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**Effects of Early Pension Withdrawal on  
Pre-Retirement Labour Supply: Evidence  
from Chile during the COVID-19 Pandemic**

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1 **Effects of early pension withdrawal on pre-retirement labour supply:**

2 **Evidence from Chile during the COVID-19 pandemic**

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# 1 **Effects of early pension withdrawal on pre-retirement labour supply:**

## 2 **Evidence from Chile during the COVID-19 pandemic**

3 Although the defined contribution pension system in Chile had not permitted pension  
4 withdrawals before retirement age, the Chilean Congress approved laws allowing early  
5 withdrawals as an economic support measure in response to the COVID-19 pandemic.  
6 This study empirically analysed the effects of mainly the third early pension  
7 withdrawal on pre-retirement labour supply using data from a nationally and regionally  
8 representative household survey for 2022. To address potential endogeneity from self-  
9 selection into pension withdrawals, we applied inverse probability weighting based on  
10 propensity score estimation. The results showed that individuals who withdrew their  
11 pensions worked longer hours and had a higher probability of employment. These  
12 effects were more pronounced among women, while they were statistically  
13 insignificant for men. The findings were robust to household-level analysis, which  
14 additionally showed that pension savings withdrawn by women were more likely to be  
15 used for home repairs. Therefore, the early pension withdrawal, rather than reducing  
16 labour supply through the income effect, encouraged female labour supply, possibly  
17 due to improved remote-work conditions.

18 Keywords: early pension withdrawal; labour supply; Chile; inverse probability  
19 weighting; propensity score; COVID-19

20 JEL classification codes; H55; J22; J26; J32

## 21 **1. Introduction**

22 Chile was the first country to introduce a defined contribution pension system in 1981,  
23 replacing its previous pay-as-you-go system. In this system, the Pension Fund Administrator  
24 (*Administradora de Fondos de Pensiones*, AFP) manages individual pension accounts within  
25 a fully funded scheme. Workers are required to contribute 10% of their monthly salary to  
26 AFP accounts, and the investment returns determine their retirement benefits (Caputo and  
27 Ordóñez 2024; Larragaña 2024). The defined contribution system was expected to ensure  
28 fiscal sustainability and increase national savings. However, as mandatory contributions

1 applied only to formal wage workers, low contribution density and the presence of informal  
2 and self-employed workers resulted in low replacement rates and limited pension coverage  
3 (Caputo and Ordóñez 2024; Larragaña 2024).<sup>1</sup>

4 To address these issues, the 2008 pension reform introduced a non-contributory  
5 pension financed by general taxes to provide financial support for low-income individuals  
6 unable to accumulate sufficient pension benefits. The Basic Solidarity Pension (*Pensión*  
7 *Básica Solidaria*, PBS) is a transfer for individuals of retirement age who are not entitled to  
8 the defined contribution system and belong to the lowest 60% of the national income  
9 distribution. The Solidarity Pension Contribution (*Aporte Previsional Solidario*, APS)  
10 supplements the PBS with a subsidy based on individuals' accumulated pension savings for  
11 those who have some pension savings but whose received benefit falls below a threshold  
12 (Becerra 2023; Duch et al. 2021; Larragaña 2024). However, low replacement rates and  
13 pension amounts persisted.<sup>2</sup> As a result, criticism of the AFP system increased, leading to the  
14 emergence of the “No more AFP” (*No más AFP*) social movement in 2016 (Kay and  
15 Borzutzky 2022; Larragaña 2024). The dissatisfaction with the pension system was one of  
16 key drivers of the mass protests known as the “Social Outburst” (*Estallido Social*) in 2019,  
17 which included demands for the abolition or substantial reform of the AFP system (Barraza,

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<sup>1</sup> Although a worker who contributed for 30 years was expected to receive a pension equal to nearly 70% of their average remuneration during their final years of employment, the median replacement rate was 33% for men and 12% for women from 2007 to 2014 (Larragaña 2024).

<sup>2</sup> The PBS amount was 75,000 Chilean pesos per month in 2009 (Larragaña 2024), equivalent to 134 USD using an exchange rate of 559.67 Chilean pesos per USD for that year. Data on the nominal exchange rate were obtained from the Central Bank of Chile (<https://si3.bcentral.cl/siete>, accessed February 21, 2026).

1 Moraga, and Iturra 2023; Kay and Borzutzky 2022).

2 Notably, the defined-contribution system had not permitted pension withdrawals  
3 before the retirement age of 65 for men and 60 for women under any circumstances (Barraza,  
4 Moraga, and Iturra 2023; López and Rosas 2022). However, during the COVID-19 crisis,  
5 dissatisfaction with government relief measures led to widespread demands to allow pension  
6 fund withdrawals to meet basic needs (Kay and Borzutzky 2022). In response, the Chilean  
7 Congress approved three laws allowing pension fund withdrawals before the official  
8 retirement age without any eligibility restrictions. The first law took effect on July 30, 2020,  
9 the second on December 10, 2020, and the third on April 28, 2021. Each law allowed  
10 contributors to withdraw 10% of their pension savings within 365 days of the law's  
11 enforcement, with a maximum withdrawal of 150 *Unidades de Fomento* (UF) (approximately  
12 5,504 USD) and a minimum of 35 UF (approximately 1,284 USD) (Ministerio de Trabajo y  
13 Previsión Social 2020a; 2020b; 2021a).<sup>3</sup>

14 This study aimed to empirically analyse the effects of early pension withdrawal on  
15 pre-retirement labour supply in Chile. Several studies have examined the effects of the 2008

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<sup>3</sup> Individuals with savings below 35 UF could withdraw their entire savings. Those with savings between 35 UF and 350 UF were required to withdraw a minimum of 35 UF. Individuals with savings from 350 UF to 1,500 UF had to withdraw exactly 10% of their savings. Those with savings above 1,500 UF were required to withdraw a maximum of 150 UF. The UF is an inflation-indexed unit of account used by financial institutions for pricing and credit operations (Kay and Borzutzky 2022). The Central Bank of Chile calculates and publishes the exchange rate between the UF and the Chilean peso. In 2020, the average exchange rates were 29,070.33 Chilean pesos per UF and 792.22 Chilean pesos per US dollar. The data were obtained from the Central Bank of Chile (<https://si3.bcentral.cl/siete>, accessed February 21, 2026).

