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Job Loss and Household Labor Supply Adjustments in Developing Countries: Evidence from Argentina

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Job loss and household labor supply adjustments in developing countries: Evidence from Argentina *

Matías Ciaschi†

Abstract

Using longitudinal data for Argentina, this paper measures the labor supply reaction of different household members to a breadwinner's job loss. Firm events and local unemployment shocks are exploited as exogenous sources of variation to estimate the causal effect. Our main findings show that job loss by the male household head has a significant and substantial effect on the labor supply response of other household members, both at the extensive and intensive margin. While we do not find any effect on daughters, female partners and sons increase their labor market participation. The latter are also more likely to drop out from the educational system. These results are stronger among economically vulnerable households.

Keywords: job loss, labor supply, educational enrollment, developing country.

JEL Codes: J16, J21, J22, J65.

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1 Introduction

Belonging to a household implies risk-sharing and represents an insurance mechanism to deal with adverse shocks. As much of the literature on this subject points out, one of the objectives of each household is to smooth consumption (Friedman, 1957). For example, households with more than one potential earner can cope with adverse labor market shocks better than single-earner households. For the former, a sizeable decline in income due to a male breadwinner's job loss can lead to changes in other members' labor market participation, thus softening the shock. Additionally, exposure to a father's job loss can have an impact on sons and daughters' education. Starting from early theoretical contributions from Humprey (1940) and Woytinsky (1940), the literature has labeled this phenomenon as "added worker effect" (hereafter, AWE).

Examining this mechanism is particularly relevant for developing countries where female labor participation and youth educational enrollment are low, and income shocks are frequent. A more comprehensive understanding of household members' labor supply elasticity to income shocks is very relevant from a policy perspective, particularly in regards to women's and youth employment. Additionally, household shocks can have an impact on young peoples' education, especially in situations where they exhibit the role of an additional worker. If labor supply reactions involve a decrease in time devoted to study, the exposure to a father's job loss can have a persistent effect on his offspring's ultimate human capital attainment. However, even in situations where sons and daughters do not have an additional worker role, household shocks can have an impact on their education as there may be fewer resources available to invest in them.

In this paper we evaluate household adjustment mechanisms after breadwinner job loss in a developing country using firm events and local unemployment shocks as exogenous sources of variation to estimate causal effects. More precisely, we evaluate changes in other household members' labor supply and educational enrollment when the household head becomes unemployed. While most of the literature concentrates their analysis on couple members, in this paper we consider both women and offspring's labor supply reactions and, also, offspring's educational enrollment changes. Additionally, we evaluate the existence of gender differences among sons and daughters' reactions and the relevance of household income shaping the AWE. In this way, we provide a more comprehensive picture of how this mechanism works. AWE causal evi-

dence in developing contexts is almost nonexistent, except for a recent contribution for China (Ma and Shi, 2020). Given this, we also contribute to the literature by proposing three potential instruments. To perform this analysis, we use longitudinal data for Argentina from 1995 to 2015. This information permits us to evaluate labor and educational transitions for every household member. Additionally, this data is useful to identify firm events and local labor market shocks which can exogenously affect breadwinner's employment status. We believe that this contribution will represent a step towards causally identifying the AWE in a developing context.

Our average findings suggest that 20.3% of female spouses who were initially outside of the labor market began to participate in response to a husband's job loss; those who were already employed increased their labor supply by 4.5 working hours per week. By contrast, after their father's job loss, 13.7% of sons and daughters began to participate in the labor market and 4.4% of them dropped out of school. However, the effect on offspring seem to be mainly driven by changes in participation among sons. Lastly, these mechanisms seem to be stronger in vulnerable households.

The remainder of this paper is organized as follows. Section 2 provides a literature review on AWE contributions. Section 3 presents the data source and our main variable construction. Section 4 details the empirical strategy, Section 5 presents the findings of this study. Finally, Section 6 concludes the paper.

2 Related literature

Following Becker (1991), in an unitary model context, the intra-household decision-making mechanism works in two stages. At the first stage, every household member independently chooses his/her time devoted to work or home, which can include leisure as well as childcare or housework. In the second stage, the household head distributes resources (e.g. time, income) among household members. But because the head internalizes the utility of other household members, each member will make choices in the first stage which maximize the total amount of household resources, no matter how selfish they are. This mechanism assigns different roles to each household member in order to maximize the utility of the entire household and of each of its members. But these roles can change, at least temporarily, when the household head,

who was assigned the role of principal worker, lost his job. As a consequence, other household members react by increasing their labor market participation. These reactions can be broken down into a substitution and an income effect. Regarding the latter, additional workers increase their labor market participation aiming to compensate for the decline in household income and, thus, generate consumption smoothing. On the other hand, the substitution effect assumes that leisure is a normal good. Therefore, if the household head and additional workers' leisure are substitutes, the reservation wage will decline for the latter when the former increases his time out of work (for example, due to a job loss), increasing their labor market participation. In other words, given the negative income shock suffered by the household, the relative value of the additional workers' leisure is reduced, which implies an increase in his/her labor supply. However, household members' preferences to spend time together and adverse expected labor market conditions can mitigate the magnitude of the AWE. In the first case, if the household head's and additional worker's time at home are not substitutes, a job loss suffered by the former can encourage labor supply reductions for the latter. On the other hand, a breadwinner's job loss can play a signaling role indicating low probabilities to find a good job for other household member, thuss disincentivizing their labor market participation. This last effect has been labelled by the literature as the "discouraged worker effect."

Empirical literature evaluating the AWE hypothesis has changed over time. While initial theoretical contributions can be traced back to Humprey (1940) and Woytinsky (1940), the origins of the empirical AWE literature can be found in studies such as Heckman and McCurdy (1980), Lundberg (1985), Maloney (1987, 1991) and Spletzer (1997). These papers focused on a correlation analysis between married men and women's labor supply, finding a small negative relationship between both variables in developed countries. These studies represent a macro-level analysis and, within the life-cycle theory framework, explain that a small reaction could be interpreted as household members perceiving income shocks as transitory. As a consequence, the literature considered the AWE to not be nonexistent or not particularly relevant.

Following contributions like Stephens (2002), the literature changed its focus from macro-level analysis to the study of microeconomic aspects. Then, it began to focus on household members' labor supply transitions using panel data that permitted authors to follow households over extended periods of time. This framework permitted the study of labor participation changes within a household in the periods following a breadwinner's job loss. Since this con-

tribution, empirical papers found evidence in line with the AWE hypothesis in developed and developing countries[1]. Moreover, researchers started to find several factors influencing the existence and magnitude of AWE. Among these, the role of social security (Cullen 2000; Bentolila and Ichino, 2008; Birinci, 2019; Wu and Krueger, 2019), aggregate female labor participation (Bredtmann et al., 2018; Keldenich and Knabe, 2018), labor informality (Basu et al., 2000; Maloney, 2004), liquidity restrictions (Ortigueira and Siassi, 2013) and macroeconomic dynamics (Parker and Skoufias, 2004; Mattingly and Smith, 2010; Bryan and Longhi, 2018; Albanesi, 2019; Serrano et al., 2019; Guner et al., 2020) are worth particular mention. Additionally, the literature found that the family structure is also relevant to determine the magnitude of AWE. In particular, women belonging to households in which there is a young child and low educational backgrounds are more likely to take the role of additional worker. Several studies (Michalopoulos et al., 1992; Kimmel, 1998; Eissa and Hoynes, 2004; Naz, 2004; Tamm, 2009; Serrano et al., 2019) have found that female labor participation in households with those characteristics is more elastic to income variation. Taken together, these empirical contributions that describe the factors shaping the AWE point out that this phenomenon can have different relevance in developed and developing contexts. For the latter, social security mechanisms are more limited, households are more likely to face credit restrictions, labor informality is higher, female labor participation lower and traditional gender roles are likely to be more prevalent.

Despite advances, most of the literature on AWE is still concentrated on a couple member's analysis. The study of changes in offspring's labor market participation and educational enrollment after a father's job loss is relevant as such changes can have long term consequences on the son or daughter's outcomes, including their human capital attainment and future income. However, the vast majority of papers only analyze female spouse's labor supply responses to a husband's job loss. One exception can be found in Cardona-Sosa et al. (2018), which finds for Colombia that a couple's adult children are more likely to enter the labor market and less likely to be in tertiary education in the wake of their father's job loss. In an effort to better understand how the AWE mechanism works within households, we study the spouse's labor supply reactions and also sons and daughters' labor supply and educational enrollment changes.

