given by Equation (3.2):

$$y_{h/i} = \alpha_{h/i} + \beta_{h/i} 1\{A_{Ohm} \geq 65\} + \delta f(\tilde{A}_{Ohm}) + \gamma f(\tilde{A}_{Ohm}) * 1\{A_{Ohm} \geq 65\} + \lambda x_{h/i} + \mu_{h/i} \quad (3.2)$$

where $y_{h/i}$ represents the outcome of interest for household h or individual i , depending the case. A_{Ohm} is the running variable, i.e. 65 years old, measured in months from the 65th birthday of the oldest member of the household. For example, 0 means the oldest member of the household is 65 years old, -120 means she is 55, 120 means she is 75, and so on. $1\{A_{Ohm} \geq 65\}$ identifies cases after the threshold. $f(\tilde{A}_{Ohm})$ is a quadratic polynomial function of A_{Ohm} that I also interact with the age indicator ($1\{A_{Ohm} \geq 65\}$), to allow the slope of the age profile to vary on either side of the 65-years-old-cut-off point. $x_{h/i}$ represents a vector of household and individual controls. Finally, $\mu_{h/i}$ is an error term.

In addition, given the non-deterministic character of the age assignment rule associated to the intervention (fuzzy regression discontinuity design - FRDD), I also estimate 2SLS regressions of the relationship between the whole set of outcomes $y_{h/i}$ and actual program participation $Pen65_h$; where this variable is a dummy equal to one if at least one household member actually benefits from from *Pensión 65*. The first stage is given by Equation (3.2), with $Pen65_h$ being the

dependent variable, and the second stage is given by Equation (3.3).

$$y_{h/i} = \alpha_{h/i} + \rho \text{Pensión65}_h + \lambda x_{h/i} + \mu_{h/i} \quad (3.3)$$

Before continuing, it is important to clarify that, in this case, the cut-off was decided at December of 2013 (i.e. the running variable is the age of the oldest household eligible member at this date). Other points are off course plausible, given that *Pensión 65* was launched in October of 2011 and that the data used in the analysis were collected between January and December of 2011 and March of 2012 and June of 2013. However, as it was mentioned in Subsection 3.2.2, although the program started earlier in some districts, it was only by December of 2013 when it reached universal coverage. In addition, households usually take some time to change consumption patterns and the nutrition and health status of children evolves gradually, so take more recent points, like 2012, will not be informative about these behaviors. Anyhow, Subsection 3.5.4 analyzes other possible points, concluding that the December of 2013 threshold is the one that better fits of the data.

Following the specialized literature, this equation is estimated using robust standard errors clustered at the level of the running variable (age of the oldest member by December of 2013)⁴⁸. Household controls include: household composition by 8 age-groups (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head; a dummy equal to 1 if the household is located in a rural area; 20 province dummies and 12 survey round dummies. Individual controls are sex and age (in months).

The impact of *Pensión 65* on $y_{h/i}$ is given by $\beta_{h/i}$, which represents the difference in the intention-to-treat probability on either side of the threshold. The crucial assumption is that in the vicinity of the 65-years-old cut-off, households and children differ only in their probability of receiving the program, so observations just missing the age threshold are a good counterfactual for their age eligible counterparts (i.e. local continuity assumption).

This assumption could be violated if households and children around the age eligibility threshold have different characteristics, that are also correlated with outcome variables. For instance, having a member over 65 y/o could be a sign of healthier household members with better nutrition habits and health practices. In this case, estimation coefficients from Equation (3.2) might be confounded with these positive attitudes towards health, instead of being the pure impact of the program.

⁴⁸See for instance Lee and Card (2008).

Tables 3.6 and 3.7 compare age-eligible and non-age eligible households and children under 5 y/o. The first table displays some very small, but still significant, differences, in terms of household composition, specially among the groups between 6 and 54 years old. Eligible household heads are also almost 7 years older and have, on average, 0.8 more years of education. Consistently with the characteristics of the program and its expansion time-table, half of them have received a *Pensión 65* subsidy in the last 12 months, whereas this percentage is only 1% among households in which the oldest eligible member was less than 65 y/o by December of 2013. Finally, eligible households spend more in breads and cereals, vegetables, education services, two health categories (tests and analysis and dentistry) and durables.

The second table shows that children in households with an eligible member have very similar characteristics than those in households with younger members. They are, however, slightly different in terms of the household composition, more precisely in the number of adults between 30 - 39 y/o and in the number of elderly over 75 y/o, and in the education of household heads.

The local continuity assumption will also be violated if individuals can control the assignment variable, i.e. living with persons holding 65 years old by December of 2013. Manipulation might be an important concern in this case because, due to the program, households may have incentives to change their composition by, for instance, moving with potential eligible elderly relatives or friends, just to receive the subsidy.

In order to test the validity of the continuity assumption I use a McCrary Test (McCrary, 2007). Figure 3.4 shows the results. The test fail to reject the null hypothesis of no discontinuity at the threshold, for both samples, suggesting that there is no systematic change in the density of eligible individuals on either side of the discontinuity. Although in the household sub-sample (Figure 3.4 - Graph A) there appears to be a slightly lower density to the right of the threshold, this difference is not significant and goes in the opposite direction of the manipulation hypothesis.

Another very sensitive issue in this setting is the choice of the window of observations at both sides of the cut-off point. Al thought, in principle, the closer to the cut-off, the better, a very narrow window, risks of leaving very small samples reducing the power of the estimations. Imbens and Kalyanaraman (2012) suggest a bandwidth choice test to perform for each sub-sample and outcome of interest. In order to have some homogeneity along the different regressions, all the estimations are run taking the average of the different optimal bandwidths suggested by this procedure: 119 months, which corresponds to the rank [55 - 75] years old.

Other concerns related to the sensitivity of the specifications and the validity of the strategy will be resumed at the end of Section 3.5.

3.5 Results

This section presents and discusses the main findings drawn from the empirical analysis outlined before. First, I report the estimates for the association between *Pensión 65* and household monetary spending and then, I document the its relationship with the nutritional and health status of young children.

Beforehand, I provide evidence of the correlation between age eligibility and program participation. Figure 3.5 plots, in two separate graphs, the association between actual program participation (probability of being treated) and the age of the oldest household member by December of 2013 (in months from her 65th birthday), for the two samples of interest: households with children under 5 years old and children under 5 years old. Dots represent the fraction of households and children under 5 y/o actually receiving a *Pensión 65* subsidy, and the blue curves represent the corresponding quadratic prediction plots.⁴⁹ on either side of the age cut-off. Households whose eligible members were 65 years old, or more, by December of 2013 are represented on the right side of the dashed red line.

Both graphs suggest an upwards jump in the probability of being treated around zero (65 years old), evidencing a discontinuity when the eldest household member becomes eligible to participate in *Pensión 65*. Formal estimations of Equation (3.2) for *Pensión 65* participation (Table 3.8) show that the probability of treatment is 22 percentage points higher among households with age eligible members, in the sample of households with children under 5, and 41 pp, in the sample of children under 5 years old.

3.5.1 Household Monetary Spending

Figure 3.6 illustrates graphically the relationship between total monetary spending, including 25 different sub-categories, and the age of the oldest household member (in months from her 65th birthday) by December of 2013.⁵⁰ Several graphs show an upwards jump at the threshold when barely age eligible and non-eligible households are compared, suggesting a positive relationship between *Pensión 65* age-eligibility and total spending (Graph A) and two of its main components, food (Graph B) and health spending (Graph R).

⁴⁹Calculated from a linear regression of y_h on A_{Ohm} and A_{Ohm}^2 .

⁵⁰Dots indicate mean values and the blue curves represents the corresponding quadratic prediction plots, calculated from a linear regression of y_h on A_{Ohm} and A_{Ohm}^2 , on either side of the age cut-off.

This positive discontinuity is also the trend observed for the main food spending sub-groups, for instance, breads and cereals (Graph C), vegetables (Graph D) and grains-legumes (Graph L); and the most relevant health spending categories, health consultations (Graph S) and medicines and treatments (Graph T). In order to confirm these results, Table 3.9 provides formal regression results for Equation (3.2). Each line corresponds to a different estimation, the dependent variable appearing in rows. The first three columns display OLS β_h coefficients, standard errors and the corresponding R^2 . Columns 4 and 5 report the results (Chi-squared and P-value) of a multiple hypothesis test (using the Bonferroni correction) implemented in order to check the statistical relative importance of each of the outcomes.

The estimates corroborate the positive correlation between *Pensión 65* and spending in vegetables, grains-legumes and health services. OLS coefficients indicate that households with age-eligible members spend, on average, 1,123 more Soles/year compared to similar households with eligible members below the age threshold. Relative to the amount of the program allocation, this spending increase is equivalent to 75% of the annual maximum *Pensión 65* allocation that an individual can get.

In the specific case of total food spending, although the coefficient is positive and large, it is not statistically significant at the 10% level. However two sub-categories show positive estimates: vegetables (117 Soles, 8% of the maximum program allocation) and grains-legumes (30 Soles, 2% of the maximum allocation). The positive correlation of the *Pensión 65* subsidy with these specific categories of food spending is important for two main reasons.

The first is that both vegetables and grains-legumes, are highly recognized for their nutritional relevance in the diet of young children⁵¹, given their high fiber, vitamin A and vitamin C contents.⁵² The second is that, these food categories are often less accessible for low income households (Stewart *et al.*, 2003). Given that households of the sample are disproportionately poor and have lower consumption and food spending, compared to national standards (see Table A-3.1 of the Appendix), the marginal utility of increasing these calories could be highly significant for them, bringing about more powerful nutrition and health benefits.

When it comes to access to health services, estimates indicate that age eligible households surpass the total spending of non-eligible households by 123 Soles (8% of the maximum allocation), explained mainly by an upsurge in consultation expenses (13 Soles, 0.9% of the allocation). In Peru, limited access to health care is one of the main causes of child mortality, esti-

⁵¹Specially those between 6 and 59 months old, in complement to breastfeeding.

⁵²See for instance: WHO and UNICEF (2003) and WHO and UNICEF (2008)

mated at 13.5 deaths per thousand live births in 2015⁵³. In addition, despite significant efforts in terms of coverage, household income is still the main source of financing health services (PAHO, 2012). These elements make the poorest most vulnerable to health shocks, explaining the positive impact of income transfers, like *Pensión 65*, in improving access to health care.

These results are consistent with previous findings related to similar cash transfer programs targeted to the elderly, including the ones on [Galiani and Gertler \(2016\)](#) on *Pensión 65*⁵⁴ and [Martinez \(2009\)](#) about the program *BONOSOL* in rural Bolivia⁵⁵. They also contribute to strengthening the hypothesis that income constraints play a key role in determining the quantity and the quality of food expenditure and the access to health care services in developing countries, pointed out already by impact assessments of other cash transfer programs. For instance, also for Peru, [Vakis and Perova \(2009\)](#) show that the program *Juntos* has positive effects on several food categories and in the intensity of use of different health services.

In order to verify whether or not these findings are specific to the sample of households with children under 5 years old, and to compare them with other household spending strategies, I re-estimate Equation (3.2) for the same set of monetary spending categories, across the following three sub-samples : (i) households not reporting any children under 5 y/o, (ii) households reporting at least one woman between 15 and 49 y/o and (iii) households reporting at least one adult over 65 y/o (in 2015).

Results are reported in Table 3.10. First, households without children under 5 y/o show a higher level of spending in medicines and treatments and durables but not in the other categories that appear to be correlated with *Pensión 65* across the sub-sample of households with children of these ages. This result strengthens the hypothesis that the increase of expenses in vegetables, grains, total health and consultations, associated to the program, may be distinctive of households with very young children.

Second, among the sub-sample of households with women between 15 and 49 years old, those with eligible members exhibit higher levels of total food spending, vegetable expenses, expenses in non-alcoholic beverages, total health spending, consultation expenses and spending in medicines and treatments. Several of these results match those found to be relevant for households with young children, which is reasonable, given that more than 60% of these families are also composed of at least one woman with these characteristics. Finally, household with adults 65 y/o and plus, appear to increase butter and oils expenses, spending on tests

⁵³This figure comes from the World Bank Database and is available in: <http://data.worldbank.org/>

⁵⁴A 40% increase in household consumption, of which 67% is for food.

⁵⁵An increase in food consumption equivalent to 1.5 times the value of the subsidy.

and analysis and household spending. The above suggests, once again, that the results on food and health expenses are more likely to be associated to an intra-household re-distribution mechanism involving very young children and women of childbearing age.

Finally, Table 3.11 presents 2SLS estimation results of the relationship between these whole set of household spending outcomes and actual program participation. Second stage results prove to be qualitatively similar to those reported in Table 3.9, although point estimates fall significantly. These differences can be due, for instance, to imperfect compliance, mainly due to the moderate take-up rates (48% of the households with age eligible members claim not to have received the subsidy in the last three months), and the choice of the cut-off point at December of 2013, which allows the inclusion of households that became eligible after 2013 in the control group (fortunately only 9 households in this group, equivalent to 1.2%, affirm had received the subsidy in the last 3 months). Note that first stage estimates correspond to those reported in Table 3.8 and confirm a very strong positive correlation (22 percentage points) between *Pensión 65* and the age eligibility rule.

3.5.2 Children's Nutrition and Health

Now I turn to investigate whether or not *Pensión 65* contributes to improve the nutrition and health status of co-resident children under 5 years old. As in the previous section, I first illustrate graphically the relationship between the different nutrition and health outcomes and the age of the oldest household member by December of 2013 (Figure 3.7). Graphs A-D suggest an upwards jump at the 65-years-old threshold on the four anthropometric measures used to characterize their nutritional status : weight for height, height for age, weight for height and body mass index.

In addition, a negative jump is observed for the probability of underweight (Graph G) and the probability of suffering from mild anemia (Graph K). Estimates from Equation (3.2), presented in Table 3.12, confirm these findings. Having an age-eligible member increases weight for age by 1.47 standard deviations, weight for height by 1.35 sd, height for age by 1 sd and body mass index by 1.15 sd (P. Value of 0.108). Besides, it decreases the likelihood of suffering from underweight by 39 percentage points and the probability of suffering from mild anemia by 35 pp (P. Value of 0.114).

Given that on average, beneficiary households claim to be receiving the subsidy during the last 18 months, these estimates correspond, approximately, to two years of exposure to the program. These results are in line with those in Duflo (2003) on South Africa according to

which, two years after the reform, pensions received by women improve the weight for height of girls by 1.19 standard deviations and height for age by 1.16 sd.

Although 2SLS results show more conservative coefficients, main estimates go in the same direction (Columns 4 and 5).⁵⁶ Also in this case, imperfect compliance issues may be at stake. Despite the fact that in this sample the take-up rate is higher, 78%, the percentage of children living in households that received the subsidy but were less than 65 y/o by December of 2013 is also more representative (8.2%).

Taken together with Subsection 3.5.1 results on household spending patterns, these findings constitute evidence that, besides the expected effects of *Pensión 65* on the well-being of the elderly, this program also enables older generations to actively participate in improving the quality of life of co-resident young generations. Despite the fact that there is no certitude that the mechanism at stake is directly related to the monetary transfer of the program, this is, indeed, a very plausible channel.⁵⁷ In similar contexts, cash transfers to the elderly have proved, not only, to be important tools to alleviate the liquidity constraints of this population, but also to have major re-distributive implications within the household. Such new evidence goes in favor of the literature that shows that households do not function as unitary entities⁵⁸, and that old age adults are important players in the decision making processes about co-resident younger children.

Nevertheless, this interpretation could be tainted by major identification caveats that need to be addressed. The following subsections discuss more in detail some of these issues, proposing some extra sensitivity and validity checks and discussing other mechanisms that could also be playing a role.

3.5.3 Sensitivity Tests

One key issue in regression discontinuity design is the correct specification of the equation to estimate, i.e. Equation (3.2). This section, therefore, investigates how sensitive are the estimates presented above to alternative specifications. First, I check the sensitivity of the results to two alternative bandwidth choices: (i) 108 months, which corresponds to the 56 - 74-years-old rank and (ii) 96 months, 57 - 73-y/o.⁵⁹ Second, I perform the estimations using a linear polynomial

⁵⁶First stage estimates (Table 3.8) confirm a very strong relationship between the age eligibility rule and the probability of receiving a *Pensión 65* subsidy.

⁵⁷Remember that *Pensión 65* also included free access to health care services to the elderly and a strategy aimed at improving the inclusion of this population in the community.

⁵⁸See the work of Bourguignon *et al.* (1993), Browning and Chiappori (1998) and Blundell *et al.* (2005) for an overview of non-unitary household models.

⁵⁹Remember that in the original estimations I used a bandwidth of 119 months, 55 - 75 years old.

and a third order polynomial of A_{Ohm} .⁶⁰

Tables 3.13 - 3.16 display these results. Although estimates are off course sensitive to the proposed bandwidth and functional form changes, in most cases the statistical significance of the coefficients is not affected and the magnitudes remain relatively stable.

3.5.4 Validity Analysis

As discussed in Section 3.4, the internal validity of the regression discontinuity approach requires households and children just below and above the age eligibility threshold to have comparable average potential outcomes (i.e. local continuity assumption). This assumption could be violated if, for instance, agents can affect the values of the assignment variable, or if there are other programs using the same cut-off score, or, simply if households and children around the age eligibility threshold have different characteristics correlated with outcome variables.⁶¹ Section 3.4 displays some descriptive statistics showing that households and children under 5 y/o around the age cut-off have, on average, similar observed characteristics; and presents the results of a discontinuity test, proposed by McCrary (McCrary, 2007), to check possible manipulation of the assignment variable.

In this part of the document I conduct further checks in order to deepen the internal validity analysis of previous section results, including: (i) discontinuity tests on covariates and retrospective variables, (ii) "Donut-hole" estimations, (iii) falsification tests using pre-program (2009 and 2010), and (iv) estimations using different discontinuity cut-off points.

Discontinuity Tests

The first check consist in testing the continuity assumption on the whole set of covariates used in the analysis, i.e. a dummy equal to 1 if the household is located in a rural area; 8 age-groups of household composition (number of members betw. 0 - 5 y/o, 6 - 11 y/o, btw. 12 - 19 y/o, btw. 20 - 29 y/o, btw. 30-39 y/o, btw. 40 - 54 y/o, btw.55 - 75 y/o and over 75 y/o), a set of characteristics of the hh head (sex, age and years of education), a dummy equal to 1 if the child is female and the age of the child in months (last two variables only for the children sample). To this end, I estimated Equation (3.2) treating the characteristics as outcome variables and excluding controls. Table 3.17 displays the results. None of the variables analyzed is statistically significant, meaning that there is no discontinuity between any of these covariates at 65 years

⁶⁰The original regressions include a quadric polynomial.

⁶¹For example, having a member over 65 y/o could be a sign of healthier household members with better nutrition habits and health practices. In this case, estimation coefficients from Equation (3.2) might be the consequence of these positive attitudes towards health instead of an impact of the program.

old.

Additionally, I carried out the same regressions using, this time, a set of retrospective variables as outcomes. The above with the purpose of testing the continuity assumption in variables potentially related with the intervention but referring to a period prior to its launch (October of 2011). The first set of variables was extracted from the 2015 ENAHO and refers to the probability that at least one household member received a social program, different than *Pensión 65*, from the year 2012.⁶² The second group of variables was drawn from the 2015 ENDES survey and makes reference to the probability of having had a live birth in the household before a given year from 2004 to 2010. These coefficients also prove not to be correlated with the assignment variable, giving greater credibility to the continuity hypothesis used in this setting.

"Donut-hole" Estimations

"Donut-hole" estimations consist in removing observations in the immediate vicinity of the 65-years-old threshold and re-estimating the discontinuity on the remaining sample. The idea behind this approach is that systematic manipulation is more likely around the cut-off point, so it is useful to investigate how sensitive the estimates are to the response of these observations (Barreca *et al.*, 2011).

Tables 3.18 and 3.19 present the results for the whole set of household spending and children's nutrition and health outcomes. Columns 1 and 2 display $\beta_{h/i}$ coefficients when removing observations within a two months radius of the threshold, and columns 3 and 4 when dropping those within a radius of six months. These very small restrictions, that reduce the size of the samples by 2% and 5% respectively, produce, in most of the cases, qualitatively similar estimates to the ones presented in Subsections 3.5.1 and 3.5.2. Even so, it is important to acknowledge that point estimates show great variability. Household spending estimates magnify and children outcomes get smaller (indeed, height for age, BMI and the probability of mild anemia become statistically indistinguishable from zero at the 10% level).

Pre-program Falsification Checks

Another falsification test consists in exploiting the availability of multiple years of pre-program data to estimate program potential effects prior to the launch of the program, i.e. 2011. I do this by estimating Equation (3.2) using ENAHO and ENDES data for two pre-program periods,

⁶²Ideally I would have preferred this variable to refer to programs received before 2011. Unfortunately, the questionnaire asks about the three last years, i.e. 2012, 2013 and 2014. However, since *Pensión 65* was launched at the end of 2011 and its initial coverage was minimal, I consider this information might not be capturing, for the great majority of cases, the effect of the program.

2009 and 2010. Knowing that *Pensión 65* was not yet operating, a finding of significant $\beta_{h/i}$ coefficients, would suggest that the estimates presented in Subsections 3.5.1 and 3.5.2 actually measure something other than the impact of *Pensión 65*.

Tables 3.20 and 3.21 report OLS estimates for the sub-samples of households with children under 5 y/o and children under 5 y/o respectively. None of the coefficients is significant and even more, some of the key point estimates are actually negative, for example 2009 health spending, 2010 food spending and 2009 Ht/A Standard deviations. This provides evidence that the results do not reflect a positive pre-existing trend in food, health spending, nutrition habits, health practices and nutrition status among age-eligible households.

