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FEMALE LABOR FORCE PARTICIPATION AND INFORMAL CARE OF ADULTS: EVIDENCE FOR A MIDDLE-INCOME COUNTRY

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Female Labor Force Participation and Informal Care of Adults: Evidence for a middle-income country[1]

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Abstract

The provision of elderly care is an issue of increasing importance in Latin American countries because of a aging population, decrease in household size, and increased complexity of care. Thus, it is important to analyze how the provision of informal care of other adults affects the welfare of women since they are usually responsible for this type of care. We analyze in this paper the relationship between providing informal care to adults and labor outcomes for a middle-income country with a rapidly aging population. This is one of the first studies to focus on middle-income countries and in Latin America. The results of this research show the importance of considering the endogeneity that exists between informal care and female labor participation. A partial correlation analysis shows a strong negative relationship between providing care and labor participation, however, when we use methods for endogeneity correction, the correlation does not hold. Additionally, we found that poor households are more likely to be involved in care giving activities, and that the presence of a spouse reduces the likelihood of provision of care.

JEL Codes: J22, J10, C26

Key Words: Female labor participation, informal caregivers, Home care

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1. Introduction.

There has been increased attention in Chile and throughout Latin America on the aging population. It was estimated that in 2010, 9.2% of the population in Chile would be older than 65, while in the rest of Latin America the average is 6.9%. Additionally, it is expected that by 2030, the population over 65 will reach a 17% of the population in Chile and 12.2% on average for the rest Latin America (ECLAC, 2009). This aging population creates increased demands for care of the elderly and chronically ill. Arriagada (2009) argues that there are several factors that increase problems about care in Chile. Among them, increasing life expectancy of people with chronic illness or disability increases the complexity of care, while at the same time, changes in family structure, especially having fewer children, limits the availability of caregivers.

Results for Chile show that women assume the role of taking care of the elderly (SENAMA, 2010). In the 2009 "National Study of the Elderly," 86% of caregivers are women, most of them a daughter or a spouse. For these women the care of an elderly is an important burden, which may have several effects. First, it decreases the chance of employment since only 25% of female caregivers have a paid job. At the same time, only 8% of caregivers receive some monetary compensation. Second, it has a negative impact on leisure; two thirds of these women have not taken a vacation in five years. Third, it can have a negative impact on their pensions as their work lives are interrupted. Finally, the care of others affects low-income households more because they not have the option of paying for care[2] increasing the loss of household income with the female head of household leaving the labor market.

[2] In general, households can pay for care in private institutions or with maids providing care at home.

These figures show the importance of research related to the subject of informal care giving. We analyzed the relationship between the care of others and the female labor supply. Despite its importance, this is the one of the first studies that addresses this issue in a middle-income country like Chile and for a Latin American country, with the exception of Trujillo et al. (2010), which addressed the case of Mexico.[3] The data provided by Voz de Mujer Survey for 2009 shows that 16% of women provide informal care for the care of the elderly, chronically ill, or disabled living at home. Of women who do not provide such care, 64% are employed, 5% are unemployed, and 31% are inactive. Comparatively, women who are these types of caregivers, only 28% are employed and 9% are looking for work, while the remaining 63% are inactive. Moreover, more than 50% of the women who provide informal care spend more than 20 hours a week in this task.

The previous numbers show that there is a potential link between informal care and labor supply decisions, however, it is necessary to consider the endogeneity of these variables. As mentioned by Wolf and Soldo (1994), the decision to provide informal care might depend on the opportunity cost of the potential care-givers' time, given the hourly wage available. At the same time, the hourly wage affects the employment decisions, thus informal care and labor supply are simultaneously determined. Estimating the effect of informal care on employment using OLS or a probit model will most likely lead to biased parameters. Several papers have dealt with this issue using structural estimation and instrumental variables: however there is no definitive evidence on the effect of informal care on employment after considering endogeneity. The work of Wolf and Soldo (1994), Stern (1995), and Heitmueller (2007) show that when considering the

[3] Most of the international evidence has been from the US, UK and recently Canada, China, and a sample of European countries.

simultaneity of the two variables, the effect of caring for others on the labor supply can be very small or zero. Other papers like Crespo (2007), Bloin et al. (2008), and Trujillo et al. (2010) show that even after correcting for endogeneity, the care of others decreases the probability of employment of women.

In this paper we consider the effects of informal care on labor market participation, employment, and hours worked. We use two methods of correction of endogeneity: the first is a biprobit estimation and the second is instrumental variables. The exclusion variables we use are the number of daughters and sons in the home where the woman lived at age 15. These variables affect the availability of caregivers for older adults, especially in the case of a woman's parents. We included them separately because, as mentioned before, women do the majority of informal care giving. Thus we expect a higher effect from the presence of daughters than the presence of brothers. Number of siblings has also been used by Wolf and Soldo (1994), Bolin et. al (2008), and Trujillo et. al (2010).

Our results show that the negative relationship between the care of others and female labor supply is not robust to different corrections of endogeneity. Additionally, the results show that women living in households with lower incomes are more likely to provide informal care, increasing their vulnerability, which can be addressed by specific public policies regarding the care of others. Currently in Chile there is not a public health networks that welcomes adults who are chronically ill or disabled. The only options are private industry.

The paper is divided into seven sections. The first is this introduction; the second presents a summary of informal care provisions in Chile and relevant studies on the subject. The third part is a theoretical model describing the care of others and female labor supply. The fourth part presents the data used in the estimates. The fifth is the descriptive statistics. The sixth part shows

the results; and the seventh and last discusses the results and recommendations emerging from this study.

2. Care of the elderly in Chile

The countries of Latin America and the Caribbean have experienced profound demographic changes, particularly an aging population and decreased population growth. This is due to the rapid decline in fertility and increased life expectancy (ECLAC, 2004).

As a result of its ageing population, Chilean society is showing signs of a transformation in the care of elderly, chronically ill, and disabled. It is very important to understand the needs of this population in order to generate social policies that aim to provide solutions especially for the most vulnerable families.

Recently the "National Study for the Elderly" (SENAMA, 2010) showed that 24.1% of people over 60 are dependent in some degree.[4] Of the population, 12.4% present severe dependence (individuals prostrate, with dementia of any degree, and/or unable to perform basic activities of daily living), 5% are moderately dependent (individuals who have an inability to take a bath on their own and need help with the basic activities of daily living), and 6.6% are mildly dependent (sometimes requires assistance for basic activities of daily living). The majority of this dependant population is female (66% of total dependents are female).

[4] The definition of dependency used in the survey was analyzed through the functionality of the person and the amount, type, and level of outside help. The two components of this definition are the functional limitations and the need for help to address these limitations. The functionality of the individual was measured through self-reported functional limitation. Functional limitation and degree of severity was defined according to criteria based on number and type of difficulty or inability to perform certain activities of daily living.

Moreover, this study shows that the dependence is closely related to the education of the person, where more dependent individuals have fewer years of schooling. In terms of income, nearly 65% of dependent elderly adults earn less than US $260 a month. More importantly, of all people older than 60, 85.3% live with someone and, for people with severe dependence, this percentage is 92.1%. The survey shows that in 36.1% of cases, caregivers of older adults are daughters or sons, 27.9% are spouses, and 13.3% of caregivers are sons or daughters in law. The remaining cases are other family members, other non-family, or maids. About 86% of these caregivers are women.

The provision of care it is mostly unpaid, only an 8% of caregivers receive a monetary compensation; there are several costs associated with providing informal care, especially for women. For instance, only 24.8% of female caregivers perform any paid work in addition to their care work. It seems fair to assume that many of these women, in addition to providing care for dependent adults, perform other domestic duties, however this care takes more than 12 hours per day.

These results show that it is mainly women who take care of the elderly, chronically ill, and disabled in Chile. Because of this, one might infer that it directly affects labor participation and work performance of women. However, there is no empirical evidence in Chile or for most Latin American countries, which could explain the effects of elderly care on labor force participation.

For the case of Chile, only the work of Contreras and Ruiz-Tagle (2008) finds that the presence of disabled persons in the home decreases the likelihood that others in the household work. The effect is greater on women, suggesting that there is a negative correlation between caring for others and participation in the labor market.

Internationally, the evidence for the effect of informal care on labor outcomes of women is mixed. Lilly et al. (2010) and Bolin et al. (2008) find that informal care negatively affects labor outcomes of women in the case of Canada and 11 European countries, respectively. Heitmuller (2007) finds for the UK that co-residential care tends to decrease employment, however extra-residential care is not related to employment. At the same time, Leigh (2010), shows that informal care has very small or non-existent effect on employment of women in Australia. Finally, Maurer-Fazio et al. (2011) shows that the presence of people aged 75 or older increases labor force participation of married women in China. All these papers correct for the endogeneity of informal care and labor outcomes, with the exception of Lilly et al. The endogenity correction uses several instrumental variables, for instance: number of sick or disabled people in a household, the age of the respondent's three closest friends (Heitmuller, 2007); parental age and health (Crespo, 2007 and Boiln et. al, 2008); number of siblings (Crespo, 2007 and Trujillo et al., 2011); and presence of parents (Trujillo et al., 2011). Lastly, Leigh (2010) uses a panel of individuals to correct for individual heterogeneity and endogeneity.

