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IMPACT OF IN-KIND SOCIAL TRANSFER PROGRAMS ON THE LABOR SUPPY: A GENDER PERSPECTIVE

Luis García y
Erika Collantes

DEPARTAMENTO DE
ECONOMÍA

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Av. Universitaria 1801, Lima 32 – Perú.
Teléfono: (51-1) 626-2000 anexos 4950 - 4951
econo@pucp.edu.pe
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Departamento de Economía – Pontificia Universidad Católica del Perú,
jorge.rojas@pucp.edu.pe
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Resumen

En los últimos años, el Perú ha experimentado una expansión de programas sociales de lucha contra la pobreza, como por ejemplo los programas de cuidado de niños Cuna Más y el programa alimentario escolar Qali Warma. El objetivo de este paper es estudiar si estos programas sociales han tenido algún impacto sobre las horas de trabajo de los hombres y mujeres pertenecientes a los hogares beneficiados por los programas. Según los enfoques de asignación del tiempo y según la distinción de los roles en el hogar por género, se esperaría que exista un impacto diferente para cada uno de estos grupos. En términos econométricos, es sabido que las horas de trabajo son resultado de un proceso de selección muestral el cual podría sesgar las estimaciones de mínimos cuadrados ordinarios, e inclusive las estimaciones por efectos fijos (within groups), pues estas últimas controlan el sesgo por heterogeneidad inobservable pero no el sesgo de selección. Estimando un modelo de determinantes de horas de trabajo por el método de Kyriazidou (1997) encontramos que existen impactos diferenciados por género, en donde el programa Qali Warma en su modalidad de Desayuno fomenta la oferta laboral femenina para los grupos de edad de menos de 25 años y mayores de 40 años, mientras que Cuna Más lo hace solo para el grupo de edad menor de 25 años. En el caso de los hombres, la modalidad de Desayuno escolar de Qali Warma también parece incrementar las horas de trabajo (aunque en menor medida que las mujeres), mientras que la modalidad de Almuerzos Escolares reduce las horas de trabajo, especialmente para los hombres por encima de los 40 años.

Palabras claves: programas alimentarios, programas de cuidado de niños, oferta laboral, sesgo de selección.
Códigos JEL: I38, J13, J16, J22

Abstract

In recent years, Peru has expanded its social programs aimed at combating poverty, with new initiatives including the *Cuna Más* childcare program and the *Qali Warma* school meals program. The goal of this paper is to determine whether these social programs have made any

impact on the working hours of men and women belonging to the beneficiary households. According to time-allocation approaches and gender-based household roles, a different impact on each of these two groups might be expected. In econometric terms, it is well known that hours worked are the result of a sample selection process that could bias ordinary least square estimations, and even (within-group) fixed effect estimations, which control for unobserved heterogeneity bias but not selection bias. We use Kyriazidou's (1997) method to estimate a model of determinants of hours worked, and find gender-differentiated impacts; the *Qali Warma* breakfast program fosters female labor supply among those aged below 25 and above 40, while *Cuna Más* does so only for those below the age of 25. In the case of men, the *Qali Warma* breakfast program also seems to increase hours worked (albeit to a lesser extent than for women), while the school lunches version of the same program reduces hours worked, especially for men over the age of 40.

Keywords: Food programs, daycare programs, labor supply, selection bias.
JEL Codes: I38, J13, J16, J22

IMPACT OF IN-KIND SOCIAL TRANSFER PROGRAMS ON THE LABOR SUPPLY: A GENDER PERSPECTIVE

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1. INTRODUCTION

There has been a significant global expansion in the numbers of social programs geared toward the poorest, such as in-kind transfer (goods and services) programs. In Peru, the past ten years have witnessed a significant restructuring and enlargement of public in-kind transfer programs, including a free food distribution program (*Qali Warma*) and a childcare service program (*Cuna Más*), both of which aim to improve the well-being of the child population in terms of health, nutrition, and development.

Recent studies have shown that these programs could have an unintended impact on multiple dimensions of well-being, such as labor participation and hours worked by the targeted children's mothers (Ghani, Kerr & O'Connell, 2013; Gong, Breunig & King, 2010; Jaumotte, 2003). In turn, because the traditional household role of men differs from that of women, a gender-differentiated impact might be expected in the households targeted by these programs. This impact might also vary depending on the age of the women and men who join the program, since the activities that individuals carry out inside and outside the household change with age. For instance, young people dedicate a lot more time to studying than do older individuals. Moreover, both remunerations and the productivity of work outside the household vary over the life cycle, which could trigger age-based changes in hours worked.

Age-based social roles condition unequal labor participation and intensity between men and women. Statistics from the Peruvian household surveys (ENAHO) show that in 2016, 81.2% of men of working age were active, while only 63.3% of their female counterparts were; this is a gap that has held stable for a long time. Moreover, the survey reveals a difference in the average number of hours worked by men and women, at 42.6 hours per week for the former and 34.8 hours for the latter.

Some recent studies have concluded that this gender gap has negative consequences for the economy. More specifically, it has been found to damage economic growth (Cuberes & Teignier, 2012; Steinberg & Nakane, 2012; Klasen & Lamanna, 2009), GDP per capita, and total factor productivity (Loko & Diouf, 2009). At the microeconomic level, gender differences hamper women's human development prospects and affect the development of society (World Bank, 2012).

In general, the aforementioned social goods-and-services transfer programs can help to reduce the gender gap in the labor market, since both food provision and childcare services free up mothers' time to engage in income-generating activities. However, it must be recalled

that the provision of goods and services also has an income effect on the household, and this, according to traditional theory, is detrimental to the labor supply.[1]

In this context, the questions that we address in this study are: Do the *Qali Warma* and *Cuna Más* programs have unintended impacts on the labor supply? Are these impacts gender-differentiated? The aim of this study is to quantify the impact of these programs on hours worked, distinguishing by gender. This impact has been little studied in Peru (Boyd & Rentería, 2018; Ccallme, 2013), while in the rest of the world the empirical evidence is inconclusive (Moffitt, 2002).

This paper is organized as follows. In the next section, we present a theoretical and empirical review of in-kind transfer (goods and services) programs, and their relationship with the labor supply. In Section 3, we present our methodology, which is appropriate for a non-experimental design. In Section 4, we present the descriptive statistics of the data and the variables. Section 5 quantifies the impact of the *Qali Warma* and *Cuna Más* social programs on the labor supply of men and women. Finally, in Section 6 we present our conclusions and the economic policy implications.

2. THEORETICAL FRAMEWORK AND EMPIRICAL RESEARCH

2.1 Theoretical framework

Under the traditional theory of labor supply, it is possible to evaluate the effect of in-kind transfer on hours worked as if it were a cash transfer. In this simple approach, the impact on labor supply would be negative due to the income effect of this transfer. However, there are other elements in the goods and services transferred that could cause the effect to have a different sign.

The economic theories of household production and time allocation within the household allow us to tackle this area while taking into account other important aspects. For instance, in his pioneering work, Becker (1964) proposes that households can dedicate time and other resources to domestic production, such as food preparation or childcare. In his model, some families might opt to produce goods instead of acquiring them on the market, depending not only on the cost of the inputs required to do so and the market value of the goods, but also on the value of the time spent producing them.

Extending this analysis, Gronau (1976) stresses that leisure should be clearly distinguished from domestic work, insofar as the latter depends upon its marginal productivity while the former depends upon preferences. In this model, a decline in the price of substitutes in the childcare market (for example, maids, nursery school, kindergarten) will reduce the time dedicated to childcare and increase the female labor supply, although this effect will diminish the older the children become (Gronau, 1976, pp.1112). Along similar lines, Blau & Robins (1988) study the labor supply of mothers and its relationship with childcare, which may be

[1] García and Collantes (2017) find that the *Juntos* conditional cash transfer program has a negative impact on the hours worked by women.

carried out by them, by other persons in their environment (other household members, for instance), or by a private provider. Theoretically, they show that if the price of childcare goes up, the probability of mothers not working at all, or of their working and sharing childcare responsibilities with another person in their environment, will increase. Connelly (1992) obtain similar results by way of a theoretical model in which the presence in the household of older relatives who can participate in childcare increases the possibilities of the mother working. If this is the case, it might be inferred that older household members find it worthwhile to work less and look after young children in their household, even without remuneration.

Other authors have developed this topic through an approach based not on household production but on substitution between leisure and transferred goods. Examples include Gavhari (1994), Murray (1980), and Leonesio (1988). According to these authors, if leisure and the good transferred are Hicks-Allen substitutes and if the quantity of the good transferred is greater than the household's optimal consumption in the absence of the program, the labor supply might increase. Similarly, Munro (1989) notes that if free or subsidized goods are disbursed as complements to work (for example, training courses or nursery schools), the labor supply will increase.

2.2 Empirical literature

The empirical evidence on the impact of food and childcare service programs is very limited in Peru, while internationally it is abundant but not conclusive.