Alternative Cut-off Points

Finally, I analyze different cut-offs in order to check whether or not the data exhibits discontinuities at other points of the assignment variable. This might be plausible, given that *Pensión 65* was launched in October of 2011 and the ENAHO and ENDES data used in the analysis were collected between January and December of 2015, the first, and March of 2015 and June of 2016, the second. Therefore, all households (and children under 5 y/o) in which there was a resident over 65 years old by these dates are potentially eligible to receive the subsidy.⁶³

Tables 3.22 and 3.23 report the results of the estimation of Equation (3.2) considering as cut-off points the age of the oldest household member by December of 2010, December of 2011, December of 2012, December of 2014 and December of 2015. The first row displays the coefficients associated to *Pensión 65* participation, showing that none of these is statistically significant. The above contrast with the findings, reported in (Table 3.8), according to which the probability of treatment is 22 percentage points higher among households whose older member was 65 years old and plus by December of 2013, and 41 pp higher among children under 5 y/o living in these households.

Additionally, with a few exceptions, most of the variables measuring household spending, as well as those related to the nutrition and health status of children under 5 y/o, do not reveal any statistical relationship with these alternative points. Therefore, it is possible to conclude the actual age eligibility threshold, being 65 y/o by December of 2013, fits the data better than all these alternative points.

⁶³Remember, however, that given that the program only reached universal coverage at the end of 2013, that households may take some time to internalize this new situation into their consumption decisions and, specially, that the nutrition and health status of children evolves gradually, the actual cut-off point was decided at the age of the oldest household member by December of 2013.

3.5.5 Potential Confounding Factors

Previous results suggest that *Pensión 65* allocations are positively correlated with the total monetary spending of households with children under 5 years old, and three of its components: vegetables, grains-legumes and health. In addition, the analysis shows a positive and significant relationship between this intervention and several nutrition and health outcomes specific to this population.

Although such findings are robust to several sensitivity and validity checks, given that they are drawn from the comparison of households and young children with *Pensión 65* age eligible and non-eligible members, any difference across these population groups, correlated with the program, may still represent a threat to the analysis.

In particular, similar results would be obtained if households with age eligible members were also benefiting from other social programs aimed at reducing poverty and improving the nutrition of children. One possibility is the program *Juntos*. *Juntos* is a very important conditional cash transfer program, launched in Peru in 2005, in order to reduce poverty, increase consumption, improve nutrition and encourage access to health and education services. It was targeted to poor households, primarily from rural areas, composed by pregnant women, children, adolescents and young people until the age of 19 (or until they finish high school).

This program offered eligible households a monthly allocation of 100 Soles, conditioned to comply with the following requirements: (i) children under 5 y/o were asked to assist regularly to growth and health checks; (ii) pregnant women had to attend pre-natal check-ups and (iii) children between 6 and 14 years old (or 19 y/o) had to be enrolled in school and attend at least to 85% of the classes during the year. By the end of 2015, this program was functioning in 1,178 districts, benefiting 769,178 households.

Despite the fact that *Juntos* was not specifically designed to the elderly, one might be worried that this intervention would have disproportionately targeted families with this population, influencing their consumption patterns and children's nutrition and health outcomes. In order to explore this possibility, I evaluate, in both samples (i.e. households with children under 5 y/o and children under 5 y/o), the relationship between the participation in *Juntos* and the probability of having a 65 y/o member (Equation (3.2)). Results, including cut-off points at December of 2010 to 2015, do not show any discontinuity in the probability of benefiting from *Juntos* when the eldest household member becomes 65 years old (Table 3.24). Thus, it is very improbable that families above the threshold would have been more likely to benefit, at least,

from this particular program.

Nevertheless, other discontinuous changes in the characteristics of families with age eligible and non-eligible members, independent from *Pensión 65*, may also be at stake, which makes it difficult to completely disentangle the true causal effect of this intervention on household spending patterns and children's nutrition and health. This does not mean, however, that interventions like *Pensión 65* do not weight in the configuration of intra-household allocation decisions related to young children.

3.6 Conclusions

This chapter exploits the expansion of the *Programa Nacional de Asistencia Solidaria - Pensión 65* in Peru, and takes advantage of its quasi-experimental design, built-on the discontinuity introduced by its 65 year age eligibility requirement, to assess the relationship between cash transfer programs to the elderly and monetary spending of household with young children and their nutrition and health status.

Two important results emerge from the analysis. First, I find a large and positive association with total monetary spending and three of its components: vegetables, grains-legumes and health. *Pensión 65* allocations increase total monetary spending by 1,123 Soles/year (75% the value of the subsidy), spending in vegetables by 117 Soles/year, spending in grains-legumes by 30 Soles/year and spending in health services by 123 Soles/year.

Second, I show positive and significant effects on several nutrition and health outcomes of the population of children under 5 y/o. *Pensión 65* subsidies improve the weight z-scores of children under 5 y/o by 1.47 standard deviations, the weight for height by 1.35 sd, the height for age by 1 sd and the body mass index by 1.15 sd. In addition, these children are 39 percentage points less likely to suffer from underweight and 35 pp less likely to suffer from mild anemia.

These findings suggest that income constraints may be playing an important role in determining the quantity and the quality of food spending and the access to health care services of poor young children in Peru. Moreover, they confirm that the nutrition and health of children in developing countries is still partially conditioned by family financial constraints.

Such results constitute new evidence that households do not function as unitary entities and that intra-household income transfers are an efficient way to channel investments towards children. Given that programs similar to *Pensión 65* are in force in several developing countries, these findings can contribute to inform the current debate on the potential impacts of these

policies, in particular in Latin America, where an important fraction of the population is in the informal sector and contributory pension systems have very low coverages.

Despite the fact that these findings are robust to several sensitivity and validity checks, the existence of confounding mechanisms can not be completely ruled out. Certainly, highlighting the role of intra-household transfers in the configuration of family decisions of human capital investment, does not imply that alternative channels, related for instance to other social interventions and behavioral responses, are innocuous. Further work is needed in order to investigate better these alternative channels and to be able to deepen on the motives behind the transfer of resources from the old generations to the youngest children. In particular, one might wonder if other behavioral effects are in place, for instance, an increase in the dedication of children to the care of the elderly.

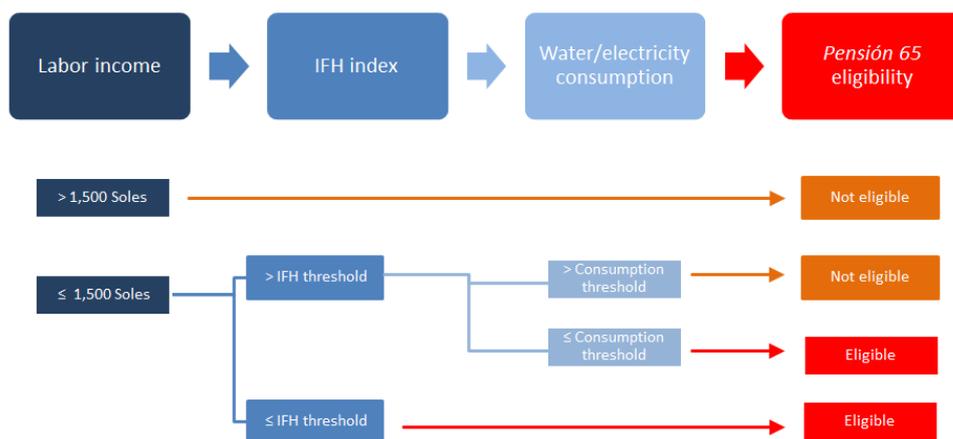
3.7 Tables and Figures

Table 3.1: Characteristics of the Elderly Population in Peru (2015)

Variables:	Mean	S.E.	Observations
<i>Hh characteristics</i>			
Rural (d)	0.19	(0.00)	11702
North Coast (d)	0.14	(0.00)	11702
Central coast (d)	0.07	(0.00)	11702
South coast (d)	0.02	(0.00)	11702
Northern highlands (d)	0.06	(0.00)	11702
Center sierra (d)	0.12	(0.00)	11702
Southern highlands (d)	0.14	(0.00)	11702
Amazonian jungle (d)	0.08	(0.00)	11702
Lima metropolitan (d)	0.37	(0.01)	11702
Total hh members	3.37	(0.03)	11702
Members between 0 - 5 y/o	0.35	(0.01)	11702
Members between 55 - 75 y/o	1.23	(0.01)	11702
Members between 56 - 103 y/o	0.63	(0.01)	11702
Extremely poor (d)	0.41	(0.01)	11702
<i>Individual characteristics</i>			
Age	74.41	(0.09)	11702
Female (d)	0.54	(0.01)	11702
Years of education	5.28	(0.06)	11702
Employed (d)	0.45	(0.01)	11702
Employed in the informal sector (d)	0.39	(0.01)	11702
Affiliated to health insurance (d)	0.38	(0.01)	11702
Affiliated to the pension system (d)	0.36	(0.01)	11702
Receiving pension income (d)	0.24	(0.01)	11702
Pension income received last year (Soles) ^a	789.89	(18.09)	2808

Source: ENAHO 2015. Notes: Sample of individuals aged 65 years and more. (d) stands for dummy variables. Mean estimates are adjusted by sampling weights. ^a Pension receivers only.

Figure 3.1: *Pensión 65* Eligibility Rule



Source: SISFOH (2010).

Table 3.2: Variables and Weights used in the Construction of the IFH

	Metropolitan Lima	Other urban areas	Rural areas
<i>Fuel used to cook</i>			
Do not cook	-0.49	-0.67	-0.76
Other	-0.4	-0.5	-0.38
Firewood	-0.37	-0.33	0.05
Carbon	-0.33	-0.22	0.36
Kerosine	-0.29	-0.19	0.37
Gas	0.02	0.12	0.52
Electricity	0.43	0.69	0.52
<i>Water supply in the home</i>			
Other	-0.78	-0.58	-
River	-0.65	-0.42	-
Well	-0.62	-0.37	-
Water tanker	-0.51	-0.34	-
Pipe	-0.41	-0.32	-
Outside	-0.35	-0.25	-
Inside	0.1	0.12	-
<i>Wall material</i>			
Other	-0.7	-0.8	-
Wood or mat	-0.48	-0.55	-
Stone with mud	-0.44	-0.46	-
Rushes covered with mud	-0.41	-0.43	-
Clay	-0.39	-0.38	-
Sun-dried brick or adobe	-0.37	-0.2	-
Stones, lime or concrete	-0.33	-0.07	-
Brick	0.1	0.25	-
<i>Type of drainage</i>			
None	-0.89	-0.68	-
River	-0.75	-0.49	-
Sinkhole	-0.59	-0.4	-
Septic tank	-0.46	-0.3	-
Drainage system outside the house	-0.39	-0.21	-
Drainage system inside the house	0.1	0.2	-

Table 3.2 (cont.): Variables and Weights used in the Construction of the IFH

	Metropolitan Lima	Other urban areas	Rural areas
<i>Number of members with health insurance</i>			
None	-0.26	-0.25	-0.1
One	-0.04	0.06	0.5
Two	0.06	0.17	0.59
Three	0.14	0.27	0.66
More than three	0.32	0.48	0.86
<i>Goods of household wealth^a</i>			
None	-0.47	-0.35	-0.11
One	-0.17	0.05	0.64
Two	0.02	0.25	0.83
Three	0.15	0.4	0.9
Four	0.25	0.52	1.09
Five	0.47	0.75	1.09
<i>Has fixed phone</i>			
Yes	-0.32	-	-
No	0.20	-	-
<i>Roof material</i>			
Other	-0.86	-0.9	-
Straw	-0.74	-0.72	-
Mat	-0.67	-0.62	-
Woven cane	-0.38	-0.23	-
Tiles	-0.23	0.03	-
Wood or mat	-0.21	0.07	-
Concrete	0.17	0.32	-
<i>Education of the Household head</i>			
None	-0.51	-0.57	-0.59
Preschool	-0.43	-0.25	-0.08
Primary	-0.28	0.01	0.35
Secondary	-0.06	0.19	0.59
Vocational education (VET)	0.1	0.33	0.68
Undergraduate	0.22	0.55	0.88
Postgraduate	0.4	0.55	0.88

Table 3.2 (cont.): Variables and Weights used in the Construction of the IFH

	Metropolitan Lima	Other urban areas	Rural areas
<i>Floor material</i>			
Other	-0.97	-1.12	-
Land	-0.6	-0.47	-
Concrete	-0.16	-0.01	-
Wood	0.08	0.3	-
Tiles	0.16	0.4	-
Vinyl sheets	0.28	0.51	-
Parquet	0.51	0.71	-
<i>Overcrowding</i>			
More than six	-0.68	-	-
Between four and six	-0.51	-	-
Between two and four	-0.31	-	-
Between one and two	-0.07	-	-
Less than one	0.24	-	-
<i>Highest level of education</i>			
None	-	-	-0.35
Primary	-	-	0.11
Secondary	-	-	0.41
Vocational education (VET)	-	-	0.62
Undergraduate	-	-	0.83
<i>Electricity</i>			
No	-	-	-0.29
Yes	-	-	0.22
<i>Floor made of earth</i>			
Yes	-	-	-0.17
No	-	-	0.47

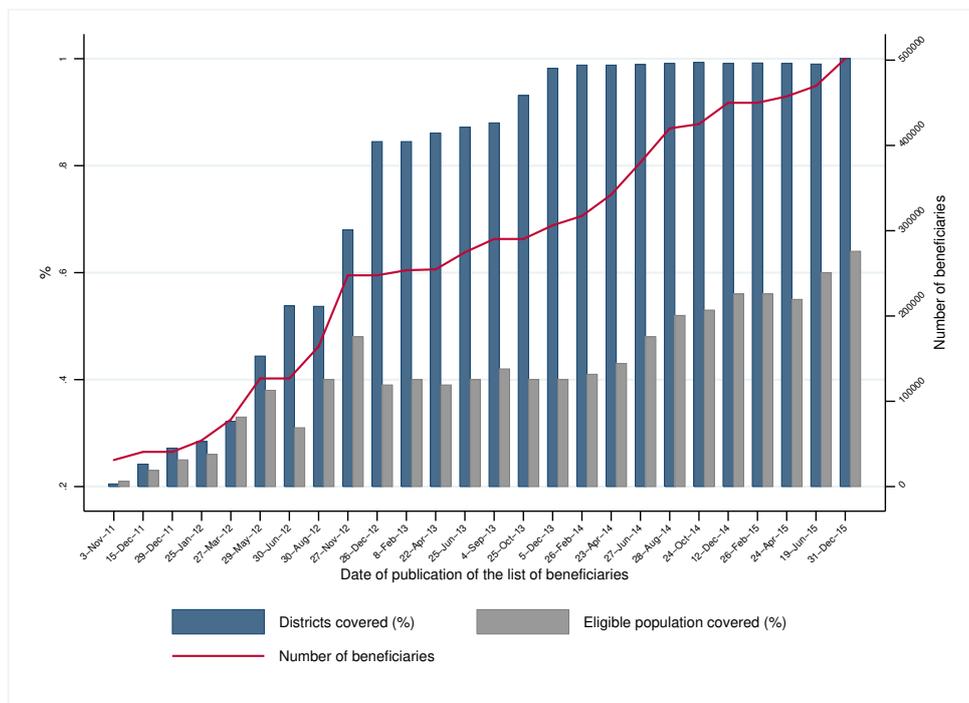
Source: SISFOH (2010).

Table 3.3: IFH Eligibility Thresholds by Cluster

Cluster	IFH - Threshold
1	33
2	36
3	34
4	38
5	35
6	34
7	52
8	42
9	44
10	50
11	44
12	43
13	43
14	33
15	55

Source: SISFOH (2010).

Figure 3.2: Pensión 65 Coverage 2011- 2015

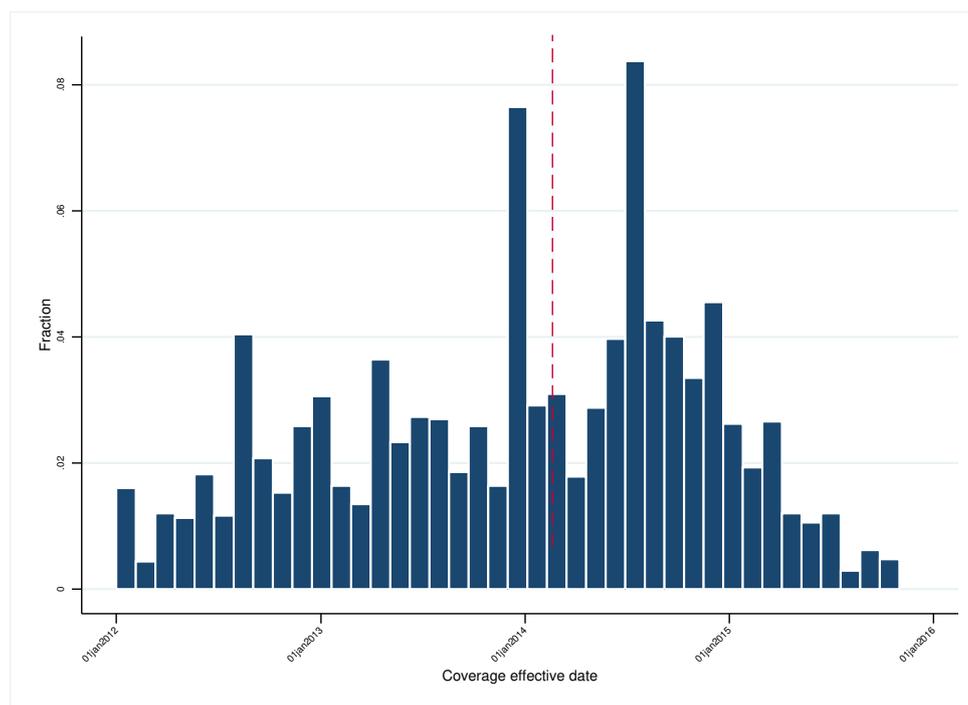


Source: Author’s calculations based on the number of beneficiaries reported by program officials (MIDIS 2016) and total population of reference (ENAH0, 2015). Notes: Each bar represents the fraction of districts (blue) and eligible individuals (red) covered by the program. The horizontal axis represents the date of publication of the list of beneficiaries by the Ministry of Development and Social Inclusion.

Table 3.4: Participation in *Pensión 65* (2015)

Variables:	Mean	S.E.	Obs.
Eligible for <i>Pensión 65</i> (d)	0.29	(0.01)	11702
Extremely poor (d)	0.41	(0.01)	11702
Have an ID (d)	0.99	(0.00)	11702
Not receiving pension income (d)	0.76	(0.01)	11702
Not receiving other subsidies (d)	0.94	(0.00)	11702
Received <i>Pensión 65</i> (d) ^a	0.64	(0.01)	3394
Time receiving <i>Pensión 65</i> (months) ^b	17.99	(0.26)	2172
Subsidy amount received last year (Soles) ^b	1320.99	(16.94)	2172

Source: ENAHO - 2015. Notes: Sample of individuals aged 65 years and more. (d) stands for dummy variables. Mean estimates are adjusted by sampling weights. ^a Eligible for *Pensión 65* old-adults only. ^b Old-adults receiving *Pensión 65* only.

Figure 3.3: Distribution of Participants by *Pensión 65* Effective Coverage Date

Source: ENAHO, 2015. Notes: Each bar represents the fraction of 65+ individuals receiving a *Pensión 65* allocation by effective coverage date). The horizontal axis represents the date from which program participants claim been receiving the benefits. The red dashed line depicts a reference date at December 31 2013.

Table 3.5: Sample Sizes

	Hh with children under 5 y/o (1)	Children under 5 y/o (2)
Total sample	11294 (100%)	24433 (100%)
Extremely Poor	5319 (47%)	4331 (18%)
Extremely poor and oldest eligible member in the rank 55 - 75 y/o	963 (9%)	269 (1.1%)

Sources: ENAHO - 2015 (Column 1) and ENDES - 2015 (Column 2). Notes: Number of observations and percentage with respect to total in parenthesis.