3. Methodology.

3.1 Equations.

We use a simultaneous model to identify the effect of informal care of the elderly, chronically ill, or disabled on female labor force participation. We write a simple model that describes both decisions. The equations are:

$$D^* = F(X\beta + C\delta + \varepsilon) \quad (1)$$

$$C^* = G(X\lambda + Z\gamma + \eta) \quad (2)$$

A woman decides to enter into the labor market (D=1) and she decides to provide informal care (C = 1) if:

$$D = 1(D^* > 0)$$
$$C = 1(C^* > 0)$$

The *X* variables affect the decision to participate and the decision to provide care simultaneously. The *Z* variables correspond to the exclusion variables that only affect the provision of care and identify the model. The effect of care on labor force participation is given by δ.

This theoretical model is consistent with the Becker model of resource allocation at home (1965). In his model household utility depends on consumption of commodities, such as caring for others. These commodities require time of household members and resources that can be purchased on the market. According to the model, households can produce care of others using different inputs, one is buying care in the market (using nurses or maids), and the other is producing care with time of household members. It therefore presents a dilemma between allocating time to work, which allows you to buy care in the market, and allocating that time directly to care. As mentioned by Wolf and Soldo (1994), there is a complex bargaining process that includes spouses and siblings to determine how parental care will be provided. At the same time, parents themselves could behave strategically. A model that would capture all the complexities of parental care is beyond the scope of our research.

According to the model equations (1) and (2), provision of care directly affects the probability of women participating in the labor market, and if the error terms of equations are correlated, then there is an endogeneity problem that must be considered when estimating both equations. The error terms can measure preferences for work and for the provision of informal care, as well as skills in both sectors. For example, women with lower labor skills have a lower chance of being employed, but also have lower opportunity costs of caring for another adult (Trujillo et al. 2010).

This generates endogeneity in care and employment and if we do not consider that endogeneity problem in our estimation method, we will have biased estimates of δ.

Angrist (2001) and Carrasco (2001) show that the endogeneity problem can be corrected using a biprobit estimation, where the first equation attempts to explain the participation decision with one of the explanatory variables being the care of others, the second equation of the biprobit corresponds to the decision to care for another adult. We call this method biprobit or structural estimation.

Angrist (2001) argues that a two stage least squared would be informative on the effect of caring for others and on labor market participation; we also use it to correct endogeneity. We call this method instrumental variables.

The effect of informal care on participation or employment can be positive or negative. Providing care for others can increase labor participation if additional resources are needed to fund this care; however, providing care for other can also negatively impact labor opportunities if care is intensive in the use of a woman's time. In that case, a woman may choose not work or search for jobs with high degrees of flexibility. We study the correlation between the provision of care and labor force participation and employment.

Additionally, we perform sensitivity analysis using Ordered Probit and Tobit models. In the case of the Ordered Probit model, we want to analyze if informal care affects the decision between part-time work and full-time work instead of the working vs. not-working decision. Thus we decided to create categories that divide the decisions into: not working, working part-time, working full time, and working overtime. The four categories are defined as: the first one is working zero hours weekly, the second one is for women working more than zero and less than 30 hours a week a week, the third is women working between 30 and 48 hours a week, and the

fourth category is women working more than 48 hours a week. Finally, we consider a truncated model to analyze if there is an effect on hours worked last week, without imposing the categories of part-time, full time, and overtime.

3.2 Exclusion Variables.

The identification of the model requires the existence of exclusion variables affecting the decision to care for an adult, but not the participation in the labor market. The previous literature has used variables with parental data such as education, health status, and their simple existence. The number of daughters and sons have also been considered as an exclusion variable. These variables attempt to measure the relative demand for informal care that women and, in the case of number of daughters and sons, other available caregivers face. Additionally, the sickest parents can more greatly affect the availability of women's time. Since there is not always health information for parents, education of parents is used as a proxy variable. The number of daughters and sons could decrease the demands of time and care from sick parents for any one individual since these demands can be distributed among more individuals. The existence of parents is an important indicator of demand for informal care, since deceased parents obviously do not demand any care.

However, parental education variables have been criticized as exclusion variables since parental education affects the conditions in the home where women grew up, for example, more educated parents spend more resources in the formation of human capital of their daughters, increasing the likelihood that they participate in the labor market. A similar criticism has been made for health of parents and the presence of parents in the home where women grew up. All these variables could affect the formation of women's human capital (Trujillo et al 2010). Additionally, Lilly et

al. (2010) discuss that most instruments are either weak or do not pass endogeneity tests, which leads them to estimate a model without correcting for endogeneity.

We use two exclusion variables in this paper: the number of sisters and the number of brothers of the respondents.[5] These variables affect the amount of time women need to devote to care of their parents since the responsibilities can be distributed among the whole sibship. Moreover since women are the principal caregivers of adults, we expect that the number of sisters has a negative effect on informal care, but we expect a smaller effect for the number of brothers. Van Houtven and Norton (2004) use the number of siblings as an instrument for studying the use of formal care and Trujillo et al. (2010) also include number of siblings on the set of exclusion variables, but they do not distinguish between sisters and brothers.

Arguably, the number of sisters and brothers may also affect the formation of women's human capital; however, we include in the participation equation variables that adequately measure the socioeconomic conditions of the childhood home. This implies that number of brothers and sister will impact the participation decision only through informal care. The variables measuring socio-economic conditions of the childhood home are: parental education, parental presence, and employment information from parents previous to the woman turning 15.

3.3 Estimation methodology.

To study the effect of endogeneity in the estimation of equations (1) and (2) we follow several steps. First, we estimate probit and linear probability models on decisions to participate in the labor market and be employed, but not including the provision of care in the estimation of labor variables. This allows us analyze the behavior of the estimates when attempting to control for the endogeneity problem.

[5] There is no information about presence of parents or health of parents in the survey.

Second, we estimate participation and employment models including information on the care of others. These equations will give us a biased parameter of the effect of caring for others on the labor variables, but allow us to analyze the changes that occur in the parameters when we include a potentially endogenous variable.

Third, we analyze the relevance of the exclusion variables. Unfortunately, traditional statistical test of weak instruments are not strictly appropriate for models with discrete independent variables, but they still may be informative. Additionally, the structural model test does not require us to test for weak instruments, they rely only on the statistical significance of the exclusion variable. We also test for endogeneity using the Hausman test.

Fourth, we estimate models that correct for endogeneity and analyze the effects of this correction on the estimates.

Fifth, for the Ordered Probit and Tobit models, we also include a correction for endogeneity in the decision of informal care. For the Ordered Probit we estimate two models: first we assume normality in the error terms and use likelihood estimation and second we estimate the Ordered Probit model using 2SLS. For the Tobit model we assume normality of the error terms and estimate only using maximum likelihood.[6]

4. Data.

The data used are provided by Comunidad Mujer and its survey Voz de Mujer. The target population for this survey is women living in urban areas in all regions of the country. We use information from 2,992 women between 18 and 65 years old. There is also information from all members of their households, thus we have a total of data for 11,618 people. The great advantage

[6] Maximum likelihood models were estimated using de CMP command in STATA.

of this survey is that only women are interviewed, increasing the quality of the information contained.[7]

The selection of the women interviewed was conducted through a multistage probability sampling design, stratified geographically and by population size. Fieldwork was conducted between September and November 2009.

We did not include in our estimates women belonging to individual households, i.e. living alone.[8] We also only considered women between 25 and 59 years old, since most women bellow 25 may be in college, not the workforce, and the retirement age for women in Chile is 60 years old.

Additionally, there some variables that are not available for all observations. This is the case for educational variables. Of the 2,132 women interviewed, 2,076 reported her educational level, we decided to estimate our model only considering women that reported their educational level; however, when women do not report information on other variables, we use a dummy variable to indicate missing information. It is noteworthy that for all the analysis, the corresponding weighting factor is used.[9]

The questionnaire collects information about job access, working conditions, and the process of determining work/life balance. The survey is structured in 12 thematic modules, which contain

[7] Unlike traditional surveys of households where one member of the household can respond for all household members where the information about women can have a measurement error.

[8] We excluded women living alone because they do not face the decision to provide care for somebody in the household.

[9] The weighting factor considers post stratification of the sample by geographical sectors, age, and sex. It also considers refusal to the survey.

extensive and varied information on the work and family situation of women. The first four modules are applied to all household members (household composition, education, work status, and household income) and the following 8 modules collect information only about the women interviewed (current employment status, working conditions, training and employment, family care, home finance, distribution and roles within the household, individual history, health and perception, and opinions about social programs).