The literature still exhibits empirical challenges regarding the potentially endogenous re-

[1]In fact, Mankart and Oikonomou (2016) document that the AWE has been increasing in the United States over the last three decades.

lationship between household members' labor supply. Most recent literature on the effects of job losses on household member's outcomes aims to address this crucial identification challenge. However, papers providing an AWE causal estimation are mainly concentrated among a small group of developed countries with rich employer-employee administrative data availability. These papers exploit the exogenous variation in household heads' employment status, associated with exposure to firm events such as plant closures and mass layoffs. In the literature, a firm event is one that is unexpected and takes place independent of workers' decisions. Contributions using this empirical approach identify the causal effects of the household head's job loss on several outcomes: health (Sullivan and von Wachter, 2009; Gathmann et al., 2020), fertility (Huttunen and Kellokumpu, 2016), children's education (Hilger, 2016), early retirement (Ichino et al., 2017) and criminal behavior (Rege et al., 2019). However, in this paper we are particularly interested in contributions that demonstrate the effect of a household head's job loss on other members' labor market participation[2]. Most of these contributions focus their analysis on spousal labor supply responses. Hardoy and Schone (2013) and Halla et al.(2018) both evaluate the causal effect of a husband's job displacement on a wife's labor supply. Hardoy and Schone (2013) use Norwegian employer-employee data and fixed effects estimations to find a 5% increase in labor supply among wives following a husband's job displacement and in particular for women who were previously unemployed. Halla et al.(2018) also utilize employer-employee data to find that wives in Austria increase their labor market participation by 4 p.p. when the male household head suffers a job displacement.

Empirical literature aiming to provide AWE causal estimations is scarce overall, and it is almost nonexistent for developing contexts. There are a few exceptions: Ma and Shi (2020) made use of the implementation of a workweek reduction policy as a natural experiment for China. They find that husbands' labor supply reductions had no significant effect on wives' labor supply; however, those reductions did produce a significant decrease in time spent together. Findings presented in Ma and Shi (2020) contrast with those of Goux, Maurin and Petrongolo (2014), which evaluates a similar natural experiment in France. As the authors suggest, one possible reason for these differences is the disparity in economic development between the two countries. As households become wealthier, the couple's relative value of leisure increases and their time spent together is more likely to become complementary. This emphasizes the

[2]There also empirical papers that have evaluated the causal effects of wage shocks on household members' labor supply; these works have found evidence in line with the AWE. (Blundell et al., 2016; Blundell et al., 2018)

relevance of providing AWE causal estimations in developing contexts where time allocation decisions can be different compared to developed countries. In this paper we propose three different variables which can aid an instrumental variables approach. Despite the fact that we cannot completely rule out endogeneity problems, our approach offers lower bound estimates of the true AWE on account of two factors. First, individuals that demonstrate a high probability of remaining unemployed after job loss are more likely to be coupled with low labor supply responsive women, due to assortative mating in unobserved characteristics related to effort and leisure preferences. Second, a breadwinner's job loss can be interpreted as a low probability of finding a good job for other household members, thus disincentivizing their labor market participation. Given the very scarce evidence available, our contribution represents a step towards more significant research on AWE estimations in developing contexts. For our analysis, we make use of longitudinal data for Argentina from 1995 to 2015 that permits us to identify labor and educational transitions for every household member. This data also includes information on firm events and local labor market conditions, which can be considered as exogenously affecting individual's employment status.

The AWE hypothesis has been previously examined for Latin American countries. However, existing analyses have concentrated on the couple and have not dealt with AWE identification problems. Parker and Skoufias (2004) and Fernández and de Felício (2005) serve as early examples. Both studies found an increase in female labor participation of about 9 p.p. and between 7 and 12 p.p. for Mexican and Brazilian urban areas, respectively. More recently, Cardona-Sosa et al. (2018) provide an AWE analysis for the Colombian case; the authors find that wives increase their labor supply between 11 and 20 p.p. in response to a husband's job loss. In the case of Argentina, Cerutti (2000) and Paz (2009) offer relevant contributions. The former focuses on the metropolitan Buenos Aires area between 1991 and 1995, a period characterized by adverse labor market conditions. Exploiting the EPH, *Encuesta Permanente de Hogares*) panel structure to compute individual labor transitions, Cerutti (2000) finds that women with husbands who had lost their jobs were twice as likely to enter in the labor market as compared to women living in households where the male head remained employed. Paz (2009) analyzes an economic growth period between the years 2003 and 2007. Results suggest that female partners increase their labor supply between 12 and 15 p.p. as a response to a male household head's job loss. The author also highlights that this rise in female labor market participation is mainly explained by transitions from inactivity to employment. Lastly, Martinoty (2015)

deserves mention even though the author studied wage declines rather than job loss. The work examines Argentina during a period of crisis, from 2000 to 2002 and performs an instrumental variable analysis using asymmetrical sectorial GDP changes as an instrument for household head earnings. The results suggest that declines in a male breadwinner's average wage causes his female partner to increase her labor supply by 4.4 percentage points.

This paper contributes to the AWE literature in two ways. First, our analysis does not only consider how a male breadwinner's job loss generates labor supply responses among female partners, but also how it affects his grown children's labor and educational decisions. As can be noted, most of the available AWE contributions concentrate their analysis on the couple and do not consider other mechanisms by which AWE can materialize, including labor market participation among sons and daughters, as well as changes in offspring's educational enrollment. In this paper, we contribute to the literature by providing a more comprehensive picture of the mechanisms by which households cope with income shocks. By including offspring's outcomes in our analysis, we are also able to evaluate gendered differences in the impact of a father's job loss; this provides information regarding gender roles among children. Second, this work makes a contribution to the study of AWE causal estimation in developing contexts by using firm events and local unemployment shocks as exogenous sources of a head of household's employment variation. This is a relevant contribution given that AWE estimations are only available for a limited group of developed countries. The only causal contribution for developing countries is very recent and analyzes a specific policy intervention in China. With this paper, we help to close the gap in the AWE literature regarding causal estimation in developing countries.

3 Data source and main variables

This paper is based on longitudinal data from the *Encuesta Permanente de Hogares* (Permanent Household Survey; hereafter, EPH), the main household survey in Argentina, for the period between 1995 and 2015.[3]. The survey contains information on a large number of socioeconomic variables, including employment and marital status, household structure, individual income, region of residence and education for each household member and is representative of about 68% of the country's urban population. Some questions in the survey are answered by each individual

[3]More recent survey versions do not include the panel structure needed to compute labor transitions.

over the age of ten living in the household; other questions related to the household as a whole are answered only by the household head. In all cases, it is possible to clearly identify couples, offspring[4] and their individual characteristics. In addition, during the period analyzed, the EPH has a rotative panel structure, which is useful for following each household for a maximum of a 1.5 year period, four times. The rotative panel design differs between the period 1995-2002 and 2003-2015. During the first interval, the survey collects information semi-annually in two waves each year. In each survey, 25% of the sample is updated. Consequently, this survey allows each household to be followed for up to four consecutive semesters. Between 2003 and 2015, each household was visited four times, twice in two consecutive trimesters, then left without visitation for two trimesters, and then visited two times again during the last two trimesters. In this paper, the EPH rotative panel structure is exploited to compute an individual's labor and educational transitions and to analyze the AWE hypothesis. In doing so, the analysis focuses on households with heterosexual couples where the male was reported as employed during the first visit. Additionally, the sample is restricted to couples in which both members are between 25 and 60 years old in the initial period to avoid the influence of educational and retirement decisions on labor market participation.

In contrast to other related studies, the unit of analysis used here is the household, not the couple: we are also interested in analyzing changes in labor market participation and education enrollment among sons and daughters in the household. Therefore, labor and educational transition variables are defined at the household level. As noted above, the EPH contains self-reported information regarding each individual employment status during a maximum of a 1.5 year period. To compute the main explanatory variable of this study, only households in which the male household head was employed during the first visit were considered. This variable will be valued zero if the individual was still employed at the last household visit and one if he was not employed at that time (i.e. he had lost his job). Importantly, our data contains information about the reason behind job losses. We can identify the individual's exposure to firm events such as a plant closure or mass layoffs. Additionally, using our main explanatory variable we can compute local labor market conditions as the proportion of initially employed individuals who lost their jobs. We label this last variable as urban area (UA) job loss.