Some studies relate the demand for childcare with the price of this service, and its relationship with the labor supply of mothers. Heckman (1974) studies the determinants of how working mothers select childcare, concluding that the price of childcare is a factor determining labor supply. On the other hand, Gong, Breunig & King (2010) find that the price of childcare provision has a negative effect on labor supply in the Australian case, and thus a reduction in this price will increase the labor supply. In a meta-analysis of 36 comparable studies on the United States, Canada, and some European countries, Akgunduz & Plantenga (2016) find that the elasticity of the female labor supply in relation to the price of childcare is -0.19 on average in the case of the studies on Canada and Europe, and -0.35 for those on the United States. The authors also find that the magnitude of the price elasticity of the female labor supply falls with time, although thus may not necessarily be attributable to chances in the population's sensitivity to childcare prices. In the same vein, Herbst & Barnow (2008), for Maryland, United States, find that the female labor supply is very sensitive to the price of care: an increase of US $100 is associated with a 3.7% drop in the rate of female participation in the job market. From the calibration of a model that includes different types of childcare, Bick (2011) suggests that the lack of subsidized childcare for some women constitutes a barrier to participating in the job market in the case of western Germany.

As to the literature on childcare provision programs and their relationship with the labor supply, Gelbach (2002) points to the positive effect of kindergarten subsidies on the labor supply of mothers in the United States; and Chevalier & Viitanen (2002), using data from the United Kingdom, note that the availability of a formal childcare service increases women's

hours worked. In the Canadian case, Baker, Gruber & Milligan (2008) find an important positive effect on the labor participation of women whose children were beneficiaries of a universal childcare program in the region of Quebec. For the case of Argentina, Berlinski & Galiani (2007) detect an increase of between 7% and 14% in female labor participation following a significant rise in the number of pre-school education establishments between 1994 and 2000. For the Chilean case, Medrano (2009) and Encina & Martínez (2009) do not find that the expansion of public childcare services (*Salas Cuna*) has significant impacts on either women's labor participation or hours worked. However, for the same country, Martínez & Perticará (2017) find that the after-school care offering for children aged between 6 and 13 pushed up labor participation by 7%. In the Ecuatorian case, Rosero & Oosterbeek (2011), using discontinuous regression, study the FODI program, which provides nationwide coverage to impoverished children aged between 0 and 6 and is randomly assigned to non-profit nurseries. The authors find that access to care centers through the FODI program increases the hours that mothers work per week by an average of six hours.

For the Peruvian case, in their recent study, Boyd & Rentería (2018) explore the impact that the daycare component of *Cuna Más* has on female labor participation and employment conditions. Using an entropy balancing method, they find an impact of 14% on the probability of participation, but no effect on the hours worked by women.

Next, we review the empirical literature on food transfer programs. Rodríguez (2011), utilizing a propensity score matching (PSM) technique, finds that Colombia's food program has positive or negative effects depending on the age of the women. In another study, Barrett (2006) finds negative effects on the labor supply in the United States due to targeting problems in the food program, but acknowledges that in-kind transfers cause not only income effects, but also substitution effects than can change the sign of the effect. Borraz & Gonzalez (2008), employing PSM, find that the PANES food program acts as a disincentive to the male and female labor supply in Uruguay. Hoddinott (2004) shows that, in the case of Ethiopia, the negative effect of food transfers may be due to insufficient use of control variables, and observes that the sign becomes positive when adequate controls are added. Finally, in the Peruvian case, the only available study is that of Ccallme (2013), who uses a cross-sectional analysis for 2010 with selection bias correction, and finds that the *Vaso de Leche* and *Comedores Populares* food programs have an apparently negative and significant effect on the labor supply for all women, but this significance disappears when disaggregating by poverty level.

3. THE *CUNA MÁS* AND *QALI WARMA* SOCIAL PROGRAMS

In this section we briefly describe the *Cuna Más* and *Qali Warma* social programs.

3.1 The *Cuna Más* program

The *Cuna Más* social program provides care and attention to children below the age of 3, and is oriented especially towards populations in poverty and extreme poverty. Based on a similar social program, *Wawa Wasi*, it was created in 2012 through supreme decree N° 003-2012, and assigned to the new Ministry of Development, created the previous year. The program provides two forms of attention: daycare and family support. The former involves comprehensive care of children for eight hours during the day. In turn, the latter consists of home visits to families in extreme poverty with children who fall inside the program's target age range, as well as sessions at local sites where the families receive training on good childcare practices. For the purposes of our study, we are mainly interested in the daycare program, which is applied more in urban than in rural areas (Boyd & Rentería, 2018).

In comparison with its predecessor, *Wawa Wasi*, *Cuna Más* reduced the maximum age of the children participating from 48 months to 36 months (MIMDES, 2011: 9). *Cuna Más* marked the culmination of a shift towards an approach centered on child development.

At present, the program encompasses three types of daycare centers. The first are Daycare Homes (DHs), located within the residence of a caregiving mother under community supervision. The second are Daycare Centers (DCs), located in community venues, and are much larger than the DCHs. In both cases, management is entrusted to the community. The third type are Comprehensive Childcare Centers (CCCs), whose infrastructure and equipment are superior to those of the other two, and have the capacity to provide a high-quality comprehensive service. These centers may be run from public, private, or community venues under the program's administration.

According to *Cuna Más* statistics, between 2012 and 2017 the number of children covered at DHs (remnants of the previous program) dropped markedly, from 41,072 in 2012 to 8,295 in 2017. The number of DH venues also fell, from 4,658 to 544, over the same period. Conversely, under the DC format the number of children covered went up from 16,621 in 2012 to 45,185 in 2017, while in the case of the CCCs the beneficiary total rose from 124 to 6,106 between the same years. The total number of children on the program went from 57,817 in 2012 to 59,586 in 2017, with fluctuations in the middle of that period (CUNA MAS, 2017). These figures reflect significant reallocations within the program, but a slight increase in beneficiaries in aggregate terms.

It is interesting to note the targeting criteria of the *Cuna Más* program. According to Supreme Decree N° 089-2017-MIDIS, in the case of districts with at least one urban population center (defined by INEA as a settlement with at least 100 houses in close proximity), the program is applied in districts with a poverty rate of 19.1% or higher, per the INEI poverty map. In the case of districts with rural population centers (defined by INEA as settlements with no more than 100 houses in close proximity, and which are not district capitals), the program is targeted to

districts: (a) with poverty levels of at least 50%; (b) with a largely rural population; (c) with a chronic nutrition rate affecting more than 30% of children below the age of 3; and (d) within the sphere of the *Juntos* program. Once a district qualifies as eligible, before the program is launched the community must first organize and commit to support local government in managing the program and assigning an appropriate venue. Likewise, for the program to begin there must be sufficient demand in the chosen district. Then, once the program is implemented, the mothers must submit some necessary documents.

3.2 The *Qali Warma* program

Qali Warma is a food program that involves the distribution of meals to pre-school and primary school children at public educational institutions in Peru. In addition, food is disbursed to secondary school students in certain areas. It is one of the biggest social programs in Peru, covering almost 3.7 million children across more than 62,000 educational institutions as of March 2018. Recipients receive breakfast, and sometimes lunch. The food given out varies from region to region according to the dietary needs of each one. According to information published on the program's website,[2] primary school children belonging to the poorest quintiles (quintiles 1 and 2) are given breakfast and lunch, while the children in quintiles 3, 4 and 5 receive only breakfast. Since 2017, some secondary school students from indigenous communities in Amazonia also receive lunch.

The program was created in May 2012 by way of Supreme Decree N° 008-2012-MIDIS, to replace the Pre-school and School Comprehensive Nutrition Program (Pre-school and School PIN), which complemented the National Food Program (PRONAA).[3] This program followed various school food initiatives that had been implemented from the 1990s (Paulini & Ravina, 2000; Alcázar, 2007; Alcázar, 2016). However, the precursors to *Qali Warma* were subject to problems of design, organization, and objectives. Alcazar (2007) observes that these programs were oriented more to poverty reduction than to nutrition (the quantities disbursed were insufficient), and that they were marked by high levels of leakage and under-coverage. Moreover, nationwide coverage could not be guaranteed for all school days. The program did not supply products that were appropriate for the different regions, resulting in low nutritional impact. Conversely, from the outset *Qali Warma* set child nutrition and dietary practices as a central objective, with the incentivization of school attendance relegated to second place, while other aspects, such as the purchase of agricultural surpluses and emergency response, among others, were sidelined entirely. Another of *Qali Warma*'s improvements was to adapt its food assistance to the needs and customs of each region, whereas the earlier programs only provided standardized meals.

[2] https://www.qaliwarma.gob.pe/que-ofrecemos/componente-alimentario/

[3] The PIN program included other components aimed at children below the age of 3, as well as pregnant mothers.

4. METHODOLOGY

From our review of the theoretical and empirical literature, we recognize that in-kind transfers can have two possible effects on labor supply, of opposite signs. Given the roles of men and women in the household, we expect the impact to be gender- and age-differentiated. The latter is because the receipt of goods replaces domestic production; and since this is a role largely played by women in the household, it serves to free up time for them to enter the labor market.