Specifically, in Module C: Employment Situation, the questions are about the employment situation of each household member (employed, unemployed, number of hours, under contract, fees, etc.). To measure labor force participation, the questions we use in this paper are:

- "Last week, did you work at least an hour regardless of your household chores?"
- "Although you did not work last week, did you carry out any activity for wages or remuneration, in your company, to a relative without receiving payment or money, as an apprentice or making a practice?"
- "Although you did not worked last week, did you have job from which you were temporarily absent because of a strike, illness, vacation or other reasons?"

A woman is considered employed if she answered yes to any of these questions. She was considered unemployed if she was looking for a job during the past four weeks. A woman participates in the labor market if she is working or looking for work.

In Module H: Family care, the woman was asked about the care of children or adults. The relevant question was:

- "Are you responsible for the care of children (who are not your children), elderly, chronically ill or disabled people living in your home?"

In she answered yes, the woman specified whether the care was of a minor, an elder, someone disabled, or chronically ill. Unfortunately, there is no information on the relationship with the person they are responsible for; so we do not know if the care is for a parent or a spouse, however the evidence we provide in Section 6 suggests that most of the informal care is to parents. We also do not have information on whether they receive any monetary compensation. However, as discussed earlier, the evidence for Chile indicates that most of this type of care is unpaid. One of the advantages of this question is that we can consider the care of children separately from other types of care. Other questions followed, which were about how this care affects employment opportunities of women and job performance.

5. Descriptive Statistics.

The Voz de Mujer survey allows us to describe women and their households in terms of their socioeconomic characteristics. In this section we present the main characteristics of women in the sample.

The survey includes a special section related to the care that women provide, asking about care provided for someone else's children, the elderly, chronically ill, or disabled. This provision takes at place at the woman's home. In Table 1, we see that 16% of women provide this type of care; 5.9% are caring for children who are not theirs, 5.4% for the elderly, 3.3% chronically ill, and 1.7% disabled.

Table 2 shows the interaction between labor participation and provision of care, 70% of women who do not provide care participate in the labor market, while for women who do provide care for adults, the percentage is 57.3%. These figures show that there is a negative correlation between the care of others and labor participation.

Table 3 shows that providing caring can dominate a woman's day; over 50% of respondents mentioned that they devote more than 20 hours a week caring for others.

Finally, table 4 shows that more than 50% of women who provide care mentioned health problems associated with this care, particularly stress and depression.

5.1 Variables used in the econometric estimation.

We include dummy regional variables due to variations in relative prices in labor market conditions. The regional dummies divide Chile into four areas: the Northern Regions I, II, III, IV and XV; the Central zone, Regions V, VI, and VII; the Southern area which includes Regions VIII, IX, X, XI, XII, and XIV; and finally the Metropolitan Region (RM).

We also consider household composition variables: a dummy variable indicating if the woman has a partner (married or cohabiting) and one for the number of children in the household under 15. Additionally, we include other household income per capita, which is measured in hundreds of thousands of Chilean pesos.[10] Other household income includes all household income, excluding the woman's income. Then we divide the other household income by the number of people in the household. In addition, we include variables related to the home where the women lived when they were 15. These variables are: presence of the biological mother and father, number of daughters and sons, and level of education achieved by parents of the respondent. We did not include the respondent's perceptions about her health because, as shown in Table 4, 50% of women mentioned that their health is affected by caring for another person, which makes health an endogenous variable.

Table 5 shows that for the sample we used in the estimations, labor participation is 67% and the employment rate reached 60%. Since we are interested in analyzing the care of adults and not

[10] The exchange rate in November 2009 was 508 pesos per U.S. dollar.

children, we separate these two types of cases. In Table 6 we can see that 37% of women providing care for children who are not theirs participate in the labor market, whereas 57% of women providing care for adults participate in the labor market. This result shows that the issue of child-care should be studied in depth given its potentially large negative effect on participation and employment. Table 7 shows that women that participate in the labor market have higher educational levels, are younger and are less involve in caregiving activities than women that do not particpatate.

We include in our estimations a measure of gender role attitudes, which as found by Vella, 1994 and Farré and Vella, 2007 could affect employment decision of women. We also investigate if these attitudes affect informal care. The survey included a special module to capture women's perceptions about the relationship among women, work, and family. From these questions we constructed an index of gender roles or attitudes; this indicator reflects the difference in perceptions and attitudes of women in relation to gender roles.

Questions about gender roles in the Voz de Mujer Survey are divided into three types. The first type is on the role of women in life, and the statements that women have to evaluate are: "A woman should earn a wage and care for her family," "A working mother can have a relationship as solid and affectionate with their children as a woman who does not work," and "The dedication of the father are equally important for cognitive and emotional development of their children." For each of these statements, women have to respond if they strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree. We considered a woman to have a traditional view if she answered neither agree nor disagree, disagree, or strongly disagree to the statements. Otherwise a woman was considered as having a modern view.

The second group of questions is related to household chores that the woman would relegate to her daughters and sons. The chores are: food preparation; washing, ironing, or cleaning; and minor home repairs. We considered a woman with a traditional view if she chooses only sons or only daughters to do one of the chores, irrespective of the chore.

The third type corresponds to the compatibility between working and being married. The relevant question set is: "Would you agree that your daughter, when she is married (or with a partner), should work in the following cases: With no children, with children in preschool, school age children, with children of school age." A woman was coded with a traditional view if she answered that her daughter shouldn't work.

Table 8 shows that women who participate in the labor market tend to be less conservative or traditional than women who do not work. At the same time, women who do not work differentiate the tasks entrusted to their sons versus their daughters. The vast majority of women believe that a woman can work if she does not have children or if children have graduated from school. Additionally, women believe that the dedication of both the father and mother are equally important for the development of children.

In the case of attitudes 1, 2, 5, and 6 there are important differences between the responses of women who participate and do not participate in the labor market. Working women are more likely to agree that women with children in preschool and school can work and also can maintain just as solid and loving relationship with their children as women who do not work.

In terms of the tasks they assign to their male children and female children, it appears that those involved in the labor market are less likely to assign chores based on sex.

We conduct the same analysis but based on whether or not the woman provides care for another adult. The results are less evident. From Table 8, it can be observed that in the case of questions

7, 8 and 9, women who care for adults are more traditional in their views of gender roles, however, the opposite is found for attitudes 2, 5, and 11. Thus the relationship between traditional attitudes and informal care is not clear.

From these 11 variables we generate an index of role perception, which is the sum of all binary variables; the index that can take any integer value between 0 and 11.[11]

6. Estimates.

6.1. Main equations.

In this section we present the results of the models of participation and employment in the labor market and informal care models. First, the models are estimated separately; the estimation of these models allows us to compare the results with the ones correcting for endogeneity and to analyze the robustness of our results. We discuss two labor market variables: participation and employment. The care provision specifically addresses the care of elderly, disabled, and chronically ill adults.[12]

As discussed in Section 3, the exclusion variables we use to correct the endogeneity are the respondent's total number of sisters and brothers in the home where she grew up. We also include several variables that measure the socioeconomic conditions of the home where the respondent grew up: presence of parents, education of parents, and labor status of the mother. Including all these background variables help us interpret the effects of the numbers of daughters

[11] Farré and Vella (2007) show that an index that is the sum of dummy variables provides similar conclusions than an index built by principal components. For that reason, and because of simplicity in presenting the results, we choose the sum index.

[12] Our estimates do not consider women who are in school or live alone. The results are robust to these specifications.

and sons as availability of caregivers and not as an indirect measure of socio-economic conditions of the childhood home.

Table 9 shows the results for participation, employment, and provision of care. The results show that more educated woman are more likely to participate in the labor market and to be employed. The number of children under 15 decreases the probability of participating and being employed. This result indicates that women are providing in-home care, which could significantly affect their choices of work.

Having a partner also decreases the probability of participating in the labor market and of being employed. This may occur because of role division, where women are involved in domestic work and men in paid work. At the same time, we also find that women with more traditional behaviors and perceptions are less likely to participate in the labor market. Similar results are found by Farre and Vella (2007) for the U.S. and Contreras and Plaza (2010) for Chile. One important issue when using a variable that measures gender roles attitudes is the potential endogeneity between labor participation and attitudes. However, a recent paper by Puentes and Ruiz-Tagle (2011) shows that there is not evidence of endogeneity between participation and roles. Thus our estimates should not be biased because of that potential endogeneity.

Participation and employment move concave with age, indicating that women's work cycle peaks around age 34.[13] The mother's education level positively affects participation and employment, but only when the mother has a college education. This result suggests that the use of variables of parental education may be a poor variable exclusion, since it is highly correlated with participation and employment. In the participation and employment models, the exclusion

[13] The peak at 34 is a mix of age and cohort effect. Only the use of longitudinal data can provide a better understanding of both effects.

variables are not correlated with the probability of participating in the labor market or being employed.