[4]Couple's children definition is based on whether the household head is recognized as the son or daughter's parent or step-parent

Next, we define outcome variables for female spouses and offspring. We consider labor market participation changes in both the extensive and intensive margin. In the case of children, we also compute educational dropout variables. Each of these five main outcome variables are defined within a particular sample. When computing the women's labor market participation variable in the extensive margin we only consider those women who were not participating in the labor market during the initial period. When we consider changes in hours worked among female spouses we restrict our sample to households where female spouses were employed during the initial and last survey. Outcome variables among sons and daughters were also defined within their specific samples. Changes in offspring's labor participation in the extensive margin were analyzed using households where sons and daughters were not employed during the initial period, while changes in their working hours were computed for households where at least one son or daughter was initially employed and is still employed in the lat period. Lastly, changes in offspring's educational enrollment were only defined for households where at least one son or daughter was enrolled in some level of schooling. In other words, in this paper we work with five different samples according to the outcome variable we are analyzing. This means that we do not consider similar households when analyzing one outcome or another. Table 1 illustrates descriptive statistics for the five samples considered. A relevant difference appears when comparing households with female spouses who were not participating in the labor market during the initial period with those households in which with they were employed in the first period. The former group shows lower education and income, and higher child presence and unemployment exposure than the latter. At the same time, households with at least one son or daughter outside the labor market and those with at least one son or daughter enrolled in school (at any level) show income, education and unemployment exposure levels between the other samples, as well as a higher number of children. Lastly, the sample of households with 16-25 year old offspring outside of the labor market is composed of older couples.

As noted above, the extensive margin female partner (son or daughter) labor participation changes only take into consideration those households in which female partner (son or daughter) were initially outside of the labor market. This variable will be valued zero if the female partner (son or daughter) had same employment status in the last period; and one if employed or unemployed in that period. Regarding changes in labor force participation in the intensive margin, we create an additional variable for female partner (son or daughter) who were already employed during the initial period and remained employed in the last one. This variable mea-

sures changes in their hours worked per week between the initial and final periods. We also construct extensive margin labor participation and educational enrollment changes variables for offspring between 16 and 25 years old in the household. The main rationale for choosing this age bracket is because individuals in this age range are more likely to be making decisions on whether to work or study. Moreover, younger children are not included as their labor participation can be under-reported in household surveys. According to the International Labor Organization (ILO), employment of children under the age of 16 is illegal. As a result, persons interviewed may choose not to disclose the working habits of underage children, fearing repercussions. The computation of sons and daughters' labor market participation and educational enrollment transition variables are analogous to those for female spouses, described previously. We examine households with at least one son or daughter between 16 and 25 years old not participating in the labor market in the initial period. This variable will be valued zero if the individual remains outside the labor market in the last period and one if he/she is employed or unemployed in the last period. Regarding educational enrollment changes, we construct a variable indicating if any son or daughter in the household dropped out of school. More precisely, this variable is only utilized for households where there was at least one son or daughter studying in the initial period. For each household, we considered this variable equal to zero if every son or daughter enrolled in school during the initial period was still attending school or had graduated by the last period; the variable was equal to one if any of the sons or daughters studying during the initial period were not enrolled (at any level of education) in the last period and had not graduated. Finally, a summary of the principal variables used in this paper can be found in Table 2.

4 Identification strategy

4.1 Baseline

To analyze spouses and offspring's labor supply responses to an adverse household income shock due to male head's job loss, we estimate the following models:

$$\Delta Y_{it} = \alpha + \gamma \Delta E_{it} + X'_{it}\beta + \sum_t \varphi_t T_t + \sum_u \rho_u UA_u + \epsilon_{it}$$

For each outcome ΔY_{it}, these estimations will be performed at the household level (i) because we examine changes in labor market participation among both spouses and grown children. The outcome variable ΔY_{it} will be different in each model. Five different models will be used in order to analyze five different outcomes: a) female labor participation in the extensive margin; b) female labor participation in the intensive margin; c) children's labor participation in the extensive margin; d) children's labor participation in the intensive margin; e) children's educational enrollment. The vector X_{it} includes a set of individual and household level covariate variables defined in the initial period, including per capita income, presence of a child, presence of a child less under five years of age, female and male household head's educational level and ages. These correspond to conventional control variables in the AWE literature. In addition, estimations include time fixed effects (quarter and year, T_t) and urban area fixed effects (UA_u), aiming to capture unobserved heterogeneities. Finally, ϵ_{it} represents the error term of the model. Because of the possible presence of heteroscedasticity, we include robust standard errors in the estimations. Additionally, we compute estimations including clustered standard errors at urban area-panel level; results did not show significant differences.

The main explanatory variable of interest is ΔE_{it}; as discussed in the previous section, this variable distinguishes whether the initially-employed household head is employed at the time of the last interview or not. Therefore, γ is expected to be positive in each specification in the presence of an AWE. Given the outcome variables definition, γ can be interpreted as the average changes from the initial period. To better understand the interpretation of γ, we can make an example for the female labor market participation outcome. At the intensive margin, for spouses or offspring employed in the first period and still employed in the last one, γ is the estimated change in weekly work hours from this period to the last one. At the extensive margin, $\gamma > 0$ reflects the percentage of spouses outside the labor market during the initial period who were participating in it during the final period. The interpretation of γ when considering sons and daughters' labor participation in the extensive margin and educational enrollment changes are analogous.

4.2 Identification issues

The AWE identification, γ in our model, faces some empirical challenges[5]. On the one hand, not every change in additional worker labor participation after a breadwinner's transition from being employed to not employed can be considered as AWE. Household members' labor participation are joint familiar decisions. Given this, it is possible that a household head's unemployment could be chosen and coordinated voluntarily with the support of his spouse or grown children. In such cases, we would observe other member's labor supply increase when the male breadwinner became unemployed, but the household would not suffer any adverse income shocks. Therefore, we would overestimate the AWE. On the other hand, AWE underestimations can be generated by two causes. First, there are situations in which household members are aware that the main breadwinner is likely to lose his job in the near future, for example if he is planning to quit. This kind of expected unemployment can lead to anticipated responses in terms of labor participation. Increases in other members' labor supply when the male household head is still employed can cause AWE underestimations. Second, unobservable variables can also produce AWE underestimations. The breadwinner's unemployment can be correlated to his unobservable characteristics, such as leisure preferences and willingness to work hard. Considering that we are analyzing a sample of initially employed household heads, a low working preferences individual is more likely to become unemployed, even voluntarily. In presence of assortative mating, women might have similar skills and preferences which make her show low labor supply reactions.

4.3 Instrumental variables and limitations

To avoid these potential identification problems, we use firm events such as plant closures and mass layoffs, and local level shocks to unemployment (urban area job losses) as exogenous source of variation of ΔE_{it}. Firm events are considered at household level. They include plant closure and mass layoffs variables, in line with recent AWE contributions for developed countries. The EPH questionnaire includes a question directly related to plant closure events and two additional questions that make it possible to identify if the individual's job loss is related to mass layoff events at the firm level. More precisely, the survey contains information on whether the

[5]One source of bias in our estimations comes from the data itself. At the time of the interview after the household head lost his job, some respondents have less time available to perform labor or educational reactions. This tends to underestimate the true AWE.

job loss was voluntary or involuntary and, also, if the individual was the only fired employee or other coworkers were also dismissed. Combining the information from both questions, is it possible to identify situations in which several workers were laid off from the same firm which we will label as "mass layoff" events in this paper.

The assumption behind this approach is that firm events represent involuntary situations for workers and are unrelated to their decisions or characteristics, even their unobserved traits. For example, it is assumed that preferences regarding leisure, effort, child care and time at home do not change when a plant closure or mass layoff occurs. Moreover, these firm events should not affect the outcome via observed control variables as these are defined prior to the firm event. Under these assumptions, a firm event exogenously affects the likelihood that a household head will lose his job, i.e. provides an exogenous variation for ΔE_{it} in the model specified above. The first column in Table 3 show that plant closures and mass layoff events represent about 4% and 14% of total job losses, respectively, for each of the five different samples used. The second column in Table 3 points out that about 24% of household heads who were employed in the initial period and lost their jobs due to firm events recovered their initial employment status by the last period. That means that firm events affect the likelihood of being employed in the last period for household heads who were initially employed. In other words, both groups of households with ΔE_{it} values 0 or 1 are exposed to firm events. Given that instrumental variables are local estimates and both groups experienced firm events, we are basically comparing households with heads recovering and not recovering their jobs. However, the individual's likelihood to recover their initial employment status can be related to his and other household members' unobserved characteristics. Household members can have similar preferences for leisure or any type of time use outside of the market. Then, households with a head whose preferences indicate a high (low) probability of remaining unemployed after a job loss (i.e. probability to show $\Delta E_{it} = 1$) are more likely to have other members (spouses or offspring) who exhibit low (high) labor supply reactions (i.e. probability to show $\Delta Y_{it} = 1$) . Although we control for individuals and household variables, it can be not enough to fully rule out endogeneity problems. However, we know that the bias produced by the remaining endogeneity tends to underestimate the true AWE. Then, at worst, the estimations using firm events as instrumental variables should be considered as lower bound estimates.

On the other hand, another variable unrelated with individual decisions can be considered.