1 pension reform on labour markets. Using difference-in-differences with propensity score  
2 matching, Encina (2013) found that PBS recipients reduced their labour market participation  
3 in 2008, as indicated by fewer working months, longer inactive periods, and lower pension  
4 contribution density. Becerra (2023) reported that while the expected pension accrual under  
5 the 2008 reform increased contributory-sector participation among pre-retirement age  
6 workers, it did not affect their labour force participation, earnings, or hours worked.  
7 Regarding the early pension withdrawals in Chile, some studies have focused on their  
8 determinants. They found that the spread of COVID-19 (Barraza, Moraga, and Iturra 2023),  
9 economic hardship, distrust in the pension system, and lack of financial literacy (Fuentes,  
10 Mitchell, and Villatoro 2023) encouraged early withdrawals, while individuals with right-  
11 leaning political views and higher trust in the system were less likely to withdraw their  
12 pensions (López and Rosas 2022). Other studies (e.g., Lorca 2021; Madeira 2022; Madeira  
13 2024) used simulation analysis to show that early pension withdrawals would negatively  
14 affect future retirement savings and pension benefits. However, they did not examine the  
15 effects on current labour supply among pre-retirement age workers. Exceptionally, Idrovo-  
16 Aguirre and Contreras-Reyes (2021) found that early pension withdrawals were positively  
17 associated with rejecting formal job offer among unemployed construction workers in 2021,  
18 possibly due to an increase in their reservation wage. However, they did not examine the  
19 effects on the labour supply of the entire pre-retirement workforce in Chile.

20 To address the research gap, this study examined the causal effects of the early  
21 pension withdrawal on pre-retirement labour supply in Chile, using data from the nationally  
22 representative Socio-economic Characterization Survey (*Encuesta de Caracterización*  
23 *Socioeconómica Nacional*, CASEN). To address potential endogeneity from self-selection  
24 into early withdrawals, we applied inverse probability weighting based on propensity score  
25 estimation. Notably, under the defined contribution system, early pension withdrawals

1 directly reduce future benefit amounts. As of September 2021, over one-third of AFP  
2 affiliates had depleted their pension savings after the third withdrawal (López and Rosas  
3 2022). If early withdrawals also led to exits from formal labour markets through the income  
4 effect, the resulting decrease in contribution density would further reduce future pension  
5 benefits. Analysing the effects on pre-retirement labour supply is therefore essential for  
6 assessing the sustainability of the defined contribution system and contributes to the  
7 literature.

8           The remainder of this paper is organized as follows. Section 2 describes the empirical  
9 framework, including the empirical model and data sources. Section 3 presents the estimation  
10 results. Section 4 provides robustness checks. The final section concludes.

## 11 **2. Empirical framework**

### 12 *Empirical model*

13 We estimate the following equation to analyse the effects of the early pension withdrawal on  
14 labour supply:

$$15 \quad Y_i = \alpha + \beta \textit{Withdraw}_i + \mathbf{Z}'_i \boldsymbol{\gamma} + u_i, \quad (1)$$

16 where the outcome variable  $Y_i$  is either the weekly working hours of individual  $i$   
17 ( $\textit{Workhour}_i$ ) or a binary variable equal to 1 if the individual has positive working hours  
18 ( $\textit{Workdummy}_i$ ); the binary treatment variable  $\textit{Withdraw}_i$  equal to 1 if the individual  
19 withdrew pension savings within the past 12 months and 0 otherwise; the vector  $\mathbf{Z}_i$  includes  
20 variables that determine  $\textit{Withdraw}_i$  and affect the outcome variable, such as individual

1 characteristics (gender, marital status, age and age squared, ethnicity,<sup>4</sup> head-of-household  
2 status, and education levels, with secondary education as the reference category), household  
3 composition (household size, presence of children under 18 years, and presence of older  
4 adults over 60 years), and monthly non-labour income (monetary subsidies and total income  
5 of other household members); and the error term is  $u_i$ . We also included municipality  
6 dummies to control for local wage differentials and industry structure.<sup>5</sup>

7         Following Unnikrishnan and Imai (2020), who examined the effects of pension  
8 receipt on household welfare indicators, including labour supply, in India, we applied inverse  
9 probability weighting based on propensity score estimation.<sup>6</sup> The CASEN survey provides  
10 expansion weights, which ensure the sample is representative at national, regional, and urban  
11 or rural levels. Therefore, the use of these expansion weights is required for statistical  
12 inference (Ministerio de Desarrollo Social y Familia 2023). Thus, we followed Ridgeway et  
13 al. (2015), who provided guidance on using sampling weights in propensity score estimation.

14         In the first stage, we estimated the probability of  $Withdraw_i$  (i.e., the propensity  
15 score) by regressing the variable on the vector  $\mathbf{Z}_i$  using probit estimation with expansion  
16 weights. In the second stage, we estimated Equation (1) using the product of the inverse  
17 probability weights and expansion weights as the weights. Moreover, we normalize the

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<sup>4</sup> Ethnicity is a binary variable equal to 1 if the individual identifies as a member of one of the ten indigenous groups recognized by law.

<sup>5</sup> Municipalities, known as communes (*comunas*), are the smallest administrative units in Chile. The 2022 survey included 335 of the 346 municipalities, excluding those that were difficult to access.

<sup>6</sup> Encina (2013) used nearest-neighbor matching estimations. However, Busso, DiNardo, and McCrary (2014) found that estimators using inverse probability weighting perform better in terms of both bias and variance compared to those using various matching approaches.

1 weights by dividing each sum of the weights within the control and treatment groups.