In the case of the equation of care provision, there is a concave relationship between age and informal care, while having a partner reduces the likelihood of care giving. This result suggests that women are not taking care of their spouses, but probably their parents. We also found that women living in households with lower incomes are more likely to provide informal care, suggesting that the care giving activities can be paid if the household has sufficient means. Finally, the variable of number of sisters is negatively correlated with the provision of care, while number of brothers is not, which suggests that a greater supply of caregivers decreases the likelihood of care provision by women and that informal care is provided by women. It is also consistent with the concept is that they are taking care of parents, not spouses.

Table 10 shows estimates of participation and employment and care, but using OLS. The results are similar to those mentioned above.

Table 11 shows two biprobit models, one for the decision to participate and another to be employed. Each of these variables of labor supply is estimated jointly with the decision to provide care. These models are only illustrative and do not analyze the effect of care giving on work decisions. Estimates show that the number of sisters is negatively correlated with care. The biprobit model results are similar to the results of the univariate estimates, showing that the specifications are highly robust to the estimation methodology used.

Table 12 and Table 13 show the probit and OLS estimates for participation and employment, which includes the care giving decision as independent variables, but there is no control for endogeneity of this variable. The results show that there is a negative correlation between both variables, in particular care giving decreases the probability of labor market participation by 16%

and decrease the probability of being employed by 20%. The results of these estimates show that provision of care could have an effect on labor force participation similar to having three children under the age of 15. This may indicate that the burden of caring responsibilities to a third party may be as important as the care of their own children.

The inclusion of care giving activities does not change the significance of the remaining variables in probit or linear probability model.

Table 14 and Table 15 show the models that attempt to correct the endogeneity between participation/employment and informal care. We used a structural model and an instrumental variable approach. Table 10 shows the first stage of the Two Stage Least Squared method. The results of the estimation show that informal care has no relationship with labor outcomes when we correct for endogeneity. Similar results are found by Wolf and Soldo (1994), Heitmueller (2007) for extra-residential care, and Leigh (2010), which highlights the importance of taking endogeneity into account when estimating these models.

The main concern with the correction is whether the exclusion variables have enough variation to properly identify the effect of informal care on labor outcomes. In the case of the biprobit models we observe that the number of sisters is significant at a 5% level. The fact that number of brothers is not significant does not affect the identification strategy, since it was expected that informal care was carried out mostly by women. Moreover, the result of number of brothers adds evidence that number of sisters can be interpreted as a measure of caregiving availability. [14]

[14] Additionally we observe that the correlation coefficient is significant at the 10% level in the case of the participation model, which is evidence in favor of the endogeneity model. For the employment model, the correlation coefficient is not significant, however likelihood models based upon normality assumptions have difficulties estimating correlation coefficients.

In the case of the linear estimation, we use the Durbin-Hausman-Wu test of endogeneity and the F-test to identify endogeneity and weak instruments, respectively. However, given the discrete nature of the explanatory variable, it is important to note that these test are not strictly appropriate, but nevertheless suggestive. The Durbin-Hausman-Wu test indicates the presence of endogeneity in the informal care variable and Table 18 reports the F-Test for both parameters, number of sisters and number of brothers, is 2.67, which implies that those variables are weak instruments. This result suggests that more exclusion variables are needed to properly identify the causal effect of informal care on labor force participation or employment, however the results in Table 14 suggest that the apparently negative impact of informal care on labor outcomes is not robust to endogeneity correction models.

The result that providing informal care does not affect female labor supply can happen if women have the flexibility to both work and care for another adult. As described by Wolf and Soldo (1994), women dedicate more hours to domestic work than men and have to simultaneously coordinate employment, informal care, and household work. Additionally, we can expect that low-skilled women who have difficulty finding a job, or those who decide to retire tend to provide informal care. Then there is no causality of informal care on employment, and informal care basically reflects employability problems (Heitmueller, 2007).

It is important to note that the rest of the explanatory variables maintain their significance and magnitude over the model without correction, suggesting that the change in the sign and statistical significance of care provision are the results of the simultaneous correction.

6.2 Robustness.

In this section we analyze two additional models for labor market outcomes. First we divide the employment decision into four different categories, giving more flexibility to the model since we

do not divide the sample between working and non-working women, but also add data for part-time, full-time, and overtime work. The four categories we define are: women working zero hours a week, women working between 1 and 29 hours a week, women working between 30 and 48 hours a week, and women working more than 48 hours a week. We estimate this model using 2SLS and IV-Oprobit model, assuming joint normality of the error terms.

Finally, we consider a truncated model to analyze if there is an effect on hours worked in the past week, without imposing categories of part-time, full time, and overtime. We estimate this model using an IV-Tobit approach assuming again joint normality of the error terms.

Table 16 shows that informal care does not affect the different categories of hours worked and, again, the number of sisters negatively affects the probability of informal care, while the number of brothers is not statistically significant. In the equation of hours of work, the rest of the variables have a similar relationship with hours of work: more educated women tend to work more, women that live with a partner or spouse tend to work less, and a higher attitude index is also negatively correlated with working longer hours.

Table 18 shows the OLS results for the same model of categories of hours of work, also finding no relationship between informal care and hours of work.

In Table 17 we can observe the IV-Tobit model that again shows no relationship between informal care and hours of work measured continuously. The model shows that more educated women work more and that higher other household income tends to decrease hours of work. Additionally, the index of attitudes shows that women with traditional views tend to participate less in the labor market and when they do, they tend to work shorter hours.

The results of the robustness analysis confirm the previous findings that, once correcting for endogeneity, there is not a relationship between informal care and hours of work, and show the

importance of explicitly considering the relationship between care provision and work behavior of women.

7. Conclusions and Implications.

The population of Latin American countries, including Chile, is rapidly aging. This will have several effects on health, public finance, and the labor market. We study informal care and its effect on women's employment decisions and find evidence that informal care does not affect the decision to work or hours of work. These results indicate, as suggested by Heitmuller (2007) and Leigh (2010), that women who provide informal care have low levels of employability or low attachment to labor force, if so, the correct policy should focus on improving the human capital of informal providers.

Our estimates show the importance of correcting for endogenity, since we find a negative correlation between informal care and labor outcomes; however, this relationship is not robust when we use endogeneity correction methods.

The results show that number of sisters is negatively related to informal care, but number of brothers does not have any relationship with informal care. Additionally, we find that women are more likely to provide care for an adult and that if a woman has a partner, she is less likely to provide care. Along with the result that number of sisters decreases informal care, this indicates that adult care giving is of parents and not spouses.

Further research should focus on the intensity of informal care on labor, separately considering the care provided to parents and spouses. Additionally, it is important to analyze the effect of informal care on the health of the caregivers, as discussed in our paper, women who provide informal care tend to have high levels of stress,. Since this affects mostly to low income households, it may increase their vulnerability.

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Annexes

Table 1: Care giving by Type of Care for ages 25-59

Care giving	**%**
Yes, children without considering her children	5.92
Yes, elderly	5.39
Yes, chronically ill	3.28
Yes, disabled	1.69
No	83.72
Total	100.0
Observations	2132

Source: Survey Voz de Mujer 2009

Table 2: Care giving and Labor Participation for ages 25-59

	Labor Participation		
Care Giving	Yes	No	Total
Yes, children without considering her children	36.52	63.48	100,0
Yes, informal care on adults	57.25	42.75	100,0
No	69.91	30.09	100,0
Total	66.62	33.38	100,0
Observations	1359	773	2132

Source: Survey Voz de Mujer 2009

Table 3: How many hours a week dedicated to the care of these people?[15]

Hours per week (N=195)	**%**
Less than 2	4.51
Between 2 and 5	17.48
Between 5 and 10	14.04
Between 10 and 20	9.49
Over 20	54.15
Total	100.0

Source: Survey Voz de Mujer 2009

Table 4: What feeling is caused by care giving activities?[17]

Feeling (N=195)	**%**
Depression	18.66
Stress	20.53
Rage	4.75
Impotence	7.54
No Feeling	38.93
Other health problems	9.26
Total	100.0

Source: Survey Voz de Mujer 2009

[15] For people taking care of a third and between ages 25-59

Table 5: Descriptive Statistics, for ages 25-59.