As we saw in the previous section, the empirical results are varied; this could be due to the strength of the effects in question, or because the most appropriate methods to control for possible biases in the estimations are not always used. Because the two Peruvian programs we study here, *Qali Warma* and *Cuna Más*, were not randomly assigned, an experimental design can be discarded. Unlike the study of Boyd & Rentería (2018) who use quasi-experimental designs, we employ a structural approach that takes into account labor participation as an endogenous decision related to working hours. This allows us to identify and control for possible biases that could arise while assessing these programs, including selection bias due to participation in the job market.

In our econometric model, the endogenous variable is the number of hours that a person dedicates to work, while the regressors of interest are variables that signal the participation of that individual or members of their household in the social programs in question. In addition, our analysis factors in other control variables.

An analysis of this type represents a considerable econometric challenge for different reasons. First, the endogenous variable (hours worked) could be zero or greater than zero, whereby the former refers to the non-participation of that person in the labor market. Such a result would not occur at random, but would be the result of a selection process, usually associated with the worker's decision to be active or not. In the standard literature on sample selection, this process is modeled using a second equation on labor participation, which could present some kind of relationship or connection with the main equation through correlation of errors. If this relationship is ignored, a simple ordinary least squares estimation will produce biased and inconsistent estimations of the population parameters, as the expectation of the error conditional upon participation in the labor market is not equal to zero, but will be variable for each individual in the sample. Heckman (1979) controls for this selection bias by considering selection as a problem of omitted variables in which the missing variable is the afore-mentioned conditional expectation of the error. This is corrected for through the inclusion of an estimator of this expectation.[4]

However, the Heckman method does not eliminate all possible biases. Since social programs depend on agents' decisions, there is another bias known as "unobservable heterogeneity," which occurs when the variables of participation in social programs are correlated with an unobservable component that is constant in time, capturing specific personal characteristics such as tastes, preferences, habits, customs, etc. This bias can be corrected for using panel

[4] Most quasi-experimental designs do not control for this bias.

data, whereby appropriate techniques (first differences or fixed effects) are used to eliminate the error component related to tasted and habits.

Heckman's method does not correct for unobservable heterogeneity bias, and nor do the fixed effects methods correct for selection bias. Fortunately, there are econometric techniques that can be used under certain circumstances to eliminate both selection bias and unobservable heterogeneity bias. This is demonstrated by Kyriazidou (1997) and Rochina-Barrachina (1999) through the application of fixed effects to two-equation models: a main equation that determines hours worked, and another equation of participation in the job market, both in the context of panel data with unobservable heterogeneity. The fixed effect is eliminated through time differentiation, and under certain conditions, it is possible to minimize or control for selection bias.

Formalizing the above-mentioned, we employ the following sample selection model with panel data,

$$y_{it}^{*} = x_{it}\beta + \alpha_i + \varepsilon_{it} \quad (1)$$

$$d_{it}^{*} = z_{it}\gamma + \eta_i + u_{it} \quad (2)$$

$$d_{it} = 1[z_{it}\gamma + \eta_i + u_{it} > 0] \quad (3)$$

$$y_{it} = d_{it} \cdot y_{it}^{*} \quad (4)$$

In this model, y_{it}^{*} is a latent variable that represents each individual's desired hours of work i at time t; and d_{it}^{*} is another latent variable that can be interpreted as a continuous index that determines the participation of the individual i in the job market. These latent variables are only partially observed, or are unobservable. Finally, the observed hours worked, y_{it}, coincide with the desired hours if they are strictly positive, and are equal to 0 otherwise. For labor participation, only one dummy variable d_{it} is observed, which is equal to 1 if the person participates in the job market and to 0 if not, at time *t*. In this model, the equations have errors corresponding to unobservable heterogeneity α_i and η_i, which are invariable in time. On the other hand, the idiosyncratic error components ε_{it} and u_{it} are variable errors over time. Finally, the vectors x_{it} and z_{it} contain variables that determine the above-mentioned endogenous variables.

Given the afore-mentioned, this model presents sample selection bias if $Cov(\varepsilon_{it}, u_{it}) \neq 0$, which would produce selection bias in the main equation (1). In addition, if α_i were correlated with the variables x_{it}, an unobservable selection bias would result. As mentioned, the fixed effect and Heckman approaches do not resolve both biases at the same time.

Kyriazidou (1997) proposes a method based on the principle that the model in equation (1) can be written as

$$y_{it} = x_{it}\beta + \lambda_{it} + \alpha_i + \varepsilon_{it}$$

Where λ_{it} is the equivalent of the correction term introduced in the sample selection models (inverse Mills ratio). This value is constant in time, so the first differences estimator does not eliminate it. However, λ_{it} depends on $z_{it}\gamma$, and therefore if $z_{it}\gamma = z_{it-1}\gamma$, then $\lambda_{it} = \lambda_{it-1}$, and so the differentiation would eliminate this component. But it is unlikely that this equality will be achieved, and so Kyriazidou works with those cases where $z_{it}\gamma \cong z_{it-1}\gamma$, giving greater weight (by way of kernels) to the observations for which $\Delta z_{it}\gamma \to 0$. Then, in the first stage, the parameters of equations (2) and (3) are estimated by assuming a conditional logit fixed effects model, and $z_{it}\hat{\gamma}$ is calculated for each period. We use these estimations to calculate the weight $\hat{\psi}_{in} = \frac{1}{h_n} K\left(\frac{\Delta z_{it}\hat{\gamma}}{h_n}\right) d_{it}d_{it-1}$ where $K(.)$ is the Gaussian kernel, h_n is the width of the previously selected window, n is the sample size, and $d_{it}d_{it-1}$ is the product of the labor participation dummy in both periods. This latter term is equal to 1 only for women who work during the periods, so we will perform the final estimation only with the subsample of women who always work. In the second stage, Kyriazidou estimates equation (1) by calculating the differences of y_{it} and x_{it} between two different periods, for the case $d_{it}d_{is} = 1$, $\forall t \neq s$, obtaining the estimator

$$\hat{\beta} = \left[\sum_{i=1}^{n}\sum_{s<t} \hat{\psi}_{in}(x_{it} - x_{is})'(x_{it} - x_{is})d_{it}d_{is}\right]^{-1} \times \left[\sum_{i=1}^{n}\sum_{s<t} \psi_{in}(x_{it} - x_{is})'(y_{it} - y_{is})d_{it}d_{is}\right]$$

We obtain the standard deviations from the variance and covariance matrices proposed by Kyriazidou in the same study. One advantage of this method is that it does not require assumption of a specific distribution of the errors, but rests on the assumption known as "conditional exchangeability," which implies homoscedasticity in the idiosyncratic error.

We will corroborate our hypothesis using Kyriazidou's method for men and women, and for comparative purposes, we will estimate the fixed effects panel data model.

5. DATA ANALYSIS

As a data source, we will use the ENAHO Panel databases for the years 2013-2015. This survey has nationwide coverage, encompassing both rural and urban areas, and gathers detailed information about the characteristics of households, their members, and their main social and economic activities (employment, education, health, social programs, etc.). We have selected the above-mentioned panel years because they correspond to the period in which the Qali Warma and *Cuna Más* programs were implemented.

Taking the above into account and discarding certain inconsistent data,[5] the total sample from the 2013-2015 ENAHO Panel survey is 25,452 women observed over the three years. We limit

[5] Fundamentally, these were inconsistencies in relation to age and sex.

the estimations to the case of women working during at least two of the three periods, so the number of observations may decrease.

According to the model presented in equations (1) - (4), the endogenous variable of the main equation is hours engaged in an income-generating economic activity in the last seven days. This variable assigns a value of 0 to those individuals who undertake unpaid work or do not participate in any economic activity. The endogenous variable in the selection equation is a dummy variable that represents participation in the labor market, and takes a value of 1 if the individual presents a positive number of hours worked over the last seven days, and of 0 otherwise. The regressors of interest are dummy variables that indicate whether the household takes part in the *Qali Warma* social program (whether the breakfast or lunch version) and the *Cuna Más* daycare service program. In addition, some control variables are added to the model.

The selection equation that determines labor participation includes certain variables that, according to the empirical literature, can affect women's decision about whether or not to work. These include socioeconomic variables (such as age, family income, household composition, woman's civil status, dependency ratio, number of children) as well as variables related to exogenous shocks that can affect household stability (for example, the presence of a member with a chronic illness). The list of variables is as follows:

a) Annual family income: The annual income of the household in soles.
b) Years of schooling: The years of education completed by the individual.
c) Number of children: The number of children aged 6 or below in the household.
d) Dependency ratio: number of children below 14 years of age plus the number of adults above 60 years of age divided by the number of working adults in the household.
e) Cohabiting or married: A dummy that takes the value of 1 if the woman is married, and 0 otherwise.
f) Pregnancy: If the women received pregnancy checkups during the last 12 months. This variable only applies to the sample of women.
g) Age: Age of the person in years.
h) Adults' education: Average years of education of the adults who live in the household.
i) Chronic illness: Dummy variable that takes the value of 1 if the individual suffers some form of chronic illness, and of 0 if the individual does not suffer from any illness.
j) Household members with chronic illnesses: The result of a division between the number of persons who suffer from a chronic illness and the total household members.
k) Age squared
l) Dependency ratio squared

In the main equation of determinants of hours worked, we include the variables of social programs, some of the variables from the previous list, and, additionally, the following predetermined variables:

a) Crime: Dummy equal to 1 if the household was victim of a criminal offense (theft, assault, etc.), and to 0 otherwise.

b) Natural disaster: Dummy equal to 1 if the household was victim of a natural disaster (drought, storm, plague, etc.), and to 0 otherwise.
c) Abandonment: Dummy equal to 1 if the head of household abandoned the household, and to 0 otherwise.
d) Serious illness or accident: Dummy equal to 1 if the house has a member who has suffered a serious illness or accident, and to 0 otherwise.
e) Occupation: A set of dummy variables that express the occupational category. These categories are: Agriculture, Mining, Services, Laborer, Employee, Manager, etc.