We use the percentage of job loss in the urban area where the household resides as another exogenous mechanism to instrument the household head's job loss. This instrument exploits the variation between the percentages of job loss in urban areas and time that the working head of household lost his job. We define this urban area job loss variable as the percentage of initially working individuals who are not employed in each period, i.e. the proportion of workers who lost their jobs. Formally, the urban area (UA) job loss variable is defined as:

$$UAJobLoss_{i,ua,t} = \sum_{-i} \frac{\Delta E_{it}}{E_{i,t_0}}$$

where $\sum_{-i} \Delta E_{it}$ indicates the number of individuals who lost his job, excluding the individual i and $\sum_{-i} E_{i,t_0}$ represents the number of individuals, except for i, employed in the initial period.

As noted above, firm event instruments produce downward biases because the likelihood of recovering employment can be correlated with other household member characteristics. UA job loss instruments do not have this particular problem. This variable represents an aggregated shock defined at macro level that affects the individual's likelihood of being employed in the final period. However, the use of the UA job loss variable as instrument can also produce biased estimates. The main reason behind this is the aforementioned "discouraged worker effect". It is very likely that the head and other household members share the same local labor market. When UA job loss is very high, the market shows difficulties in job creation which can discourage other household members from participating in the labor market. If this discouraging effect is greater than the adverse income effect produced by a household head's job loss, higher UA job loss can directly affect ΔY_{it}. However we know that the "discouraged worker effect" creates downward biased estimates. Again, as was the case with firm event variables, UA job loss performs, at worst, at the lower bound estimates of the true AWE.

5 Results

In this section, we present the main results of this paper[6]. We include OLS and instrumental variables estimates. Table 4 shows the first stages estimations for the five samples we consider.

[6]Henceforth, results including robust standard errors are presented. Clustering standard errors at the urban area level the significance of the results remain for the most part unaltered.

They show that both firm events and urban job loss variables are not weak instruments predicting the breadwinner's likelihood to lose his job (i.e. ΔE_{it}). Coefficients are positive, as expected, and statistically significant. Moreover, the Kleibergen-Paap test clearly rejects the null hypothesis for weak instruments under robust standard errors.

5.1 Female labor participation

In this section we present the results regarding female labor participation in both the extensive and intensive margin.

5.1.1 Extensive margin

The estimated changes in female labor participation in the extensive margin are shown in Table 5. Results suggest that between 16% and 23% of women found to be initially out of labor market start to participate because of a household breadwinner's job loss. Considering that nearly 43% of women are initially out of the labor market, our results point out an increase in female labor participation of between 7 p.p. and 10 p.p. This result is in line with the literature. Contributions analyzing developed countries (Hardoy and Schøne, 2013; Bredtmann et al., 2018; Halla et al., 2018; Keldenich and Knabe, 2018) found women's labor supply responses in between 3 and 9 p.p. while the AWE literature for Latin American countries show larger results, from 12 to 20 p.p. (Parker and Skoufias, 2004; Fernández and de Felício, 2005; Cardona-Sosa et al., 2018). Lastly, previous contributions for Argentina found increases in female labor participation in between 12.5 and 15 p.p. after a husband's job loss (Paz, 2009; Martinoty, 2014).

5.1.2 Intensive margin

Another mechanism through the AWE can materialize is in the intensive margin. Table 6 shows the estimates on female labor participation measured in working hours per week for spouses who were employed during the initial and last period. Results suggest an increase of between 4 and 4.9 work hours. Considering that spouses who were initially employed work, on average, 33.81 weekly hours ,our results suggest an increase of between 12% and 15%. These estimations are in line with the literature that consider wives' labor supply changes in the intensive margin.

Mattingly and Smith (2010), for the United States, find that women partnered with a men who lost their jobs are 51% more likely to increase their worked hours as compared to women partnered with men who remained employed. Bredtmann et al. (2018) finds that a male partner's job loss increases women's probability to perform transitions from part time to full time jobs by approximately 6 p.p. in European countries. In this sense, Bryan and Longhi (2018) find that women increase their labor supply in about 3.5 weekly hours worked in the United Kingdom. In contrast, Fernández and Felício (2005) and Martinoty (2014) results for Brazil and Argentina, respectively, suggest that the entire women labor supply response materializes in the extensive margin. Therefore, this paper is the first to record women's labor supply responses in the intensive margin in a Latin American context.

5.2 The effect on sons and daughters

5.2.1 Labor participation

Most of the literature on AWE focuses its analysis on the couple at the head of the household. However, female partners are not the only household members who can take on the role of an additional worker. Grown children can also report labor participation changes due to a breadwinner's job loss. As noted in Section 3, we will analyze the labor supply changes of the couple's sons and daughters, ages 16 to 25, as they are more likely to be making decisions between work and continuing education.[7]

Estimated changes in the labor force participation of a household head's sons and daughters in the extensive margin are available in Table 7. They show that, due to a father job loss, between 10% and 16% of sons and daughters who were initially outside the labor market begin to work or looking for a job. Considering that nearly 67% of offspring were initially out of labor market, our results suggest and increase of 3.3 - 5.8 p.p. in sons and daughters' labor participation. On the other hand, as can be seen from Table 8, we do not find any effect on the sons and daughters' labor participation in the intensive margin. This is an expected result since unconditional means from Table 2 showed very small changes in their weekly hours worked. From our results, it is worth noting that labor supply response among sons and daughters is clearly smaller than the previously estimated female partner labor force participation changes,

[7]Results regarding a couple's children between 18 and 25 years old are quite similar.

suggesting that females in couple with the male household head are the main additional workers within the households. In the AWE literature, papers studying sons and daughters' labor force participation changes are scarce. They mainly concentrate their analysis on the heads of household (husband and wife). An exception can be found in Cardona-Sosa et al. (2018), although the authors do not focus their analysis on sons and daughters who are outside of the labor market. In the Colombian case the authors find a 14 p.p. labor supply participation increase for sons and daughters between the ages of 18 and 25 following a father's job loss.

5.2.2 Educational dropout

The previous findings regarding sons and daughters' labor supply reactions can also have educational implications. In Argentina, there exist very high educational enrollment levels for children up to 14 years old; however, this rate falls to 82% for individuals aged between 15 and 17 (Marchionni, Gasparini and Edo, 2019). Increases in the sons and daughters' labor force participation can be a relevant factor to explain and document this trend. If these young persons are considering whether to work or study, a labor supply increase could indicate that the sons and daughters are dropping off their studies.

Table 9 shows the estimated educational dropout rate among sons and daughters in response to a father's job loss. Results suggest that, for sons and daughters enrolled in school at any level during the initial period, between 3.5% and 5.9% of them drop out. Considering that 77.81% of these young people are initially enrolled in any educational level, our results suggest that participation decreases from 2.7 to 4.5 p.p. The empirical evidence for the relationship between the father's job loss and sons' educational attainment is also scarce. In an early contribution for the Argentinian case, Marchionni and Sosa Escudero (1999) finds that a father's unemployment represents a factor correlated with the son's educational dropout. Duryea et al. (2007) indicate that a male breadwinner's unemployment shock increases the likelihood of school dropouts for his children in metropolitan Brazil. Lastly, Cerutti et al. (2019) find that a father's job loss is correlated with tertiary education exits in Argentina and Brazil; the authors found no such correlation for Mexico.

5.3 Heterogeneous results

The heterogeneous results of this paper can be found in the Appendix. First, we discuss the role of household income in shaping wives' and sons and daughters' labor participation and sons and daughters' educational dropouts. As the literature shows (Serrano et al., 2019), our results suggest that the AWE is stronger among lower income households. Second, as previous results suggest that wives increase their labor market participation in response to a husband's job loss, we evaluate whether they find a job or remain unemployed. Results suggest that around 14% of female spouses initially outside of the labor market were employed during the last period while, on average, 7.5% did not find a job. Third, focusing on sons and daughters' outcomes, we perform an analysis evaluating gender differences in both labor participation and educational enrollment. Our results point out that a father's job loss only affected male children, and had not effect on daughters. Lastly, given that previous results suggested that enrolled children would drop out of school due to a breadwinner job loss, we examined what level of schooling they dropped out of. Consistent with Cerutti et al.(2019), our findings suggest that school dropouts occurred mainly at the tertiary level.

5.4 Additional results

5.4.1 Exclusion restriction

The exclusion restriction within an instrumental variables framework states that the instruments should not affect the outcome by themselves or through other variables other than the endogenous variable. Despite it do not completely rule out the existence of exclusion restriction problems, Table 10 performs a test for this hypothesis for the five samples used, incorporating the instruments as an additional covariate in second stage estimations. Results show that both firm events and urban area job loss variables do not directly explain the estimated outcomes. Lastly, it is worth noting that the urban area job loss instrument can have another identification problem related to the presence of spillover effects across urban areas. This problem can be solved by clustering the standard errors at the urban area level. As noted above, results including clustered standard errors yielded similar results as the those with robust standard errors presented in this section.