Variables	Mean	Std. Dev	Description	N
Dependent Variables				
Participation	0.67	-	1 participates in the labor market; 0 otherwise.	2133
Employment	0.60	-	1 employed; 0 otherwise.	2133
Hours	21.69	22.33	Hours worked weekly.	2133
Independent Variables				
Primary	0.20	-	1 primary education or less; 0 otherwise.	2076
Incomplete secondary	0.17	-	1 incomplete secondary education; 0 otherwise.	2076
Secondary	0.36	-	1 complete secondary education; 0 otherwise.	2076
Vocational education	0.12	-	1vocational training; 0 otherwise.	2076
College	0.16	-	1 has college education; 0 otherwise.	2076
Age	41.82	9.50	Age.	2133
North	0.12	-	1 lives in the north; 0 en otherwise.	2133
Center	0.19	-	1 lives in the central region; 0 otherwise.	2133
South	0.24	-	1 lives in the south; 0 otherwise.	2133
Metropolitan Region	0.45	-	1 lives in the metropolitan region; 0 otherwise.	2133
Children	0.79	0.93	Number of children less than 15 years old.	2133
Partner	0.63	-	1 has a spouse or partner; 0 otherwise.	2132
Other household Income	0.96	1.57	Per capita total income of the household, less the labor income of the woman (in thousand Chilean Pesos, exchange rate 1US$508 $ Chilean pesos)*	2133
Mother-Father	0.75	-	1 lived with mother and father before she was 15 years old; 0 otherwise.	2133
Father-no-mother	0.03	-	1 lived with father, but not mother before she was 15 years old; 0 otherwise	2133
Mother-no-father	0.13	-	1 lived with mother but not father before she was 15 years old; 0 otherwise	2133
Working mom	0.45	-	1 mother worked before she was 15 years old; 0 otherwise	2133
Mom primary	0.60	-	1 mother some primary education; 0 otherwise	2090
Mom secondary	0.09	-	1 mother some secondary education; 0 otherwise	2090
Mom college	0.07	-	1 mother some tertiary education; 0 otherwise	2090
Dad primary	0.52	-	1 father some primary education; 0 otherwise	2088
Dad secondary	0.09	-	1 father some secondary education; 0 otherwise	2088
Dad college	0.09	-	1 father some tertiary education; 0 otherwise	2088
Role Index	2.23	1.89	Attitude index	2133
Female siblings	2.09	1.93	Number of female siblings	2126
Male siblings	1.83	1.69	Number of male siblings	2125

Source: Survey Voz de Mujer 2009

Table 6: Descriptive statistics by type of care provision, for ages 25-59

	Care giver of Children			**Care giver adults**			**Does not provide care**		
Variables	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs
Dependent Variables									
Participation	0.37	-	109	0.57	-	195	0.69	-	1828
Employment	0.28	-	109	0.48	-	195	0.64	-	1828
Hours	8.94	18.29	109	15.70	19.92	195	23.34	22.47	1828
Independent Variables									
Primary	0.26	-	106	0.19	-	187	0.19	-	1782
Incomplete secondary	0.19	-	106	0.20	-	187	0.17	-	1782
Secondary	0.41	-	106	0.35	-	187	0.36	-	1782
Vocational education	0.03	-	106	0.09	-	187	0.13	-	1782
College	0.10	-	106	0.18	-	187	0.16	-	1782
Age	46.83	9.12	109	45.78	8.07	195	40.97	9.47	1828
North	0.11	-	109	0.08	-	195	0.12	-	1828
Center	0.09	-	109	0.25	-	195	0.19	-	1828
South	0.15	-	109	0.28	-	195	0.24	-	1828
Metropolitan Region	0.65	-	109	0.39	-	195	0.45	-	1828
Children	0.54	0.88	109	0.62	0.85	195	0.82	0.93	1828
Partner	0.70	-	109	0.48	-	195	0.64	-	1827
Other household Income	0.96	1.22	109	0.77	0.68	195	0.98	1.67	1828
Mother-Father	0.72	-	109	0.80	-	195	0.74	-	1828
Father-no-Mother	0.08	-	109	0.03	-	195	0.03	-	1828
Mother-no-Father	0.07	-	109	0.10	-	195	0.13	-	1828
Working Mom	0.44	-	109	0.58	-	195	0.44	-	1828
Mom primary	0.70	-	109	0.58	-	195	0.60	-	1785
Mom secondary	0.04	-	109	0.07	-	195	0.10	-	1785
Mom college	0.01	-	109	0.09	-	195	0.07	-	1785
Dad primary	0.62	-	109	0.55	-	194	0.50	-	1784
Dad secondary	0.08	-	109	0.04	-	194	0.10	-	1784
Dad college	0.04	-	109	0.15	-	194	0.08	-	1784
Role Index	2.05	1.80	109	2.08	1.82	195	2.26	1.90	1828
Female siblings	2.49	2.04	109	1.95	1.67	195	2.07	1.95	1821
Male siblings	2.24	1.85	109	1.83	1.82	194	1.80	1.66	1821

Source: Survey Voz de Mujer 2009

Table 7: Descriptive statistics by labor participation, for ages 25-59.

	Participates			Inactive		
Variables	Mean	Std. Dev	Obs	Mean	Std. Dev	Obs
Dependent Variables						
Employed	0.90	0.30	1360	-	-	773
Involved in Care Giving activities	0.09	0.28	1360	0.13	0.34	773
Hours	32.56	19.87	1360	-	-	773
Independent Variables						
Primary	0.16	-	1332	0.28	-	744
Incomplete secondary	0.15	-	1332	0.22	-	744
Secondary	0.34	-	1332	0.39	-	744
Vocational education	0.15	-	1332	0.06	-	744
College	0.21	-	1332	0.04	-	744
Age	40.74	9.40	1360	43.97	9.35	773
North	0.11	-	1360	0.14	-	773
Center	0.19	-	1360	0.18	-	773
South	0.24	-	1360	0.24	-	773
Metropolitan Region	0.46	-	1360	0.44	-	773
Children	0.76	0.89	1360	0.83	1.00	773
Partner	0.55	-	1359	0.78	-	773
Other household Income	0.95	1.79	1360	0.96	1.00	773
Mother-Father	0.75	-	1360	0.73	-	773
Father-no-Mother	0.03	-	1360	0.03	-	773
Mother-no-Father	0.12	-	1360	0.14	-	773
Working Mom	0.48	-	1360	0.40	-	773
Mom primary	0.58	-	1330	0.64	-	760
Mom secondary	0.11	-	1330	0.06	-	760
Mom college	0.09	-	1330	0.01	-	760
Dad primary	0.50	-	1328	0.56	-	760
Dad secondary	0.10	-	1328	0.07	-	760
Dad college	0.11	-	1328	0.04	-	760
Role Index	2.03	1.74	1360	2.64	2.10	773
Female siblings	1.99	1.87	1357	2.27	2.04	769
Male siblings	1.75	1.66	1356	1.99	1.74	769

Source: Survey Voz de Mujer 2009

Table 8: Perceptions of women by Labor Force Participation and Adult Care, for ages 25-59.

	Participates in the Labor Market		Caregiver			
	Yes	No	Yes	No		
Variable	Mean	Mean	Mean	Mean	Obs.	Description
Agrees or Disagrees						
Attitude 1	0.46	0.54	0.5	0.49	2112	"= 0 Agrees with "A woman should earn a wage and care for her family"; = 1 Disagrees
Attitude 2	0.24	0.4	0.22	0.3	2110	"= 0 Agrees with "A working mother can have a relationship as solid and affectionate with their children as a woman who does not work "; = 1 Disagrees
Attitude 3	0.06	0.07	0.05	0.07	2111	"= 0 Agrees with "The dedication of the father and mother are equally important for cognitive and emotional development of their children"; = 1 Disagrees
Would you agree that your daughter, when she is married (or with a partner), works in the following cases:						
Attitude 4	0.02	0.03	0.02	0.02	2088	She does not have Children (= 0 Yes; = 1 No)
Attitude 5	0.31	0.39	0.24	0.34	2087	She has children of preschool age (= 0 Yes; = 1 No)
Attitude 6	0.2	0.31	0.21	0.24	2089	She has children of school age (= 0 Yes; = 1 No)
Attitude 7	0.05	0.07	0.09	0.05	2087	She has children that finish high school (= 0 Yes; = 1 No)
Chores allocated to daughters and sons						
Attitude 8	0.16	0.2	0.21	0.17	2074	" =1 You would ask your daughter to prepare a meal, but not to your son, Or would you ask to your son to prepare a meal, but not to your daughter, =0 Otherwise"
Attitude 9	0.17	0.21	0.22	0.18	2077	" =1 You would ask your daughter to do the laundry and iron, but not to your son, Or would you ask to your son to do the laundry and iron, but not to your daughter, =0 Otherwise"
Attitude 10	0.2	0.27	0.22	0.23	2080	" =1 You would ask your daughter to make small repairs at home, but not to your son, Or would you ask to your son make small repairs at home, but not to your daughter, =0 Otherwise"
Attitude 11	0.17	0.19	0.14	0.18	2068	" =1 You would ask your daughter wash the car, but not to your son, Or would you ask to your son to wash the car, but not to your daughter, =0 Otherwise"

Source: Survey Voz de Mujer 2009

Table 9: Probit estimates on participation, employment and caregiving (Marginal Effects), for ages 25-59