Table 1 shows the statistics corresponding to the endogenous variable from the main equation for the case of men and women. The table shows that men allocated an average of 17 hours per week to their main income-generating activity between 2013 and 2015. This average also takes into account the zero hours of non-working men; if only working men are taken into account, the average number of hours per week increases to 41. This is because the sample is smaller when only working men are factored in, in comparison with the sample that includes both men who work and those who do not work.

In the case of women, the table shows that they allocated an average of 17 hours per week to paid work between 2013 and 2015. This average also takes into account the zero hours of non-working women; again, if only working women are taken into account, the average number of hours per week increases to 36. This is because the sample is approximately halved when only working women are factored in, in comparison with the sample that includes both women who work and those who do not work. It is also noteworthy that in both samples, both for women and for men, there is variability between individuals and over time.

Table 1
Hours worked in main income-generating activity
(Average for 2013-2015)

Men						
Variable		Mean	Std. Dev.	Min	Max	Observations
Hours	*overall*	30.512	24.339	0	98	N = 25452
	between		20.202	0	95	n = 8484
	within		13.576	-33.488	95.845	T3
Hours	*overall*	41.293	18.882	1	98	N = 18807
(If Hours >0)	*between*		16.148	1	98	n = 7284
	within		10.932	-12.041	93.959	T-bar = 2.582
Women						
Variable		Mean	Std. Dev.	Min	Max	Observations
Hours	*overall*	17.214	23.193	0	98	N = 27201
	between		19.563	0	98	n = 9067
	within		12.459	-48.119	82.548	T3
Hours	*overall*	35.884	21.245	1	98	N = 13049
(If Hours >0)	*between*		18.801	1	98	n = 5919
	within		10.959	-18.783	95.551	T-bar = 2,205

Source: ENAHO Panel 2013-2015. Compiled by the authors.

Table 2 presents statistics on the hours worked by men and women by certain age groups. The table shows the average number of hours taking into account those who do not work (those who have zero hours of work), and the average hours excluding those who do not work. In the case of the sample of men, the number of hours worked increases when we move from the 14 to 25 year-olds group to the 25 to 40 group. Considering only the persons who work a number of hours strictly greater than zero, the average increases by a little more than seven hours per week. This increase is reasonable, since many persons stop doing other activities, such as studying, as they get older. However, in the case of age ranges beyond 40 years of age, the average falls by almost four hours per week. This slight decline may be explained by the accumulation of assets during youth, which can yield an economic return during maturity, although this effect may be more notable among those with medium to high income. Another explanation, based on the allocation of time in the household, lies in the fact that some older persons can collaborate with other, much younger individuals in the care of small children, as mentioned in the section on the theoretical framework. In the case of women's average hours worked, the pattern is similar, although the changes are even less pronounced. Finally, the difference between the average hours including zeros and the strictly positive average hours is greater for the below 25 age group, and somewhat smaller for the above 40 age group. It can be inferred that labor participation is lower below 25 age group and greater in the above 40 age group, in comparison with the 25 to 40 group.

Table 2
Average hours worked by men and women, by age range
(Panel sample, 2013-2015)

Men						
Age group	Variable	Mean	Std. Dev.	Min	Max	Observations
Below 25	Hours	15.351	22.433	0	98	N = 6020
	Hours >0	37.099	20.231	1	98	N = 2491
25 to 39	Hours	38.068	22.893	0	98	N = 5471
	Hours >0	44.341	18.228	1	98	N = 4697
40 and over	Hours	34.088	22.878	0	98	N = 13961
	Hours >0	40.960	18.640	1	98	N = 11619
Women						
	Variable	Mean	Std. Dev.	Min	Max	Observations
Below 25	Hours	9.903	19.354	0	98	N = 5353
	Hours >0	35.624	20.765	1	98	N = 1488
25 to 39	Hours	20.931	24.260	0	98	N = 6430
	Hours >0	37.138	21.031	1	98	N = 3624
40 and over	Hours	18.203	23.415	0	98	N = 15418
	Hours >0	35.360	21.409	1	98	N = 7937

Source: ENAHO Panel 2013-2015. Compiled by the authors.

Table 3 sets out the descriptive statistics of the other variables used in the estimations. As can be seen in this table, for the 2013-2015 sample, 19% of households received the *Qali Warma* breakfast program, 7% are beneficiaries of the *Qali Warma* lunch program, and just 0.8% of households are registered with the *Cuna Más* daycare program. As to the characteristics of the individuals in the sample, it is notable that 45% of the sample reported having a chronic illness, which is a relatively high percentage, and 56% of the individuals in the sample cohabit or are married. Also interesting is that around 4% of women were pregnant at the time they were surveyed during one of the three sample years. When it comes to the household characteristic variables, the dependency ratio of the households surveyed was 0.63 on average between 2013 and 2015. Another characteristic of the sample is that the average number of children below the age of 6 is 0.38. It should be noted that 24% of those surveyed lived with a household member with a chronic illness. Finally, Table 3 presents two variables related to the population's education level. The first is years of schooling, for which the average is eight years of completed schooling. In the Peruvian education system, this means having reached the second year of secondary. The other variable is the average education of adults in the household, which presents a similar average.

As a general comment regarding the standard deviations, it can be stated that all variables selected in the model contain intragroup, or within-group, variability (except for the case of the home abandonment variable, which has a standard deviation of close to 0). This variability in time favors the use of fixed effect techniques.

Table 3
Descriptive statistics of the other variables used in the estimations, for both sexes
(Average for 2013-2015)

Variable		Mean	Std. Dev.	Variable		Mean	Std. Dev.
Breakfast Qali Warma	overall	0.186	0.389	Desertion of head of household (1 = Yes, 0 = No)	overall	0.004	0.066
	between		0.332		between		0.042
	within		0.204		within		0.052
Lunch Qali Warma	overall	0.076	0.266	Victim of a criminal offense (1 = Yes, 0 = No)	overall	0.033	0.179
	between		0.221		between		0.118
	within		0.148		within		0.137
Cuna Más	overall	0.008	0.091	Victim of a natural disaster (1 = Yes, 0 = No)	overall	0.098	0.297
	between		0.063		between		0.218
	within		0.065		within		0.198
Log(non-labor income)	overall	0.249	1.184	Age	overall	43.331	18.825
	between		0.912		between		18.806
	within		0.754		within		0.861
Number of children aged 5 or below	overall	0.380	0.656	Years of schooling	overall	8.056	4.738
	between		0.585		between		4.683
	within		0.295		within		0.824
Dummy if suffers from a chronic illness	overall	0.455	0.498	Average education of adults	overall	8.159	4.099
	between		0.398		between		4.098
	within		0.299		within		0.082
Dummy if cohabits or is married	overall	0.560	0.496	Household members with chronic illnesses	overall	0.243	0.225
	between		0.487		between		0.178
	within		0.095		within		0.139
Pregnancy dummy (women only)	overall	0.036	0.186	Household dependency ratio	overall	0.634	0.265
	between		0.112		between		0.246
	within		0.149		within		0.099
Serious illness or accident suffered by a household member (1 = Yes, 0 = No)	overall	0.082	0.274				
	between		0.181				
	within		0.209				

Source: ENAHO Panel 2013-2015. Compiled by the authors.

6. ECONOMETRIC RESULTS

We estimate the model of hours worked using the Peruvian ENAHO Panel database from 2013-2015, following the standard within-groups method, which controls for unobservable heterogeneity bias; as well as Kyriazidou's (1997) method, which controls for both unobservable heterogeneity bias and sample selection bias.

As noted earlier, the regressors of interest are the dummy variables *Cuna Más*, *Qali Warma* breakfast, and *Qali Warma* lunch, which take the value of 1 if one or more children within the household are beneficiaries of these programs and of 0 if they are not. In turn, the endogenous variable of the model is the hours worked of each person (regardless of sex) over 14 years of age in remunerated activities. In addition, given that the role of individuals in the household can change with age, we tested the model with various alternatives of the model by adding interactions of the program dummies with dummy variables for three age groups, for where the individual is below the age of 25, between 25 and 45 years of age, or over the age of 40.

Tables 4 to 7 contain seven columns. The first refers to the simplest model that only includes the three dummies and the control variables.[6] In turn, the interactions with the age groups are added to the subsequent columns. Tables 4 and 5 present the results for the men in the sample under the two afore-mentioned estimation methods, while tables 6 and 7 do so for the women.