2 Therefore, we assigned the following final weights  $W_i^C$  and  $W_i^T$  to the control and treatment  
3 groups, respectively:

$$4 \quad W_i^C = \left\{ (1 - \text{Withdraw}_i) \frac{\hat{p}_i}{1 - \hat{p}_i} S_i \right\} / \left\{ \frac{1}{n} \sum_{i=1}^n (1 - \text{Withdraw}_i) \frac{\hat{p}_i}{1 - \hat{p}_i} S_i \right\}, \quad (2)$$

5 and

$$6 \quad W_i^T = (\text{Withdraw}_i S_i) / \left( \frac{1}{n} \sum_{i=1}^n \text{Withdraw}_i S_i \right), \quad (3)$$

7 where  $S_i$  is the expansion weight,  $n$  is the number of the observations, and  $\hat{p}_i$  is the estimated  
8 propensity score from the first-stage probit estimation. The coefficient  $\beta$  in Equation (1)  
9 therefore identifies the conditional average treatment effect on the treated (ATT).<sup>7</sup> When the  
10 outcome variable is  $Workdummy_i$ , we estimated Equation (1) with the final weights using  
11 probit estimation.

## 12 ***Data and descriptive statistics***

13 We sourced the data from the CASEN 2022 survey,<sup>8</sup> a cross-sectional household survey  
14 conducted every two or three years. Although the data from the 2020 survey are available,  
15 individuals in 2020 had very limited discretion over employment decisions due to COVID-19

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<sup>7</sup> Ridgeway et al. (2015) showed that  $\frac{1}{n} \sum_{i=1}^n Y_i W_i^T - \frac{1}{n} \sum_{i=1}^n Y_i W_i^C = E(Y_i^T - Y_i^C | \text{Withdraw}_i = 1)$ ,

where  $Y_i^T$  and  $Y_i^C$  denote the potential outcomes when the treatment occurred and did not occur, respectively.

<sup>8</sup> We obtained the data from the Ministry of Social Development and Family of Chile

(<https://observatorio.ministeriodesarrollosocial.gob.cl/encuesta-casen-2022>, accessed February 25, 2025).

1 restrictions.<sup>9</sup> After the implementation of the “Step by Step” (*Paso a Paso*) plan in July 2020,  
2 lockdown measures were gradually lifted by the end of 2021 (Larroulet et al. 2026). As a  
3 result, employment choices became more feasible in 2022.<sup>10</sup>

4 The 2022 survey included 72,056 households and 202,231 individuals. The survey  
5 was conducted from November 1, 2022 to February 2, 2023. It collected detailed information  
6 on individual characteristics, such as age, gender, education level, employment status, and  
7 family structure. Notably, the survey asked whether an individual had withdrawn any 10% of  
8 his or her AFP savings within the past 12 months; this served as the treatment variable in this  
9 study.<sup>11</sup> Given that the expiration date for the second early pension withdrawal was  
10 December 10, 2021, most individuals who withdrew pensions during the 2022 survey period  
11 made their third withdrawal.

12 In constructing the sample, in-house domestic servants were excluded because their  
13 income was not included in total household income and they were not counted in household  
14 size. After creating the household composition variables and calculating the total income of  
15 other household members, we limited the sample to individuals affiliated with the pension

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<sup>9</sup> The Chilean government announced the first mandatory lockdown on March 26, 2020, which included the closure of schools (Larroulet et al. 2026).

<sup>10</sup> Alternatively, data from the longitudinal Social Protection Survey (*Encuesta de Protección Social*, EPS) are available. The 2020 EPS survey included an additional telephone survey conducted from August 28 to December 10, 2020 (Ministerio de Trabajo y Previsión Social 2021b). However, because the 2020 EPS survey asked whether an individual used or will use his or her AFP funds, it is not possible to consistently identify early pension withdrawals from this survey.

<sup>11</sup> As explained in footnote 3, the withdrawal amounts are not always exactly 10% of AFP savings. In addition, the survey did not collect information on the withdrawal amounts.

1 system, aged 25–64 years for men and 25–59 years for women.<sup>12</sup> We also excluded  
2 individuals who reported that their reasons for not seeking employment were enrolment in  
3 school, illness or disability, or receipt of pensions, because they were not able to participate  
4 in the labour force. Additionally, we excluded observations in which at least one used  
5 variable was reported as unknown.<sup>13</sup> Observations outside the common support were also  
6 excluded, although this applied to only two cases. The final sample included 67,987  
7 observations.

8 We chose the variables included in vector  $\mathbf{Z}_i$  in Equation (1) based on Barraza,  
9 Moraga and Iturra, (2023), who analysed the determinants of early pension withdrawals in  
10 Chile using data from the CASEN 2020 survey. Previous studies (e.g., Murakami and  
11 Nomura 2023) have shown that the effects of higher education on wages were heterogeneous  
12 across degree types. Therefore, we used detailed dummy variables for educational attainment  
13 instead of years of schooling. Specifically, we included dummy variables for three types of  
14 degrees (technical, professional, and post-graduate), and for each degree, we created separate

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<sup>12</sup> Using the expansion weights, the affiliation rate among individuals aged 15 or older was 68.9% in 2022. Because the minimum age for pension system affiliation was 15, the sample could include individuals aged 15 or older. However, due to the low affiliation rate among those aged 15 to 22 and the relatively high university enrolment rate, we set the minimum sample age at 25 to minimize the sample selection issue. The results for the sample aged 15 to 64 for men and 15 to 59 for women are remarkably similar to those presented in Section 3. Detailed results are available upon request.

<sup>13</sup> The income variables in the data had already been corrected and adjusted for non-response and missing values; therefore, we did not conduct additional data cleaning, including removing outliers.

1 dummies for individuals who completed and did not complete the degree.<sup>14</sup> Table A1 in the  
2 Appendix presents the descriptive statistics of the variables used, applying the expansion  
3 weights.