5.4.2 Compliers

Given the identification strategy employed, the results presented here should be interpreted as local average treatment effects of a male breadwinner's job loss on other household members' outcomes. However, households affected by firm events and UA job losses may be different. In Table 11, we compare households exposed to the two groups of instruments by both household and UA characteristics. As can be noted, households affected by firm events seem to be more vulnerable than those more affected by UA job losses in several dimensions: education, income, presence of children, and female labor participation and unemployment exposure. In fact, Table 11 shows that the household's vulnerability increases with higher exposure to UA job losses and as its characteristics become closer to those from households affected by firm events. This compliers differences between both group of instruments is very relevant since the AWE literature identified that household member reactions are greater in vulnerable households (Ortigueira and Siassi, 2013) and lower female labor participation (Bredtmann et al., 2018; Keldenich and Knabe, 2018) and lower economic performance (Albanesi, 2019; Serrano et al., 2019; Guner et al., 2020) contexts. This is the main reason to explain why, in our results, AWE estimates that use UA job losses as an instrument are lower than those that use firm events.

6 Conclusions

In this paper, we evaluated how households cope with adverse income shocks originated by a main male breadwinner's job loss in a developing context. Unlike most of the AWE literature, which analyzes only the labor transitions of female and male heads of household, we also took into account how sons and daughters responded in terms of their labor market participation and educational enrollment. By studying the spouse and sons and daughters' reactions, we contributed a more comprehensive picture of the AWE mechanism. Including analysis of sons and daughters' responses to the male breadwinner's job loss not only permitted us to evaluate whether those individuals took up the role of additional worker but also if their education was affected; too, we were able to examine gender differences in their responses. Additionally, as a step forward to an AWE causal identification, we proposed an identification strategy which performs lower bound estimates of the true AWE.

We found that both spouses and offspring substantially increase their labor market partic-

ipation after a male breadwinner job loss, specially in low-income households. This result is larger for the former, which serves to show that female spouses are the main additional worker within households. Additionally, our results showed that sons and daughters are more likely to drop out of their schooling as a consequence of their father's job loss, and that this mainly occurs at the tertiary level. Importantly, we found that a father's unemployment only affects sons' outcomes.

Future research on this topic is needed to take up remaining questions of interest. Future studies may ask if the AWE mechanism affects family members' formality in the labor market. Further investigations can also study the relationship between AWE and different measures of women's empowerment, such as female partners' probability of being exclusively in charge of household chores or divorce rates. Moreover, it would be interesting to evaluate if the exposure to a father's job loss affects sons and daughters' lifetime education attainment and their future incomes.

Finally, the analysis presented in this paper is relevant from a policy perspective. It highlights the need for employment policies that target women and youth in order to match the increased labor supply with its demand. Additionally, our results show that young peoples' ultimate human capital attainment can be affected by a household income shock. This stresses the need to extend the safety net in developing countries in order to safeguard families and give young people more equal opportunities. Such measures can also have implications for future economic growth.

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Tables

Table 1: Samples descriptive statistics

	Sample A	**Sample B**	**Sample C**	**Sample D**	**Sample E**
	mean	*mean*	*mean*	*mean*	*mean*
Male Head's education (years)	9.87	11.63	10.70	9.50	10.84
	[9.85-9.90]	[11.60-11.65]	[10.65-10.74]	[9.45-9.55]	[10.83-10.86]
Wives' education (years)	9.80	12.09	10.75	9.53	11.09
	[9.77-9.82]	[12.07-12.12]	[10.71-10.80]	[9.48-9.58]	[11.07-11.11]
↪ Max. education	10.91	12.94	11.83	10.64	12.05
	[10.89-10.93]	[12.92-12.96]	[11.79-11.87]	[10.59-10.68]	[12.04-12.07]
Male Head's age	42.09	41.38	47.03	49.90	40.81
	[42.01-42.16]	[41.32-41.45]	[46.96-47.10]	[49.82-49.99]	[40.76-40.86]
Wives' age	39.34	39.35	44.73	47.52	38.34
	[39.26-39.41]	[39.29-39.41]	[44.65-44.80]	[47.44-47.60]	[38.29-38.38]
Household income (log)	5.81	6.75	6.09	6.36	6.16
	[5.80-5.83]	[6.74-6.76]	[6.06-6.11]	[6.34-6.38]	[6.15-6.17]
At least one child(%)	89.96	80.73	100	100	100
	[89.77-90.15]	[80.48-80.97]	-	-	-
Num. of children	2.12	1.69	2.59	2.90	2.19
	[2.11-2.13]	[1.69-1.70]	[2.57-2.60]	[2.88-2.92]	[2.19-2.20]
UA Unemployment(%)	4.70	4.52	4.59	4.66	4.64
	[4.69-4.71]	[4.51-4.53]	[4.57-4.60]	[4.64-4.68]	[4.63-4.65]
UA male Unemployment(%)	5.29	5.03	5.13	5.20	5.19
	[5.28-5.30]	[5.02-5.04]	[5.11-5.15]	[5.18-5.22]	[5.18-5.20]

Note: 95% confidence intervals between brackets;

Sample: (A) Households with female spouse who were not participating in the labor market during the initial period; (B) Households where female spouse was employed during the initial and last period; (C) Households with at least one son or daughter not participating in the labor market during the initial period; (D) Households where at least one son or daughter was employed during the initial and last period; (E) Households with at least one son or daughter enrolled in any educational level during the initial period.

Table 2: Main variables description

	Mean
Male head: Employed ⇒ Non-Employed	7.21%
↪ Plant Closure	4.28%
↪ Mass Layoff	13.77%
↪ UA Job Loss	15.85%
Wives: Out of labor market ⇒ In the labor market	22.19%
Wives: Out of labor market ⇒ Employed	16.78%
Wives: Out of labor market ⇒ Unemployed	6.98%
Wives: Δ hours worked	4.65
Children(*) (all): Out of labor market ⇒ In the labor market	30.98%
Children(*) (son): Out of labor market ⇒ In the labor market	18.03%
Children(*) (daughter): Out of labor market ⇒ In the labor market	16.66%
Children(*) (all): Δ hours worked	0.45
Children(*) (son): Δ hours worked	0.29
Children(*) (daughter): Δ hours worked	0.13

(*): Between 16 and 25 years old.

Note: Only considering household with initially employed head.

Table 3: Firm events. Job loss and recoveries.

Sample A			
Firm event	Job loss share	Job recoveries	Observations
Plant Closure	4.67%	24.08%	94,100
Mass Layoff	14.62%	24.79%	
Sample B			
Firm event	Job loss share	Job recoveries	Observations
Plant Closure	3.88%	24.25%	95,110
Mass Layoff	12.82%	25.07%	
Sample C			
Firm event	Job loss share	Job recoveries	Observations
Plant Closure	3.46%	16.61%	35,304
Mass Layoff	11.15%	17.53%	
Sample D			
Firm event	Job loss share	Job recoveries	Observations
Plant Closure	3.45%	23.11%	24,781
Mass Layoff	11.36%	22.76%	
Sample E			
Firm event	Job loss share	Job recoveries	Observations
Plant Closure	4.43%	22.46%	160,850
Mass Layoff	14.57%	24.16%	

Table 4: First stage estimations

Outcome: HH head job loss	(Sample A)			(Sample B)			(Sample C)			(Sample D)			(Sample E)		
Instrument: **Plant Closure**	0.582***			0.584***			0.596***			0.587***			0.631***		
	(0.028)			(0.025)			(0.042)			(0.028)			(0.019)		
Instrument: **Mass Layoff**		0.608***			0.600***			0.608***			0.601***			0.633***	
		(0.016)			(0.015)			(0.025)			(0.015)			(0.012)	
Instrument: **UA Job Loss**			0.500***			0.509***			0.562***			0.503***			0.454***
			(0.029)			(0.026)			(0.050)			(0.029)			(0.021)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	86,868	86,868	86,868	95,110	95,110	95,110	33,177	33,177	33,177	23,153	23,153	23,153	150,472	150,472	150,472
Adjusted R-squared	0.107	0.153	0.042	0.103	0.141	0.048	0.054	0.060	0.036	0.125	0.1631	0.058	0.091	0.109	0.033
Weak IV F-Stat	438.86	1394.04	305.64	549.95	1612.27	381.24	203.61	1062.18	129.05	267.77	770.21	400.32	580.29	3025.58	459.12

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

Table 5: Estimates on female labor participation. Extensive margin

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.179***	0.192***	0.231***	0.235***	0.211***	0.210***	0.145***	0.163***
	(0.010)	(0.010)	(0.048)	(0.050)	(0.027)	(0.028)	(0.002)	(0.003)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	94,100	86,868	94,100	86,868	94,100	86,868	94,100	86,868
Adjusted R-squared	0.029	0.048	0.028	0.048	0.029	0.048	0.034	0.054

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

Sample: Households with female spouse who were not participating in the labor market during the initial period.
Baseline: 43.03% of female spouses initially out of labor market.