Before presenting the results, it should be noted that the within-groups method does not estimate a labor participation equation, whereas the Kyriazidou method does, since it requires this estimation to correct for the sample selection bias. Table A1 in the Appendix presents the estimation of labor participation, performed using the conditional logit fixed effects model for both men and women. In this model it can be seen that the programs appear not to have a significant impact on labor participation, which does seem to be influenced by other variables such as non-labor income, education (in the case of men), number of children in the household), civil status (cohabiting or married), and being pregnant (in the case of women). Meanwhile, for age, a positive and significant coefficient is observed for both sexes, and a negative coefficient is recorded for age squared; this is consistent with labor participation, which has an inverted-U relationship with age.

6.1 Impact on hours worked for men

Now, we will look at tables 4 and 5 together, for each of the programs.

- Impact of *Cuna Más*

The *Cuna Más* dummy variable is not significant under either of the methods, although its interactions with age are slightly significant when they are estimated using Kyriazidou's using. As can be seen in Table 5, we only find a negative impact for men below the age of 25, though

[6] We do not present the estimations of the control variables for reasons of space. The results of these variables can be found in the Appendix.

this impact is only significant at 10%. That is, for very young men, the presence in the household of young children who are beneficiaries of C*una Más* reduces the number of hours engaged in remunerated work by approximately nine hours per week. Finally, no effect is appreciated for other age groups. Apparently, for very young men (possibly dependent on their parents), the fact of their sharing a household with children below the age of 3 who are program beneficiaries causes them to work less hours, perhaps because other family members have more time available to spend working, making it unnecessary for these youth to do so.

- Impact of *Qali Warma* breakfast

According to the results of columns (1), (2), and (4) in tables 4 and 5, if one or more children in the household receive free breakfasts through the *Qali Warma* program, this causes a slight increase in the hours worked by men of around one hour per week, and this coefficient is significant at 5%. This result is obtained under both estimation methods. Upon analysis of whether this impact is stronger for any age group in particular, the within-groups estimation detects a positive effect of a little under two hours for men between 25 and 40 years of age depending on the specification of the model, and also finds an effect of a little over one hour for those over 40 years of age in two of the models. Meanwhile, the estimation by way of Kyriazidou's method finds a similar impact for the 25 to 40 age group, with significance at 5% in two of the specifications; it also finds a positive impact of around one hour per week for the 40 and over group, significant under all specifications of the model. This result can be interpreted as the receipt of breakfasts by primary school children freeing up a little time for men to dedicate to work.

- Impact of *Qali Warma* lunches

Returning to columns (1), (2), (3), and (5) from tables 4 and 5, we observe that the *Qali Warma* lunch dummy has a negative coefficient that is significant at 1% for all within-groups estimations, as well as for the Kyriazidou method. The calculated effect is 1.8 less work per week under the first method and 2.3 hours less under the second. When this effect is broken down by age ranges, it is evident that children's participation in the *Qali Warma* lunch program mainly affects men over the age of 40 in the recipient household, whereby the estimated effect is four hours less spent on remunerated work under both methods, at 1% significance.

Considering the monetary value that this in-kind transfer could mean, the negative sign for older persons might be interpreted as a strong income effect discouraging individuals over 40 in the household from working.

Table 4
Estimation of impact of the social programs on hours worked, within groups
(Male panel, 2013-2015)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cuna Más	-0.117		-0.0933	-0.135		-0.124	
	(1.608)		(1.608)	(1.608)		(1.608)	
Qali Warma breakfast	1.027 **	1.022 **		1.064 **			
	(0.500)	(0.500)		(0.500)			
Qali Warma lunch	-1.848 ***	-1.845 ***	-1.832 ***		-1.830 ***		
	(0.668)	(0.668)	(0.669)		(0.669)		
Cuna Más interactions with:							
Below 25 years of age		-2.040			-2.077		-2.091
		(3.447)			(3.448)		(3.447)
25 to 40 years of age		-1.258			-1.160		-1.341
		(2.747)			(2.750)		(2.751)
Above 40 years of age		1.666			1.663		1.735
		(2.381)			(2.381)		(2.381)
Qali Warma breakfast interactions with:							
Below 25 years of age			0.678		0.665	0.433	0.420
			(0.954)		(0.954)	(0.967)	(0.967)
25 to 40 years of age			1.612 *		1.595 *	1.297	1.275
			(0.898)		(0.899)	(0.913)	(0.915)
Above 40 years of age			0.881		0.887	1.274 *	1.283 *
			(0.702)		(0.702)	(0.715)	(0.715)
Qali Warma lunch interactions with:							
Below 25 years of age				-0.372		-0.211	-0.207
				(1.224)		(1.242)	(1.242)
25 to 40 years of age				0.160		0.095	0.120
				(1.281)		(1.302)	(1.302)
Above 40 years of age				-3.733 ***		-3.797 ***	-3.807 ***
				(0.937)		(0.955)	(0.955)

Robust standard errors in parentheses. ***=sig. at 1%, **=sig. at 5%, *=sig. at 10%.
Compiled by the authors. The control variables are presented in Table A1 of the appendix.

Table 5
Estimation of the impact of social programs on hours worked, correcting for sample selection bias using Kyriazidou's method
(Male panel, 2013-2015)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cuna Más	0.158		0.191	0.077		0.000	
	(1.344)		(1.343)	(1.344)		(1.343)	
Qali Warma breakfast	1.012 ***	1.024 ***		1.023 ***			
	(0.356)	(0.356)		(0.356)			
Qali Warma lunch	-2.307 ***	-2.321 ***	-2.302 ***		-2.317 ***		
	(0.494)	(0.494)	(0.494)		(0.493)		
Cuna Más interactions with:							
Below 25 years of age		-9.490 *			-9.509 *		-9.534 *
		(5.286)			(5.263)		(5.273)
25 to 40 years of age		1.133			1.202		0.752
		(1.738)			(1.743)		(1.751)
Above 40 years of age		0.608			0.595		0.820
		(2.143)			(2.140)		(2.133)
Qali Warma breakfast interactions with:							
Below 25 years of age			0.818		0.801	0.944	0.924
			(1.365)		(1.359)	(1.423)	(1.417)
25 to 40 years of age			1.272 **		1.298 **	0.484	0.508
			(0.536)		(0.536)	(0.560)	(0.561)
Above 40 years of age			0.866 *		0.873 **	1.391 ***	1.399 ***
			(0.445)		(0.445)	(0.449)	(0.449)
Qali Warma lunch interactions with:							
Below 25 years of age				-2.694 *		-2.692	-2.694
				(1.571)		(1.649)	(1.649)
25 to 40 years of age				0.584		0.867	0.845
				(0.791)		(0.831)	(0.832)
Above 40 years of age				-3.967 ***		-4.161 ***	-4.173 ***
				(0.612)		(0.620)	(0.620)

Robust standard errors in parentheses. ***=sig. at 1%, **=sig. at 5%, *=sig. at 10%.
Compiled by the authors.

6.2 Impact on hours worked for women

Tables 6 and 7 show the results of the estimations under the two methods.

- Impact of *Cuna Más*

Under the within-groups estimation, the *Cuna Más* program has no significant impact on the hours worked by women. Conversely, in the case of Kyriazidou's method, the impact is significant for women under 25. As can be seen in Table 7, for very young women, the presence in the household of young children who are beneficiaries of C*una Más* increases the number of hours engaged in income-generating work by approximately six hours per week. No effect is noted for other age groups. This provides evidence of women's traditional role in childcare, and that it is younger women who most often play this role.

- Impact of *Qali Warma* breakfast

We will not comment on the results of Table 6, as the within-groups method yielded no significant effects.[7] According to the results of columns (1), (2), and (4) in Table 7, positive and significant results are obtained for this program using Kyrazidou's method. If one or more children in the household receive free breakfasts through the *Qali Warma* program, this causes a slight increase in the hours worked by women of around 1.2 hours per week – a coefficient that is significant at 1%. In addition, we observe positive and significant impacts by age group in columns (3), (5), (6), and (7). We find a positive effect of four hours for the youngest women, as well as an effect of 1.7 hours per week for women over 40 years of age. These results are similar under all specifications of the model. From this, it can be inferred that when primary school children receive free breakfasts at school, women's time is freed up, whereby it is the youngest women and those over 40 who benefit most. This is consistent with women's traditional role of preparing meals within the household. It is notable that these impacts are greater than those obtained in the case of men. On the other hand, the table shows a non-significant impact for the group of women aged between 25 and 40, which is consistent with the higher labor participation of this group in comparison with the other age groups. Thus, it is reasonable to infer that household meal preparation falls to the youngest and oldest women.