### 4 **3. Estimation results**

#### 5 *Baseline results*

6 Table A2 in the Appendix presents the first-stage results of the probit estimation. Married  
7 individuals, heads of households, indigenous people, those with children under 18 in the  
8 household, and recipients of monetary subsidies were more likely to make the early pension  
9 withdrawal. In contrast, individuals aged 54.24 years or older (based on the coefficients in  
10 column [1] of Table A2) and women were less likely to make the early pension withdrawal.<sup>15</sup>

11 Figure 1 presents the histogram of estimated propensity scores for the control and  
12 treatment groups. The figure demonstrates that individuals with a low probability of  
13 withdrawal are more likely to be in the control group, indicating that the estimated propensity  
14 score accurately reflects the probability of treatment assignment. Furthermore, Table 1 shows

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<sup>14</sup> Since the 1980 education reform, Chile has had three types of higher education institutions:

Technical Training Centers (*Centros de Formación Técnica*, CFTs), Professional Institutes (*Institutos Profesionales*, IPs), and universities. Universities can offer all three types of degrees, IPs can offer only technical and professional degrees, and CFTs can offer only technical degrees. For more details, see Murakami and Nomura (2023).

<sup>15</sup> Thus, the relationship between age and the probability of making early pension withdrawals follows an inverse U-shaped pattern. Given that pension withdrawals are considered dissaving, this finding aligns with Schclarek and Caggia (2017), who identified a U-shaped relationship between age and saving rate in Chile. However, it contradicts the standard life-cycle hypothesis.

1 that, when applying the final weights from Equations (2) and (3), the means of all  
2 explanatory variables do not differ significantly between the control and treatment groups.  
3 Thus, the final weights achieved balanced covariates between the control and treatment  
4 groups.

5 Table 2 presents the second-stage estimation results. Individuals who withdrew their  
6 pensions within the past 12 months worked significantly longer hours and had a higher  
7 probability of employment (0.9054 hours and 1.54%, respectively; see columns [1] and [2] of  
8 Table 2). Thus, the treatment group's longer working hours result from both increased hours  
9 among the employed and a higher probability of employment. Among the control variables,  
10 heads of household and individuals with technical, professional, or post-graduate degrees  
11 worked longer hours and had a higher probability of employment. In contrast, individuals  
12 aged 38.60 years or older (based on the coefficients in column [1] of Table 2), those whose  
13 final educational attainment was primary education or less, women, indigenous people,  
14 individuals with children and older people, and those with higher non-labour income worked  
15 fewer hours and had a lower probability of employment. The negative coefficients for non-  
16 labour income indicate negative effects on labour supply through the income effect.

17 The positive association between the early pension withdrawal and pre-retirement  
18 labour supply contrasts with Idrovo-Aguirre and Contreras-Reyes (2021). Thus, this finding,  
19 which contradicts the standard income effect, requires further explanation. One possible  
20 explanation is that withdrawn pension savings were used to fund home repairs and the  
21 purchase of durable goods, such as electronic products and household equipment, which  
22 improved conditions for working from home (Banco Central de Chile, 2020; 2021; Idrovo-

1 Aguirre and Contreras-Reyes 2021), thereby contributing to the increase in labour supply.<sup>16</sup>

2 We examined this issue further in Section 4.

### 3 *Heterogeneous effects*

4 To further examine the effects of the early pension withdrawal on labour supply, we  
5 estimated the effects separately by gender. The first-stage estimation results for men and  
6 women appear in columns [2] and [3] of Table A2 in the Appendix, and the second-stage  
7 results for men and women are shown in columns [3]–[4] and [5]–[6] of Table 2,  
8 respectively. The effects of the early pension withdrawal on working hours and working  
9 probability were positive and statistically significant only for women, with larger effects  
10 (1.6260 hours and 2.91%, respectively; see columns [5] and [6] of Table 2) than for the full  
11 sample. For men, the effects were positive but not statistically significant. We also found that  
12 marriage and having children substantially reduced working hours and working probability,  
13 consistent with previous studies, including Murakami and Nomura (2023), who analysed the  
14 determinants of labour participation in Chile.

15 The finding that the positive effect of the pension withdrawal on labour supply was  
16 observed only for females likely supports the previous explanation. As women in Chile were  
17 more likely to be employed in occupations compatible with remote work, such as clerical  
18 positions (Berniell et al. 2023), it is plausible that pension savings withdrawn by women were

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<sup>16</sup> Although we controlled for the covariates determining the early pension withdrawal, we cannot completely rule out the possibility that other unobserved shocks would affect both early pension withdrawal and labor supply. For example, it is possible that individuals who faced unexpected financial needs and liquidity constraints needed to withdraw their pensions and increase their labour supply.

1 used to improve remote-work conditions, which may have contributed to the increase in their  
2 labour supply.

3         Second, in addition to gender, we divided the sample by age groups. Table 3 shows  
4 the second-stage estimation by age group.<sup>17</sup> The positive effects of the early pension  
5 withdrawal on female labour supply were consistent across age groups, with the largest  
6 effects observed among women aged 40 to 49 years. In contrast, we found a significant  
7 negative effect of the early pension withdrawal on working hours for men aged 40 to 49  
8 years, while the effects for men in other age groups were positive but not statistically  
9 significant. As the negative effect aligns with the standard income effect, it is plausible that  
10 men aged 40 to 49 years did not need to increase their working hours, possibly because they  
11 held other liquid assets.

#### 12 **4. Robustness checks**

13 A possible concern with our analysis is that it may not fully account for individual labour  
14 supply being determined at the household level, even though we controlled for household-  
15 level characteristics. Therefore, as a robustness check, following Unnikrishnan and Imai  
16 (2020), we examined the effect of the early pension withdrawal on working hours at the  
17 household level.

18         In the household-level analysis, the treatment variable equals 1 if at least one male  
19 member under 65 or one female member under 60 withdrew their pensions. The dependent  
20 variable is the total hours per week worked by men aged 15 to 64 and women aged 15 to 59

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<sup>17</sup> We excluded observations outside the common support in each estimation. Using the final weights from Equations (2) and (3), we confirmed that the means of all explanatory variables did not differ significantly between the control and treatment groups across all age groups.