Table 3.6: Summary Statistics
 Households with Children under 5 y/o

	Full sub-sample (FS) ^a		Age-eligible members (E) ^b		Difference (E) - (NE) ^c	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)	Mean (5)	S.E. (6)
<i>Household characteristics</i>						
Rural (d)	0.52	(0.02)	0.49	(0.03)	-0.05	(0.04)
Total hh members	4.07	(0.09)	3.99	(0.15)	-0.12	(0.18)
Members between 0 - 5 y/o	1.72	(0.06)	1.76	(0.10)	0.05	(0.12)
Members between 6 - 11 y/o	0.42	(0.03)	0.38	(0.04)	-0.05	(0.05)
Members between 12 - 19 y/o	0.55	(0.03)	0.43	(0.04)	-0.21***	(0.06)
Members between 20 - 29 y/o	0.58	(0.03)	0.49	(0.04)	-0.16***	(0.06)
Members between 30 - 39 y/o	0.39	(0.03)	0.50	(0.05)	0.18***	(0.06)
Members between 40 - 54 y/o	0.18	(0.02)	0.23	(0.03)	0.09***	(0.03)
Members between 55 - 75 y/o	1.48	(0.02)	1.43	(0.04)	-0.09*	(0.05)
Members older than 75 y/o	0.04	(0.01)	0.08	(0.02)	0.06**	(0.03)
Hh head age	61.03	(0.50)	65.02	(0.76)	6.61***	(0.89)
Female hh head (d)	0.33	(0.02)	0.33	(0.03)	0.00	(0.04)
Hh head years of education	3.75	(0.16)	3.28	(0.26)	-0.77**	(0.32)
Total consumption	5061.97	(148.07)	5192.50	(288.48)	216.44	(327.06)
Received <i>Pensión 65</i> (d)	0.20	(0.02)	0.49	(0.04)	0.47***	(0.04)

Table 3.6 (cont.): Summary Statistics
Households with Children under 5 y/o

	Full sub-sample (FS) ^a		Age-eligible members (E) ^b		Difference (E) - (NE) ^c	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)	Mean (5)	S.E. (6)
<i>Household spending</i>						
Total expenditures	3130.04	(125.85)	3314.97	(262.97)	306.66	(286.50)
Food spending	2125.53	(95.00)	2333.16	(193.52)	344.30	(212.85)
Breads and cereals	454.13	(20.48)	511.55	(42.35)	95.22**	(46.06)
Vegetables	236.04	(13.25)	277.06	(26.94)	68.02**	(29.47)
Fruit	174.95	(12.41)	181.82	(24.97)	11.39	(27.83)
Butter and oils	80.15	(3.30)	83.93	(6.04)	6.26	(7.08)
Seafood	144.76	(9.55)	148.14	(13.67)	5.60	(18.86)
Meat	317.18	(16.13)	325.64	(23.27)	14.03	(31.97)
Milk, cheese, eggs	205.18	(13.48)	232.00	(20.78)	44.46	(27.07)
Sugar	86.16	(3.56)	90.51	(5.70)	7.20	(7.29)
Coffee, tea, cacao	42.11	(3.22)	41.58	(4.37)	-0.87	(6.26)
Grains	55.18	(3.61)	62.73	(6.79)	12.51	(7.76)
Tubers	89.57	(5.40)	100.59	(8.97)	18.27	(11.18)
Food prepared away from home	45.89	(12.41)	56.95	(26.95)	18.34	(28.79)
Non-alcoholic beverages	36.25	(3.07)	34.13	(3.56)	-3.51	(5.74)
Alcoholic beverages	2.16	(0.68)	3.04	(1.54)	1.46	(1.62)
Spending in education	80.18	(7.91)	61.94	(8.05)	-30.24**	(14.18)
Spending in health	128.66	(13.78)	149.10	(29.20)	33.90	(31.57)
Consultations	6.88	(1.17)	7.71	(1.95)	1.38	(2.43)
Medicines and treatments	67.17	(6.55)	76.63	(12.81)	15.70	(14.49)
Tests and analysis	7.13	(1.73)	3.90	(1.39)	-5.35*	(3.04)
Dentistry	11.2	(3.27)	4.43	(1.98)	-11.23**	(5.59)
Ophthalmology	2.77	(0.82)	4.33	(1.72)	2.60	(1.86)
Hospitalization and surgery	20.94	(11.08)	34.43	(27.11)	22.36	(27.37)
Spending on durables	1.79	(0.60)	0.70	(0.31)	-1.80*	(1.01)
Housing spending	47.06	(9.82)	33.49	(9.63)	-22.51	(17.67)
Observations	963		584		963	

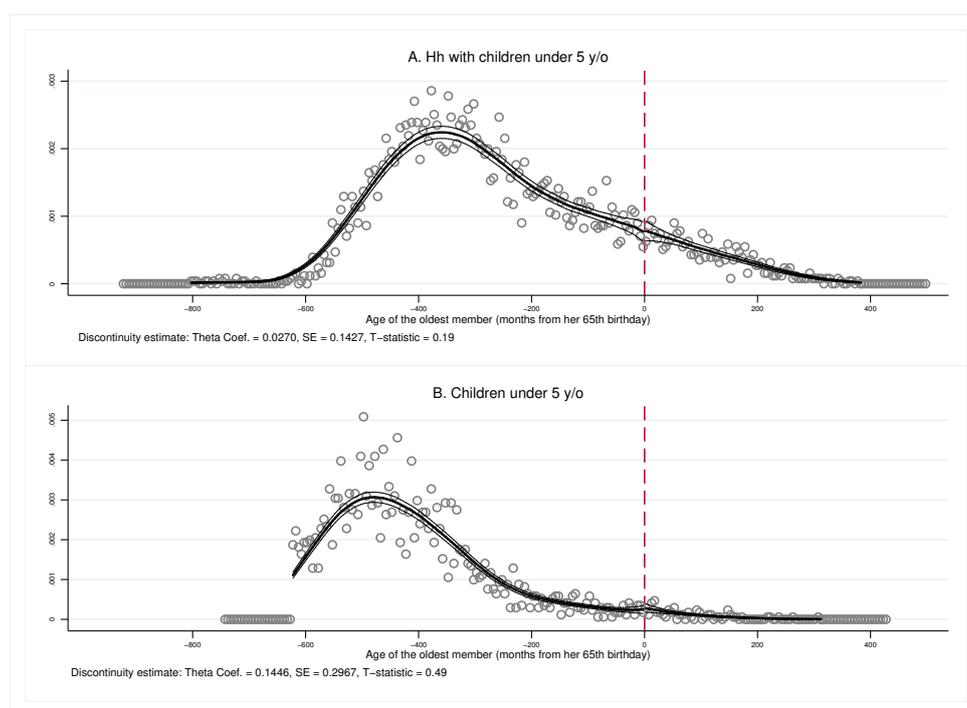
Source: ENAHO - 2015. Notes: (d) stands for dummy variables. Mean estimates are adjusted by sampling weights and standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013. All values are deflected and converted into per-capita annual flows. ^aExtremely poor households with children under 5 y/o and at least one *Pensión 65* eligible member between 55 and 75 y/o. ^bExtremely poor households with children under 5 y/o whose oldest household *Pensión 65* eligible member was 65 y/o, or more, by December of 2013. ^cThese figures result from the estimation of the following equation (OLS): $w_h = \theta_h + \kappa Eli_h + \zeta_h$, where w_h represents the different variables, Eli_h is a dummy variable equal to 1 if the oldest household *Pensión 65* eligible member was at least 65 y/o by December of 2013 (E), and to 0 if the oldest household *Pensión 65* eligible member was between 55 and 64 y/o by December of 2013 (NE), and ζ_h is an error term. *** p<0.001 ** p<0.05 * p<0.1.

Table 3.7: Summary Statistics
Children under 5 y/o

	Sub-sample 55 - 75 y/o (FS) ^a		Age-eligible members (E) ^b		Difference (E) - (NE) ^c	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)	Mean (5)	S.E. (6)
<i>Household characteristics</i>						
Rural (d)	0.12	(0.03)	0.12	(0.06)	0.01	(0.07)
Total hh members	5.59	(0.22)	5.95	(0.33)	0.58	(0.43)
Members between 0 - 5 y/o	1.40	(0.08)	1.40	(0.11)	0.01	(0.15)
Members between 6 - 11 y/o	0.54	(0.08)	0.64	(0.13)	0.13	(0.17)
Members between 12 - 19 y/o	0.51	(0.08)	0.39	(0.14)	-0.19	(0.16)
Members between 20 - 29 y/o	0.77	(0.09)	0.73	(0.15)	-0.07	(0.19)
Members between 30 - 39 y/o	0.48	(0.08)	0.70	(0.15)	0.38**	(0.16)
Members between 40 - 54 y/o	0.24	(0.04)	0.27	(0.08)	0.05	(0.09)
Members between 55 - 75 y/o	1.49	(0.07)	1.54	(0.12)	0.08	(0.14)
Members older than 75 y/o	0.17	(0.05)	0.28	(0.09)	0.19*	(0.10)
Hh head age	61.91	(1.17)	63.48	(2.23)	2.71	(2.49)
Female hh head (d)	0.32	(0.05)	0.26	(0.08)	-0.08	(0.10)
Hh head years of education	2.86	(0.28)	2.15	(0.33)	-1.15**	(0.49)
Received <i>Pensión 65</i>	0.80	(0.04)	0.77	(0.07)	-0.05	(0.08)
<i>Children characteristics</i>						
Age in months	32.70	(1.37)	33.14	(2.23)	1.31	(2.83)
Woman (d)	0.49	(0.05)	0.45	(0.07)	-0.04	(0.09)
Wt/A Standard deviations	-0.49	(0.09)	-0.50	(0.17)	-0.01	(0.20)
Ht/A Standard deviations	-1.36	(0.08)	-1.35	(0.12)	0.02	(0.16)
Wt/Ht Standard deviations	0.41	(0.09)	0.39	(0.19)	0.02	(0.21)
BMI Standard deviations	0.51	(0.09)	0.49	(0.17)	-0.05	(0.19)
Acute malnutrition (d)	0.01	(0.01)	0.03	(0.02)	0.02	(0.02)
Stunting (d)	0.21	(0.04)	0.20	(0.05)	-0.00	(0.07)
Underweight (d)	0.06	(0.02)	0.03	(0.02)	-0.05	(0.04)
Obesity (d)	0.04	(0.02)	0.03	(0.02)	-0.06	(0.04)
Severe anemia (d)	0.00	(0.00)	0.00	(0.00)	-0.00	(0.00)
Moderate anemia (d)	0.18	(0.04)	0.20	(0.06)	0.05	(0.07)
Mild anemia (d)	0.17	(0.03)	0.18	(0.05)	0.02	(0.06)
Observations	269		170			

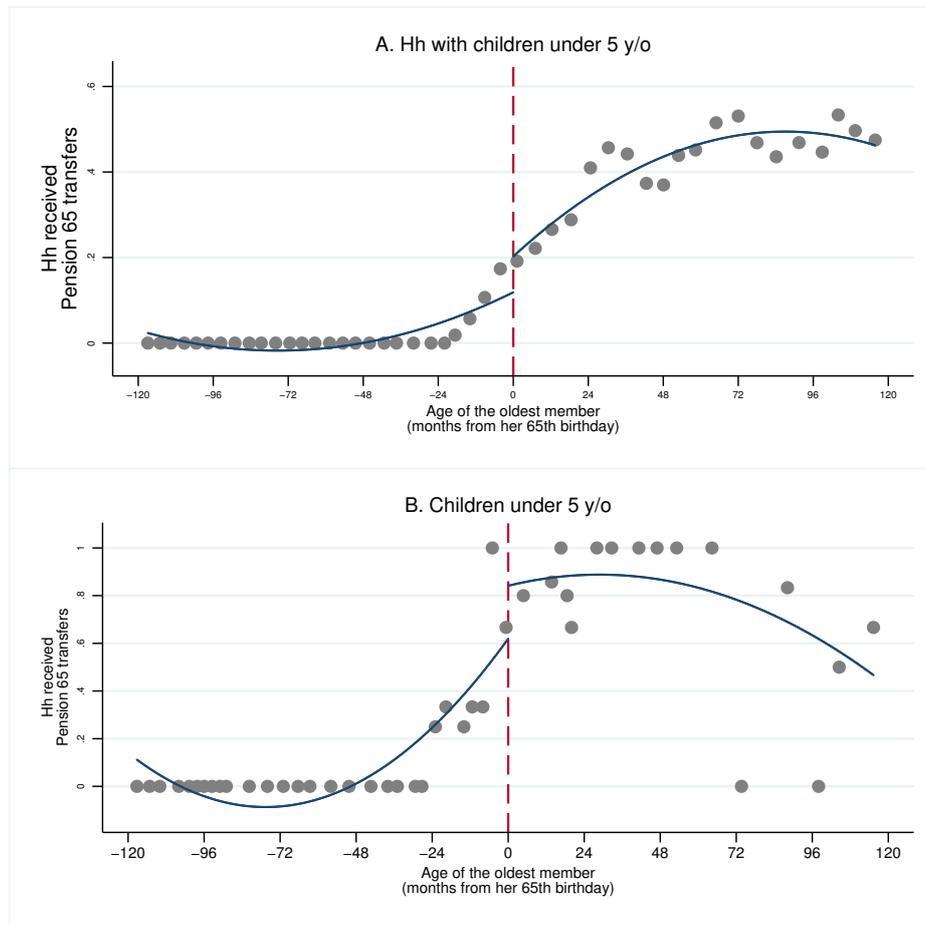
Source: ENDES - 2015. Notes: (d) stands for dummy variables. standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and means are adjusted by weights. ^aChildren under 5 y/o living in extremely poor households with at least one *Pensión 65* eligible member between 55 and 75 y/o. ^b Children under 5 y/o living in extremely poor households whose oldest household *Pensión 65* eligible member was 65 y/o, or more, by December of 2013. ^cThese figures result from the estimation of the following equation (OLS): $w_h = \theta_h + \kappa Eli_h + \zeta_h$, where w_h represents the different variables, Eli_h is a dummy variable equal to 1 if the oldest household *Pensión 65* eligible member was at least 65 y/o by December of 2013 (E), and to 0 if the oldest household *Pensión 65* eligible member was between 55 and 64 y/o by December of 2013 (NE), and ζ_h is an error term. *** p<0.001 ** p<0.05 * p<0.1.

Figure 3.4: McCrary Tests



Sources: ENAHO - 2015 (Graph A) and ENDES - 2015 (Graph B). Notes: Dots are density estimates with bin size 5 and solid lines are predictions from local linear regressions using triangle kernel with a bandwidth of 119 months. The horizontal axis represents the age of the oldest eligible member by December of 2013, measured in months from her 65th birthday. Negative values correspond to individuals under 65 years old by December of 2013. Theta coefficients and standard errors, in parenthesis, are calculated as in [McCrary \(2007\)](#).

Figure 3.5: Discontinuity of Program Participation



Sources: Author's calculations based on ENAHO - 2015 (Graph A) and ENDES - 2015 (Graph B). Notes: Each dot represents the fraction of households / children under 5 receiving a *Pensión 65* subsidy with bin size 5. The horizontal axis represents the age of the oldest eligible member by December of 2013, measured in months from her 65th birthday. Negative values correspond to individuals under 65 years old by December of 2013. The solid lines are quadratic predictions from local linear regressions using triangle kernel within a bandwidth of 119 months.

Table 3.8: Program Discontinuity at 65 y/o Participation in *Pensión 65* (LPM)

	Dependent variable: received a <i>Pensión 65</i> subsidy	
	ENAHO - 2015	ENDES - 2015
	(1)	(2)
β_h	0.22** (0.09)	0.41* (0.24)
R^2	0.42	0.57
Observations	269	963

Sources: ENAHO - 2015 (Column 1) and ENDES - 2015 (Column 2). Notes: LPM estimations of Equation (3.2) for participation in *Pensión 65*. The following controls are included: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. ***p<0.001 ** p<0.05 * p<0.1.