- Impact of *Qali Warma* lunch

As tables 6 and 7 show, the *Qali Warma* lunch dummy is non-significant in almost all within-groups estimates, and in all of the Kyriazidou method specifications. This can be interpreted as evidence that children receiving the lunches delivered through the *Qali Warma* program does not cause any significant change in the labor supply of women. Nor are there any effects

[7] This may due to the within-groups estimation not correcting for possible selection bias, which may be stronger for women than for men.

controlled by age range. That is, with regard to freeing up time for women, children having lunch at school does not appear to reduce the time a family devotes to preparing this meal.[8]

Table 6
Estimation of impact of the social programs on hours worked, within groups
(Female panel, 2013-2015)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cuna Más	0.828		0.811	0.839		0.824	
	(1.233)		(1.233)	(1.233)		(1.233)	
Qali Warma breakfast	0.411	0.410		0.399			
	(0.423)	(0.423)		(0.423)			
Qali Warma lunch	-0.884	-0.884	-0.898		-0.898		
	(0.575)	(0.575)	(0.575)		(0.575)		
Cuna Más interactions with:							
Below 25 years of age		1.403			1.330		1.291
		(2.491)			(2.492)		(2.493)
25 to 40 years of age		0.412			0.402		0.455
		(1.856)			(1.856)		(1.856)
Above 40 years of age		0.945			0.958		0.956
		(2.101)			(2.101)		(2.101)
Qali Warma breakfast interactions with:							
Below 25 years of age			-0.465		-0.462	-0.649	-0.645
			(0.890)		(0.890)	(0.910)	(0.910)
25 to 40 years of age			0.453		0.452	0.601	0.599
			(0.663)		(0.663)	(0.674)	(0.674)
Above 40 years of age			0.794		0.793	0.736	0.735
			(0.619)		(0.619)	(0.633)	(0.633)
Qali Warma lunch interactions with:							
Below 25 years of age				-0.226		0.108	0.101
				(1.216)		(1.243)	(1.244)
25 to 40 years of age				-1.657 *		-1.725 *	-1.721 *
				(0.896)		(0.910)	(0.911)
Above 40 years of age				-0.535		-0.656	-0.656
				(0.843)		(0.864)	(0.864)

Robust standard errors in parentheses. ***=sig. at 1%, **=sig. at 5%, *=sig. at 10%.
Compiled by the authors.

[8] Apparently, the production function of preparing lunch may be different from the function of preparing breakfast. This difference could give rise to dissimilar results in the *Qali Warma* breakfast versus lunch programs.

Table 7
Estimation of the impact of social programs on hours worked, correcting for selection bias using Kyriazidou's method
(Female panel, 2013-2015)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cuna Más	1.166		1.140	1.228		1.158	
	(1.360)		(1.362)	(1.363)		(1.365)	
Qali Warma breakfast	1.232 ***	1.233 ***		1.207 ***			
	(0.454)	(0.454)		(0.456)			
Qali Warma lunch	-0.244	-0.193	-0.371		-0.321		
	(0.647)	(0.647)	(0.648)		(0.649)		
Cuna Más interactions with:							
Below 25 years of age		6.671 **			6.312 *		6.774 **
		(3.304)			(3.401)		(3.415)
25 to 40 years of age		2.311			2.233		2.227
		(2.553)			(2.556)		(2.555)
Above 40 years of age		-0.646			-0.574		-0.578
		(1.573)			(1.575)		(1.577)
Qali Warma breakfast interactions with:							
Below 25 years of age			4.351 **		4.328 ***	4.123 **	3.874 **
			(1.695)		(1.677)	(1.806)	(1.828)
25 to 40 years of age			0.243		0.277	0.254	0.296
			(0.685)		(0.686)	(0.689)	(0.689)
Above 40 years of age			1.718 ***		1.698 ***	1.715 ***	1.696 ***
			(0.611)		(0.611)	(0.623)	(0.624)
Qali Warma lunch interactions with:							
Below 25 years of age				2.263		0.334	1.090
				(2.471)		(2.639)	(2.603)
25 to 40 years of age				-0.644		-0.478	-0.473
				(0.895)		(0.897)	(0.896)
Above 40 years of age				-0.167		-0.343	-0.307
				(0.912)		(0.931)	(0.932)

Robust standard errors in parentheses. ***=sig. at 1%, **=sig. at 5%, *=sig. at 10%.
Compiled by the authors.

7. CONCLUSIONS

Recent studies demonstrate that, given women's household role in childcare and meal preparation, food and service programs could have an unintended impact on the labor participation and hours worked of beneficiary children's parents. Based on a panel data methodology with selection bias correction, we explored whether the *Qali Warma* and *Cuna Más* programs make such an impact on labor supply, differentiating by gender. Our results show that the impact of the *Cuna Más* program does increase hours worked for women below the age of 25, while the *Qali Warma* breakfast program does so for men and women below 25, and for women over 40. The impact is stronger for women than for men. These results are consistent with the theory of time allocation, household production, and traditional household gender roles, indicating that if free or subsidized goods are distributed as a compliment to work, the labor supply will increase. Finally, the *Qali Warma* breakfast program reduces hours worked for men over the age of 40, but has no impact on women's hours worked. This result indicates that the income effect appears to predominate in the *Qali Warma* lunch program for men over 40.

From a regulatory standpoint, these programs favor younger women by increasing their hours worked in the labor market. As such, these programs can contribute to increasing the female labor supply, which, as we have discussed here, brings important benefits to the economy. However, it should be recalled that given the interrelations within the household, lunch distribution programs could discourage men over the age of 40 from working. This finding merits in-depth analysis in another study.

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Appendix

Table A1
Estimation of a logit conditional fixed effects model for labor participation, by gender (2013-2015 panel sample)

Variables	Men		Women	
Cuna Más	0.326		0.159	
	(0.403)		(0.295)	
Qali Warma breakfast	0.151		0.030	
	(0.121)		(0.0948)	
Qali Warma lunch	-0.250	*	-0.105	
	(0.147)		(0.130)	
Number of children < 6 years of age	0.047		-0.160	**
	(0.082)		(0.064)	
Log (non-labor income)	-0.060	**	0.037	
	(0.030)		(0.027)	
Age	0.298	***	0.344	***
	(0.064)		(0.064)	
Age squared	-0.004	***	-0.004	***
	(0.0007)		(0.0007)	
Years of education	0.051	*	0.033	
	(0.029)		(0.027)	
Pregnancy	--		-0.38	***
			(0.122)	
Cohabiting or married	0.048		-0.847	***
	(0.252)		(0.192)	
Suffers from chronic illness	-0.029		0.004	
	(0.091)		(0.074)	
Household members with chronic illnesses	0.435	**	0.143	
	(0.192)		(0.162)	
Average education of adults in the household	-0.355		-0.463	
	(0.336)		(0.407)	
Serious illness or accident suffered by a household member	-0.439	***	-0.124	
	(0.104)		(0.091)	
Abandonment by head of household	-0.083		0.216	
	(0.549)		(0.292)	
Criminal offense (theft, robbery)	-0.064		0.110	
	(0.169)		(0.147)	
Natural disaster	0.114		0.011	
	(0.112)		(0.99)	
Dependency ratio	-0.615	**	-0.061	
	(0.249)		(0.201)	
Observations	5,341		7,732	
Number of individuals	1,836		2,649	

Table A2
Control variables from Table 4
(Panel, 2013-2015)