1 in each household.<sup>18</sup> We used household head information for individual characteristics  
2 (gender, marital status, age and age squared, ethnicity, and education levels). We also  
3 included household-level variables (household size, presence of children under 18 years,  
4 presence of older adults over 60 years, and total monetary subsidies). The sample was limited  
5 to households where the household head was a man aged 25 to 64 or a woman aged 25 to 59.  
6 We excluded households with no members affiliated with the pension system. Table A3 in  
7 the Appendix presents the descriptive statistics of the variables using the expansion weights.  
8 The final weights for the control and treatment groups were calculated based on Equations (2)  
9 and (3), consistent with the individual-level analysis. Table A4 presents the first-stage  
10 estimation results, and Table A5 presents the descriptive statistics of the variables using the  
11 final weights, showing that the covariates were balanced between the control and treatment  
12 groups.

13 Table 4 presents the second-stage estimation results. Households with at least one  
14 member who withdrew their pensions worked 1.156 more hours per week than those without  
15 such a member (column [1]). Disaggregating by gender,<sup>19</sup> the results align with our  
16 individual-level analysis. Households with at least one male member under age 65 who  
17 withdrew their pensions did not have significantly longer working hours. In contrast,  
18 households with at least one female member under age 60 who withdrew their pensions

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<sup>18</sup> In the household-level analysis, we did not use the dummy variable for employment status, because only 8% of households in the sample had no working members at those ages.

<sup>19</sup> When analysing the effects of pension withdrawal by male members, we excluded households without men aged 15 to 64 and households where only women withdrew their pensions. Similarly, when analysing the effects of pension withdrawal by female members, we excluded households without women aged 15 to 59 and households where only men withdrew their pensions.

1 worked 1.501 more hours per week (column [3]). These findings suggest that the labour  
2 supply response to pension withdrawal is stronger in households with female withdrawers.

3 To examine the mechanism behind the positive effects of the early pension  
4 withdrawal on labour supply, we additionally analysed the effects of withdrawn pensions on  
5 home repairs. We used a binary dependent variable (*repair*), which equals 1 if the household  
6 made any improvements or changes to its home during the past year, including upgrades to  
7 utility connections (e.g., electricity) and construction of interior partitions and rooms. Tables  
8 A3 and A5 in the Appendix show the descriptive statistics for this variable. Using the same  
9 final weights as in Table 4, Table A6 reports the second-stage estimation results. We found  
10 that households with at least one member who withdrew their pensions were 3.25% more  
11 likely to have repaired their home (column [1]). The effect was larger when at least one  
12 female member withdrew her pension (3.85%, column [3]) compared to when at least one  
13 male member withdrew his pension (3.24%, column [2]).

14 Therefore, we conclude that a significant mechanism underlying the positive effects  
15 of early pension withdrawal on female labour supply is that pension savings withdrawn by  
16 women were more likely to be used for home repairs, which improved remote-work  
17 conditions. This finding is consistent with Berniell et al. (2023), who found that women in  
18 jobs compatible with remote work were more likely to remain employed during the COVID-  
19 19 pandemic in Latin American countries, including Chile.

## 20 **5. Conclusion**

21 In response to the COVID-19 pandemic, the Chilean Congress approved three laws  
22 permitting early pension withdrawals before the official retirement age of 65 for men and 60  
23 for women. This study empirically examined the effects of mainly the third early pension  
24 withdrawal on labour supply among men aged 25 to 64 and women aged 25 to 59, using the  
25 data from a nationally and regionally representative household survey for 2022. To address

1 potential endogeneity from self-selection in pension withdrawals, we applied inverse  
2 probability weighting based on propensity score estimation. Specifically, we used the product  
3 of the inverse probability weights and expansion weights as the final weights, which  
4 successfully balanced the covariates between the control and treatment groups.

5 We found that individuals who withdrew their pensions worked longer hours and had  
6 a higher probability of employment. The effects were more pronounced among women, while  
7 they were statistically insignificant for men. This result remained robust to the household-  
8 level analysis, which additionally showed that pension savings withdrawn by women were  
9 more likely to be used for home repairs. Thus, the early pension withdrawal, rather than  
10 reducing labour supply through the income effect, encouraged female labour supply, possibly  
11 due to improved remote-work conditions.

12 These findings suggested that early pension withdrawals in Chile provided a short-  
13 term coping mechanism for women, offering liquidity during the COVID-19 crisis without  
14 discouraging labour market participation. However, the positive labour supply response  
15 observed in the short term may not have led to long-term welfare gains, as the withdrawals  
16 directly reduced future pension savings. Therefore, analysis of the medium- and long-term  
17 effects of early pension withdrawals on future pension savings and retirement benefits,  
18 incorporating the positive short-term labour supply effects found in this study, may be  
19 necessary. Such analysis is beyond the scope of this study, but it is an important topic for  
20 future research.