Figure 3.6: Discontinuity in Household Spending

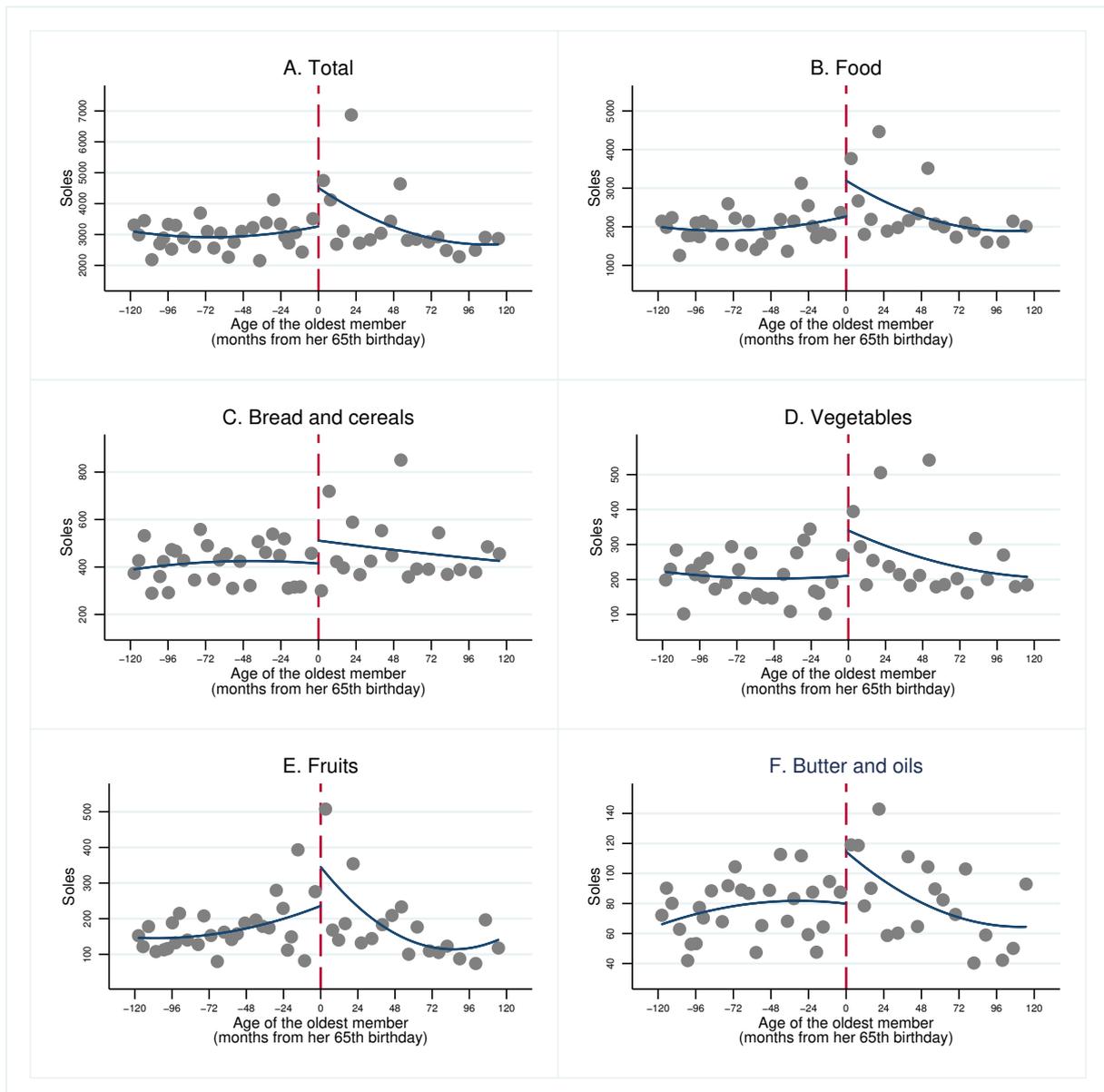


Figure 3.6 (cont.): Discontinuity in Household Spending

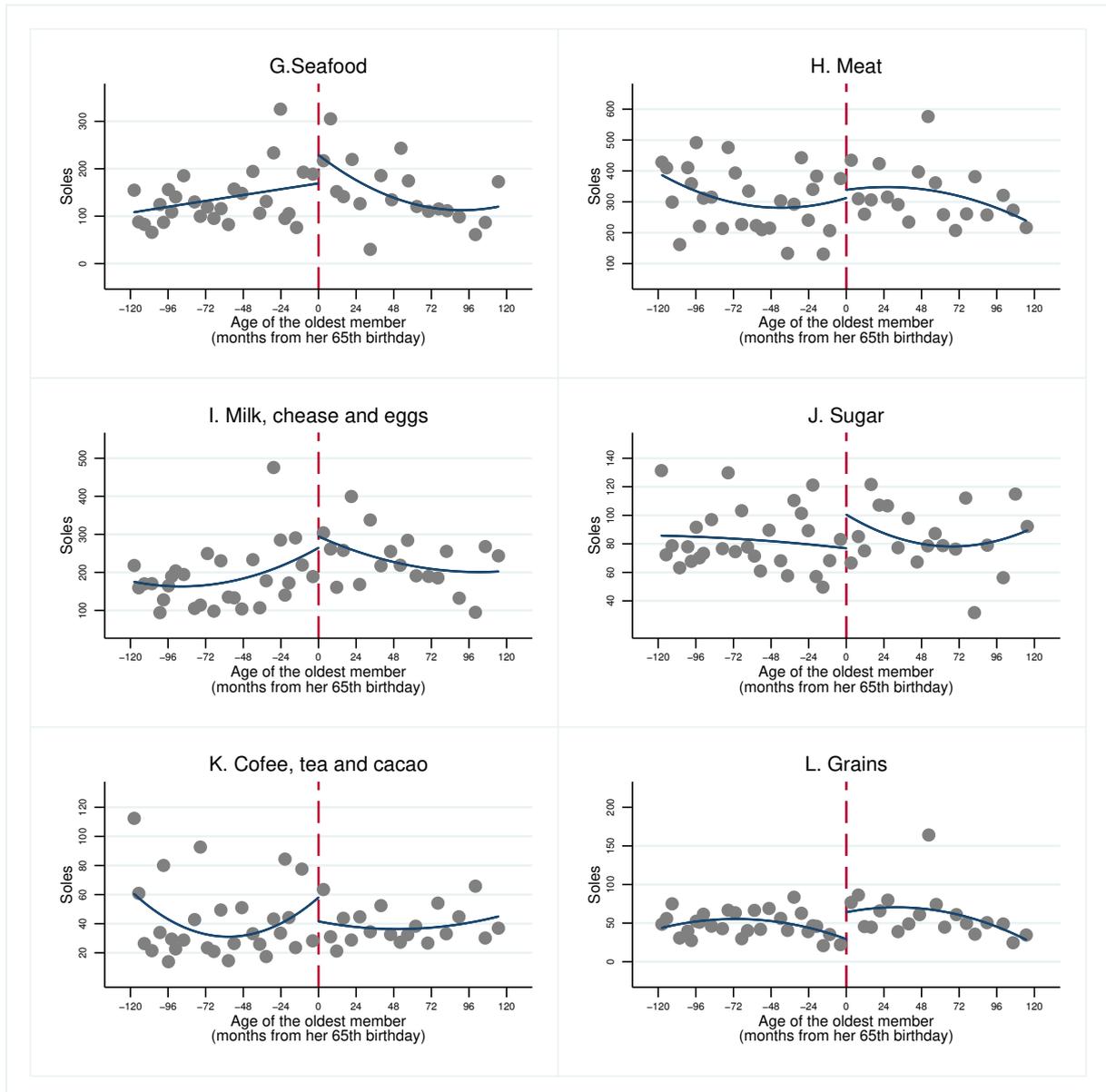


Figure 3.6 (cont.): Discontinuity in Household Spending

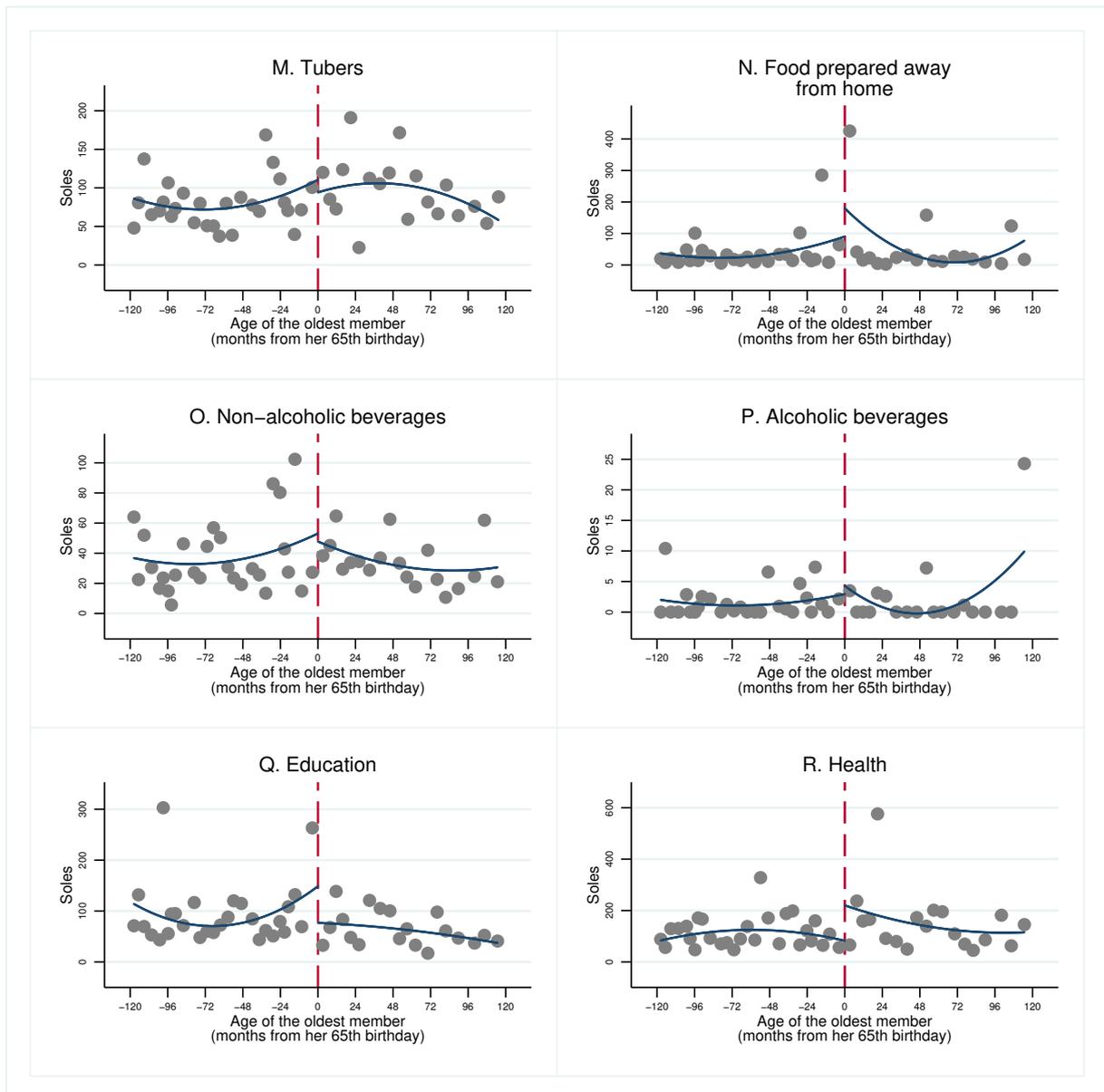


Figure 3.6 (cont.): Discontinuity in Household Spending

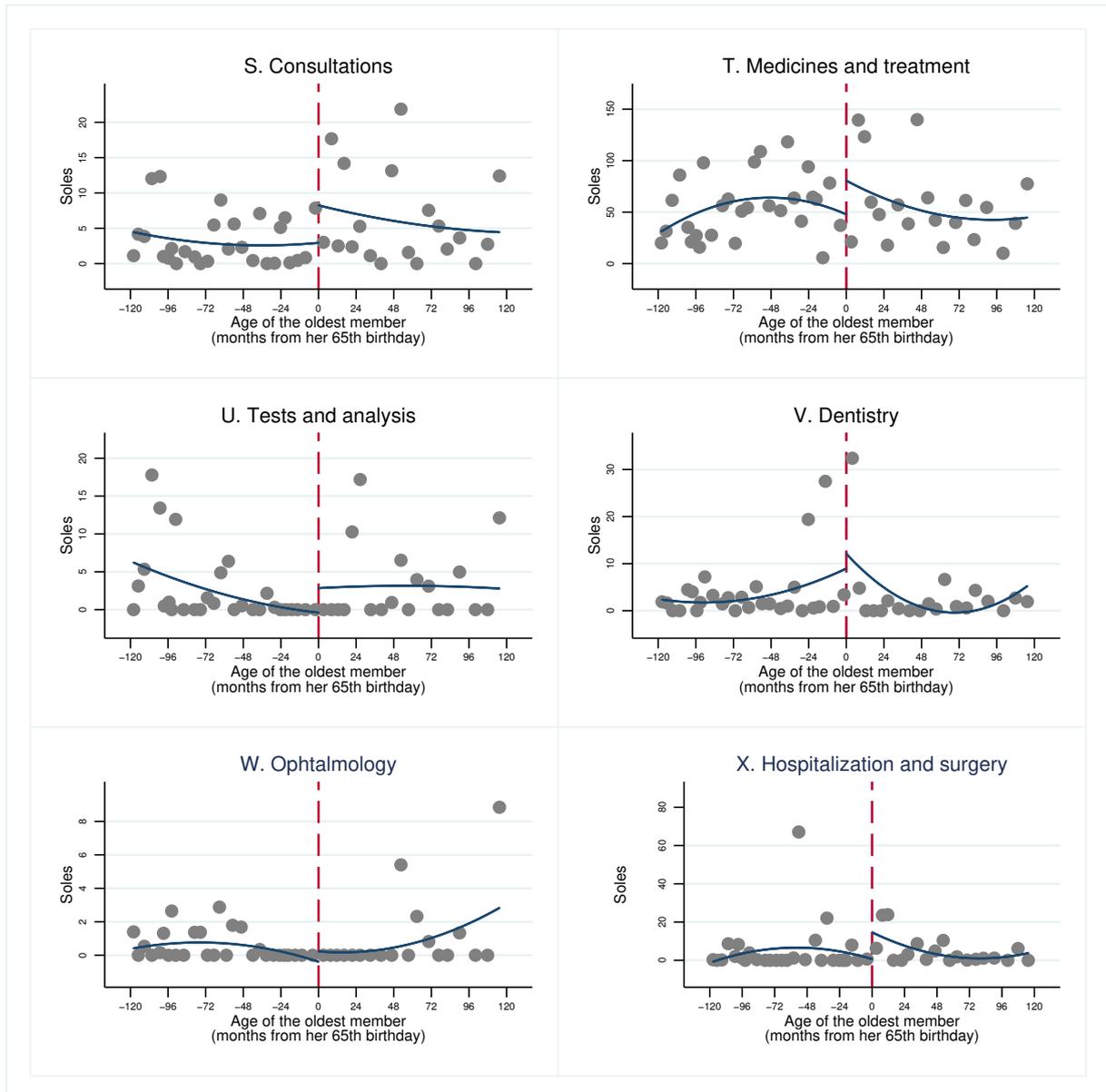
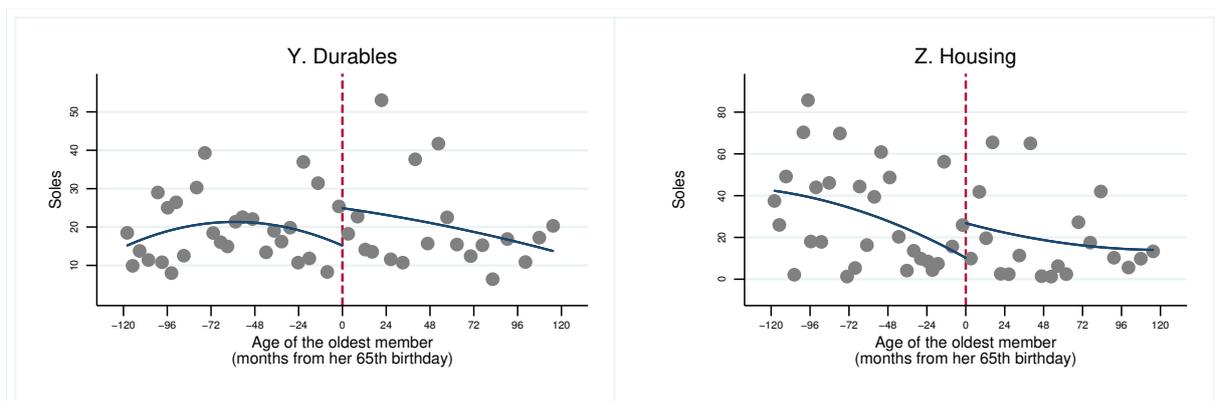


Figure 3.6 (cont.): Discontinuity in Household Spending

Source: ENAHO - 2015. Notes: Household with at least one child under 5 y/o Rank [-119, 119]. Bin size = 5. Quadratic fit.

**Table 3.9: Pensión 65 Estimates on Monetary Spending
 Households with Children under 5 y/o**

	Estimation results			Multiple hypothesis testing	
	β_h		R^2	χ^2	P-value
	(1)	(2)	(3)	(4)	(5)
Total expenditures	1,131.76†	(706.18)	0.38	6.44	0.09
Food spending	844.43	(585.16)	0.37	6.20	0.10
Breads and cereals	99.89	(91.80)	0.18	8.91	0.02
Vegetables	116.71*	(69.38)	0.27	7.72	0.04
Fruit	80.57	(93.15)	0.32	2.08	1.00
Butter and oils	30.04	(19.41)	0.13	2.05	1.00
Seafood	32.48	(50.47)	0.19	1.59	1.00
Meat	42.48	(82.91)	0.31	0.78	1.00
Milk, cheese, eggs	1.64	(64.63)	0.29	0.35	1.00
Sugar	20.37	(17.16)	0.14	1.16	1.00
Coffee, tea, cacao	-7.35	(17.68)	0.11	0.00	1.00
Grains	29.86*	(16.15)	0.12	2.44	0.95
Tubers	13.93	(27.44)	0.21	0.66	1.00
Food prepared away from home	73.45	(120.58)	0.20	0.52	1.00
Non-alcoholic beverages	-3.59	(17.19)	0.11	1.08	1.00
Alcoholic beverages	-0.28	(2.60)	0.11	0.02	1.00
Spending in education	-89.26	(77.85)	0.14	0.00	1.00
Spending in health	122.68*	(72.24)	0.11	0.51	0.02
Consultations	13.27*	(7.16)	0.09	2.63	1.00
Medicines and treatments	41.95	(31.09)	0.12	0.54	1.00
Tests and analysis	4.18	(3.40)	0.05	0.00	1.00
Dentistry	-19.15	(14.60)	0.06	1.38	1.00
Ophthalmology	6.13	(5.25)	0.13	0.00	1.00
Hospitalization and surgery	11.96	(8.74)	0.06	1.28	1.00
Spending on durables	-1.58	(3.26)	0.08	0.00	1.00
Housing spending	14.08	(35.61)	0.15	0.07	1.00
Observations	963				

Source: ENAHO - 2015. Notes: Households with at least one child 0 - 5 y/o. Each row corresponds to a different estimation, dependent variable appearing in the first column. Columns 1 to 3 display OLS β_h coefficients, adjusted by weights, standard errors, clustered at the age of the oldest member by December of 2013, and the corresponding R^2 . Columns 4 and 5 report the results (Chi-squared and P-value) of a multiple hypothesis test, using the Bonferroni correction, implemented in order to check the statistical relative importance of each of the results. All values are deflected and converted into per-capita annual flows. Top 1% of outliers were removed. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1. †P. Value = 0.110.

**Table 3.10: *Pensión 65* Estimates on Monetary Spending
Alternative Household Samples**

	Hhs without children under 5 y/o		Hhs with women btw. 15 - 49 y/o		Hhs with adults 65 y/o and older	
	β_h		β_h		β_h	
	(1)	(2)	(3)	(4)	(5)	(6)
Total expenditures	385.58	(374.13)	432.91	(449.19)	-1,326.23	(893.48)
Food spending	93.78	(322.80)	695.44**	(346.78)	-551.33	(636.74)
Breads and cereals	-2.71	(46.58)	24.35	(57.08)	40.46	(80.00)
Vegetables	25.53	(38.57)	82.65+	(50.65)	-86.70	(75.84)
Fruit	-10.85	(33.02)	39.59	(48.68)	-102.98	(64.14)
Butter and oils	2.65	(9.49)	0.57	(14.65)	-38.86**	(19.26)
Seafood	37.24	(28.19)	31.15	(45.95)	-39.10	(40.90)
Meat	117.14	(81.07)	65.43	(86.15)	-11.13	(80.75)
Milk, cheese, eggs	18.88	(43.47)	77.22	(67.82)	-68.16	(73.77)
Sugar	-2.11	(12.02)	16.94	(14.28)	15.00	(20.26)
Coffee, tea, cacao	2.59	(8.60)	-4.94	(12.77)	-0.94	(18.39)
Grains	16.09	(10.83)	4.15	(18.18)	20.76	(27.21)
Non-alcoholic beverages	-3.12	(14.40)	44.92**	(18.98)	-8.13	(18.92)
Alcoholic beverages	-2.08	(2.52)	0.66	(2.40)	-0.74	(2.28)
Spending in education	4.31	(29.05)	-68.22	(53.06)	-17.74	(43.46)
Spending in health	13.60	(53.53)	128.60**	(57.73)	-167.19	(147.03)
Consultations	2.60	(3.97)	15.87**	(6.53)	6.06	(9.39)
Medicines and treatments	41.89*	(22.37)	78.76**	(30.58)	-12.34	(30.32)
Tests and analysis	5.87	(7.32)	12.26	(8.06)	18.13**	(8.76)
Dentistry	12.18	(10.02)	9.42	(23.52)	-11.15	(7.92)
Ophthalmology	0.53	(2.80)	6.37	(4.30)	-5.78	(5.23)
Hospitalization and surgery	-4.83	(3.77)	11.69	(7.74)	7.93	(9.32)
Spending on durables	1.24**	(0.62)	1.57	(1.24)	-0.08	(2.33)
Housing spending	-58.69	(135.07)	-61.25	(103.78)	257.61**	(109.82)
Observations	3386		1333		2620	

Source: ENAHO - 2015. Notes: Each row corresponds to a different estimation, the dependent variable appearing in the first column. β_h coefficients correspond to OLS estimations, adjusted by weights. Standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013. All values are deflated and converted into per-capita annual flows. Top 1% of outliers were removed. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1. †P. Value = 0.110.

Table 3.11: 2SLS Estimates on Household Spending

	ρ_i	
	(1)	(2)
Total expenditures	124.26*	(67.75)
Food spending	51.62	(404.85)
Breads and cereals	-3.96	(352.95)
Vegetables	95.97*	(50.20)
Fruit	-27.45	(32.47)
Butter and oils	5.94	(12.50)
Seafood	-24.86	(31.23)
Meat	-10.13	(64.28)
Milk, cheese, eggs	41.40	(48.07)
Sugar	16.83	(14.15)
Coffee, tea, cacao	2.99	(11.46)
Grains	11.65	(14.13)
Non-alcoholic beverages	11.97	(10.54)
Alcoholic beverages	4.36	(4.46)
Spending in education	7.89	(25.34)
Spending in health	28.26*	(14.90)
Consultations	11.76*	(6.15)
Medicines and treatments	29.99	(34.37)
Tests and analysis	0.65	(4.66)
Dentistry	12.26	(55.28)
Ophthalmology	3.81	(3.53)
Hospitalization and surgery	20.73	(34.79)
Spending on durables	3.78	-2.95
Housing spending	-80.64	(98.44)
Observations	963	

Sources: ENDES - 2015. Notes: Column 1 presents ρ_h coefficients from 2SLS regressions, where the first stage (Table ??) is given by Equation (3.2) with a dependent variable equal to one if at least one household member received a *Pensión 65* subsidy in the last three months, and the second stage is given by Equation (3.3). Each row corresponds to a different estimation, the dependent variable appearing in the first column. Standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and coefficients are adjusted by weights. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1.

Figure 3.7: Discontinuity in Children Outcomes

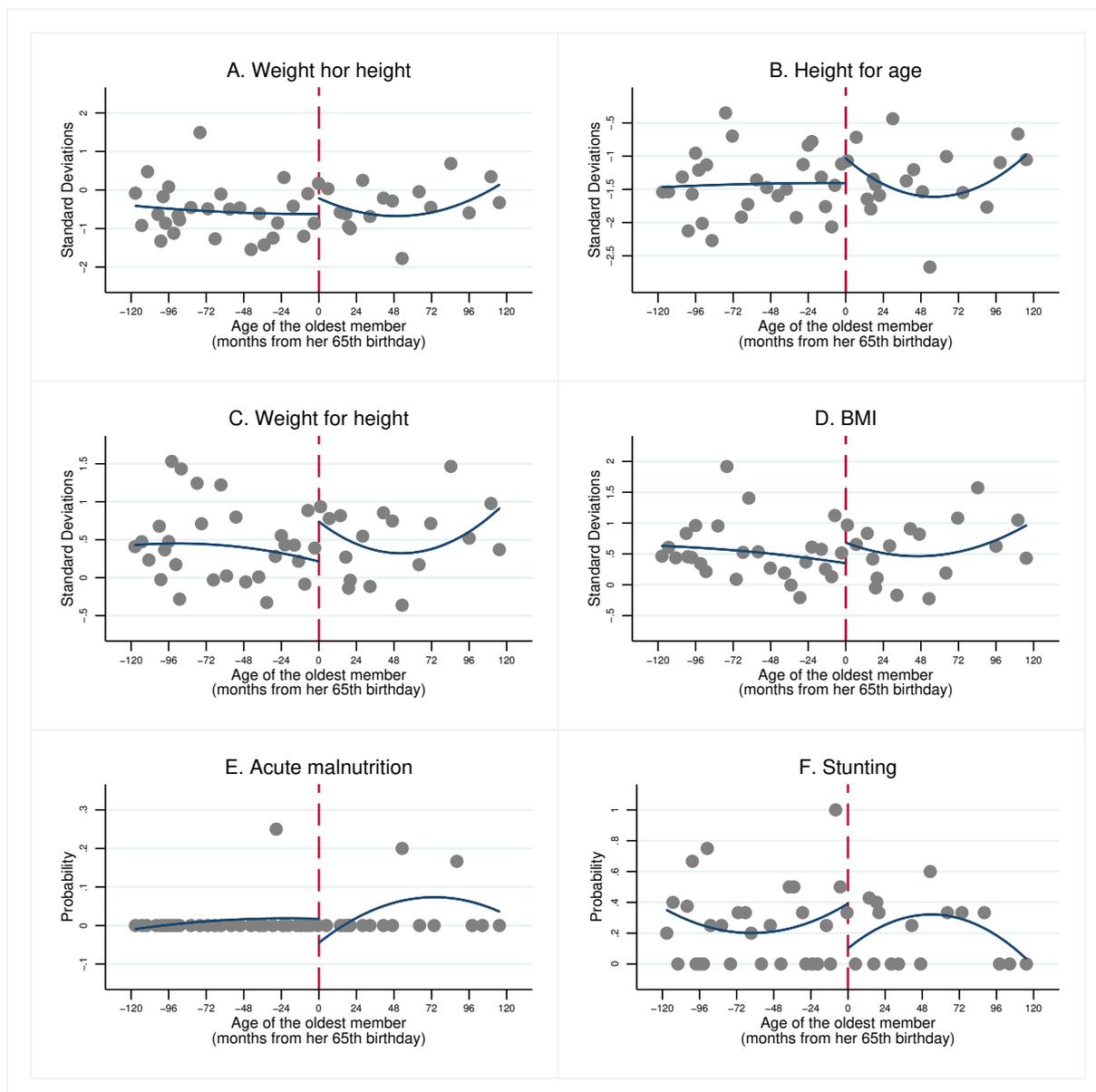
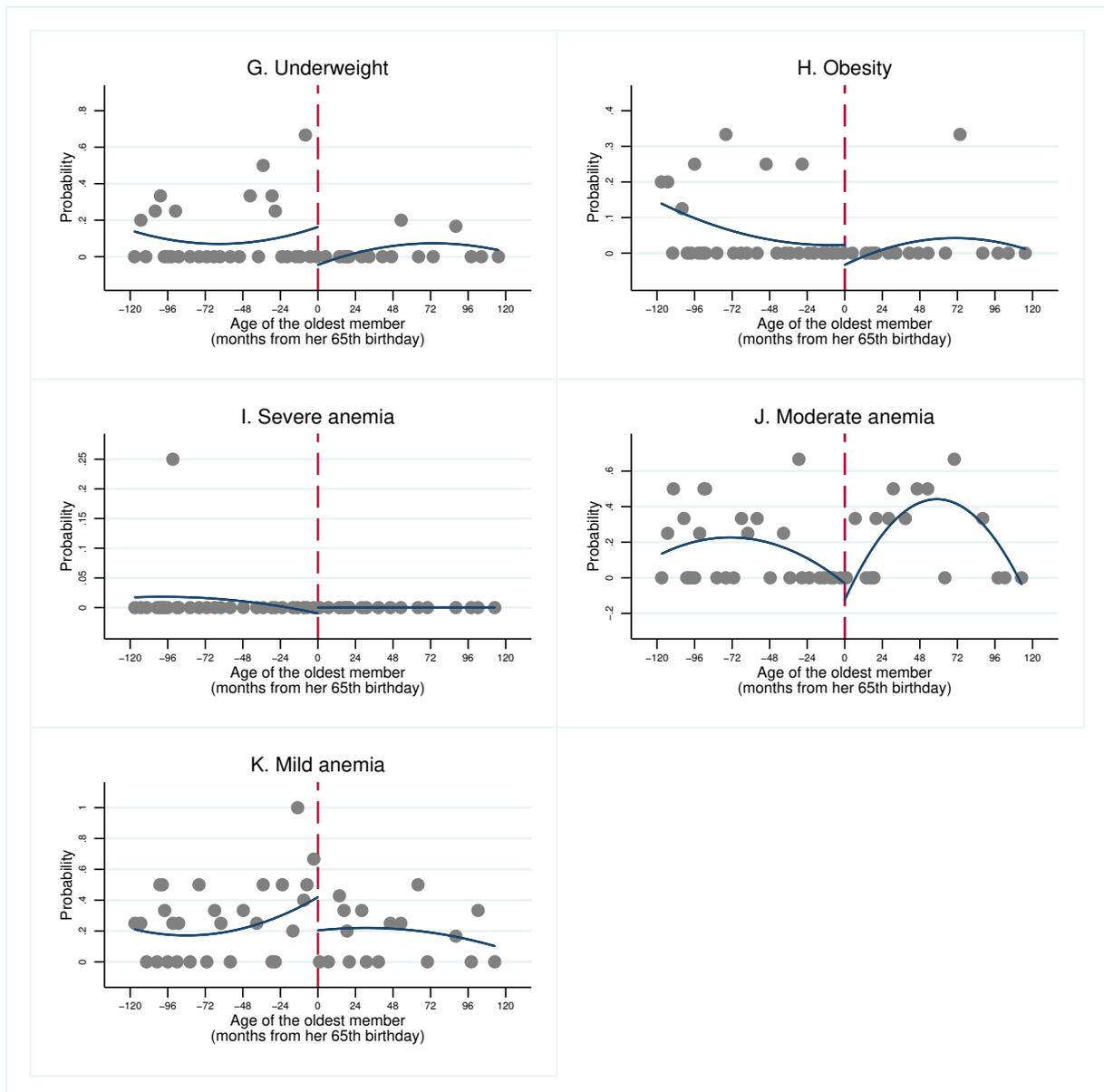