	Participation		Employment		Caregiving	
Variables	Coef.	Std.err	Coef.	Std.err	Coef.	Std.err
Incomplete secondary	0.023	(0.041)	0.007	(0.045)	0.030	(0.029)
Secondary	0.068*	(0.038)	0.047	(0.042)	0.024	(0.024)
Vocational education	0.200***	(0.034)	0.223***	(0.044)	-0.002	(0.030)
College	0.289***	(0.035)	0.261***	(0.054)	0.007	(0.031)
Age	0.020	(0.014)	0.025*	(0.015)	0.024**	(0.010)
Age Squared	-0.000*	(0.000)	-0.000**	(0.000)	-0.000*	(0.000)
North	-0.032	(0.039)	-0.053	(0.041)	-0.015	(0.020)
Center	-0.014	(0.040)	-0.017	(0.042)	0.029	(0.028)
South	-0.009	(0.040)	-0.037	(0.045)	0.021	(0.023)
Children	-0.064***	(0.018)	-0.067***	(0.020)	0.003	(0.012)
Partner	-0.187***	(0.029)	-0.154***	(0.033)	-0.063***	(0.021)
Other household income	-0.009	(0.010)	-0.039**	(0.019)	-0.024***	(0.009)
Mother-Father	-0.041	(0.057)	-0.031	(0.060)	0.022	(0.026)
Father-no-mother	-0.033	(0.122)	0.008	(0.121)	0.050	(0.078)
Mother-no-father	-0.068	(0.066)	-0.004	(0.065)	-0.011	(0.030)
Working mom	0.056*	(0.031)	0.037	(0.034)	0.047***	(0.018)
Dummy for no information about working mom	0.006	(0.079)	-0.021	(0.080)	-0.035	(0.030)
Dummy for no information about mother education	-0.060	(0.065)	-0.055	(0.072)	0.024	(0.035)
Mom primary	0.049	(0.057)	0.010	(0.061)	-0.031	(0.040)
Mom secondary	0.100	(0.071)	0.104	(0.081)	-0.015	(0.048)
Mom college	0.176***	(0.067)	0.242***	(0.078)	-0.022	(0.055)
Dummy for no information about father education	0.118	(0.083)	0.058	(0.086)	-0.009	(0.042)
Dad primary	-0.112	(0.069)	0.002	(0.076)	0.024	(0.038)
Dad secondary	-0.102	(0.104)	-0.015	(0.100)	-0.029	(0.040)
Dad college	-0.177	(0.125)	-0.015	(0.121)	0.104	(0.089)
Role index	-0.024***	(0.007)	-0.017**	(0.008)	-0.003	(0.004)
Female siblings	0.000	(0.008)	0.000	(0.009)	-0.011***	(0.004)
Male siblings	0.003	(0.010)	0.006	(0.010)	0.001	(0.006)
Chi2	167.6		134.9		68.31	
Pseudo R2	0.146		0.111		0.107	
Observations	1991		1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 10: OLS estimation for Participation, Employment and Care Giving, for ages 25-59

	Participation		**Employment**		**Caregiving**	
Variables	Coef.	Std.err	Coef.	Std.err	Coef.	Std.err
Incomplete secondary	0.024	(0.046)	0.007	(0.046)	0.030	(0.031)
Secondary	0.078*	(0.042)	0.048	(0.043)	0.025	(0.026)
Vocational education	0.238***	(0.047)	0.229***	(0.050)	-0.008	(0.033)
College	0.313***	(0.053)	0.253***	(0.061)	0.003	(0.033)
Age	0.024*	(0.013)	0.028**	(0.014)	0.019	(0.012)
Age Squared	-0.000**	(0.000)	-0.000**	(0.000)	-0.000	(0.000)
North	-0.025	(0.036)	-0.041	(0.037)	-0.007	(0.021)
Center	-0.008	(0.036)	-0.011	(0.037)	0.043	(0.039)
South	-0.012	(0.037)	-0.031	(0.040)	0.029	(0.027)
Children	-0.052***	(0.016)	-0.054***	(0.017)	0.010	(0.013)
Partner	-0.169***	(0.029)	-0.145***	(0.031)	-0.073***	(0.024)
Other household Income	-0.012	(0.013)	-0.018**	(0.009)	-0.009	(0.006)
Mother-Father	-0.047	(0.058)	-0.038	(0.059)	0.022	(0.029)
Father-no-Mother	-0.021	(0.121)	0.011	(0.118)	0.046	(0.073)
Mother-no-Father	-0.059	(0.059)	-0.005	(0.061)	-0.017	(0.031)
Working Mom	0.050*	(0.030)	0.036	(0.032)	0.061***	(0.023)
Dummy for no information about mother worked	-0.001	(0.077)	-0.017	(0.074)	-0.026	(0.038)
Dummy for no information about mother education	-0.062	(0.073)	-0.053	(0.074)	0.040	(0.056)
Mom primary	0.053	(0.059)	0.014	(0.061)	-0.040	(0.055)
Mom secondary	0.086	(0.079)	0.090	(0.083)	-0.020	(0.069)
Mom college	0.106	(0.075)	0.161*	(0.087)	-0.040	(0.092)
Dummy for no information about father education	0.116	(0.076)	0.055	(0.084)	-0.007	(0.050)
Dad primary education	-0.115*	(0.069)	-0.003	(0.077)	0.022	(0.049)
Dad secondary	-0.096	(0.087)	-0.013	(0.095)	-0.019	(0.057)
Dad college	-0.158*	(0.090)	-0.027	(0.102)	0.095	(0.079)
Role index	-0.025***	(0.007)	-0.018**	(0.007)	-0.003	(0.005)
Female siblings	0.000	(0.008)	0.001	(0.008)	-0.010**	(0.005)
Male siblings	0.004	(0.010)	0.007	(0.010)	-0.001	(0.007)
Constant	0.461*	(0.270)	0.265	(0.285)	-0.416*	(0.244)
R2	0.158		0.131		0.068	
Observations	1991		1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 11: Biprobit estimation of participation, employment and care giving, for ages 25-59

	Participation				Employment			
	Participation		Caregiving		Employment		Caregiving	
Variables	Coef.	Std.err	Coef.	Std.err	Coef.	Std.err	Coef.	Std.err
Incomplete secondary	0.070	(0.123)	0.163	(0.161)	0.021	(0.119)	0.166	(0.162)
Secondary	0.204*	(0.116)	0.145	(0.142)	0.127	(0.112)	0.141	(0.142)
Vocational education	0.726***	(0.163)	-0.035	(0.203)	0.681***	(0.160)	-0.056	(0.204)
College	1.130***	(0.229)	0.024	(0.194)	0.784***	(0.209)	0.014	(0.192)
Age	0.054	(0.042)	0.145**	(0.065)	0.063	(0.040)	0.148**	(0.065)
Age Squared	-0.001*	(0.001)	-0.001*	(0.001)	-0.001**	(0.000)	-0.001*	(0.001)
North	-0.097	(0.111)	-0.121	(0.144)	-0.141	(0.105)	-0.103	(0.144)
Center	-0.056	(0.115)	0.185	(0.156)	-0.056	(0.109)	0.186	(0.157)
South	-0.032	(0.116)	0.135	(0.138)	-0.097	(0.117)	0.138	(0.138)
Children	-0.189***	(0.053)	0.020	(0.076)	-0.178***	(0.052)	0.024	(0.076)
Partner	-0.575***	(0.097)	-0.372***	(0.115)	-0.413***	(0.092)	-0.380***	(0.114)
Other household Income	-0.027	(0.029)	-0.173***	(0.062)	-0.104**	(0.050)	-0.158**	(0.062)
Mother-Father	-0.122	(0.171)	0.162	(0.189)	-0.081	(0.159)	0.162	(0.190)
Father-no-Mother	-0.093	(0.340)	0.249	(0.376)	0.023	(0.321)	0.267	(0.375)
Mother-no-Father	-0.190	(0.181)	-0.081	(0.216)	-0.008	(0.170)	-0.069	(0.216)
Working Mom	0.156*	(0.094)	0.304***	(0.112)	0.092	(0.090)	0.302***	(0.112)
Dummy for no information about mother worked	0.013	(0.231)	-0.283	(0.276)	-0.048	(0.207)	-0.296	(0.273)
Dummy for no information about mother education	-0.181	(0.206)	0.189	(0.264)	-0.147	(0.199)	0.186	(0.265)
Mom primary	0.143	(0.166)	-0.197	(0.239)	0.026	(0.163)	-0.193	(0.239)
Mom secondary	0.309	(0.246)	-0.089	(0.345)	0.285	(0.235)	-0.071	(0.344)
Mom college	0.624**	(0.300)	-0.159	(0.437)	0.755**	(0.314)	-0.158	(0.435)
Dummy for no information about father education	0.332	(0.227)	-0.048	(0.262)	0.148	(0.221)	-0.058	(0.260)
Dad primary	-0.326	(0.204)	0.142	(0.244)	0.010	(0.200)	0.156	(0.243)
Dad secondary	-0.273	(0.276)	-0.271	(0.340)	-0.035	(0.260)	-0.269	(0.341)
Dad college	-0.503	(0.320)	0.513	(0.345)	-0.059	(0.315)	0.526	(0.342)
Role index	-0.070***	(0.020)	-0.015	(0.027)	-0.046**	(0.020)	-0.016	(0.027)
Female siblings	0.002	(0.024)	-0.073**	(0.028)	0.002	(0.024)	-0.073**	(0.029)
Male siblings	0.010	(0.029)	0.001	(0.037)	0.018	(0.027)	0.004	(0.037)
Constant	0.394	(0.872)	-4.972***	(1.441)	-0.239	(0.826)	-5.059***	(1.444)
Athrho	-0.254***	(0.074)			-0.279***	(0.070)		
Observations	1991		1991		1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 12: Probit estimates with no correction for endogeneity (Marginal Effects), for ages 25-59.