## 21 **Declarations and ethics statements**

### 22 *Data availability statement*

23 The data that support the findings of this study are available upon request.

1 ***Competing interests***

2 There are no potential conflicts of interest to declare.

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1 **Tables**

2 Table 1. Descriptive statistics of variables using the final weights in Equations (2) and (3).

	Control	Treatment	Total	<i>P</i> value
Workhour	35.543 (18.937)	36.402 (18.435)	35.973 (18.693)	0.001
Workdummy	0.835 (0.371)	0.850 (0.357)	0.843 (0.364)	0.001
Female	0.437 (0.496)	0.436 (0.496)	0.437 (0.496)	0.971
Married	0.639 (0.480)	0.638 (0.481)	0.639 (0.480)	0.822
Age	42.727 (10.358)	42.701 (10.367)	42.714 (10.362)	0.826
Age_squared	1,932.861 (906.965)	1,930.864 (909.374)	1,931.863 (908.164)	0.844
Head_household	0.616 (0.486)	0.616 (0.486)	0.616 (0.486)	0.944
Primary	0.119 (0.324)	0.119 (0.324)	0.119 (0.324)	0.938
Technical_incomplete	0.023 (0.149)	0.023 (0.150)	0.023 (0.150)	0.98
Technical_completed	0.119 (0.323)	0.118 (0.323)	0.118 (0.323)	0.942
Professional_incomplete	0.031 (0.175)	0.032 (0.176)	0.032 (0.175)	0.812
Professional_completed	0.243 (0.429)	0.244 (0.429)	0.244 (0.429)	0.944
Postgraduate_incomplete	0.002 (0.042)	0.002 (0.041)	0.002 (0.042)	0.903
Postgraduate_completed	0.028 (0.166)	0.029 (0.167)	0.028 (0.166)	0.956
Ethnicity	0.099 (0.298)	0.099 (0.298)	0.099 (0.298)	0.956
People_in_household	3.384 (1.511)	3.383 (1.545)	3.383 (1.528)	0.961
Children	0.520 (0.500)	0.519 (0.500)	0.519 (0.500)	0.864
Older	0.234 (0.423)	0.234 (0.424)	0.234 (0.423)	0.862
Monetary subsidies (10,000 pesos)	1.082 (3.026)	1.064 (2.863)	1.073 (2.946)	0.578
Other_householdmembers_income (10,000 pesos)	80.807 (109.895)	80.907 (115.692)	80.857 (112.830)	0.944
Observations	27,155	40,832	67,987	

3 Note: Numbers in parentheses represent standard deviations. The *P* values show the results of *t*-test assessing the hypothesis that the means of the control and treatment  
 4 groups are equal.

1 Table 2. Second-stage estimation results.

Dependent variable	Full		Male		Female	
	Workhour	Workdummy	Workhour	Workdummy	Workhour	Workdummy
	(1)	(2)	(3)	(4)	(5)	(6)
Withdraw	0.9054*** (0.2000)	0.0154*** (0.0038)	0.0464 (0.2465)	0.0020 (0.0041)	1.6260*** (0.3096)	0.0291*** (0.0064)
Female	-9.7386*** (0.2173)	-0.1505*** (0.0036)				
Married	0.6977*** (0.2231)	0.0005 (0.0041)	3.4541*** (0.3045)	0.0458*** (0.0047)	-2.9234*** (0.3205)	-0.0704*** (0.0068)
Age	0.3594*** (0.0834)	0.0067*** (0.0016)	0.2038** (0.0998)	0.0019 (0.0016)	1.0558*** (0.1504)	0.0204*** (0.0030)
Age_squared	-0.0047*** (0.0010)	-0.0001*** (0.0000)	-0.0029** (0.0011)	-0.0000 (0.0000)	-0.0134*** (0.0018)	-0.0003*** (0.0000)
Head_household	4.2259*** (0.2328)	0.0795*** (0.0039)	2.7592*** (0.2742)	0.0421*** (0.0042)	4.5658*** (0.3620)	0.0987*** (0.0071)
Primary	-2.2620*** (0.3181)	-0.0227*** (0.0053)	-2.0610*** (0.3714)	-0.0108** (0.0055)	-3.1410*** (0.5898)	-0.0445*** (0.0097)
Technical_incomplete	-0.1446 (0.6614)	0.0092 (0.0116)	-0.1532 (0.8053)	0.0028 (0.0130)	0.0782 (1.0268)	0.0217 (0.0193)
Technical_completed	2.9620*** (0.3419)	0.0506*** (0.0068)	1.1151*** (0.4020)	0.0252*** (0.0081)	5.1407*** (0.4967)	0.0807*** (0.0099)
Professional_incomplete	-0.0605 (0.5518)	0.0065 (0.0103)	-1.1475* (0.6588)	-0.0143 (0.0097)	1.4653 (0.9230)	0.0480*** (0.0182)
Professional_completed	4.0122*** (0.2589)	0.1038*** (0.0058)	-0.0581 (0.3317)	0.0251*** (0.0064)	8.5426*** (0.4124)	0.1892*** (0.0092)
Postgraduate_incomplete	-5.3030* (3.1179)	-0.0809 (0.0542)	-9.1863** (3.8824)	-0.1074** (0.0438)	1.3959 (4.9561)	0.0373 (0.1238)
Postgraduate_completed	4.7048*** (0.5105)	0.1451*** (0.0167)	1.6492** (0.8316)	0.0615*** (0.0189)	9.0529*** (0.7800)	0.2434*** (0.0267)
Ethnicity	-0.7493** (0.3081)	-0.0122** (0.0055)	-0.4833 (0.3886)	-0.0118* (0.0060)	-0.6766 (0.4719)	-0.0079 (0.0092)
People_in_household	0.1447* (0.0854)	-0.0019 (0.0015)	0.0516 (0.1083)	-0.0032* (0.0018)	-0.1011 (0.1401)	-0.0069*** (0.0026)
Children	-0.7431***	-0.0152***	0.5918*	0.0072	-3.6843***	-0.0696***

	(0.2596)	(0.0049)	(0.3414)	(0.0061)	(0.3822)	(0.0080)
Older	-1.0085***	-0.0264***	-1.5032***	-0.0230***	-0.4384	-0.0205***
	(0.2491)	(0.0044)	(0.3275)	(0.0047)	(0.3871)	(0.0077)
Monetary subsidies	-0.3187***	-0.0017***	-0.1875	-0.0009	-0.2204***	-0.0011
	(0.0522)	(0.0006)	(0.1188)	(0.0018)	(0.0633)	(0.0008)
Other_householdmembers_income	-0.0020**	-0.0000	0.0017	0.0001*	-0.0018	-0.0001*
	(0.0010)	(0.0000)	(0.0018)	(0.0000)	(0.0013)	(0.0000)
Municipality dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	67,987	67,955	35,885	35,557	32,094	32,076

1 Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.  
2 Numbers in parentheses represent robust standard errors clustered by household. The final weights in  
3 Equations (2) and (3) were used. Coefficients in columns (2), (4) and (6) represent the marginal effects of  
4 the probit estimation. In the probit estimation, observations with no within-municipality variation in the  
5 work dummy variable (i.e., municipalities where the dummy equals 1 or 0 for all observations) were  
6 excluded.  
7