Figure 3.7 (cont.): Discontinuity in Children Outcomes



Source: ENDES - 2015. Notes: Children under 5 years old (0 - 59 months old). Rank [-119, 119]. Bin size = 5. Quadratic fit.

Table 3.12: *Pensión 65* Estimates on Children's Nutrition and Health (OLS and 2SLS)

	OLS			2SLS	
	β_i		R^2	ρ_i	
	(1)	(2)	(3)	(4)	(5)
Wt/A Standard deviations	1.47**	(0.65)	0.73	0.31†††	(0.20)
Ht/A Standard deviations	1.00*	(0.56)	0.74	0.20	(0.22)
Wt/Ht Standard deviations	1.35*	(0.74)	0.70	0.37*	(0.19)
BMI Standard deviations	1.15†	(0.71)	0.67	0.04	(0.19)
Acute malnutrition (d)	-0.14	(0.11)	0.54	0.03	(0.23)
Stunting (d)	-0.28	(0.26)	0.70	-0.14††††	(0.09)
Underweight (d)	-0.39**	(0.16)	0.64	-0.01	(0.04)
Obesity (d)	-0.06	(0.14)	0.74	0.00	(0.08)
Severe anemia (d)	0.01	(0.03)	0.48	-0.01	(0.01)
Moderate anemia (d)	0.19	(0.23)	0.77	-0.06	(0.09)
Mild anemia (d)	-0.35††	(0.22)	0.73	-0.11*	(0.06)
Observations	269			269	

Source: ENDES - 2015. Notes: Children under 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. Columns 2 and 3 present results from reduced-form β_i estimates of Equation (3.2). Columns 4 and 5 display ρ_i estimates from 2SLS regressions, where the first stage (Table ??) is given by Equation (3.2) with a dependent variable equal to one if at least one household benefits from *Pensión 65*, and the second stage is given by Equation (3.3). The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1. †P. Value = 0.101; ††P. Value = 0.114; †††P. Value = 0.131, ††††P. Value = 0.133.

**Table 3.13: Different Bandwidth Choices
Household Spending Estimates**

	Bandwidth 56 - 74 y/o			Bandwidth 57 - 73 y/o		
	β_h		R^2	β_h		R^2
	(1)	(2)	(3)	(4)	(5)	(6)
Total expenditures	1,208.55*	(706.26)	0.39	1,227.39*	(727.95)	0.4
Food spending	844.38	(529.68)	0.21	864.82	(544.80)	0.22
Breads and cereals	103.55	(92.32)	0.18	111.49	(96.38)	0.19
Vegetables	124.41*	(69.09)	0.27	122.08*	(72.02)	0.29
Fruit	87.22	(93.28)	0.33	76.83	(92.10)	0.35
Butter and oils	31.54	(19.58)	0.13	31.82	(20.18)	0.15
Seafood	35.54	(50.52)	0.19	29.61	(51.25)	0.2
Meat	36.65	(83.54)	0.31	65.23	(84.96)	0.32
Milk, cheese, eggs	4.06	(65.09)	0.29	9.32	(60.50)	0.32
Sugar	20.89	(17.29)	0.14	22.97	(18.21)	0.13
Coffee, tea, cacao	-6.45	(18.04)	0.11	1.39	(16.93)	0.09
Grains	32.05**	(16.03)	0.12	37.44**	(16.90)	0.12
Tubers	13.82	(27.69)	0.21	13.25	(29.53)	0.22
Food prepared away from home	74.67	(121.48)	0.2	60.76	(120.20)	0.22
Non-alcoholic beverages	-3.88	(17.29)	0.11	3.64	(18.02)	0.11
Alcoholic beverages	-0.23	(2.68)	0.11	-0.91	(2.42)	0.06
Spending in education	-92.03	(77.87)	0.14	-107.72	(83.38)	0.16
Spending in health	123.04*	(71.84)	0.11	121.58†	(74.72)	0.12
Consultations	13.10*	(7.16)	0.09	9.49	(6.97)	0.1
Medicines and treatments	39.36	(30.77)	0.12	37.56	(31.70)	0.13
Tests and analysis	3.6	(3.35)	0.05	2.3	(3.19)	0.05
Dentistry	-15.18	(13.75)	0.07	-17.38	(13.83)	0.07
Ophthalmology	6.19	(5.30)	0.13	5.71	(5.34)	0.13
Hospitalization and surgery	11.69	(8.74)	0.06	12.47	(9.50)	0.07
Spending on durables	-1.97	(3.31)	0.08	-1.9	(3.51)	0.09
Housing spending	-24.03	(93.21)	0.40	-40.49	(97.28)	0.38
Observations	872			810		

Source: ENAHO - 2015. Notes: Households with at least one child 0 - 5 y/o Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. All values are deflected and converted into per-capita annual flows. Top 1% of outliers were removed. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1. †P. Value = 0.105.

Table 3.14: Different Bandwidth Choices
Children's Nutrition and Health Estimates

	Bandwidth 56 - 74 y/o			Bandwidth 57 - 73 y/o		
	β_i		R^2	β_i		R^2
	(1)	(2)	(3)	(4)	(5)	(6)
Wt/A Standard deviations	1.46**	(0.68)	0.74	1.41**	(0.65)	0.73
Ht/A Standard deviations	0.99*	(0.59)	0.75	0.95*	(0.57)	0.75
Wt/Ht Standard deviations	1.33*	(0.74)	0.70	1.29*	(0.73)	0.70
BMI Standard deviations	1.15†	(0.72)	0.68	1.11††	(0.71)	0.68
Acute malnutrition (d)	-0.13	(0.11)	0.52	-0.13	(0.10)	0.52
Stunting (d)	-0.28	(0.27)	0.70	-0.26	(0.26)	0.70
Underweight (d)	-0.38**	(0.17)	0.64	-0.38**	(0.16)	0.64
Obesity (d)	-0.12	(0.17)	0.68	-0.13	(0.17)	0.68
Severe anemia (d)	0.01	(0.03)	0.50	0.01	(0.03)	0.50
Moderate anemia (d)	0.19	(0.24)	0.77	0.19	(0.24)	0.77
Mild anemia (d)	-0.33	(0.23)	0.74	-0.35†††	(0.22)	0.74
Observations	243			215		

Source: ENDES - 2015. Notes: Children under 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1. †P. Value = 0.101. †P-value = 0.112, ††P-value = 0.119, †††P-value = 0.118.

**Table 3.15: Various Polynomials
 Household Spending Estimates**

	Linear polynomial			Polynomial order 3		
	β_h		R^2	β_h		R^2
	(1)	(2)	(3)	(4)	(5)	(6)
Total expenditures	847.42*	(487.75)	0.38	1,109.10*	(631.67)	0.38
Food spending	524.97	(350.22)	0.21	768.74*	(465.23)	0.21
Breads and cereals	61.67	(58.68)	0.17	97.29	(78.89)	0.18
Vegetables	97.96**	(46.69)	0.27	115.51*	(60.93)	0.27
Fruit	29.97	(56.75)	0.32	69.25	(80.69)	0.32
Butter and oils	23.52*	(12.86)	0.13	28.35*	(17.08)	0.13
Seafood	11.47	(34.29)	0.19	28.92	(45.53)	0.19
Meat	65.78	(63.00)	0.31	56.57	(72.16)	0.31
Milk, cheese, eggs	17.59	(48.57)	0.29	5.39	(59.70)	0.29
Sugar	9.92	(11.53)	0.14	20.16	(15.53)	0.14
Coffee, tea, cacao	-0.8	(11.38)	0.1	-7.92	(15.21)	0.11
Grains	24.53**	(12.37)	0.11	26.99*	(14.75)	0.12
Tubers	28.69	(19.72)	0.2	18.35	(24.53)	0.21
Food prepared away from home	21.76	(70.48)	0.18	57.15	(103.14)	0.19
Non-alcoholic beverages	-7.51	(13.21)	0.11	-5.48	(15.84)	0.11
Alcoholic beverages	-1.45	(2.24)	0.11	-0.38	(2.23)	0.11
Spending in education	-45.88	(43.59)	0.14	-70.32	(65.22)	0.14
Spending in health	79.31†	(50.03)	0.11	113.47†	(71.00)	0.11
Consultations	9.15*	(4.95)	0.09	13.25**	(6.52)	0.09
Medicines and treatments	13.9	(23.17)	0.12	36.59	(28.72)	0.12
Tests and analysis	2.72	(3.74)	0.05	4.61	(3.70)	0.05
Dentistry	-11.2	(9.31)	0.05	-19.42	(13.10)	0.06
Ophthalmology	2.12	(3.44)	0.13	5.21	(4.81)	0.13
Hospitalization and surgery	6.01	(6.79)	0.06	10.45	(7.93)	0.06
Spending on durables	-2.74	(2.38)	0.08	-1.95	(3.00)	0.08
Housing spending	56.4	(76.84)	0.40	2.37	(87.06)	0.4
Observations	963			963		

Source: ENAHO - 2015. Notes: Households with at least one child 0 - 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. All values are deflected and converted into per-capita annual flows. Top 1% of outliers were removed. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies. *** p<0.001 ** p<0.05 * p<0.1. †P-value = 0.112.

Table 3.16: Various Polynomials
Children's Nutrition and Health Estimates

	Bandwidth 56 - 74 y/o			Bandwidth 57 - 73 y/o		
	β_i		R^2	β_i		R^2
	(1)	(2)	(3)	(4)	(5)	(6)
Wt/A Standard deviations	1.41**	(0.65)	0.73	1.15*	(0.61)	0.78
Ht/A Standard deviations	1.37**	(0.63)	0.73	1.14**	(0.51)	0.73
Wt/Ht Standard deviations	1.35*	(0.69)	0.70	1.23**	(0.56)	0.69
BMI Standard deviations	1.21*	(0.67)	0.68	1.16**	(0.55)	0.67
Acute malnutrition (d)	-0.15	(0.10)	0.53	-0.11	(0.09)	0.52
Stunting (d)	-0.24	(0.24)	0.70	-0.22	(0.19)	0.70
Underweight (d)	-0.37**	(0.15)	0.64	-0.31**	(0.12)	0.62
Obesity (d)	-0.13	(0.14)	0.69	-0.03	(0.12)	0.68
Severe anemia (d)	0.01	(0.02)	0.50	0.01	(0.02)	0.50
Moderate anemia (d)	0.17	(0.20)	0.77	0.12	(0.14)	0.77
Mild anemia (d)	-0.29	(0.20)	0.74	-0.23	(0.15)	0.73
Observations	269			269		

Source: ENDES - 2015. Notes: Children under 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1.

Table 3.17: Discontinuity in Covariates and Retrospective Variables

	Household sample		Children under 5 y/o sample	
	β_h		β_i	
	(1)	(2)	(3)	(4)
Covariates				
Rural (d)	0.12	(0.10)	0.35	(0.30)
Members between 0 - 5 y.o.	-0.04	(0.12)	0.25	(0.31)
Members between 6 - 11 y.o.	0.15	(0.15)	0.62	(0.48)
Members between 12 - 19 y.o.	0.15	(0.16)	-0.12	(0.46)
Members between 20 - 29 y.o.	-0.15	(0.18)	0.39	(0.45)
Members between 30 - 39 y.o.	0.01	(0.14)	0.11	(0.32)
Members between 40 - 49 y.o.	0.10	(0.10)	0.04	(0.22)
Members between 50 - 75 y.o.	-0.25	(0.20)	0.11	(0.32)
Members older than 75 y.o.	0.19	(0.43)	0.04	(0.22)
Hh head age	0.29	(2.02)	0.00	(0.00)
Female hh head (d)	-0.08	(0.11)	0.00	(0.00)
Hh head years of education	0.37	(0.83)	0.46	(1.36)
Female (d)	-	-	0.22	(0.26)
Months old	-	-	4.70	(8.90)
Observations	963		269	
Retrospective variables				
Social programs received from 2012 ^a				
Any social program (d)	-0.02	(0.11)	-	-
<i>Programa Nacional Wawa Wasi Cuna Mas</i> (d)	0.00	(0.00)	-	-
<i>Juntos</i> (d)	-0.01	(0.02)	-	-
<i>Programa contra la Violencia Familiar y Sexual</i> (d)	0.00	(0.00)	-	-
<i>Programa de Alfabetización PRONAMA / DIALEFA</i> (d)	-0.01	(0.05)	-	-
<i>Programa Jóvenes a la Obra</i> (d)	-0.01	(0.01)	-	-
<i>Programa Especial de Reconversión Laboral</i> (d)	0.00	(0.00)	-	-
<i>Programa Beca 18</i> (d)	0.01	(0.01)	-	-
<i>Programa para la Generación de Empleo Inclusivo</i> (d)	0.02	(0.02)	-	-
Probability of a live birth ^a				
Before 2004 (d)	-	-	-0.11	(0.24)
Before 2005 (d)	-	-	-0.30	(0.23)
Before 2006 (d)	-	-	-0.20	(0.27)
Before 2007 (d)	-	-	-0.28	(0.35)
Before 2008 (d)	-	-	-0.04	(0.29)
Before 2009 (d)	-	-	0.22	(0.34)
Before 2010 (d)	-	-	0.32	(0.35)
Observations	963		228	

Sources: ENAHO - 2015 (Columns 1 and 2) and ENDES - 2015 (Columns 3 and 4). Notes: Each row corresponds to a different estimation, the dependent variable appearing in the first column. Coefficients are estimated from a regression of the form: $y_{h/i} = \alpha_{h/i} + \beta_{h/i}1\{A_{Ohm} \geq 65\} + \delta f(\tilde{A}_{Ohm}) + \gamma f(\tilde{A}_{Ohm}) * 1\{A_{Ohm} \geq 65\} + \mu_{h/i}$ (i.e. Equation (3.2) excluding control variables). The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. ^aProbability that at least one member received the program from 2012. ^bSample of households with eligible members (btw. 55 - 75 y/o), at least one woman between 15 and 49 years old and children under 5 years of age. Probability that there was at least one live birth in the household in the period of reference. *** p<0.001 ** p<0.05 * p<0.1.

Table 3.18: "Donut-hole" Estimates on Household Spending

	Two months ^a		Six months ^b	
	β_h		β_h	
	(1)	(2)	(3)	(4)
Total expenditures	1,787.83**	(739.84)	1,610.95**	(772.42)
Food spending	1,394.37***	(523.62)	1,088.18*	(552.09)
Breads and cereals	191.46**	(92.89)	174.75*	(98.63)
Vegetables	163.15**	(75.17)	134.68*	(69.27)
Fruit	116.46	(101.06)	22.18	(79.37)
Butter and oils	40.24*	(21.67)	41.31**	(20.92)
Seafood	72.32	(54.02)	64.22	(60.04)
Meat	100.19	(90.56)	71.58	(96.99)
Milk, cheese, eggs	20.60	(75.32)	-19.64	(84.71)
Sugar	35.83*	(18.50)	46.55**	(23.51)
Coffee, tea, cacao	-10.10	(20.10)	-28.32	(19.56)
Grains	34.33**	(16.80)	13.20	(18.92)
Tubers	22.54	(25.84)	26.87	(33.98)
Food prepared away from home	86.70	(130.53)	-80.69	(69.09)
Non-alcoholic beverages	-2.82	(20.48)	-6.67	(25.14)
Alcoholic beverages	0.97	(2.91)	-1.04	(2.94)
Spending in education	0.45	(32.64)	15.02	(44.29)
Spending in health	155.40*	(80.59)	229.72**	(111.76)
Consultations	18.12**	(8.20)	24.12**	(11.04)
Medicines and treatments	61.38*	(36.23)	94.48**	(43.17)
Tests and analysis	5.47	(4.27)	7.03	(5.94)
Dentistry	-21.47	(16.17)	-40.74**	(16.95)
Ophthalmology	7.65	(6.24)	12.03	(8.89)
Hospitalization and surgery	15.24	(10.70)	16.98	(14.53)
Spending on durables	-2.33	(4.08)	-3.69	(5.03)
Housing spending	19.14	(96.55)	77.63	(119.70)
Observations	945		916	

Source: ENAHO - 2015. Notes: Households with at least one child 0 - 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. All values are deflected and converted into per-capita annual flows. Top 1% of outliers were removed. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies. ^a Excludes observations within 2 months of the 65-years-old cut-off. ^b Excludes observations within 6 months of the 65-years-old cut-off. *** p<0.001 ** p<0.05 * p<0.1.

Table 3.19: "Donut-hole" Estimates on Children's Nutrition and Health

	Two months ^a		Six months ^b	
	β_i		β_i	
	(1)	(2)	(3)	(4)
Wt/A Standard deviations	1.31*	(0.70)	1.39†	(0.86)
Ht/A Standard deviations	0.74	(0.59)	0.86	(0.67)
Wt/Ht Standard deviations	1.42*	(0.76)	1.50††	(0.93)
BMI Standard deviations	1.17††	(0.72)	1.20	(0.89)
Acute malnutrition (d)	-0.17	(0.11)	-0.20	(0.13)
Stunting (d)	-0.29	(0.29)	-0.25	(0.33)
Underweight (d)	-0.38**	(0.16)	-0.46**	(0.20)
Obesity (d)	-0.07	(0.16)	-0.04	(0.19)
Severe anemia (d)	-0.01	(0.02)	-0.02	(0.03)
Moderate anemia (d)	0.26	(0.25)	0.40	(0.26)
Mild anemia (d)	-0.39	(0.26)	-0.35	(0.31)
Observations	259		253	

Source: ENDES - 2015. Notes: Children under 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies. ^a Excludes observations within 2 months of the 65-years-old cut-off. ^b Excludes observations within 6 months of the 65-years-old cut-off. *** p<0.001 ** p<0.05 * p<0.1. †P-value = 0.107, ††P-value = 0.110.