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Log (non-labor income)	-0.261	**	-0.262	**	-0.262	**	-0.262	**	-0.263	**	-0.262	**	-0.263	**
	(0.129)		(0.129)		(0.129)		(0.129)		(0.129)		(0.129)		(0.129)	
Number of children < 6 years of age	-0.005		-0.007		0.000		-0.004		-0.001		0.000		-0.002	
	(0.352)		(0.352)		(0.352)		(0.352)		(0.352)		(0.352)		(0.352)	
Suffers from chronic illness	-0.201		-0.199		-0.204		-0.211		-0.202		-0.211		-0.209	
	(0.345)		(0.345)		(0.345)		(0.345)		(0.345)		(0.345)		(0.345)	
Cohabiting or married dummy	2.144	*	2.139	*	2.137	*	2.167	*	2.132	*	2.160	*	2.156	*
	(1.170)		(1.170)		(1.170)		(1.170)		(1.170)		(1.170)		(1.170)	
Suffers from chronic illness or accident	-1.893	***	-1.888	***	-1.884	***	-1.880	***	-1.881	***	-1.873	***	-1.869	***
	(0.478)		(0.479)		(0.479)		(0.478)		(0.479)		(0.479)		(0.479)	
Abandonment dummy	0.428		0.411		0.434		0.466		0.416		0.472		0.454	
	(2.603)		(2.603)		(2.603)		(2.603)		(2.604)		(2.603)		(2.603)	
Criminal offense dummy	-0.271		-0.268		-0.276		-0.270		-0.273		-0.276		-0.273	
	(0.724)		(0.724)		(0.724)		(0.724)		(0.724)		(0.724)		(0.724)	
Natural disaster dummy	-0.033		-0.030		-0.039		-0.051		-0.037		-0.054		-0.051	
	(0.495)		(0.495)		(0.495)		(0.495)		(0.495)		(0.495)		(0.495)	
Occupation: Manager or official	27.010	***	27.030	***	27.010	***	26.970	***	27.030	***	26.970	***	27.000	***
	(1.776)		(1.776)		(1.776)		(1.775)		(1.776)		(1.775)		(1.776)	
Occupation: Office worker	23.220	***	23.230	***	23.230	***	23.200	***	23.230	***	23.200	***	23.210	***
	(1.030)		(1.030)		(1.030)		(1.030)		(1.030)		(1.030)		(1.030)	
Occupation: Profe-ssional or technician	21.260	***	21.260	***	21.270	***	21.270	***	21.270	***	21.280	***	21.280	***
	(0.832)		(0.832)		(0.832)		(0.832)		(0.832)		(0.832)		(0.832)	
Occupation: Laborer	18.870	***	18.870	***	18.870	***	18.860	***	18.870	***	18.870	***	18.870	***
	(0.549)		(0.549)		(0.549)		(0.549)		(0.549)		(0.549)		(0.549)	
Occupation: Salesperson	14.680	***	14.680	***	14.690	***	14.680	***	14.690	***	14.690	***	14.690	***
	(0.814)		(0.814)		(0.814)		(0.814)		(0.814)		(0.814)		(0.814)	
Occupation: Service employee	24.170	***	24.170	***	24.180	***	24.170	***	24.180	***	24.180	***	24.180	***
	(0.645)		(0.645)		(0.645)		(0.645)		(0.645)		(0.645)		(0.645)	
Occupation: Miner	22.840	***	22.810	***	22.830	***	22.920	***	22.810	***	22.920	***	22.900	***
	(1.857)		(1.857)		(1.857)		(1.856)		(1.857)		(1.857)		(1.857)	
Occupation: Domestic employee	18.880	***	18.880	***	18.840	***	18.880	***	18.840	***	18.850	***	18.850	***
	(6.235)		(6.235)		(6.235)		(6.234)		(6.236)		(6.234)		(6.234)	
Dependency ratio	1.732		1.723		1.748		1.854		1.738		1.834		1.825	
	(3.552)		(3.552)		(3.552)		(3.551)		(3.552)		(3.551)		(3.552)	
Dependency ratio squared	-3.391		-3.383		-3.407		-3.490		-3.397		-3.481		-3.473	
	(2.786)		(2.786)		(2.786)		(2.785)		(2.786)		(2.786)		(2.786)	
25 to 40 years of age	2.231	*	2.215	*	2.108	*	2.196	*	2.092	*	2.094	*	2.079	*
	(1.243)		(1.244)		(1.254)		(1.244)		(1.255)		(1.254)		(1.255)	
Above 40 years of age	-0.350		-0.401		-0.225		0.189		-0.282		0.0883		0.0299	
	(1.673)		(1.674)		(1.705)		(1.683)		(1.706)		(1.708)		(1.709)	
Constant	20.700	***	20.740	***	20.660	***	20.370	***	20.700	***	20.460	***	20.500	***

	(1.671)	(1.671)	(1.682)	(1.674)	(1.683)	(1.684)	(1.684)	
Observations	23,850	23,850	23,850	23,850	23,850	23,850	23,850	23,850
R-squared	0.139	0.139	0.139	0.140	0.139	0.140	0.140	0.139
Number of individuals	8,391	8,391	8,391	8,391	8,391	8,391	8,391	8,391

Table A3
Control variables from Table 5
(Panel, 2013-2015)

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Log (non-labor income)	-0.171		-0.173		-0.171		-0.171		-0.173		-0.172		-0.174	
	(0.117)		(0.117)		(0.117)		(0.117)		(0.117)		(0.117)		(0.117)	
Number of children < 6 years of age	-0.449	**	-0.438	*	-0.448	**	-0.440	*	-0.437	*	-0.440	*	-0.429	*
	(0.226)		(0.227)		(0.226)		(0.226)		(0.227)		(0.226)		(0.226)	
Suffers from chronic illness	0.250		0.255		0.248		0.218		0.252		0.220		0.226	
	(0.223)		(0.222)		(0.223)		(0.223)		(0.223)		(0.223)		(0.223)	
Cohabiting or married dummy	-0.741		-0.741		-0.746		-0.711		-0.746		-0.701		-0.703	
	(0.826)		(0.826)		(0.826)		(0.826)		(0.826)		(0.826)		(0.826)	
Suffers from chronic illness or accident	0.242		0.214		0.243		0.239		0.214		0.239		0.215	
	(0.496)		(0.496)		(0.496)		(0.497)		(0.496)		(0.497)		(0.497)	
Abandonment dummy	4.212	**	4.214	**	4.214	**	4.183	**	4.216	**	4.194	**	4.196	**
	(2.132)		(2.131)		(2.132)		(2.131)		(2.132)		(2.133)		(2.133)	
Criminal offense dummy	-1.684	***	-1.680	***	-1.687	***	-1.686	***	-1.683	***	-1.675	***	-1.671	***
	(0.508)		(0.508)		(0.508)		(0.507)		(0.508)		(0.507)		(0.507)	
Natural disaster dummy	-1.345	***	-1.343	***	-1.349	***	-1.409	***	-1.348	***	-1.406	***	-1.403	***
	(0.359)		(0.359)		(0.359)		(0.359)		(0.359)		(0.359)		(0.359)	
Occupation: Manager or official	10.901	***	10.912	***	10.908	***	10.859	***	10.920	***	10.840	***	10.852	***
	(0.857)		(0.857)		(0.857)		(0.857)		(0.856)		(0.856)		(0.856)	
Occupation: Office worker	8.336	***	8.348	***	8.338	***	8.280	***	8.351	***	8.272	***	8.283	***
	(0.792)		(0.791)		(0.791)		(0.790)		(0.791)		(0.790)		(0.789)	
Occupation: Professional or technician	6.761	***	6.774	***	6.770	***	6.835	***	6.784	***	6.825	***	6.836	***
	(0.696)		(0.696)		(0.696)		(0.695)		(0.695)		(0.696)		(0.695)	
Occupation: Laborer	6.724	***	6.725	***	6.725	***	6.738	***	6.726	***	6.743	***	6.744	***
	(0.470)		(0.470)		(0.470)		(0.470)		(0.470)		(0.469)		(0.469)	
Occupation: Salesperson	9.723	***	9.728	***	9.727	***	9.715	***	9.733	***	9.709	***	9.713	***
	(0.857)		(0.857)		(0.857)		(0.859)		(0.857)		(0.859)		(0.859)	
Occupation: Service employee	11.391	***	11.412	***	11.394	***	11.385	***	11.416	***	11.382	***	11.402	***
	(0.629)		(0.628)		(0.629)		(0.628)		(0.628)		(0.628)		(0.627)	
	12.074	***	12.078	***	12.067	***	12.235	***	12.070	***	12.271	***	12.273	***

Occupation: Miner	(1.467)		(1.467)		(1.466)		(1.468)		(1.466)		(1.468)		(1.468)
Occupation: Domestic employee	12.973	***	12.981	***	12.941	***	12.990	***	12.948	***	13.061	***	13.067 ***
	(2.710)		(2.710)		(2.722)		(2.712)		(2.723)		(2.687)		(2.687)
Dependency ratio	-5.058	**	-5.014	**	-5.065	**	-4.833	*	-5.021	**	-4.806	*	-4.765 *
	(2.525)		(2.526)		(2.525)		(2.526)		(2.526)		(2.525)		(2.526)
Dependency ratio squared	3.887	**	3.853	*	3.888	**	3.716	*	3.854	*	3.704	*	3.672 *
	(1.980)		(1.980)		(1.980)		(1.981)		(1.981)		(1.980)		(1.981)
25 to 40 years of age	2.470	**	2.391	**	2.415	**	2.288	**	2.330	**	2.329	**	2.247 **
	(1.085)		(1.088)		(1.086)		(1.086)		(1.090)		(1.084)		(1.087)
Above 40 years of age	1.676		1.597		1.765		2.209	*	1.687		1.999		1.920
	(1.231)		(1.234)		(1.247)		(1.233)		(1.250)		(1.244)		(1.247)

Table A4
Control variables from Table 6
(Panel, 2013-2015)