	Participation		Employment	
Variables	Coef.	Std.err	Coef.	Std.err
Informal care	-0.160***	(0.057)	-0.199***	(0.056)
Incomplete secondary	0.028	(0.041)	0.014	(0.046)
Secondary	0.072*	(0.038)	0.053	(0.042)
Vocational education	0.203***	(0.034)	0.228***	(0.043)
College	0.289***	(0.036)	0.263***	(0.055)
Age	0.021	(0.015)	0.027*	(0.016)
Age Squared	-0.000*	(0.000)	-0.000**	(0.000)
North	-0.035	(0.039)	-0.057	(0.041)
Center	-0.013	(0.041)	-0.014	(0.043)
South	-0.006	(0.040)	-0.032	(0.045)
Children	-0.064***	(0.018)	-0.067***	(0.020)
Partner	-0.198***	(0.030)	-0.167***	(0.033)
Other household Income	-0.010	(0.010)	-0.044**	(0.019)
Mother-Father	-0.038	(0.058)	-0.026	(0.061)
Father-no-Mother	-0.025	(0.123)	0.018	(0.123)
Mother-no-Father	-0.071	(0.067)	-0.006	(0.065)
Working Mom	0.063**	(0.032)	0.047	(0.034)
Dummy for no information about mother worked	0.001	(0.079)	-0.024	(0.079)
Dummy for no information about mother education	-0.055	(0.066)	-0.048	(0.074)
Mom primary	0.043	(0.058)	0.003	(0.062)
Mom secondary	0.095	(0.072)	0.101	(0.083)
Mom college	0.172**	(0.067)	0.239***	(0.080)
Dummy for no information about father education	0.118	(0.084)	0.056	(0.086)
Dad primary	-0.108	(0.070)	0.008	(0.076)
Dad secondary	-0.103	(0.106)	-0.018	(0.101)
Dad college	-0.171	(0.124)	-0.003	(0.120)
Role index	-0.024***	(0.007)	-0.018**	(0.008)
Female siblings	-0.001	(0.008)	-0.001	(0.009)
Male siblings	0.003	(0.010)	0.007	(0.010)
Wald Chi2	172.1		139.9	
Pseudo R2	0.153		0.121	
Observations	1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 13: OLS estimates with no correction for endogeneity, for ages 25-59.

	Participation		**Employment**	
Variables	Coef.	Std.err	Coef.	Std.err
Informal care	-0.144***	(0.049)	-0.178***	(0.049)
Incomplete secondary	0.028	(0.046)	0.012	(0.046)
Secondary	0.081*	(0.042)	0.052	(0.042)
Vocational education	0.237***	(0.047)	0.227***	(0.050)
College	0.314***	(0.053)	0.254***	(0.060)
Age	0.027*	(0.014)	0.032**	(0.015)
Age Squared	-0.000**	(0.000)	-0.000**	(0.000)
North	-0.026	(0.035)	-0.042	(0.036)
Center	-0.002	(0.037)	-0.004	(0.038)
South	-0.008	(0.036)	-0.025	(0.040)
Children	-0.050***	(0.016)	-0.053***	(0.017)
Partner	-0.179***	(0.029)	-0.158***	(0.031)
Other household Income	-0.014	(0.013)	-0.019**	(0.009)
Mother-Father	-0.044	(0.058)	-0.034	(0.060)
Father-no-Mother	-0.014	(0.121)	0.019	(0.118)
Mother-no-Father	-0.061	(0.059)	-0.008	(0.061)
Working Mom	0.059*	(0.030)	0.047	(0.032)
Dummy for no information about mother worked	-0.005	(0.077)	-0.022	(0.073)
Dummy for no information about mother education	-0.056	(0.073)	-0.046	(0.074)
Mom primary	0.048	(0.058)	0.007	(0.061)
Mom secondary	0.083	(0.079)	0.087	(0.083)
Mom college	0.101	(0.074)	0.154*	(0.087)
Dummy for no information about father education	0.114	(0.076)	0.053	(0.084)
Dad primary	-0.111	(0.069)	0.001	(0.076)
Dad secondary	-0.099	(0.088)	-0.016	(0.095)
Dad college	-0.144	(0.089)	-0.010	(0.100)
Role index	-0.025***	(0.007)	-0.018**	(0.007)
Female siblings	-0.001	(0.008)	-0.001	(0.008)
Male siblings	0.004	(0.009)	0.007	(0.010)
Constant	0.401	(0.277)	0.191	(0.294)
R-squared	0.167		0.143	
Observations	1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 14: Biprobit estimation with correction for endogeneity, for ages 25-59.

	Participation				Employment			
	Participation		Caregiving		Employment		Caregiving	
Variables	Coef.	Std.err	Coef.	Std.err	Coef.	Std.err	Coef.	Std.err
Informal Care	0.528	(0.490)			0.168	(0.543)		
Incomplete secondary	0.050	(0.121)	0.139	(0.158)	0.013	(0.118)	0.161	(0.160)
Secondary	0.179	(0.118)	0.134	(0.138)	0.116	(0.113)	0.138	(0.142)
Vocational education	0.700***	(0.165)	-0.064	(0.206)	0.669***	(0.162)	-0.069	(0.217)
College	1.076***	(0.221)	-0.005	(0.199)	0.764***	(0.210)	0.005	(0.197)
Age	0.043	(0.043)	0.131*	(0.070)	0.060	(0.043)	0.145**	(0.067)
Age Squared	-0.001	(0.001)	-0.001	(0.001)	-0.001*	(0.001)	-0.001*	(0.001)
North	-0.092	(0.111)	-0.144	(0.149)	-0.142	(0.106)	-0.103	(0.143)
Center	-0.079	(0.112)	0.190	(0.156)	-0.065	(0.108)	0.189	(0.158)
South	-0.050	(0.117)	0.142	(0.137)	-0.100	(0.118)	0.141	(0.139)
Children	-0.187***	(0.053)	0.024	(0.074)	-0.180***	(0.052)	0.026	(0.076)
Partner	-0.505***	(0.126)	-0.360***	(0.116)	-0.395***	(0.108)	-0.379***	(0.114)
Other household Income	-0.024	(0.027)	-0.189***	(0.070)	-0.101**	(0.051)	-0.158**	(0.062)
Mother-Father	-0.105	(0.158)	0.169	(0.191)	-0.057	(0.153)	0.160	(0.192)
Father-no-Mother	-0.105	(0.327)	0.208	(0.389)	0.028	(0.319)	0.259	(0.378)
Mother-no-Father	-0.156	(0.173)	-0.089	(0.217)	0.011	(0.167)	-0.069	(0.217)
Working Mom	0.107	(0.098)	0.300***	(0.111)	0.074	(0.098)	0.302***	(0.111)
Dummy for no information about mother worked	0.024	(0.229)	-0.290	(0.270)	-0.049	(0.211)	-0.301	(0.271)
Dummy for no information about mother education	-0.193	(0.201)	0.209	(0.261)	-0.147	(0.198)	0.189	(0.264)
Mom primary	0.155	(0.164)	-0.192	(0.233)	0.027	(0.164)	-0.190	(0.238)
Mom secondary	0.306	(0.240)	-0.069	(0.334)	0.278	(0.232)	-0.059	(0.348)
Mom college	0.620**	(0.300)	-0.156	(0.435)	0.748**	(0.312)	-0.155	(0.434)
Dummy for no information about father education	0.323	(0.220)	-0.041	(0.259)	0.147	(0.221)	-0.058	(0.259)
Dad primary	-0.330	(0.201)	0.127	(0.240)	0.002	(0.201)	0.157	(0.243)
Dad secondary	-0.256	(0.268)	-0.321	(0.344)	-0.042	(0.260)	-0.282	(0.348)
Dad college	-0.548*	(0.319)	0.508	(0.340)	-0.085	(0.323)	0.529	(0.340)
Role index	-0.066***	(0.021)	-0.012	(0.028)	-0.045**	(0.021)	-0.016	(0.027)
Female siblings			-0.069**	(0.028)			-0.072**	(0.028)
Male siblings			-0.001	(0.035)			0.007	(0.036)
Constant	0.609	(0.888)	-4.690***	(1.535)	-0.168	(0.876)	-5.008***	(1.469)
Athrho	-0.562*	(0.321)			-0.371	(0.293)		
Observations	1991		1991		1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 15: 2SLS estimation correcting for endogeneity, for ages 25-59