**Table 3.20: Pre-program Checks on Household Spending
(2009 and 2010)**

	2009			2010		
	β_h		R^2	β_h		R^2
	(1)	(2)	(3)	(5)	(6)	(7)
Total expenditures	219.33	(365.26)	0.34	104.43	(348.60)	0.37
Food spending	236.80	(292.23)	0.35	-94.12	(281.77)	0.34
Breads and cereals	5.72	(72.01)	0.26	-34.67	(62.59)	0.22
Vegetables	7.81	(36.78)	0.23	-35.41	(37.81)	0.22
Fruit	41.70	(43.80)	0.22	-37.87	(33.22)	0.22
Butter and oils	-0.43	(17.50)	0.12	-7.07	(10.86)	0.11
Seafood	19.79	(36.48)	0.18	27.92	(30.77)	0.15
Meat	35.00	(71.48)	0.29	-40.75	(71.94)	0.31
Milk, cheese, eggs	18.89	(36.98)	0.31	26.80	(36.57)	0.28
Sugar	12.28	(14.07)	0.14	5.94	(17.26)	0.12
Coffee, tea, cacao	-2.08	(6.25)	0.13	-0.59	(9.52)	0.11
Grains	-12.01	(16.18)	0.14	-5.98	(12.20)	0.09
Tubers	18.35	(20.12)	0.18	-7.47	(17.97)	0.16
Food prepared away from home	16.44	(12.65)	0.12	-22.64	(18.75)	0.13
Non-alcoholic beverages	10.72	(13.25)	0.12	-4.58	(12.87)	0.14
Alcoholic beverages	2.60	(3.07)	0.06	1.35	(2.08)	0.06
Spending in education	-13.78	(22.20)	0.17	-3.11	(29.29)	0.21
Spending in health	-6.89	(50.20)	0.13	29.51	(39.83)	0.13
Consultations	5.29	(5.41)	0.07	5.81	(4.67)	0.10
Medicines and treatments	-16.95	(27.88)	0.12	22.77	(19.36)	0.11
Tests and analysis	-17.77	(18.17)	0.07	2.62	(2.37)	0.16
Dentistry	2.11	(10.06)	0.06	-1.05	(6.44)	0.06
Ophthalmology	-0.80	(2.19)	0.04	1.03	(2.68)	0.13
Hospitalization and surgery	1.29	(7.65)	0.08	-4.01	(3.90)	0.09
Spending on durables	0.45	(0.61)	0.05	0.03	(1.45)	0.06
Housing spending	50.02	(54.27)	0.17	-11.02	(16.34)	0.12
Observations	1092			1019		

Sources: ENAHO - 2009 and 2010. Notes: HH with at least one child 0 - 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. All values are deflected and converted into per-capita annual flows. Top 1% of outliers were removed for a final sample of 1092 observations for 2009 and 1019 for 2010. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1.

Table 3.21: Pre-program Checks on Children's Nutrition and Health (2009 and 2010)

	2009			2010		
	β_i		R^2	β_i		R^2
	(1)	(2)	(3)	(5)	(6)	(7)
Wt/A Standard deviations	0.38	(0.45)	0.68	0.83	(0.61)	0.67
Ht/A Standard deviations	-0.46	(0.57)	0.66	0.58	(0.52)	0.67
Wt/Ht Standard deviations	0.63	(0.43)	0.66	0.51	(0.58)	0.69
BMI Standard deviations	0.57	(0.41)	0.63	0.60	(0.61)	0.66
Acute malnutrition (d)	-0.03	(0.04)	0.49	-0.02	(0.08)	0.48
Stunting (d)	0.12	(0.19)	0.60	0.04	(0.23)	0.65
Underweight (d)	0.12	(0.13)	0.51	-0.09	(0.12)	0.47
Obesity (d)	-0.08	(0.16)	0.66	-0.01	(0.11)	0.57
Severe anemia (d)	0.14	(0.12)	0.67	0.00	(0.00)	0.00
Moderate anemia (d)	0.06	(0.23)	0.57	0.10	(0.19)	0.74
Mild anemia (d)	0.06	(0.26)	0.54	0.19	(0.35)	0.60
Observations	229			253		

Sources: ENDES - 2009 and 2010. Notes: Children under 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies.*** p<0.001 ** p<0.05 * p<0.1.

**Table 3.22: Alternative Cut-offs
Sample of Households**

	Dec 2010		Dec 2011		Dec 2012		Dec 2014		Dec 2015	
	β_h	(2)	β_h	(3)	β_h	(5)	β_h	(7)	β_h	(9)
Program participation (d)	0.00	(0.05)	0.18	(0.12)	0.06	(0.08)	-0.00	(0.04)	0.03	(0.13)
Total expenditures	401.19	(531.65)	-186.53	(449.06)	40.46	(531.32)	414.99	(898.79)	-1,326.23	(893.48)
Food spending	619.36	(506.55)	-275.71	(397.71)	229.97	(427.85)	86.85	(616.34)	-551.33	(636.74)
Breads and cereals	19.60	(95.23)	-62.32	(78.01)	4.80	(78.06)	29.16	(81.83)	40.46	(80.00)
Vegetables	77.76	(54.07)	-23.06	(55.92)	73.35	(56.66)	18.58	(79.36)	-86.70	(75.84)
Fruit	91.94*	(48.97)	32.31	(64.58)	-11.08	(78.97)	-65.05	(88.00)	-102.98	(64.14)
Butter and oils	-14.34	(18.75)	-22.64	(16.08)	21.84	(15.71)	-0.26	(20.88)	-38.86**	(19.26)
Seafood	6.62	(63.14)	-124.19	(84.57)	50.09	(59.09)	-45.96	(41.34)	-39.10	(40.90)
Meat	41.28	(63.60)	26.90	(73.17)	-4.55	(76.73)	-5.50	(74.49)	-11.13	(80.75)
Milk, cheese, eggs	60.87	(88.79)	-124.25	(99.74)	-73.35	(67.69)	2.85	(64.43)	-68.16	(73.77)
Sugar	8.82	(18.83)	-0.25	(19.99)	3.05	(18.00)	55.30***	(16.06)	15.00	(20.26)
Coffee, tea, cacao	-4.32	(15.85)	25.24	(16.84)	4.70	(18.94)	-15.49	(14.78)	-0.94	(18.39)
Grains	-4.21	(17.28)	-18.55	(16.22)	-12.98	(15.59)	-7.05	(18.21)	20.76	(27.21)
Non-alcoholic beverages	19.78	(19.91)	-21.07	(28.05)	-35.17*	(21.29)	-1.21	(15.94)	-8.13	(18.92)
Alcoholic beverages	0.01	(2.75)	2.11	(3.15)	-1.46	(2.50)	0.65	(2.78)	-0.74	(2.28)

Table 3.22 (cont.): Alternative Cut-offs
Sample of Households

	Dec 2010	Dec 2011	Dec 2012	Dec 2014	Dec 2015					
	β_h	β_h	β_h	β_h	β_h					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Spending in education	-49.76 (60.11)	29.03 (26.84)	8.32 (51.49)	-54.32 (53.12)	-17.74 (43.46)					
Spending in health	38.83 (60.76)	-25.55 (48.36)	9.31 (49.07)	185.54 (126.26)	-167.19 (147.03)					
Consultations	2.08 (4.37)	2.93 (3.38)	8.29* (4.46)	-1.76 (8.12)	6.06 (9.39)					
Medicines and treatments	35.61 (39.23)	-25.52 (33.50)	6.20 (32.22)	49.65 (39.41)	-12.34 (30.32)					
Tests and analysis	12.41 (8.36)	-6.34 (7.13)	1.59 (4.03)	8.87 (5.74)	18.13** (8.76)					
Dentistry	33.42* (17.89)	-0.21 (23.38)	-24.13 (19.46)	-23.01** (10.13)	-11.15 (7.92)					
Ophthalmology	-0.82 (3.99)	4.29 (3.04)	0.23 (3.58)	3.72 (7.55)	-5.78 (5.23)					
Hospitalization and surgery	-8.46 (10.24)	-10.21 (6.72)	-2.22 (6.56)	8.76 (12.98)	7.93 (9.32)					
Spending on durables	0.18 (3.06)	4.91 (3.76)	-4.13 (4.35)	-0.52 (2.04)	-0.08 (2.33)					
Housing spending	47.47 (147.29)	-116.83 (110.04)	-48.24 (85.32)	30.71 (107.76)	-257.61** (109.82)					
Observations	963	963	963	963	963					

Source: ENAHO - 2015. Notes: HH with at least one child 0 - 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered according to the assignment variable (age of the oldest member by December of 2010, 2011, 2012, 2014 or 2015) and the coefficients are adjusted by weights. All values are deflated and converted into per-capita annual flows. Top 1% of outliers were removed. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies. *** p<0.001 ** p<0.05 * p<0.1.

**Table 3.23: Alternative Cut-offs
Sample of Children under 5 y/o**

	Dec 2010		Dec 2011		Dec 2012		Dec 2014		Dec 2015														
	β_i	(1)	β_i	(2)	β_h	(3)	β_i	(4)	β_i	(5)	β_i	(6)	β_i	(7)	β_i	(8)	β_i	(9)	β_i	(10)			
Program participation (d)	0.21	(0.25)	-0.18	(0.23)	0.08	(0.32)	-0.06	(0.30)	0.01	(0.30)	0.01	(0.30)	0.01	(0.30)	0.01	(0.30)	0.01	(0.30)	0.01	(0.30)	0.01	(0.30)	
Wt/A Standard deviations	0.20	(0.70)	0.08	(0.72)	0.63	(0.71)	-0.29	(0.84)	1.23	(0.84)	-0.29	(0.84)	1.23	(0.84)	-0.29	(0.84)	1.23	(0.84)	-0.29	(0.84)	1.23	(0.84)	
Ht/A Standard deviations	0.17	(0.68)	-0.42	(0.56)	-0.15	(0.67)	-0.59	(0.57)	0.76	(0.57)	-0.59	(0.57)	0.76	(0.57)	-0.59	(0.57)	0.76	(0.57)	-0.59	(0.57)	0.76	(0.57)	
Wt/Ht Standard deviations	0.30	(0.78)	0.44	(0.73)	1.01	(0.77)	0.01	(0.90)	1.49	(0.90)	0.01	(0.90)	1.49	(0.90)	0.01	(0.90)	1.49	(0.90)	0.01	(0.90)	1.49	(0.90)	
BMI Standard deviations	0.14	(0.77)	0.51	(0.75)	1.02	(0.76)	0.15	(0.90)	1.11	(0.90)	0.15	(0.90)	1.11	(0.90)	0.15	(0.90)	1.11	(0.90)	0.15	(0.90)	1.11	(0.90)	
Acute malnutrition (d)	0.05	(0.10)	-0.11	(0.12)	-0.15	(0.10)	-0.05	(0.12)	-0.11	(0.12)	-0.05	(0.12)	-0.11	(0.12)	-0.05	(0.12)	-0.11	(0.12)	-0.05	(0.12)	-0.11	(0.12)	
Stunting (d)	-0.31	(0.28)	0.02	(0.24)	0.10	(0.30)	0.06	(0.24)	-0.43	(0.24)	0.06	(0.24)	-0.43	(0.24)	0.06	(0.24)	-0.43	(0.24)	0.06	(0.24)	-0.43	(0.24)	
Underweight (d)	0.16	(0.15)	-0.19	(0.15)	0.29	(0.20)	-0.07	(0.18)	-0.35	(0.20)	-0.07	(0.18)	-0.35	(0.20)	-0.07	(0.18)	-0.35	(0.20)	-0.07	(0.18)	-0.35	(0.20)	
Obesity (d)	0.05	(0.22)	0.08	(0.12)	-0.13	(0.20)	0.12	(0.14)	-0.20	(0.20)	0.12	(0.14)	-0.20	(0.20)	0.12	(0.14)	-0.20	(0.20)	0.12	(0.14)	-0.20	(0.20)	
Severe anemia (d)	0.05	(0.06)	0.05	(0.05)	0.02	(0.03)	0.05	(0.05)	0.04	(0.05)	0.05	(0.05)	0.04	(0.05)	0.05	(0.05)	0.04	(0.05)	0.05	(0.05)	0.04	(0.05)	
Moderate anemia (d)	-0.41	(0.27)	-0.35+	(0.22)	-0.41*	(0.28)	-0.41*	(0.21)	-0.37	(0.21)	-0.41*	(0.21)	-0.37	(0.21)	-0.41*	(0.21)	-0.37	(0.21)	-0.41*	(0.21)	-0.37	(0.21)	
Mild anemia (d)	0.15	(0.30)	0.22	(0.25)	-0.18	(0.29)	0.32	(0.26)	0.35	(0.26)	0.32	(0.26)	0.35	(0.26)	0.32	(0.26)	0.35	(0.26)	0.32	(0.26)	0.35	(0.26)	
Observations	269		269		269		269		269		269		269		269		269		269		269		269

Sources: ENDES - 2015. Notes: Children under 5 y/o. Each row corresponds to a different estimation, the dependent variable appearing in the first column. The standard errors, in parenthesis, are clustered according to the assignment variable (age of the oldest member by December of 2010, 2011, 2012, 2014 or 2015) and the coefficients are adjusted by weights. Estimations include the following controls: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies. *** p<0.001 ** p<0.05 * p<0.1.

Table 3.24: Program Discontinuity at 65 y/o
 Participation in *Juntos* (LPM)

	ENAH0 - 2015	ENDES - 2015
	β_h (1)	β_i (2)
Dec 2010	-0.16 (0.14)	0.41 (0.32)
Dec 2011	0.08 (0.13)	0.36 (0.32)
Dec 2012	0.04 (0.12)	-0.23 (0.46)
Dec 2013	-0.04 (0.13)	-0.30 (0.30)
Dec 2014	-0.06 (0.12)	0.14 (0.32)
Dec 2015	-0.01 (0.11)	0.39 (0.37)
Observations	963	269

Sources: ENAH0 - 2015 (Column 1) and ENDES - 2015 (Column 2). Notes: LPM estimations of Equation (3.2) for participation in *Pensión 65*. Each row corresponds to a different estimation the cut-off point appearing in the first column. In the first row the threshold is the age of the oldest hh member by December of 2010, in the second the age of the oldest hh member in 2011, and so on. The following controls are included: household composition by age-group (0 - 5 y/o, 6 - 11 y/o, 12 - 19 y/o, 20 - 29 y/o, 30-39 y/o, 40 - 54 y/o, 55 - 75 y/o and more than 75 y/o); sex, age and education (years of education) of the household head, a dummy equal to 1 if the household is located in a rural area, 20 province dummies and 12 survey round dummies. The standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013 and the coefficients are adjusted by weights. *** p<0.001 ** p<0.05 * p<0.1.

Appendix

The Contributory Pension System in Peru

The contributory pension system in Peru consists of two main regimes: (i) The National Pension System (NPS), publicly founded, and (ii) the Private Pension System (PPS), administered by private funds. The National Pension System, created in 1973 (Law Decree No. 19990), is a pay-as-you-go system that grants fixed benefits and gathers variable contributions so that the collective contributions finance the payments to currently retired workers. It enrolls wage earners, salaried employees in the private and public sectors, employees of worker-owned and cooperative enterprises, teachers, artists, household workers, seamen, journalists, tannery workers, and certain self-employed workers. It is voluntary for housewives and includes special systems for fishermen and military and police personnel.

Under this regime workers make a contribution of 13% of their taxable earnings, for old age, survivor and disability coverage. Retirement age is fixed at 65 years old (for both men and women) and requires also at least 20 years of contributions. Old-age benefits range from 30% to 45% of average earnings during the last 60 remunerations, plus 2% for each additional year of contributions exceeding 20, up to a maximum of 100%. There is a legal monthly minimum pension established at 415 Soles and a maximum at 857.36. An advance of their retirement benefit is offered to women after the age of 50 and to men after 55, requiring 25 and 30 years of contributions, respectively.

The private regime was established in 1992 (Law Decree No. 25897) in order to offer an alternative system supported in the idea that pensioners could self-finance their own retirement. It is characterized as a capitalization regime in which individual contributions are deposited into a personal account and the value of the pension depends directly on the contributions made during the working life. Both private - and public - sector employees can subscribe to this regime and also self-employed persons, under a voluntary basis. Employees are not allowed to contribute.

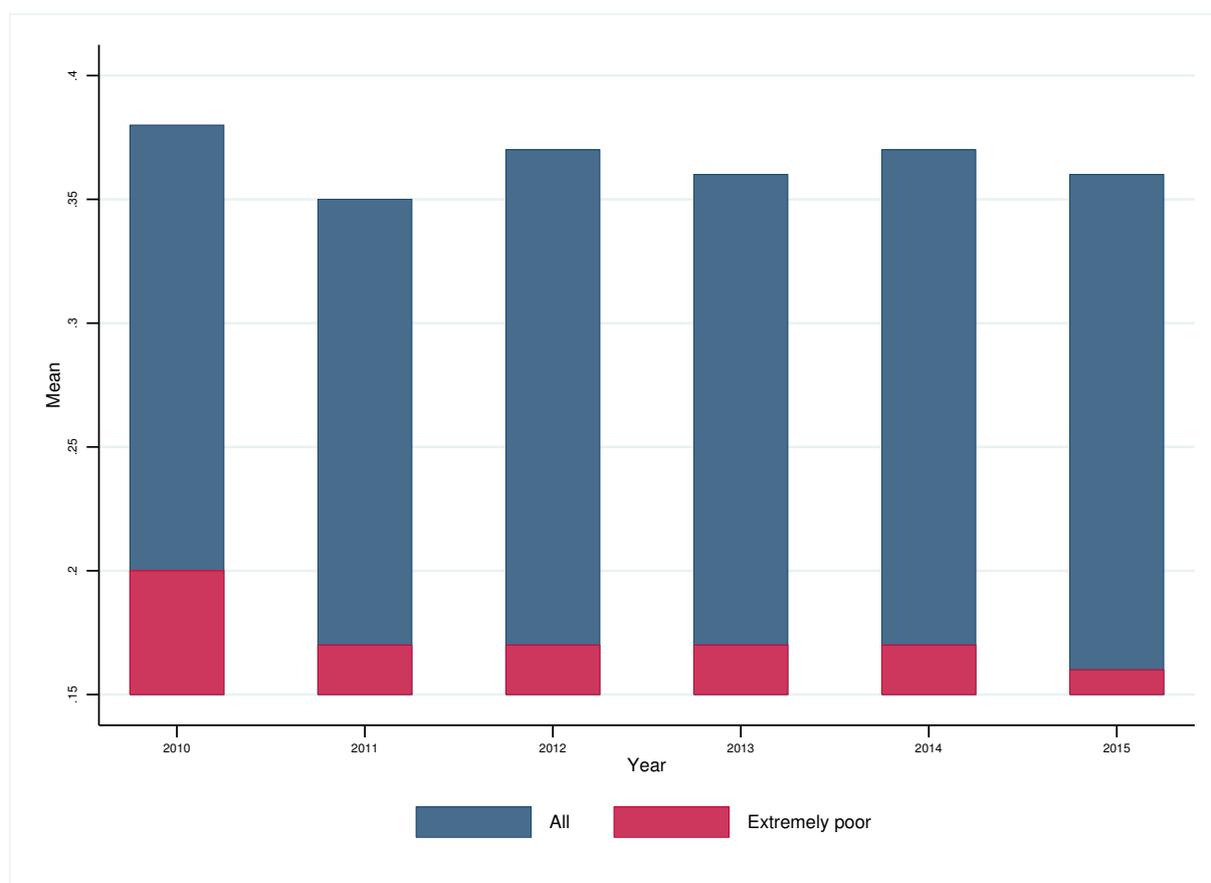
Workers who opt for this regime should contribute with at least 10% of their taxable earnings, plus another 0.92% of their gross earnings to cover term survivor and disability insurance and an average of 2.27% of their gross earnings to cover administrative fees. Retirement age is also 65 years old, for both men and women, and anticipated retirement is possible if the individual account has accumulated assets that will replace at least 50% of the average indexed earnings of the last 120 months. Retirees may choose between four benefits options: programmed withdrawal from their individual accounts; individual life annuities; joint survivor life annuities or deferred annuity accompanied by temporary programmed withdrawals.

This regime contemplates a guaranteed minimum pension for the insured borne before December 31 of 1945; who are at least aged 65; had at least 20 years of contributions paid on earnings equal to or greater than the minimum wage; and whose accumulated capital and interest in the individual account is insufficient to provide the minimum pension set by law (i.e. 415 Soles).

New entrants into the labor force are free to choose whether to join the NPS or the PPS within a period of 10 days. If they do not, they will be automatically affiliated to the private system. Workers affiliated to the public system can remain there or switch to the private system at any time, but, workers in the private system are not allowed to switch back except under certain circumstances.

Figure A-3.1 presents the evolution of the probability of affiliation in either of these two systems for the period 2010 - 2015, according to the *Encuesta Nacional de Hogares sobre Condiciones de Vida y Pobreza (ENAHO)*. Blue bars represent the whole sample of affiliated individuals over 65 y/o and red bars represent only those in a situation of extreme poverty.⁶⁴ This figure provides evidence of a negative evolution towards a system of greater coverage, specially among the poorest. While the total coverage rate has declined by 2 percentage points since 2010, the same figure among the poor is 4 pp.

⁶⁴The definition of extreme poverty used for these calculations draws on the one employed by the Peruvian household targeting system to evaluate welfare and provide social benefits, i.e. the *Sistema de Focalización de Hogares (SISFOH)*

Figure A-3.1: Affiliation to Contributory Pensions in Peru

Source: ENAHO - 2010 - 2015. Notes: Sample of individuals over 65 y/o. Each bar represents the fraction of individuals over 65 years old affiliated to any contributory pension regime. Blue bars include the whole 65+ population and red bars restrict the sample to 65+ individuals living in extremely poor households.

Descriptive Statistics of Complete Samples

In order to give some context to the description of the two samples of this chapter and to facilitate comparisons with the national population, this section presents some descriptive statistics for the complete sample of households with children under 5 y/o and children under 5 y/o.

Table A-3.1 displays the figures for the sample of households from ENAHO - 2015, whereas Table A-3.2 presents those for the sample of children from ENDES - 2015. The structure of these tables is as follows: the first two columns present mean and standard error estimates for the complete sample surveys and Columns (3) and (4) show mean difference estimates with respect to the samples of interest (FS).

Statistics confirm the specificity of these samples. In the case of households, they are more rural (24%); have 1.22 more children under 5 and 0.71 more adults between 55 - 75 y/o, have older (10 years), more female and less educated (3.75 years) household heads and are, as expected, poorer, as they consume and spend a lot less in all the categories analyzed (Table A-3.1).