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Log (non-labor income)	0.0952		0.0954		0.0958		0.0949		0.0959		0.0953		0.0954	
	(0.119)		(0.119)		(0.119)		(0.119)		(0.119)		(0.119)		(0.119)	
Number of children < 6 years of age	-0.207		-0.206		-0.205		-0.212		-0.204		-0.208		-0.207	
	(0.294)		(0.294)		(0.294)		(0.294)		(0.294)		(0.294)		(0.294)	
Suffers from chronic illness	-0.593	**	-0.593	**	-0.596	**	-0.589	**	-0.596	**	-0.593	**	-0.593	**
	(0.283)		(0.283)		(0.283)		(0.283)		(0.283)		(0.283)		(0.283)	
Pregnancy dummy	-2.079	***	-2.083	***	-2.077	***	-2.085	***	-2.081	***	-2.086	***	-2.089	***
	(0.573)		(0.573)		(0.573)		(0.573)		(0.574)		(0.573)		(0.574)	
Cohabiting or married dummy	-3.22	***	-3.22	***	-3.228	***	-3.222	***	-3.227	***	-3.226	***	-3.226	***
	(0.877)		(0.877)		(0.877)		(0.877)		(0.877)		(0.877)		(0.877)	
Suffers from chronic illness or accident	-0.655		-0.654		-0.657		-0.657		-0.655		-0.659		-0.657	
	(0.405)		(0.405)		(0.405)		(0.405)		(0.405)		(0.405)		(0.405)	
Abandonment dummy	2.882	**	2.881	**	2.885	**	2.88	**	2.885	**	2.885	**	2.885	**
	(1.373)		(1.373)		(1.373)		(1.373)		(1.373)		(1.373)		(1.373)	
Criminal offense dummy	-0.416		-0.419		-0.417		-0.421		-0.420		-0.421		-0.423	
	(0.617)		(0.617)		(0.617)		(0.617)		(0.617)		(0.617)		(0.617)	
Natural disaster dummy	0.0903		0.0907		0.0924		0.0971		0.0930		0.0954		0.0959	
	(0.430)		(0.430)		(0.430)		(0.430)		(0.430)		(0.430)		(0.430)	
Occupation: Manager or official	35.14	***	35.14	***	35.15	***	35.16	***	35.15	***	35.16	***	35.17	***
	(2.271)		(2.271)		(2.271)		(2.271)		(2.272)		(2.272)		(2.272)	
	31.85	***	31.85	***	31.85	***	31.87	***	31.85	***	31.87	***	31.87	***

Occupation: Office worker	(0.891)		(0.891)		(0.891)		(0.891)		(0.891)		(0.891)		(0.891)	
Occupation: Professional or technician	27.3	***	27.3	***	27.3	***	27.3	***	27.3	***	27.31	***	27.31	***
	(0.865)		(0.865)		(0.865)		(0.865)		(0.865)		(0.865)		(0.865)	
Occupation: Laborer	19.74	***	19.75	***	19.75	***	19.76	***	19.75	***	19.76	***	19.77	***
	(0.689)		(0.689)		(0.689)		(0.689)		(0.689)		(0.689)		(0.689)	
Occupation: Salesperson	20.02	***	20.02	***	20.02	***	20.02	***	20.02	***	20.03	***	20.03	***
	(0.455)		(0.455)		(0.455)		(0.455)		(0.455)		(0.455)		(0.455)	
Occupation: Service employee	20.63	***	20.63	***	20.64	***	20.63	***	20.64	***	20.64	***	20.64	***
	(0.530)		(0.530)		(0.530)		(0.530)		(0.530)		(0.530)		(0.530)	
Occupation: Miner	26.13	***	26.13	***	26.21	***	26.09	***	26.21	***	26.18	***	26.18	***
	(6.405)		(6.406)		(6.406)		(6.406)		(6.406)		(6.407)		(6.407)	
Occupation: Domestic employee	32.82	***	32.83	***	32.84	***	32.8	***	32.84	***	32.81	***	32.82	***
	(0.980)		(0.980)		(0.980)		(0.981)		(0.980)		(0.981)		(0.981)	
Dependency ratio	-3.322		-3.322		-3.372		-3.332		-3.372		-3.368		-3.367	
	(2.758)		(2.758)		(2.759)		(2.758)		(2.759)		(2.759)		(2.759)	
Dependency ratio squared	2.445		2.446		2.479		2.459		2.480		2.480		2.481	
	(2.208)		(2.208)		(2.208)		(2.208)		(2.208)		(2.208)		(2.208)	
25 to 40 years of age	2.499	**	2.514	**	2.357	**	2.625	**	2.371	**	2.449	**	2.462	**
	(1.057)		(1.058)		(1.076)		(1.064)		(1.077)		(1.078)		(1.080)	
Above 40 years of age	2.879	**	2.887	**	2.632	*	2.892	**	2.638	*	2.68	*	2.686	*
	(1.397)		(1.398)		(1.415)		(1.404)		(1.416)		(1.418)		(1.419)	
Constant	8.647	***	8.639	***	8.844	***	8.612	***	8.836	***	8.791	***	8.784	***
	(1.376)		(1.376)		(1.386)		(1.380)		(1.387)		(1.388)		(1.388)	
Observations	25,337		25,337		25,337		25,337		25,337		25,337		25,337	
R-squared	0.218		0.218		0.218		0.218		0.218		0.218		0.218	
Number of individuals	8,948		8,948		8,948		8,948		8,948		8,948		8,948	

Table A5
Control variables from Table 7
(Panel, 2013-2015)

	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Log (non-labor income)	0.131		0.130		0.133		0.129		0.133		0.133		0.132	
	(0.137)		(0.137)		(0.137)		(0.137)		(0.138)		(0.137)		(0.138)	
Number of children < 6 years of age	-0.047		-0.038		-0.085		-0.044		-0.076		-0.082		-0.069	
	(0.374)		(0.374)		(0.375)		(0.374)		(0.375)		(0.375)		(0.376)	
Suffers from chronic illness	-0.290		-0.294		-0.283		-0.289		-0.287		-0.283		-0.287	
	(0.283)		(0.283)		(0.283)		(0.283)		(0.283)		(0.283)		(0.283)	
Pregnancy dummy	-1.180		-1.216		-1.173		-1.175		-1.208		-1.170		-1.203	**
	(1.023)		(1.024)		(1.021)		(1.022)		(1.021)		(1.020)		(1.021)	

Cohabiting or married dummy	-0.313	**	-0.351		-0.382		-0.347		-0.416		-0.388		-0.433	
	(1.396)		(1.395)		(1.372)		(1.394)		(1.373)		(1.373)		(1.375)	
Suffers from chronic illness or accident	-0.346		-0.315		-0.349		-0.345		-0.320		-0.349		-0.319	**
	(0.493)		(0.494)		(0.492)		(0.493)		(0.493)		(0.492)		(0.493)	
Abandonment dummy	3.382	**	3.383	**	3.410	**	3.376	**	3.410	**	3.408	**	3.408	***
	(1.464)		(1.464)		(1.456)		(1.464)		(1.456)		(1.456)		(1.457)	
Criminal offense dummy	-0.756	***	-0.760		-0.751		-0.762		-0.756		-0.753		-0.759	***
	(0.609)		(0.609)		(0.609)		(0.609)		(0.609)		(0.609)		(0.609)	
Natural disaster dummy	1.333	***	1.326	**	1.341	**	1.326	**	1.335	**	1.338	**	1.329	***
	(0.546)		(0.546)		(0.546)		(0.547)		(0.546)		(0.547)		(0.547)	
Occupation: Manager or official	16.265	***	16.239	***	16.373	***	16.280	***	16.345	***	16.375	***	16.349	***
	(1.449)		(1.450)		(1.445)		(1.449)		(1.445)		(1.445)		(1.445)	
Occupation: Office worker	10.959	***	10.935	***	11.023	***	11.004	***	11.000	***	11.032	***	11.016	***
	(1.148)		(1.148)		(1.147)		(1.149)		(1.147)		(1.148)		(1.147)	
Occupation: Professional or technician	7.563	***	7.542	***	7.601	***	7.576	***	7.580	***	7.603	***	7.584	***
	(1.099)		(1.099)		(1.098)		(1.099)		(1.098)		(1.098)		(1.098)	
Occupation: Laborer	6.557	***	6.520	***	6.545	***	6.563	***	6.509	***	6.548	***	6.513	*
	(0.917)		(0.918)		(0.917)		(0.918)		(0.917)		(0.917)		(0.918)	
Occupation: Salesperson	8.138	*	8.121	***	8.150	***	8.141	***	8.134	***	8.150	***	8.134	***
	(0.776)		(0.775)		(0.776)		(0.776)		(0.775)		(0.776)		(0.775)	
Occupation: Service employee	5.973	***	5.934	***	5.991	***	5.975	***	5.955	***	5.991	***	5.953	
	(0.815)		(0.815)		(0.814)		(0.815)		(0.814)		(0.814)		(0.814)	
Occupation: Miner	12.906		12.872	*	12.926	*	12.885	*	12.893	*	12.921	*	12.892	
	(7.359)		(7.362)		(7.337)		(7.359)		(7.340)		(7.330)		(7.332)	
Occupation: Domestic employee	10.319		10.313	***	10.292	***	10.278	***	10.287	***	10.281	***	10.268	
	(1.310)		(1.310)		(1.309)		(1.311)		(1.310)		(1.311)		(1.311)	
Dependency ratio	-1.762		-1.807		-1.776		-1.773		-1.815		-1.783		-1.829	
	(3.132)		(3.132)		(3.132)		(3.132)		(3.132)		(3.132)		(3.132)	
Dependency ratio squared	3.400		3.437		3.421		3.406		3.453		3.426		3.463	
	(2.402)		(2.402)		(2.402)		(2.402)		(2.402)		(2.402)		(2.402)	
25 to 40 years of age	0.620		0.857		1.217		0.806		1.429		1.238		1.487	
	(1.348)		(1.366)		(1.368)		(1.351)		(1.384)		(1.370)		(1.387)	
Above 40 years of age	2.071		2.324		2.326		2.236		2.567		2.344		2.622	
	(1.598)		(1.613)		(1.605)		(1.601)		(1.620)		(1.607)		(1.623)	

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