Table 6: Estimates on female labor participation. Intensive margin

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	2.855***	2.806***	4.855*	4.822*	4.007***	4.057***	5.241***	4.955***
	(0.360)	(0.368)	(2.790)	(2.918)	(1.368)	(1.420)	(1.253)	(1.337)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	100,176	95,110	100,176	95,110	100,176	95,110	100,176	95,110
Adjusted R-squared	0.016	0.028	0.015	0.027	0.016	0.028	0.018	0.030

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

Sample: Households where female spouse was employed during the initial and last period.
Baseline: Initially employed female spouses work 33.81 weekly hours on average.

Table 7: Estimates on children labor participation. Extensive margin

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.161***	0.135***	0.197**	0.166*	0.171***	0.138***	0.130***	0.109***
	(0.017)	(0.017)	(0.087)	(0.090)	(0.051)	(0.053)	(0.003)	(0.003)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	35,304	33,177	35,304	33,177	35,304	33,177	35,304	33,177
Adjusted R-squared	0.041	0.061	0.041	0.061	0.041	0.061	0.041	0.061

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

Sample: Households with at least one son or daughter not participating in the labor market during the initial period.
Baseline: 66.95% of grown children initially out of labor market.

Table 8: Estimates on grown children labor participation. Intensive margin

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	1.348**	1.430**	1.547	1.672	0.821	0.858	1.949*	1.698
	(0.525)	(0.543)	(3.023)	(3.090)	(1.366)	(1.409)	(1.067)	(1.487)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	24,781	23,153	24,781	23,153	24,781	23,153	24,781	23,153
Adjusted R-squared	0.015	0.019	0.015	0.019	0.015	0.019	0.015	0.019

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

Sample: Households where at least one son or daughter was employed during the initial and last period.
Baseline: Initially employed grown children work 11.34 weekly hours on average.

Table 9: Estimates on children educational dropout

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.079***	0.059***	0.074***	0.059**	0.044***	0.038***	0.052***	0.035***
	(0.006)	(0.006)	(0.027)	(0.027)	(0.013)	(0.013)	(0.001)	(0.001)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	160,850	150,472	160,850	150,472	160,850	150,472	160,850	150,472
Adjusted R-squared	0.006	0.050	0.006	0.050	0.005	0.049	0.005	0.049

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

Sample: Households with at least one son or daughter enrolled in any educational level during the initial period.
Baseline: 77.81% of children initially enrolled in any educational level.

Table 10: Instruments in second stage estimations

	(Sample A)			(Sample B)			(Sample C)			(Sample D)			(Sample E)		
HH head job loss	0.190***	0.190***	0.189***	2.733***	2.639***	2.575***	0.134***	0.134***	0.125***	0.674	0.741	0.681	0.059***	0.063***	0.051***
	(0.010)	(0.011)	(0.010)	(0.365)	(0.371)	(0.369)	(0.017)	(0.018)	(0.017)	(1.156)	(1.186)	(1.171)	(0.006)	(0.006)	(0.006)
Instrument: **Plant Closure**	0.039			1.880			0.028			0.723			0.000		
	(0.045)			(2.652)			(0.082)			(2.051)			(0.026)		
Instrument: **Mass Layoff**		0.018			1.302			0.004			0.302			-0.023	
		(0.027)			(1.350)			(0.051)			(1.786)			(0.026)	
Instrument: **UA Job Loss**			0.010			2.716			-0.025			1.551			0.085
			(0.120)			(4.796)			(0.164)			(2.312)			(0.063)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	86,868	86,868	86,868	95,110	95,110	95,110	33,177	33,177	33,177	23,153	23,153	23,153	150,472	150,472	150,472
Adjusted R-squared	0.049	0.048	0.049	0.028	0.028	0.031	0.061	0.061	0.065	0.017	0.017	0.017	0.050	0.050	0.057

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

Table 11: Compliers descriptive statistics

	Firm events	**UA Job Loss**				
	mean	$< p25$	$p25 - p50$	$p50 - p75$	$> p75$	*mean*
Male Head's education (years)	9.26	11.76(†)	10.76(†)	10.54(†)	10.14(†)	10.80(†)
	[9.10-9.42]	[11.72-11.79]	[10.73-10.80]	[10.51-10.58]	[10.11-10.17]	[10.78-10.82]
Wives' education (years)	9.70	11.97(†)	11.03(†)	10.78(†)	10.31(†)	11.02(†)
	[9.54-9.87]	[11.93-12.00]	[10.99-11.06]	[10.75-10.82]	[10.28-10.34]	[11.00-11.04]
↪ Max. education	10.61	12.90(†)	11.99(†)	11.76(†)	11.31(†)	11.99(†)
	[10.46-10.77]	[12.87-12.93	[11.96-12.02]	[11.73-11.79]	[11.28-11.34]	[11.98-12.01]
Male Head's age	41.67	41.65	41.69	41.64	41.31	41.57
	[41.21-42.13]	[41.55-41.75]	[41.60-41.79]	[41.55-41.74]	[41.23-41.40]	[41.53-41.62]
Wives' age	39.23	39.42	39.33	39.25	38.83	39.21
	[38.78-39.69]	[39.32-39.52]	[39.24-39.43]	[39.15-39.35]	[38.75-38.91]	[39.16-39.25]
Household income (log)	5.20	6.84(†)	6.45(†)	6.36(†)	5.49(†)	6.29(†)
	[5.10-5.30]	[6.82-6.86]	[6.43-6.46]	[6.35-6.38]	[5.48-5.51]	[6.28-6.29]
Child presence(%)	89.31	80.84(†)	85.45(†)	86.03(†)	86.77(†)	84.77(†)
	[87.9-90.6]	[80.49-81.20]	[85.14-85.77]	[85.71-86.34]	[86.51-87.04]	[84.61-84.93]
Num. of children(%)	2.09	1.69(†)	1.88(†)	1.92(†)	2.02	1.88(†)
	[2.02-2.15]	[1.68-1.70]	[1.87-1.90]	[1.91-1.94]	[2.01-2.03]	[1.88-1.89]
Urban Area (UA) variables:						
Women in labor market (%)	53.37	62.50(†)	57.61(†)	56.62(†)	51.16	56.97(†)
	[51.22-55.51]	[62.06-62.94]	[57.17-58.05]	[56.16-57.07]	[50.77-51.55]	[56.76-57.19]
Employed women (%)	46.56	57.65(†)	51.98(†)	51.28(†)	45.06	51.49(†)
	[44.42-48.71]	[57.20-58.09]	[51.53-52.43]	[50.82-51.73]	[44.67-45.45]	[51.27-51.71]
Unemployment (%)	5.06	4.36(†)	4.84(†)	4.36(†)	4.93(†)	4.62(†)
	[5.01-5.11]	[4.34-4.37]	[4.82-4.85]	[4.35-4.37]	[4.92-4.94]	[4.62-4.63]
Male unemployment (%)	5.91	4.81(†)	5.35(†)	4.81(†)	5.71(†)	5.17(†)
	[5.85-5-98]	[4.80-4.83]	[5.33-5.36]	[4.79-4.82]	[5.70-5.72]	[5.16-5.18]

Notes: (i) Only considering employed household head in the first visit; (ii) 95% confidence intervals between brackets; (†) Statistically different from firm events mean.

Job loss and household labor supply adjustments in developing countries: Evidence from Argentina. Online Appendix

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1 Heterogeneous results

Our main results showed that labor supply response among sons and daughters is clearly smaller than the estimated female spouse labor force participation changes, but also relevant. Additionally, our results suggested that exposure to a father's job loss can have an impact on sons and daughters' education. To better understand how the AWE mechanism works, is worth to study household members' heterogeneous responses to a breadwinner job loss. Following the literature which points out that the AWE may be greater in vulnerable households, we first evaluate it for different income deciles. We find a higher AWE in low income deciles households. Later, when analyzing female labor participation changes for spouses initially out of labor market, it becomes relevant to study whether they find or not. Our results suggest that they are more likely to find a job than to remain unemployed. Regarding sons and daughters' outcomes, we find that there exist gender differences in both labor participation and educational enrollment: the AWE is concentrated among sons. Finally, our findings suggest that school dropouts occurred mainly at the tertiary level.