When it comes to the sample of children under 5 y/o they are less likely to live in rural areas and their households have less members between 30 and 54 y/o but 1.23 more elderly over 55. Their heads are more than 20 years younger, more represented by women and almost 10 years less educated and they have, on average, 2.5 years older. They are weaker and smaller, as evidenced by their Wt/A and Ht/A higher z-scores, and are more prone to have moderate anemia (Table A-3.2).

Table A-3.1: Summary Statistics: Complete Sample of Households

	Complete sample survey (CS) ^a		Difference (FS) - (CS) ^b	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)
<i>Household characteristics</i>				
Rural (d)	0.24	(0.00)	0.29***	(0.02)
Total hh members	3.90	(0.02)	0.18**	(0.09)
Members between 0 - 5 y/o	0.54	(0.01)	1.22***	(0.06)
Members between 6 - 11 y/o	0.44	(0.01)	-0.02	(0.03)
Members between 12 - 19 y/o	0.61	(0.01)	-0.05	(0.03)
Members between 20 - 29 y/o	0.64	(0.01)	-0.06*	(0.03)
Members between 30 - 39 y/o	0.50	(0.02)	-0.11***	(0.03)
Members between 40 - 54 y/o	0.49	(0.02)	-0.32***	(0.03)
Members between 55 - 75 y/o	0.79	(0.02)	0.71***	(0.03)
Members older than 75 y/o	0.15	(0.01)	-0.11***	(0.01)
Hh head age	51.75	(0.37)	9.58***	(0.60)
Female hh head (d)	0.28	(0.00)	0.05**	(0.02)
Hh head years of education	7.38	(0.07)	-3.75***	(0.17)
Total consumption	8305.68	(60.96)	-3347.12***	(161.05)
Received <i>Pensión 65</i>	0.08	(0.00)	0.13***	(0.02)

Table A-3.1 (cont.): Summary Statistics: Complete Sample of Households

	Complete sample survey (CS) ^a		Difference (FS) - (CS) ^b	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)
<i>Household spending</i>				
Total expenditures	6141.45	(51.95)	-3107.42***	(137.02)
Food spending	3535.96	(22.60)	-1455.40***	(98.26)
Breads and cereals	621.38	(3.48)	-172.58***	(20.88)
Vegetables	339.97	(2.70)	-107.24***	(13.63)
Fruit	343.53	(3.37)	-173.96***	(12.89)
Butter and oils	88.73	(0.72)	-8.85***	(3.44)
Seafood	237.69	(2.56)	-95.89***	(9.89)
Meat	615.74	(5.41)	-308.08***	(17.32)
Milk, cheese, eggs	416.92	(4.25)	-218.49***	(14.20)
Sugar	100.54	(0.87)	-14.83***	(3.67)
Coffee, tea, cacao	52.58	(0.69)	-10.81***	(3.31)
Grains	76.79	(0.85)	-22.29***	(3.69)
Tubers	139.57	(1.27)	-51.59***	(5.50)
Food prepared away from home	146.94	(3.97)	-104.27***	(12.93)
Non-alcoholic beverages	94.59	(1.52)	-60.19***	(3.43)
Alcoholic beverages	14.76	(1.01)	-13.00***	(1.27)
Spending in education	348.49	(9.46)	-276.86***	(12.39)
Spending in health	281.26	(5.68)	-157.46***	(15.12)
Consultations	19.08	(0.56)	-12.59***	(1.32)
Medicines and treatments	128.81	(3.36)	-63.61***	(7.39)
Tests and analysis	26.24	(1.31)	-19.71***	(2.21)
Dentistry	41.18	(2.02)	-30.93***	(3.88)
Ophthalmology	19.01	(0.92)	-16.76***	(1.29)
Hospitalization and surgery	21.08	(1.97)	-0.14	(11.25)
Spending on durables	6.59	(0.41)	-4.95***	(0.74)
Housing spending	224.85	(10.58)	-183.46***	(14.30)
Observations	31091		32055	

Source: ENAHO - 2015. Notes: (d) stands for dummy variables. Mean estimates are adjusted by sampling weights and standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013. All values are deflected and converted into per-capita annual flows. ^a Complete set of households sampled in the 2015 ENAHO survey (CS). ^b These figures result from the OLS estimation of the following equation: $w_h = \theta_h + \kappa FSS_h + \zeta_h$, where w_h represents the different variables, FSS_h is a dummy variable equal to 1 if the household is part of the full sub-sample of extremely poor households with children under 5 y/o and at least one *Pensión 65* eligible member between 55 and 75 years old (FS) and ζ_h is an error term. *** p<0.001 ** p<0.05 * p<0.1.

Table A-3.2: Summary Statistics: Complete Sample of Children

	Complete sample survey (CS) ^a		Difference (FS) - (CS) ^b	
	Mean (1)	S.E. (2)	Mean (3)	S.E. (4)
<i>Household characteristics</i>				
Rural (d)	0.68	(0.01)	-0.58***	(0.03)
Total hh members	5.34	(0.04)	0.26	(0.22)
Members between 0 - 5 y/o	1.51	(0.01)	-0.12	(0.07)
Members between 6 - 11 y/o	0.67	(0.01)	-0.11	(0.08)
Members between 12 - 19 y/o	0.57	(0.02)	-0.07	(0.08)
Members between 20 - 29 y/o	0.88	(0.04)	-0.11	(0.10)
Members between 30 - 39 y/o	0.87	(0.03)	-0.40***	(0.08)
Members between 40 - 54 y/o	0.40	(0.02)	-0.17***	(0.05)
Members between 55 - 75 y/o	0.39	(0.01)	1.11***	(0.07)
Members older than 75 y/o	0.05	(0.00)	0.12***	(0.04)
Hh head age	40.62	(0.28)	21.27***	(1.17)
Female hh head (d)	0.17	(0.00)	0.14***	(0.05)
Hh head years of education	9.44	(0.06)	-6.68***	(0.28)
Received <i>Pensión 65</i>	0.81	(0.00)	-0.09	(0.04)
<i>Children characteristics</i>				
Age in months	30.05	(0.17)	2.49*	(1.40)
Woman (d)	0.50	(0.01)	-0.01	(0.05)
Wt/A Standard deviations	-0.14	(0.01)	-0.36***	(0.09)
Ht/A Standard deviations	-0.92	(0.01)	-0.44***	(0.08)
Wt/Ht Standard deviations	0.56	(0.01)	-0.14	(0.09)
BMI Standard deviations	0.61	(0.01)	-0.10	(0.09)
Acute malnutrition (d)	0.01	(0.00)	0.00	(0.01)
Stunting (d)	0.16	(0.00)	0.05	(0.04)
Underweight (d)	0.04	(0.00)	0.02	(0.02)
Obesity (d)	0.08	(0.00)	-0.03	(0.02)
Severe anemia (d)	0.00	(0.00)	0.00	(0.00)
Moderate anemia (d)	0.09	(0.00)	0.08**	(0.04)
Mild anemia (d)	0.20	(0.00)	-0.03	(0.03)
Observations	18317		18586	

Source: ENDES - 2015. Notes: (d) stands for dummy variables. Mean estimates are adjusted by sampling weights and standard errors, in parenthesis, are clustered at the age of the oldest member by December of 2013. ^aComplete set of children under 5 y/o sampled in the 2015 ENDES survey (CS). ^bThese figures result from the OLS estimation of the following equation: $w_h = \theta_h + \kappa F_{SS_h} + \zeta_h$, where w_h represents the different variables, F_{SS_h} is a dummy variable equal to 1 if the child is part of the full sub-sample of children under 5 y/o living in an extremely poor households with at least one *Pensión 65* eligible member between 55 and 75 years old (FS) and ζ_h is an error term. *** p<0.001 ** p<0.05 * p<0.1.

Conclusion

This dissertation investigates the dynamics of private income transfers in Colombia, Ecuador and Peru, focusing on analyzing how they contribute to shape five fundamental aspects of development: (i) social interactions, (ii) market and household work, (iii) spending patterns, (iv) nutrition and (v) health.

This topic is addressed in three essays.

The first documents how private income transfers respond to positive income shocks, depending on the relative distance between agents (transfer donors and transfer receivers). I show that transfers are affected but only when the two parts of the interaction are geographically close to each other.

To do so, first, I present a new version of the Cox model of private transfers with information asymmetry. Then, I use a difference-in-difference method to evaluate whether conditional cash transfers to the poor in Colombia, *Familias en Acción*, influence transfer-income dynamics in a differentiated way, according to distance.

Although the evaluation design of the program, the characteristics of the data and the endogeneity behind the choice of transfer partners, all raise important identification threats, the results illustrate well the theoretical predictions.

The second essay evaluates how a remittances contraction, due to external macroeconomic events, shapes individual labor supply adjustments in Ecuador, and how these phenomena may drive differentiated responses according to the characteristics of the left behind.

Using a novel dataset that tracks Ecuadorian residents before and after the onset of the 2008 global economic recession and an IV strategy, I show that this event implied a generalized remittances cut-back in Ecuador, widening age and sex differences in the allocation of labor

supply.

Finally, the third essay illustrates the relationship between intra-household transfers, household spending patterns and the well-being of young children. I analyze these issues exploiting the expansion of a non-contributory pension program in Peru, *Pensión 65*, and taking advantage of a regression discontinuity design on the age eligibility associated to the program. Results show that, after two years receiving the subsidy, households with children under 5 years old enhance the quality and quantity of food and health spendings, which drive major improvements in the nutrition and health of this population.

In summary, this dissertation presents suggestive evidence that private income transfers play a major important role in shaping income redistribution and social well-being in Latin America. In a region where a big part of the population is still exposed to important economic deprivations, where social integration is a major challenge and where social policies are limited, we, researchers and policy makers, should be asking more often about the implications of these phenomena:

- What is being left aside when a poor household shares a subsidy with a close friend? Who benefits from the reduction of transfers previously addressed to the beneficiaries of these subsidies?
- How does school performance is affected by the increase of children participation in household work? In which sectors is concentrated the expansion of the labor supply of adult men? Are remittances contractions inciting informality among adult women and old adults?
- What are the motives behind the transfer of resources to young children? In addition of spendings, nutrition and health, do cash transfers to the elderly influence other dimensions of investment in child human capital, e.g. education?

Bibliography

- Abadie, A., Angrist, J., and Imbens, G.**, 2002. "Instrumental Variables Estimates of the Effect of Subsidized Training on the Quantiles of Trainee Earnings." *Econometrica* 70(1), 91–117.
- Achenbaum, W. A. and Bengtson, V. L.**, 1993. *The Changing contract across generations / Vern L. Bengtson and W. Andrew Achenbaum, editors*. A. de Gruyter New York, xviii, 311 p. : pages.
- Acosta, P., Calderon, C., Fajnzylber, P., and Lopez, H.**, 2008. "What is the impact of international remittances on poverty and inequality in Latin America?" *World Development* 36(1), 89–114.
- Adams, R. and Page, J.**, 2005. "Do international migration and remittances reduce poverty in developing countries?" *World Development* 33(10), 1645–1669.
- Agüero, J., Carter, M., and Woolard, I.**, 2006. "The Impact of Unconditional Cash Transfers on Nutrition: The South African Child Support Grant." SALDRU Working Papers 8, Southern Africa Labour and Development Research Unit, University of Cape Town.
- Ahmed, A., Quisumbing, A., Nasreen, M., Hoddinott, J., and Bryan, E.**, 2009. "Comparing Food and Cash Transfers to the Ultra-Poor in Bangladesh." Research reports 163, International Food Policy Research Institute (IFPRI).
- Albarran, P. and Attanasio, O.**, 2002. "Do Public Transfers Crowd Out Private Transfers? Evidence from a Randomized Experiment in Mexico." WIDER Working Paper Series 006, World Institute for Development Economic Research (UNU-WIDER).
- Alcaraz, C., Chiquiar, D., and Salcedo, A.**, 2010. "Remittances, schooling, and child labor in Mexico." Working Papers, Banco de México 2010-14, Ciudad de México.
- Allen, L., Gillespie, S., and on Co-ordination. Sub-Committee on Nutrition, U. N. A. C.**, 2001. *What Works?: A Review of the Efficacy and Effectiveness of Nutrition Interventions*. No. 976 in Asian Development Bank nutrition and development series, United Nations, Administrative Committee on Coordination, Sub-Committee on Nutrition.
- Altonji, J., Hayashi, E., and Kotlikoff, L.**, 1995. "Parental Altruism and Inter Vivos Transfers: Theory and Evidence." NBER Working Papers 5378, National Bureau of Economic Research, Inc.
- Ambler, K.**, 2015. "Don't tell on me: Experimental evidence of asymmetric information in transnational households." *Journal of Development Economics* 113(C), 52–69.

- Amuedo-Dorantes, C. and Pozo, S.**, 2006. "Migration, Remittances, and Male and Female Employment Patterns." *American Economic Review* 96(2), 222–226.
- Amuedo-Dorantes, C. et al.**, 2006. "Remittances and their microeconomic impacts: evidence from Latin America." *Proceedings, Federal Reserve Bank of Dallas*, 187–197.
- Angrist, J. and Pischke, J.-S.**, 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*. 1st ed. Princeton University Press.
- Arango Thomas, L., Mata, D., and Obando, N.**, 2015. "Echoes of the crises in Spain and US in the Colombian labor market: a differences-in-differences approach." *SERIEs: Journal of the Spanish Economic Association* 6(4), 441–477.
- Arrondel, L. and Laferrere, A.**, 1998. "Taxation and Wealth Transmission in France." DELTA Working Papers, DELTA (Ecole normale supérieure).
- Atalay, K. and Barrett, G.**, 2012. "The Impact of Age Pension Eligibility Age on Retirement and Program Dependence: Evidence from an Australian Experiment." *Social and Economic Dimensions of an Aging Population Research Papers*, McMaster University.
- Attanasio, O., Battistin, E., Fitzsimons, E., Meghir, C., Mesnard, A., and Vera-Hernandez, M.**, 2004. "Evaluación del impacto del programa Familias en Acción-subsidios condicionados de la red de apoyo social: Informe del primer seguimiento." Tech. Rep., Econometria/SEI.
- Attanasio, O., Battistin, E., Fitzsimons, E., Mesnard, A., and Vera-Hernandez, M.**, 2005. "How effective are conditional cash transfers? Evidence from Colombia." Tech. Rep.
- Attanasio, O., Battistin, E., and Mesnard, A.**, 2012. "Food and Cash Transfers: Evidence from Colombia." *Economic Journal* 122(559), 92–124.
- Attanasio, O., Fitzsimons, E., Gomez, A., Gutiérrez, M. I., Meghir, C., and Mesnard, A.**, 2010. "Children's Schooling and Work in the Presence of a Conditional Cash Transfer Program in Rural Colombia." *Economic Development and Cultural Change* 58(2), 181–210.
- Attanasio, O., Fitzsimons, E., Gomez, A., Lopez, D., Meghir, C., and Mesnard, A.**, 2006. "Child Education and Work Choices in the Presence of a Conditional Cash Transfer Programme in Rural Colombia." CEPR Discussion Papers 5792, C.E.P.R. Discussion Papers.
- Attanasio, O., Goldberg, P., and Pavcnik, N.**, 2003. "Trade Reforms and Wage Inequality in Colombia." CEPR Discussion Papers 4023, C.E.P.R. Discussion Papers.
- Attanasio, O. and Mesnard, A.**, 2006. "The Impact of a Conditional Cash Transfer Programme on Consumption in Colombia." *Fiscal Studies* 27(4), 421–442.
- Balazs, R., Jordan, T., Lewis, P. D., and Patel, A. J.**, 1986. "Undernutrition and Brain Development." In "Human Growth: A Comprehensive Treatise," .
- Balestra, S. and Backes-Gellner, U.**, 2017. "Heterogeneous returns to education over the wage distribution: Who profits the most?" *Labour Economics* 44(C), 89–105.
- Bank, W.**, 2006. *Repositioning Nutrition as Central to Development: A Strategy for Large Scale Action*. The World Bank.
- Barker, D. J.**, 1990. "The fetal and infant origins of adult disease." *BMJ* 301(6761), 1111–1111.
- Barreca, A., Guldi, M., Lindo, J., and Waddell, G. R.**, 2011. "Saving Babies? Revisiting the effect of very low birth weight classification." *The Quarterly Journal of Economics* 126(4), 2117–2123.

- Barrientos, A.**, 2005. "Non-contributory pensions and poverty reduction in Brazil and South Africa." Tech. Rep., Institute for Development Policy and Management. Manchester University.
- Barro, R.**, 1974. "Are Government Bonds Net Wealth?" *Journal of Political Economy* 82(6), 1095–1117.
- Batista, C.** and **Narciso, G.**, 2013. "Migrant Remittances and Information Flows: Evidence from a Field Experiment." CReAM Discussion Paper Series 1331, Centre for Research and Analysis of Migration (CReAM), Department of Economics, University College London.
- Batson, C. D.**, 1991. *The altruism question : toward a social psychological answer / C. Daniel Batson*. L. Erlbaum, Associates Hillsdale, N.J, ix, 257 p. ; pages.
- Baulch, B.**, 2011. "The medium-term impact of the primary education stipend in rural Bangladesh." *Journal of Development Effectiveness* 3(2), 243–262.
- Becker, G.**, 1974. "A Theory of Social Interactions." *Journal of Political Economy* 82(6), 1063–93.
- , 1981. *A Treatise on the Family*. National Bureau of Economic Research, Inc.
- Beckett, S.**, **Gould, W.**, **Lillard, L.**, and **Welch, F.**, 1988. "The Panel Study of Income Dynamics after Fourteen Years: An Evaluation." *Journal of Labor Economics* 6(4), 472–492.
- Behrman, J.** and **Hoddinott, J.**, 2005. "Programme Evaluation with Unobserved Heterogeneity and Selective Implementation: The Mexican "PROGRESA" Impact on Child Nutrition." *Oxford Bulletin of Economics and Statistics* 67(4), 547–569.
- Bernheim, B. D.**, **Shleifer, A.**, and **Summers, L.**, 1985. "The Strategic Bequest Motive." *Journal of Political Economy* 93(6), 1045–76.
- Bertrand, M.**, **Mullainathan, S.**, and **Miller, D.**, 2003. "Public Policy and Extended Families: Evidence from Pensions in South Africa." *World Bank Economic Review* 17(1), 27–50.
- Blundell, R.**, **Chiappori, P.**, and **Meghir, C.**, 2005. "Collective Labor Supply with Children." *Journal of Political Economy* 113(6), 1277–1306.
- Boccagni, P.**, 2011. "The framing of return from above and below in Ecuadorian migration: a project, a myth, or a political device?" *Global Networks* 11(4), 461–480.
- Boccagni, P.** and **Lagomarsino, F.**, 2011. "Migration and the Global Crisis: New Prospects for Return? The Case of Ecuadorians in Europe." *Bulletin of Latin American Research* 30(3), 282–297.
- Bourguignon, F.**, **Browning, M.**, **Chiappori, P.-A.**, and **Lechene, V.**, 1993. "Intra Household Allocation of Consumption: A Model and some Evidence from French Data." *Annals of Economics and Statistics* (29), 137–156.
- Browning, M.** and **Chiappori, P.**, 1998. "Efficient Intra-Household Allocations: A General Characterization and Empirical Tests." *Econometrica* 66(6), 1241–1278.
- Case, A.**, 2001. "Health, Income, and Economic Development." In "Annual World Bank Conference on Development Economics," Washington DC. The World Bank pp. 221–241.
- Case, A.**, **Deaton, A.**, and **of Economic Research, N. B.**, 1996. *Large Cash Transfers to the Elderly in South Africa*. No. 5572 in Working paper series (National Bureau of Economic Research), National Bureau of Economic Research.

- Case, A. and Menendez, A.**, 2007. "Does money empower the elderly? Evidence from the Agincourt demographic surveillance site, South Africa." *Scandinavian journal of public health. Supplement* 69, 157–64.
- Case, A. and Paxson, C.**, 2008. "Stature and Status: Height, Ability, and Labor Market Outcomes." *Journal of Political Economy* 116(3), 499–532.
- Chamberlain, G.**, 1982. "Panel Data." NBER Working Papers 0913, National Bureau of Economic Research, Inc.
- Chernozhukov, V., Fernandez-Val, I., and Kowalski, A.**, 2015. "Quantile regression with censoring and endogeneity." *Journal of Econometrics* 186(1), 201–221.
- Chernozhukov, V. and Hansen, C.**, 2008. "Instrumental variable quantile regression: A robust inference approach." *Journal of Econometrics* 142(1), 379–398.
- Chort, I., Senne, J.-N., and Gubert, F.**, 2016. "MIDDAS : Un projet innovant pour une analyse originale des liens entre migration, transferts de fonds et développement." Post-Print, Tiers-Monde, Hors-série.
- Clarke, G. and Wallsten, S.**, 2003. "Do Remittances Act Like Insurance? Evidence From a Natural Disaster in Jamaica." .
- Cox, D.**, 1987. "Motives for Private Income Transfers." *Journal of Political Economy* 95(3), 508–46.
- , 1990. "Intergenerational Transfers and Liquidity Constraints." *The Quarterly Journal of Economics* 105(1), 187–217.
- Cox, D. and Fafchamps, M.**, 2008. "Extended Family and Kinship Networks: Economic Insights and Evolutionary Directions." vol. 4, 1st ed., chap. 58. Elsevier, pages 3711–3784.
- Cox, D., Galasso, E., and Jimenez, E.**, 2006. "Private Transfers in a Cross Section of Developing Countries." Working Papers, Center for Retirement Research at Boston College, Center for Retirement Research.
- Cox, D., Hansen, B., and Jimenez, E.**, 2004. "How responsive are private transfers to income? Evidence from a laissez-faire economy." *Journal of Public Economics* 88(9-10), 2193–2219.
- Cox, D. and Jakubson, G.**, 1995. "The connection between public transfers and private inter-family transfers." *Journal of Public Economics* 57(1), 129–167.
- Cox, D. and Jimenez, E.**, 1998. "Risk Sharing and Private Transfers: What about Urban Households?" *Economic Development and Cultural Change* 46(3), 621–37.
- Cox, D., Jimenez, E., and Okrasa, W.**, 1997. "Family Safety Nets and Economic Transition: A Study of Worker Households in Poland." *Review of Income and Wealth* 43(2), 191–209.
- Cox, D. and Rank, M. R.**, 1992. "Inter-vivos Transfers and Intergenerational Exchange." *The Review of Economics and Statistics* 74(2), 305–14.
- de Carvalho Filho, I.**, 2008. "Old-age benefits and retirement decisions of rural elderly in Brazil." *Journal of Development Economics* 86(1), 129–146.
- , 2012. "Household Income as a Determinant of Child Labor and School Enrollment in Brazil: Evidence from a Social Security Reform." *Economic Development and Cultural Change* 60(2), 399–435.
- de la Briere, B., Sadoulet, E., de Janvry, A., and Lambert, S.**, 2002. "The roles of destination, gender, and household composition in explaining remittances: an analysis for the Dominican Sierra." *Journal of Development Economics* 68(2), 309–328.