	Participation		**Employment**	
Variables	Coef.	Std.err	Coef.	Std.err
Informal Care	-0.152	(0.776)	-0.320	(0.812)
Incomplete secondary	0.027	(0.053)	0.015	(0.054)
Secondary	0.081	(0.049)	0.054	(0.049)
Vocational education	0.236***	(0.046)	0.224***	(0.050)
College	0.312***	(0.053)	0.250***	(0.060)
Age	0.027	(0.020)	0.034	(0.022)
Age Squared	-0.000*	(0.000)	-0.000**	(0.000)
North	-0.027	(0.036)	-0.044	(0.037)
Center	-0.002	(0.049)	0.002	(0.053)
South	-0.007	(0.044)	-0.020	(0.050)
Children	-0.050***	(0.017)	-0.052***	(0.018)
Partner	-0.179***	(0.063)	-0.168***	(0.064)
Other household Income	-0.014	(0.014)	-0.020*	(0.012)
Mother-Father	-0.041	(0.056)	-0.026	(0.058)
Father-no-Mother	-0.012	(0.120)	0.029	(0.120)
Mother-no-Father	-0.060	(0.062)	-0.008	(0.064)
Working Mom	0.058	(0.057)	0.054	(0.059)
Dummy for no information about mother worked	-0.007	(0.078)	-0.028	(0.076)
Dummy for no information about mother education	-0.055	(0.078)	-0.038	(0.079)
Mom primary	0.047	(0.065)	-0.000	(0.068)
Mom secondary	0.081	(0.078)	0.082	(0.085)
Mom college	0.099	(0.077)	0.145	(0.092)
Dummy for no information about father education	0.114	(0.076)	0.051	(0.084)
Dad primary	-0.111	(0.068)	0.004	(0.077)
Dad secondary	-0.100	(0.090)	-0.021	(0.098)
Dad college	-0.143	(0.112)	0.003	(0.125)
Role index	-0.026***	(0.007)	-0.019**	(0.008)
Constant	0.401	(0.430)	0.138	(0.458)
Durbin-Hausman-Wu chi-square	0.0002		0.0643	
R2	0.167		0.134	
Observations	1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 16: IV OProbit estimations for worked hours decisions, for ages 25-59.

	IV Oprobit			
	Hours (Discrete)		**Caregiving**	
Variables	Coef.	Std.err	Coef.	Std.err
Informal Care	0.538	(0.532)		
Incomplete secondary	0.027	(0.107)	0.141	(0.156)
Secondary	0.140	(0.105)	0.128	(0.140)
Vocational education	0.466***	(0.141)	-0.118	(0.225)
College	0.633***	(0.154)	-0.007	(0.185)
Age	0.063*	(0.037)	0.134**	(0.066)
Age Squared	-0.001**	(0.000)	-0.001	(0.001)
North	-0.061	(0.099)	-0.118	(0.141)
Center	-0.058	(0.091)	0.200	(0.156)
South	-0.179*	(0.098)	0.150	(0.134)
Children	-0.147***	(0.044)	0.026	(0.074)
Partner	-0.219**	(0.092)	-0.368***	(0.107)
Other household Income	-0.070	(0.047)	-0.162**	(0.065)
Mother-Father	0.010	(0.130)	0.171	(0.189)
Father-no-Mother	-0.122	(0.225)	0.293	(0.365)
Mother-no-Father	0.048	(0.139)	-0.078	(0.216)
Working Mom	-0.003	(0.083)	0.303***	(0.108)
Dummy for no information about mother worked	-0.055	(0.188)	-0.283	(0.258)
Dummy for no information about mother education	-0.186	(0.171)	0.241	(0.260)
Mom primary	0.078	(0.146)	-0.212	(0.231)
Mom secondary	0.116	(0.189)	-0.015	(0.335)
Mom college	0.161	(0.279)	-0.166	(0.421)
Dummy for no information about father education	0.272	(0.217)	-0.096	(0.260)
Dad primary	-0.231	(0.197)	0.189	(0.245)
Dad secondary	-0.232	(0.233)	-0.262	(0.334)
Dad college	-0.313	(0.268)	0.573*	(0.344)
Role index	-0.051***	(0.019)	-0.008	(0.027)
Female siblings			-0.062**	(0.028)
Male siblings			0.002	(0.034)
Constant			-4.801***	(1.443)
Chi2	118.14			
(p-value)	(0.000)			
Athrho	-0.591*	(0.340)		
Observations	1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 17: IV Tobit estimations for worked hours decisions, for ages 25-59.

	IV Tobit			
	Hours (Discrete)		Caregiving	
Variables	Coef.	Std.err	Coef.	Std.err
Informal Care	-0.093	(11.631)		
Incomplete secondary	0.932	(3.594)	0.166	(0.161)
Secondary	4.786	(3.320)	0.141	(0.143)
Vocational education	17.255***	(4.495)	-0.065	(0.217)
College	22.504***	(4.762)	0.025	(0.189)
Age	2.581**	(1.199)	0.147**	(0.066)
Age Squared	-0.035**	(0.014)	-0.001*	(0.001)
North	-2.979	(3.078)	-0.109	(0.145)
Center	-0.028	(2.929)	0.188	(0.159)
South	-4.738	(3.189)	0.135	(0.138)
Children	-4.815***	(1.478)	0.024	(0.076)
Partner	-8.029***	(2.610)	-0.383***	(0.114)
Other household Income	-2.266*	(1.355)	-0.160**	(0.062)
Mother-Father	-1.297	(4.534)	0.170	(0.193)
Father-no-Mother	-2.629	(8.030)	0.285	(0.374)
Mother-no-Father	-0.255	(4.693)	-0.070	(0.217)
Working Mom	1.731	(2.457)	0.306***	(0.112)
Dummy for no information about mother worked	-3.238	(6.316)	-0.278	(0.273)
Dummy for no information about mother education	-3.791	(5.649)	0.202	(0.267)
Mom primary	1.143	(4.691)	-0.207	(0.240)
Mom secondary	2.776	(6.191)	-0.068	(0.349)
Mom college	2.838	(9.113)	-0.157	(0.432)
Dummy for no information about father education	6.366	(6.646)	-0.063	(0.261)
Dad primary	-5.021	(6.021)	0.163	(0.245)
Dad secondary	-5.308	(7.262)	-0.259	(0.344)
Dad college	-4.856	(8.302)	0.525	(0.342)
Role index	-1.691***	(0.604)	-0.014	(0.027)
Female siblings			-0.070**	(0.029)
Male siblings			0.003	(0.037)
Constant	-22.029	(24.281)	-5.055***	(1.452)
Chi2	143.69			
(p-value)	(0.000)			
Athrho	-0.246	(0.160)		
Observations	1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1

Table 18: 2SLS estimations on hours worked, for ages 25-59.

	Hours (Discrete)		Informal Care (First Stage)	
Variables	Coef.	Std.err	Coef.	Std.err
Informal Care	-1.002	(1.701)		
Incomplete secondary	0.070	(0.110)	0.030	(0.031)
Secondary	0.162	(0.102)	0.025	(0.026)
Vocational education	0.428***	(0.128)	-0.008	(0.033)
College	0.612***	(0.138)	0.003	(0.033)
Age	0.087*	(0.048)	0.019	(0.012)
Age Squared	-0.001**	(0.001)	-0.000	(0.000)
North	-0.062	(0.085)	-0.007	(0.021)
Center	0.031	(0.121)	0.043	(0.039)
South	-0.112	(0.108)	0.029	(0.027)
Children	-0.110***	(0.042)	0.010	(0.013)
Partner	-0.312**	(0.141)	-0.073***	(0.024)
Other household Income	-0.041	(0.026)	-0.009	(0.006)
Mother-Father	0.032	(0.124)	0.022	(0.029)
Father-no-Mother	-0.066	(0.220)	0.046	(0.073)
Mother-no-Father	0.001	(0.136)	-0.017	(0.031)
Working Mom	0.096	(0.128)	0.061***	(0.023)
Dummy for no information about mother worked	-0.088	(0.168)	-0.026	(0.038)
Dummy for no information about mother education	-0.099	(0.163)	0.040	(0.056)
Mom primary	0.013	(0.142)	-0.040	(0.055)
Mom secondary	0.081	(0.180)	-0.020	(0.069)
Mom college	0.069	(0.294)	-0.040	(0.092)
Dummy for no information about father education	0.195	(0.187)	-0.007	(0.050)
Dad primary	-0.158	(0.171)	0.022	(0.049)
Dad secondary	-0.210	(0.210)	-0.019	(0.057)
Dad college	-0.107	(0.292)	0.095	(0.079)
Role index	-0.048***	(0.016)	-0.003	(0.005)
Female siblings			-0.010**	(0.005)
Male siblings			-0.001	(0.007)
Constant	0.745	(1.019)	-0.416*	(0.244)
Durbin-Hausman-Wu Chi-square	0.251			
F-test			2.671	
R-squared	0.082		0.068	
Observations	1991		1991	

Source: Survey Voz de Mujer 2009

Robust standard error in parentheses, significant at *** p<0.01, ** p<0.05, * p<0.1