1 Table 3. Second-stage estimation results by age groups.

Dependent variable	Full		Male		Female	
	Workhour (1)	Workdummy (2)	Workhour (3)	Workdummy (4)	Workhour (5)	Workdummy (6)
Age 25–39	1.0139*** (0.2917)	0.0143** (0.0057)	0.4478 (0.3548)	0.0056 (0.0060)	1.2793*** (0.4596)	0.0224** (0.0094)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,224	28,121	14,049	13,370	14,169	14,116
Age 40–49	0.5564 (0.3851)	0.0178*** (0.0069)	-1.1966** (0.4989)	-0.0076 (0.0081)	1.8315*** (0.5632)	0.0357*** (0.0110)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,739	17,621	8,678	7,825	9,058	8,971
Age 50–64	1.1343*** (0.3491)	0.0183*** (0.0065)	0.6423 (0.4243)	0.0070 (0.0070)	1.7547*** (0.5930)	0.0357*** (0.0124)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipality dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,019	21,909	13,155	12,438	8,861	8,784

2 Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in parentheses represent robust standard errors clustered by  
3 household. The final weights in Equations (2) and (3) were used. Coefficients in columns (2), (4) and (6) represent the marginal effects of the probit estimation. In the probit  
4 estimation, observations with no within-municipality variation in the work dummy variable (i.e., municipalities where the dummy equals 1 or 0 for all observations) were  
5 excluded. The controls indicate the variables included in vector  $Z$  of Equation (1). However, we combined the dummies for post-graduate completed and incomplete into the  
6 same dummy, due to the small number of the observations in each category.

7

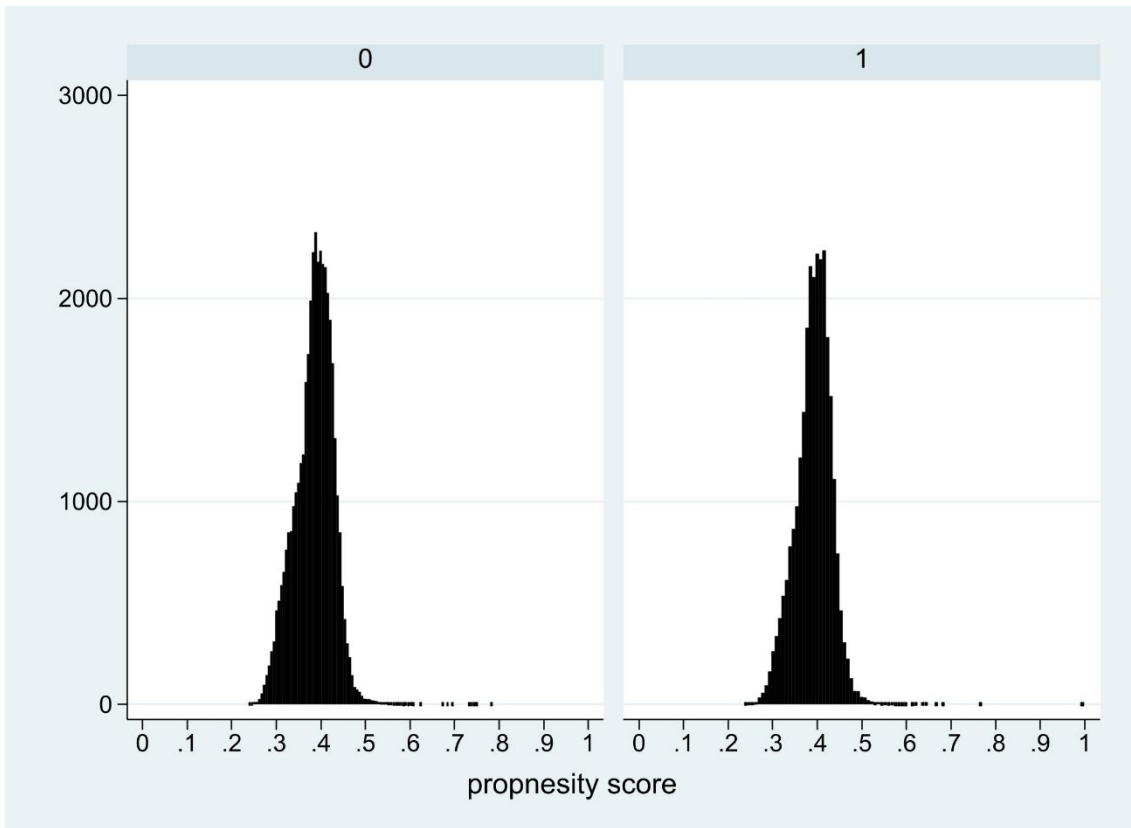
1 Table 4. Second-stage estimation results for household-level analysis.

	Dependent variable: Workhour		
	Full (1)	Male (2)	Female (3)
Withdraw	1.1561** (0.4885)	0.6876 (0.6066)	1.5011** (0.5919)
Female	-0.9329** (0.4155)	3.2713*** (0.6288)	-1.8596*** (0.6979)
Married	9.9368*** (0.7231)	5.5403*** (0.8640)	13.9751*** (0.9622)
Age	-1.0150*** (0.2347)	-0.8230*** (0.2449)	-1.5793*** (0.3249)
Age_squared	0.0066** (0.0028)	0.0048* (0.0029)	0.0133*** (0.0039)
Primary	-1.4918* (0.8425)	-1.6643 (1.0243)	-1.8336 (1.2589)
Technical_incomplete	0.4137 (1.2979)	0.9235 (1.5008)	-0.5237 (1.7907)
Technical_completed	2.9824*** (0.7693)	3.2544*** (0.9374)	2.6113*** (0.9029)
Professional_incomplete	0.5947 (1.0507)	0.0552 (1.2433)	0.2460 (1.3223)
Professional_completed	6.0127*** (0.7237)	6.5215*** (0.8875)	5.6440*** (0.7682)
Postgraduate	6.5736*** (1.2371)	6.6374*** (1.4134)	5.5875*** (1.3173)
Ethnicity	-0.2799 (0.6790)	-0.6224 (0.7397)	0.3689 (0.7768)
People_in_household	19.2941*** (0.6409)	19.4305*** (0.7208)	19.0500*** (0.8173)
Children	-6.3186*** (0.5136)	-5.3069*** (0.6467)	-5.4105*** (0.6093)
Older	3.5516*** (0.6802)	3.4617*** (0.8099)	3.4010*** (0.8577)
Monetary subsidies	-0.5205*** (0.0410)	-0.5421*** (0.0465)	-0.5116*** (0.0515)
Municipality dummies	Yes	Yes	Yes
Observations	40,732	29,566	27,685