- de Oliveira, P. R. and Kassouf, A. L.,** 2012. "Impact Evaluation of the Brazilian Non-Contributory Pension Program Benefício de Prestação Continuada (BPC) on Family Welfare." Working Papers PIERI, PEP-PIERI.
- De Weerdt, J., Genicot, G., and Mesnard, A.,** 2014. "Asymmetry of Information within Family Networks." CReAM Discussion Paper Series 1433, Centre for Research and Analysis of Migration (CReAM), Department of Economics, University College London.
- Devreyer, P., Safir, A., Sylla, M. B., and Lambert, S.,** 2008. "Pauvreté et Structure Familiale: Pourquoi une nouvelle enquête ?" Post-Print, HAL.
- DGPP-MEF,** 2015. "Informe final. Evaluación de diseño y ejecución de presupuesto de: Programa Nacional de Asistencia Solidaria "Pensión 65"." Tech. Rep., Dirección General de Presupuesto Público (DGPP) - Ministerio de Economía y Finanzas (MEF).
- DGSE-MIDIS,** 2016. "Nota técnica para la cuantificación de la población potencial y población objetivo del programa Pensión 65 para el periodo 2016 – 2019." Tech. Rep., Dirección General de Seguimiento y Evaluación (DGSE) - Viceministerio de Políticas y Evaluación Social (VMPES) - Ministerio de Desarrollo e Inclusión Social (MIDIS).
- Duflo, E.,** 2000. "Child Health and Household Resources in South Africa: Evidence from the Old Age Pension Program." *American Economic Review* 90(2), 393–398.
- , 2003. "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa." *World Bank Economic Review* 17(1), 1–25.
- Duflo, E., Glennerster, R., and Kremer, M.,** 2008. "Using Randomization in Development Economics Research: A Toolkit." vol. 4, 1st ed., chap. 61. Elsevier, pages 3895–3962.
- Duryea, S. and Robles, M.,** 2016. *Realities & Perspectives. Social Pulse in Latin America and the Caribbean 2016*. Inter-American Development Bank.
- ECLAC,** 2017. *Statistical Yearbook for Latin America and the Caribbean 2017*. United Nations - Economic Commission for Latin America and the Caribbean (ECLAC).
- Edmonds, E.,** 2006. "Child labor and schooling responses to anticipated income in South Africa." *Journal of Development Economics* 81(2), 386–414.
- Edmonds, E., Mammen, K., and Miller, D.,** 2005. "Rearranging the Family?: Income Support and Elderly Living Arrangements in a Low-Income Country." *Journal of Human Resources* 40(1).
- Fajnzylber, P. and López, J. H.,** 2008. "The development impact of remittances in Latin America." *Remittances and Development* , 1.
- Fan, E.,** 2010. "Who Benefits from Public Old Age Pensions? Evidence from a Targeted Program." *Economic Development and Cultural Change* 58(2), 297–322.
- Fernald, L., Gertler, P., and Neufeld, L.,** 2008. "Role of Cash in Conditional Cash Transfer Programmes for Child Health, Growth, and Development: An analysis of Mexico's Oportunidades." 371, 828–37.
- Ferreira, F. and Bank, W.,** 2012. *Economic Mobility and the Rise of the Latin American Middle Class*. Latin America and Caribbean Studies, World Bank Publications.
- Fitzgerald, J., Gottschalk, P., and Moffitt, R.,** 1998. "An Analysis of Sample Attrition in Panel Data: The Michigan Panel Study of Income Dynamics." *Journal of Human Resources* 33(2), 251–299.

- Foster, A. and Rosenzweig, M.**, 2001. "Imperfect Commitment, Altruism, And The Family: Evidence From Transfer Behavior In Low-Income Rural Areas." *The Review of Economics and Statistics* 83(3), 389–407.
- Frankenberg, E., Lillard, L., and Willis, R. J.**, 2002. "Patterns of Intergenerational Transfers in Southeast Asia." *Journal of Marriage and Family* 64(3), 627–641.
- Galiani, S. and Gertler, P.**, 2016. "Evaluación de Impacto del Programa Pensión 65: Nueva Evidencia Causal de las Pensiones No Contributivas en Perú." Tech. Rep., Innovations for Poverty Action (IPA) and Ministerio de Economía y Finanzas (MEF).
- Galiani, S., Gertler, P., and Bando, R.**, 2016. "Non-contributory pensions." *Labour Economics* 38(C), 47–58.
- Gertler, P.**, 2004. "Do Conditional Cash Transfers Improve Child Health? Evidence from PROGRESA's Control Randomized Experiment." *American Economic Review* 94(2), 336–341.
- Girma, S. and Kedir, A.**, 2005. "Heterogeneity in returns to schooling: Econometric evidence from Ethiopia." *Journal of Development Studies* 41(8), 1405–1416.
- Grantham-McGregor, S., Cheung, Y. B., Cueto, S., Glewwe, P., Richter, L., and Strupp, B.**, 2017. "Developmental potential in the first 5 years for children in developing countries." *The Lancet* 369(9555), 60–70.
- Gutierrez, E., Juarez, L., and Adrian, R.**, 2015. "The Effect of a Transfer Program for the Elderly in Mexico City on Co-Residing Children's School Enrollment." Working Papers 2015-09, Banco de México.
- Hamilton, W.**, 1964. "The genetical evolution of social behaviour. I." *Journal of Theoretical Biology* 7(1), 1 – 16.
- Hamoudi, A., Thomas, D., and for Population Research, C. C.**, 2005. *Pension Income and the Well-being of Children and Grandchildren: New Evidence from South Africa*. On-line working paper series, California Center for Population Research, University of California - Los Angeles.
- Hernández Luna, Y.**, 2008. "Efecto marginal de las remesas en la distribución del ingreso y la pobreza en Colombia." Archivos de Economía, Departamento Nacional de Planeación.
- Himaz, R.**, 2008. "Welfare Grants and Their Impact on Child Health: The Case of Sri Lanka." *World Development* 36(10), 1843–1857.
- Hosegood, V., Case, A., and Ardington, C.**, 2009. "Labor Supply Responses to Large Social Transfers: Longitudinal Evidence from South Africa." *American Economic Journal: Applied Economics* 1(1), 22–48.
- Imbens, G. and Angrist, J.**, 1994. "Identification and Estimation of Local Average Treatment Effects." *Econometrica* 62(2), 467–75.
- Imbens, G. and Kalyanaraman, K.**, 2012. "Optimal Bandwidth Choice for the Regression Discontinuity Estimator." *Review of Economic Studies* 79(3), 933–959.
- INEC**, 2009. "Trabajo infantil en Ecuador: Informe Nacional de 2006." Tech. Rep., Instituto Nacional de Estadística y Censos, INEC.
- INEI**, 2015. "Informe Técnico: Evolución de la Pobreza Monetaria 2009-2015." Tech. Rep., Instituto Nacional de Estadística e Informática (INEI).

- Ioannides, Y. and Kan, K.**, 1999. "The Nature of Two-Directional Intergenerational Transfers of Money and Time: An Empirical Analysis." Discussion Papers Series, Department of Economics, Tufts University 9917, Department of Economics, Tufts University.
- JA, R., D, S.-A., J, H., T, S., and S, V.**, 2004. "Impact of the mexican program for education, health, and nutrition (progresa) on rates of growth and anemia in infants and young children: A randomized effectiveness study." *JAMA* 291(21), 2563–2570.
- Jensen, R. T.**, 2004. "Do private transfers 'displace' the benefits of public transfers? Evidence from South Africa." *Journal of Public Economics* 88(1-2), 89–112.
- Jokisch, B.**, 2014. "Ecuador: From Mass Emigration to Return Migration? Published at the Migration." .
- Karaca-Mandic, P. and Train, K.**, 2003. "Standard error correction in two-stage estimation with nested samples." *Econometrics Journal* 6(2), 401–407.
- Killingsworth, M. R.**, 1983. *Labor Supply*. Cambridge Surveys of Economic Literature, Cambridge University Press.
- Kowalski, A.**, 2016. "Censored Quantile Instrumental Variable Estimates of the Price Elasticity of Expenditure on Medical Care." *Journal of Business and Economic Statistics* 34(1), 107–117.
- Kremer, M. and Miguel, E.**, 2004. "Worms: Education and health externalities in kenya." Natural Field Experiments, The Field Experiments Website.
- Kuhn, R. and Stillman, S.**, 2002. "Understanding Interhousehold Transfers in a Transition Economy: Evidence from Russia." IZA Discussion Papers 574, Institute for the Study of Labor (IZA).
- Lee, D. S. and Card, D.**, 2008. "Regression discontinuity inference with specification error." *Journal of Econometrics* 142(2), 655–674.
- Lewis, M., Haviland-Jones, J., and Barrett, L.**, 2008. *Handbook of Emotions, Third Edition*. Guilford Publications.
- Lillard, L. and Willis, R.**, 1997. "Motives for Intergenerational Transfers. Evidence from Malaysia." Working Papers, RAND - Reprint Series.
- Lovo, S.**, 2011. "Pension Transfers and farm household technical efficiency: Evidence from South Africa." *American Journal of Agricultural Economics* 93(5), 1391–1405.
- Lucas, R. and Stark, O.**, 1985. "Motivations to Remit: Evidence from Botswana." *Journal of Political Economy* 93(5), 901–18.
- Ma, L. and Koenker, R.**, 2006. "Quantile regression methods for recursive structural equation models." *Journal of Econometrics* 134(2), 471–506.
- Machado, J. A., Parente, P., and Santos Silva, J.**, 2017. "QREG2: Stata module to perform quantile regression with robust and clustered standard errors."
- Macours, K., Schady, N., and Vakis, R.**, 2012. "Cash Transfers, Behavioral Changes, and Cognitive Development in Early Childhood: Evidence from a Randomized Experiment." *American Economic Journal: Applied Economics* 4(2), 247–73.
- Maitra, P. and Ray, R.**, 2003. "The effect of transfers on household expenditure patterns and poverty in South Africa." *Journal of Development Economics* 71(1), 23–49.

- Maluccio, J. and Flores, R.**, 2005. "Impact evaluation of a conditional cash transfer program: the Nicaraguan Red de Protección Social." Research reports 141, International Food Policy Research Institute (IFPRI).
- Manacorda, M. and Moretti, E.**, 2005. "Why Do Most Italian Young Men Live With Their Parents? Intergenerational Transfers and Household Structure." CEPR Discussion Papers 5116, C.E.P.R. Discussion Papers.
- Manley, J.**, 2012. "How effective are cash transfer programmes at improving nutritional status? A rapid evidence assessment of programmes effects on anthropometric outcomes." Tech. Rep., London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.
- Martinez, S.**, 2009. "Pensions, Poverty and Household Investments in Bolivia." .
- McCabe, K., Yi-Ying Lin, S., Tanaka, H., and Plewa, P.**, 2009. "Pay to go: countries offer cash to immigrants willing to pack their bags." .
- McCrary, J.**, 2007. "Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test." NBER Technical Working Papers 0334, National Bureau of Economic Research, Inc.
- McGarry, K.**, 2000. "Testing Parental Altruism: Implications of a Dynamic Model." NBER Working Papers 7593, National Bureau of Economic Research, Inc.
- McGarry, K. and Schoeni, R.**, 1996. "Measurement and the Redistribution of Resources Within the Family." Working Papers, RAND - Reprint Series.
- McKenzie, D., Gibson, J., and Stillman, S.**, 2013. "A land of milk and honey with streets paved with gold: Do emigrants have over-optimistic expectations about incomes abroad?" *Journal of Development Economics* 102(C), 116–127.
- McKernan, S.-M., Pitt, M., and Moskowitz, D.**, 2005. "Use of the formal and informal financial sectors: does gender matter? empirical evidence from rural Bangladesh." Policy Research Working Paper Series 3491, The World Bank.
- McLeod, D. and Molina, J.**, 2005. "Remittances, inequality and poverty reduction: Some tests for Latin America." In "Papers prepared for the LACEA meetings, AUP Paris, France," .
- Medina H., F. and Galván, M.**, 2008. "Descomposición del coeficiente de Gini por fuentes de ingreso: evidencia empírica para América Latina 1999-2005." *Estudios Estadísticos* 63, Naciones Unidas Comisión Económica para América Latina y el Caribe (CEPAL).
- Mendolia, S., Paloyo, A., and Walker, I.**, 2016. "Heterogeneous Effects of High School Peers on Educational Outcomes." IZA Discussion Papers 9795, Institute for the Study of Labor (IZA).
- Mercier, M., David, A., Mahia, R., and Rafael De Arce, R. D. A.**, 2016. "Reintegration upon return: insights from Ecuadorian returnees from Spain." Working Papers DT/2016/04, DIAL (Développement, Institutions et Mondialisation).
- MIDIS**, 2016. "Usuarios Pension 65 según padrones aprobados hasta el 31 de agosto de 2016." Tech. Rep., Ministerio de Desarrollo e Inclusión Social (MIDIS).
- Mongkolchati, A., Thinkhamrop, B., Mo-Suwan, L., Chittchang, U., and Choprapawon, C.**, 2010. "Prevalence and incidence of child stunting from birth to two years of life in Thai children: based on prospective cohort study of Thai children (PCTC)." *Journal of the Medical Association of Thailand* (93), 121368–78.

- Mundaca, B. G.**, 2009. "Remittances, financial market development, and economic growth: the case of Latin America and the Caribbean." *Review of Development Economics* 13(2), 288–303.
- Mundlak, Y.**, 1978. "On the Pooling of Time Series and Cross Section Data." *Econometrica* 46(1), 69–85.
- Novella, R.** and **Olivera, J.**, 2014. "Mental retirement and non-contributory pensions for the elderly poor in Peru." Working Papers Department of Economics, KU Leuven, Faculty of Economics and Business, Department of Economics.
- OECD**, 2010. "Economic Outlook." Tech. Rep., Organization of Economic Cooperation and Development, OECD.
- Olinto, P., Ersbak, M., and Nielsen, B.**, 2006. "Do Conditional Cash Transfers Crowd Out Private Transfers? Evidence from Randomized Trials." In "Nicaragua". Princeton University, Department of Economics (mimeo)," .
- Olivera, J.** and **Zuluaga, B.**, 2014. "The Ex-Ante Effects of Non-Contributory Pensions in Colombia and Peru." *Journal of International Development* 26(7), 949–973.
- Orozco, M.**, 2004. *Remittances to Latin America and the Caribbean: Issues and perspectives on development*. Organization of American States Washington, DC.
- Oxfam**, 2015. *Privileges that Deny Rights: Extreme inequality and the hijacking of democracy in Latin America and the Caribbean*. Oxford: Oxfam International.
- Parente, P.** and **Santos Silva, J.**, 2016. "Quantile Regression with Clustered Data." *Journal of Econometric Methods* 5(1), 1–15.
- Plewa, P.**, 2012. "The Effects of Voluntary Return Programmes on Migration Flows in the Context of the 1973/74 and 2008/09 Economic Crises." *Comparative Population Studies* 37(1-2).
- Posel, D., Fairburn, J. A., and Lund, F.**, 2006. "Labour migration and households: A reconsideration of the effects of the social pension on labour supply in South Africa." *Economic Modelling* 23(5), 836–853.
- S Morris, S., Flores, R., Olinto, P., and Manuel Medina, J.**, 2004. "Monetary Incentives in Primary Health Care and Effects on Use and Coverage of Preventive Health Care Interventions in Rural Honduras: Cluster Randomised Trial." 364, 2030–7.
- Schieffelin, E. L.**, 1980. "Reciprocity and the Construction of Reality." *Man* 15(3), 502–517.
- Schmillen, A.** and **Umkehrer, M.**, 2013. "The scars of youth: effects of early-career unemployment on future unemployment experience." IAB Discussion Paper 201306, Institut für Arbeitsmarkt- und Berufsforschung (IAB), Nürnberg [Institute for Employment Research, Nuremberg, Germany].
- Schoeni, R.**, 1997. "Private Interhousehold Transfers of Money and Time: New Empirical Evidence." *Review of Income and Wealth* 43(4), 423–48.
- Schurr, C.** and **Stolz, M.**, 2010. "¿Bienvenid@s a casa?- Return schemes and the remigration process of Ecuadorian female migrants." *Iberoamericana. Revista interdisciplinaria de literatura, historia y ciencias sociales* 10(39), 55–75.
- Secondi, G.**, 1997. "Private monetary transfers in rural china: Are families altruistic?" *Journal of Development Studies* 33(4), 487–511.

- Serror, M.**, 2015. "Modeling and Measuring Information Asymmetry in the Context of Senegalese Migrants' Remittances." Working Papers DT/2015/23, DIAL (Développement, Institutions et Mondialisation).
- Seshan, G. and Zubrickas, R.**, 2017. "Asymmetric Information about Migrant Earnings and Remittance Flows." *World Bank Economic Review* 31(1), 24–43.
- Sinha, N. and Yoong, J.**, 2009. "Long-term financial incentives and investment in daughters: evidence from conditional cash transfers in north India." Policy Research Working Paper Series 4860, The World Bank.
- Sirkeci, I., Cohen, J. H., and Ratha, D.**, 2012. *Migration and Remittances during the Global Financial Crisis and Beyond*. The World Bank.
- SISFOH**, 2010. "Metodología de Cálculo del Índice de Focalización de Hogares (IFH)." Tech. Rep., Ministerio de Economía y Finanzas (MEF).
- Soares, R., Kruger, D., and Berthelon, M.**, 2012. "Household Choices of Child Labor and Schooling: A Simple Model with Application to Brazil." *Journal of Human Resources* 47(1), 1–31.
- Stewart, H., Blisard, N., and Jolliffe, D.**, 2003. "Do Income Constraints Inhibit Spending on Fruits and Vegetables Among Low-Income Households?" *Journal of Agricultural and Resource Economics* 28(03).
- Strauss, J. and Thomas, D.**, 1998. "Health, Nutrition, and Economic Development." *Journal of Economic Literature* 36(2), 766–817.
- Teruel, G. and Davis, B.**, 2000. "Final Report: An Evaluation of the Impact of Progresca Cash Payments on Private Inter-Household Transfers." Tech. Rep., International Food Policy Research Institute.
- Trivers, R. L.**, 1971. "The Evolution of Reciprocal Altruism." *The Quarterly Review of Biology* 46(1), 35.
- Vaillant, J.**, 2010. "The methodological challenge of monitoring living conditions. Insights from a tracking experience in Madagascar." Working Papers DT/2010/13, DIAL (Développement, Institutions et Mondialisation).
- Vakis, R. and Perova, E.**, 2009. "Welfare impacts of the "Juntos" program in Peru: evidence from a non-experimental evaluation." Tech. Rep., The World Bank.
- Vakis, R., Rigolini, J., and Lucchetti, L.**, 2015. *Left Behind: Chronic Poverty in Latin America and the Caribbean*. Latin American Development Forum, World Bank.
- Victorio, A. G. and Arnott, R.**, 1993. "Wealth, bequests and attention." *Economics Letters* 42(2-3), 149–154.
- WHO**, 2006. "Child growth standards SAS macro." Tech. Rep., World Health Organization (WHO).
- WHO and UNICEF**, 2003. *Global Strategy for Infant and Young Child Feeding*. Nonserial Publication, World Health Organization.
- , 2008. *Child growth and development*. Nonserial Publication, World Health Organization.
- Wolff, F.-C.**, 2006. "Microeconomic models of family transfers." vol. 1, 1st ed., chap. 13. Elsevier, pages 889–969.

- Wooldridge, J.**, 2010. *Econometric Analysis of Cross Section and Panel Data*, vol. 1. 2nd ed. The MIT Press.
- World Bank**, 2017a. "GDP per capita growth (annual %)." Data retrieved from World Development Indicators, <http://data.worldbank.org>.
- , 2017b. "Poverty headcount ratio at \$5.50 a day (2011 PPP) (% of population)." Data retrieved from World Development Indicators, <http://data.worldbank.org> accessed.
- , 2017c. "Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)." Data retrieved from World Development Indicators, <http://data.worldbank.org> accessed.
- Yang, D.**, 2006. "International Migration, Remittances, and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks." NBER Working Papers 12325, National Bureau of Economic Research, Inc.