1.1 AWE and household income

Households have different characteristics across the income distribution. As the literature points out, members' labor supply tend to be more elastic in vulnerable contexts. This vulnerability can be approximated by initial household income. Despite the existence of some contributions pointing out the relevance of household vulnerability in the AWE magnitude (Ortigueira and Siassi, 2013; Serrano et al., 2019), the literature have not yet analyzed it at household level. In this section, we focus on household members' responses to a breadwinner's job loss considering different household income deciles in the initial period. In Tables 1-8 we analyze female spouses' as well as sons and daughters' responses but comparing households at both sides of two cutoffs deciles. In particular, we compare households above and below 3rd and 4th income deciles, which represents the ranks to which poor households are likely to belong.

Results from Tables 1-8 shows that both female spouse and offspring labor participation in the extensive margin as well as the latter educational dropouts follows a similar pattern across income distribution. These results suggest that households members' reactions to a head's job loss are greater for households below the 3rd or 4th income deciles cutoffs than above them. In other words, more vulnerable households show a more elastic labor supply. However, this pattern do not appear when considering female spouses' labor supply changes in working hours. Already employed women seem to show no differences in their labor supply responses at both sides of the two cutoffs analyzed. This difference compared to extensive margin results can be explained by sample selection. As noted before, households with initially working women who are still employed in the last period are different from those with women out of labor market in the first visit. More precisely, the former group shows higher education levels and incomes, and smaller presence of children and unemployment exposure than the latter. In particular, the mean wives' years of education for the already employed women is 12, which is equivalent as to have completed high school education. In other words, the prevalence of what we consider vulnerable situations may be lower within this group of households. Then, we can expect initially employed women not to face very dissimilar restrictions to increase their working hours across the income distribution.

1.2 Female labor participation and employment

Previously, we showed that initially outside of the labor market female spouses began to participate in response to a husband's job loss. However, this result is silent about whether they find or not. As expected, the likelihood of finding a job depends on labor market performance during the period analyzed. For example, contributions such as Paz (2009) and Keldenich and Knabe (2018) explore the Argentinian and German cases, respectively, during an economic growth period. Both studies find that female spouses who incorporate into the labor market are more likely to find a job than to remain unemployed. On the other hand, Bredtmann et al. (2018) considers a larger time period and shows that, on average, female labor supply responses are completely attributable

to transitions from inactivity to unemployment. However, when the authors conduct a separate analysis by country groups, their results suggest that wives living in countries that experienced better economic performance are more likely to find a job when they start to participate in the labor market. Finally, Bryan and Longhi (2018) analyses the AWE in United Kingdom during a 20-year period. Their results suggest an almost equal probability to find a job or remain unemployed for female spouses beginning to participate in the labor market. In this paper, we are considering a 20-year period in which labor market dynamics had been changing and also including year and quarter fixed effects in our estimations. Consequently, female spouses' likelihood to find a job is possibly not affected by particular macroeconomic performances in our results.

Aiming to analyze female spouses' labor transitions from outside of the labor market to employment or unemployment we create two additional outcome variables. We depart from the extensive margin female labor participation variable defined before. Then, this variable is redefined to consider whether the wive is employed or unemployed in the last period. For the former case, the original female labor participation variable is re-coded zero if she is unemployed in the last period; and, for the latter, the original variable is re-coded zero if she is employed in the last period. These new variables permit us to identify the percentage of initially outside of the labor market women who are employed or unemployed in the last period.

From Table 9 and Table 10 is it possible to compare female spouses' labor participation changes depending on whether they find a job or not. Results suggest that around 14% of initially outside of the labor market wives are employed in the last period, while between 5% and 10% of them do not find a job. The interpretation of these results are far for being simple. A higher women job finding likelihood may be desirable as can be interpreted as labor demand matching the increased labor supply. But we also need to consider the quality of the created jobs. If a male breadwinner's job loss represents a considerable household income shock, female spouses may be forced to accept any job in order to counterbalance that shock. In addition, if there exist traditional gender roles within the household, wives may prefer informal jobs because they are more flexible and

permits them to combine work with childcare or other kind of domestic tasks (Berniell et al., 2019). The consequences of male breadwinner's job loss on newly employed wives' informality levels represents an interesting topic to be considered in further investigations.

1.3 Gender differences in son and daughters' labor participation and educational attainment

In previous sections we discussed the effect of breadwinner's job loss on sons and daughters' labor market participation. As noted above, results suggest that between 10% and 16& of outside of the labor market sons or daughters began to participate in response to a father's job loss. Additionally, estimates showed that between 3.5% and 6% of sons or daughters attending any educational level, drop out of their studies after a breadwinner's job loss. However, this results are silent regarding possible gender differences among sons and daughter's labor and educational changes. This differentiation can be important in a developing country context. Recent literature focused on Latin American countries clearly point this out. For example, Gasparini et al.(2015) document a considerable educational attendance gender gap at both high school and tertiary education favoring female children. Additionally, Cardona-Sosa et nl.(2018) find that grown children's labor supply responses to a father's job loss occur mainly for sons in Colombia. Lastly, Cerutti et al. (2019) show that male breadwinner job losses are correlated with children tertiary education exits in Argentina and Brazil, which are also concentrated among male children in Argentina.

To evaluate possible gender differences in both sons and daughter's labor market participation and educational dropouts, we created two additional variables. We start from the original grown children labor participation variable defined before. Then, this variable is redefined to consider the grown child's gender. Considering daughters' labor participation, the original grown children labor participation variable is re-coded zero for sons. Analogously, it is re-coded zero if the child is a daughter, when computing sons' labor participation. These variables permit us to identify, by gender, the percentage of

initially outside of the labor market grown children who began to participate in the last period.

Tables 11 and 12 show the estimates for sons and daughters' changes in labor participation and educational attendance separately. Results suggest that only sons are affected by a father job loss. This finding can represent one of the reasons behind the documented educational attendance gender gap favoring daughters in Latin America. However, the interpretation of this result is not that straightforward. In principle, they imply that only sons' long term outcomes are affected through lower ultimate human capital attainment and, thus, lower future incomes. However, this result is also in line with the existence of traditional gender roles among grown children. According to them, daughters are more involved in domestic tasks such as housework or childcare than sons. Then, results also may show that there is not daughters' labor supply responses because they are restricted to do so in presence of these traditional roles.

1.4 Sons and daughters' educational dropouts by level

Lastly, previous results also revealed that studying sons and daughters drop out of their education due to a breadwinner's job loss. However, we made no distinction regarding the educational level they are dropping out for. As noted above, available evidence suggest that educational attendance starts to fall considerably for individuals aged 15 in Argentina. Therefore, educational dropouts are more likely to occur at high school level or later, at tertiary level. To perform this analysis, we compute two additional output variables. We began with the main educational dropout variable defined before. Then, when considering high school educational dropouts, the main variable is re-coded zero when the individual dropped out of tertiary education. The variable considering dropouts from tertiary education is constructed analogously, re-coding zero high school dropout situations. Then, these variables identify the percentage of initially studying sons and daughters dropping out of each educational level, secondary or tertiary.

Estimates on educational dropouts analyzing separately high school and tertiary education dropouts are shown in Table 13 and Table 14. Results suggest that grown children drop out of education mainly at tertiary level. In the available literature, papers evaluating dropouts by education level are scarce. An exception can be found in Cerutti et al.(2019). Their results also suggest that children dropouts occur mainly at tertiary level in Argentina. These results, taken together with findings regarding greater AWE in vulnerable households previously shown, can have some adverse implications. For example, if the exposure to a father's job loss is more likely to produce educational dropouts for children in vulnerable households, this kind of shocks worsens intergenerational mobility.

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Appendix Tables

Table 1: Estimates on female labor participation, by income deciles. Extensive margin

	OLS		IV					
	$< D3$	$\geq D3$	$< D3$	$\geq D3$	$< D3$	$\geq D3$	$< D3$	$\geq D3$
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
	0.220***	0.176***	0.320***	0.162**	0.228***	0.194***	0.180***	0.153***
HH head job loss	(0.016)	(0.012)	(0.042)	(0.036)	(0.044)	(0.037)	(0.003)	(0.004)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	24,013	62,855	24,013	62,855	24,013	62,855	24,013	62,855
Adjusted R-squared	0.044	0.048	0.053	0.049	0.064	0.049	0.057	0.058

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

Sample: Households with female spouse who were not participating in the labor market during the initial period.

Table 2: Estimates on female labor participation, by income deciles. Extensive margin

	OLS		IV					
	$< D4$	$\geq D4$	$< D4$	$\geq D4$	$< D4$	$\geq D4$	$< D4$	$\geq D4$
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.223***	0.167***	0.284***	0.142*	0.221***	0.200***	0.185***	0.146***
	(0.014)	(0.013)	(0.062)	(0.080)	(0.034)	(0.044)	(0.003)	(0.005)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	32,372	54,496	32,372	54,496	32,372	54,496	32,372	54,496
Adjusted R-squared	0.042	0.047	0.053	0.047	0.055	0.047	0.055	0.047

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

Sample: Households with female spouse who were not participating in the labor market during the initial period.

Table 3: Estimates on female labor participation, by income deciles. Intensive margin

	OLS		IV					
	$< D3$	$\geq D3$	$< D3$	$\geq D3$	$< D3$	$\geq D3$	$< D3$	$\geq D3$
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	2.595***	2.919***	5.267**	5.350**	4.904**	5.114**	5.316***	5.036***
	(0.576)	(0.474)	(2.618)	(2.704)	(2.492)	(2.104)	(0.506)	(0.525)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	26,675	68,429	26,675	68,429	26,675	68,429	26,675	68,429
Adjusted R-squared	0.022	0.024	0.014	0.032	0.020	0.028	0.079	0.146

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

Sample: Households where female spouse was employed during the initial and last period.

Table 4: Estimates on female labor participation, by income deciles. Intensive margin

	OLS		IV					
	$< D4$	$\geq D4$	$< D4$	$\geq D4$	$< D4$	$\geq D4$	$< D4$	$\geq D4$
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	2.587***	2.955***	4.607	5.615*	4.876**	5.361***	5.032***	5.598***
	(0.502)	(0.535)	(3.901)	(3.352)	(2.860)	(1.966)	(0.565)	(0.595)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	35,940	60,102	35,940	60,102	35,940	60,102	35,940	60,102
Adjusted R-squared	0.021	0.038	0.016	0.033	0.023	0.025	0.081	0.168

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

Sample: Households where female spouse was employed during the initial and last period.

Table 5: Estimates on sons and daughters' labor participation, by income deciles

	OLS		IV					
	$< D3$	$\geq D3$	$< D3$	$\geq D3$	$< D3$	$\geq D3$	$< D3$	$\geq D3$
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.149***	0.119***	0.154*	0.103	0.176***	0.038	0.127***	0.096***
	(0.026)	(0.022)	(0.092)	(0.137)	(0.065)	(0.085)	(0.005)	(0.004)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	9,324	23,852	9,324	23,852	9,324	23,852	9,324	23,852
Adjusted R-squared	0.040	0.040	0.081	0.084	0.081	0.082	0.066	0.059

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

Sample: Households with at least one son or daughter not participating in the labor market during the initial period.

Table 6: Estimates on sons and daughters' labor participation, by income deciles

	OLS		IV					
	$< D4$	$\geq D4$	$< D4$	$\geq D4$	$< D4$	$\geq D4$	$< D4$	$\geq D4$
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.143***	0.121***	0.130**	0.093	0.155***	0.030	0.122***	0.097***
	(0.023)	(0.024)	(0.092)	(0.145)	(0.065)	(0.080)	(0.005)	(0.005)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	12,536	20,640	12,536	20,640	12,536	20,640	12,536	20,640
Adjusted R-squared	0.039	0.038	0.065	0.070	0.056	0.070	0.063	0.055

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

Sample: Households with at least one son or daughter not participating in the labor market during the initial period.

Table 7: Estimates on sons and daughters' educational dropout, by income deciles

	OLS		IV					
	$< D3$	$\geq D3$	$< D3$	$\geq D3$	$< D3$	$\geq D3$	$< D3$	$\geq D3$
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.064***	0.054***	0.079**	0.033	0.053***	0.033***	0.048***	0.034***
	(0.009)	(0.007)	(0.040)	(0.039)	(0.001)	(0.002)	(0.002)	(0.002)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	41,921	46,850	41,921	46,850	41,921	46,850	41,921	46,850
Adjusted R-squared	0.011	0.012	0.055	0.057	0.059	0.060	0.055	0.057

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

Sample: Households with at least one son or daughter enrolled in any educational level during the initial period.

Table 8: Estimates on sons and daughters' educational dropout, by income deciles

	OLS		IV					
	$< D4$	$\geq D4$	$< D4$	$\geq D4$	$< D4$	$\geq D4$	$< D4$	$\geq D4$
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.060***	0.051***	0.071**	0.022	0.050***	0.035***	0.040***	0.032***
	(0.008)	(0.008)	(0.035)	(0.043)	(0.001)	(0.002)	(0.002)	(0.002)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	56,537	93,928	56,537	93,928	56,537	93,928	56,537	93,928
Adjusted R-squared	0.012	0.012	0.057	0.056	0.058	0.060	0.057	0.056

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

Sample: Households with at least one son or daughter enrolled in any educational level during the initial period.

Table 9: Estimates on female labor participation. Do not find a job

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.054***	0.063***	0.118***	0.117***	0.109***	0.108***	0.040***	0.050***
	(0.007)	(0.007)	(0.038)	(0.040)	(0.021)	(0.022)	(0.001)	(0.002)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	94,100	86,868	94,100	86,868	94,100	86,868	94,100	86,868
Adjusted R-squared	0.011	0.024	0.006	0.021	0.007	0.022	0.011	0.024

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

Sample: Households with female spouse who were not participating in the labor market during the initial period.

Table 10: Estimates on female labor participation. Find a job

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.152***	0.160***	0.159***	0.166***	0.144***	0.143***	0.120***	0.130***
	(0.009)	(0.009)	(0.044)	(0.046)	(0.025)	(0.026)	(0.002)	(0.003)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	94,100	86,868	94,100	86,868	94,100	86,868	94,100	86,868
Adjusted R-squared	0.027	0.039	0.026	0.039	0.026	0.039	0.027	0.039

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

Sample: Households with female spouse who were not participating in the labor market during the initial period.

Table 11: Estimates on sons' labor participation

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.092***	0.077***	0.194**	0.171*	0.165***	0.143***	0.077***	0.070***
	(0.015)	(0.015)	(0.089)	(0.092)	(0.048)	(0.051)	(0.002)	(0.003)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	35,304	33,177	35,304	33,177	35,304	33,177	35,304	33,177
Adjusted R-squared	0.019	0.027	0.014	0.023	0.016	0.025	0.019	0.027

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

Sample: Households with at least one son not participating in the labor market during the initial period.

Table 12: Estimates on daughters' labor participation

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.089***	0.075***	0.005	-0.018	0.024	0.009	0.069***	0.057***
	(0.015)	(0.015)	(0.059)	(0.063)	(0.039)	(0.041)	(0.003)	(0.003)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	35,304	33,177	35,304	33,177	35,304	33,177	35,304	33,177
Adjusted R-squared	0.023	0.035	0.019	0.031	0.021	0.033	0.023	0.035

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

Sample: Households with at least one daughter not participating in the labor market during the initial period.

Table 13: Estimates on sons' education dropout

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.042***	0.032***	0.047**	0.037*	0.023**	0.018*	0.039***	0.027***
	(0.004)	(0.004)	(0.021)	(0.021)	(0.010)	(0.010)	(0.004)	(0.004)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	160,850	150,472	160,850	150,472	160,850	150,472	160,850	150,472
Adjusted R-squared	0.003	0.025	0.003	0.025	0.003	0.025	0.006	0.029

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

Sample: Households with at least one son enrolled in any educational level during the initial period.

Table 14: Estimates on daughters' education dropout

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.040***	0.030***	0.042*	0.035	0.021**	0.011	0.026***	0.017***
	(0.004)	(0.004)	(0.022)	(0.022)	(0.010)	(0.012)	(0.001)	(0.001)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	160,850	150,472	160,850	150,472	160,850	150,472	160,850	150,472
Adjusted R-squared	0.003	0.025	0.003	0.025	0.003	0.025	0.006	0.029

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

Sample: Households with at least one daughter enrolled in any educational level during the initial period.

Table 15: Estimates on sons and daughters' education dropout. High school level

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.055***	0.035***	0.030	0.011	0.023*	0.016	0.041***	0.022***
	(0.005)	(0.005)	(0.021)	(0.021)	(0.012)	(0.012)	(0.005)	(0.005)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	145,521	135,735	145,521	135,735	145,521	135,735	145,521	135,735
Adjusted R-squared	0.010	0.063	0.008	0.062	0.008	0.062	0.010	0.041

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

Sample: Households with at least one son or daughter enrolled in any educational level during the initial period.

Table 16: Estimates on sons and daughters education dropout. Tertiary level

	OLS		IV					
Instrument	-	-	Plant Closure		Mass Layoff		UA Job Loss	
HH head job loss	0.095***	0.073***	0.211***	0.202**	0.087**	0.082**	0.076***	0.064***
	(0.014)	(0.014)	(0.077)	(0.080)	(0.041)	(0.041)	(0.003)	(0.003)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y	N	Y
Observations	35,195	33,524	35,195	33,524	35,195	33,524	35,195	33,524
Adjusted R-squared	0.023	0.048	0.017	0.041	0.023	0.048	0.023	0.033

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

Sample: Households with at least one son or daughter enrolled in any educational level during the initial period.