2 Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in  
3 parentheses represent robust standard errors clustered by municipality. The final weights in Equations (2) and  
4 (3) are used.

5  
6

1 **Figure**



2

3 Source: The results are based on the authors' own calculations using the data from the CASEN 2022 survey.  
4 Note: 0 and 1 indicate control and treatment groups, respectively. The horizontal axis shows the estimated  
5 propensity score, and the vertical axis displays the number of observations.

6

7 Figure 1. Histogram of the estimated propensity score.

8

1 **Appendix**

2 Table A1. Descriptive statistics of variables used.

Variable	Observations	Mean	Standard deviation	Min	Max
Workhour	67,987	35.751	18.776	0	120
Workdummy	67,987	0.839	0.368	0	1
Withdraw	67,987	0.385	0.487	0	1
Female	67,987	0.450	0.498	0	1
Married	67,987	0.624	0.484	0	1
Age	67,987	41.997	10.496	25	64
Age_squared	67,987	1873.880	912.560	625	4096
Head_household	67,987	0.598	0.490	0	1
Primary	67,987	0.115	0.319	0	1
Technical_incomplete	67,987	0.022	0.146	0	1
Technical_completed	67,987	0.118	0.322	0	1
Professional_incomplete	67,987	0.035	0.184	0	1
Professional_completed	67,987	0.248	0.432	0	1
Postgraduate_incomplete	67,987	0.002	0.043	0	1
Postgraduate_completed	67,987	0.032	0.176	0	1
Ethnicity	67,987	0.093	0.291	0	1
People_in_household	67,987	3.389	1.536	1	13
Children	67,987	0.510	0.500	0	1
Older	67,987	0.241	0.428	0	1
Monetary subsidies (10,000 pesos)	67,987	0.954	2.619	0	184.919
Other householdmembers income (10,000 pesos)	67,987	83.717	116.495	0	4150

3 Source: Authors' calculations based on the data from the CASEN 2022.

4 Note: Expansion weights are used.

1 Table A2. Estimation results of the first-stage probit model.

	Dependent variable: Withdraw		
	Full (1)	Male (2)	Female (3)
Female	-0.0289*** (0.0047)		
Married	0.0155** (0.0074)	0.0138 (0.0105)	0.0087 (0.0089)
Age	0.0128*** (0.0026)	0.0081** (0.0033)	0.0218*** (0.0040)
Age_squared	-0.0001*** (0.0000)	-0.0001* (0.0000)	-0.0002*** (0.0000)
Head_household	0.0138*** (0.0047)	0.0142* (0.0084)	0.0094 (0.0090)
Primary	-0.0105 (0.0077)	-0.0074 (0.0097)	-0.0209* (0.0120)
Technical_incomplete	0.0260 (0.0207)	0.0107 (0.0319)	0.0483** (0.0244)
Technical_completed	0.0104 (0.0097)	-0.0135 (0.0132)	0.0348*** (0.0125)
Professional_incomplete	-0.0255* (0.0153)	-0.0230 (0.0192)	-0.0278 (0.0233)
Professional_completed	0.0084 (0.0089)	-0.0067 (0.0121)	0.0275** (0.0109)
Postgraduate_incomplete	-0.0436 (0.0709)	-0.0590 (0.0894)	-0.0062 (0.1078)
Postgraduate_completed	-0.0422** (0.0205)	-0.0656** (0.0299)	-0.0064 (0.0267)
Ethnicity	0.0231*** (0.0086)	0.0358*** (0.0115)	0.0100 (0.0117)
People_in_household	-0.0039 (0.0032)	-0.0034 (0.0039)	-0.0041 (0.0038)
Children	0.0180** (0.0090)	0.0243** (0.0109)	0.0072 (0.0108)
Older	-0.0069 (0.0084)	-0.0102 (0.0105)	-0.0059 (0.0103)
Monetary subsidies	0.0068*** (0.0010)	0.0157*** (0.0022)	0.0062*** (0.0012)
Other_householdmembers_income	-0.0000 (0.0000)	-0.0000 (0.0001)	0.0000 (0.0000)
Observations	67,987	35,885	32,094

2 Note: The coefficients represent the marginal effects of the probit estimation. \*\*\*, \*\*, and \* indicate  
3 statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in parentheses represent  
4 standard errors clustered by household. Expansion weights are used.

1 Table A3. Descriptive statistics of variables used for household-level analysis

Variable	Observations	Mean	Standard deviation	Min	Max
Workhour	40,732	62.893	36.954	0	348
Withdraw	40,732	0.427	0.495	0	1
Repair	40,732	0.315	0.465	0	1
Female	40,732	0.438	0.496	0	1
Married	40,732	0.615	0.487	0	1
Age	40,732	44.071	10.340	25	64
Age_squared	40,732	2049.145	923.566	625	4096
Primary	40,732	0.138	0.344	0	1
Technical_incomplete	40,732	0.029	0.168	0	1
Technical_completed	40,732	0.105	0.306	0	1
Professional_incomplete	40,732	0.052	0.222	0	1
Professional_completed	40,732	0.224	0.417	0	1
Postgraduate	40,732	0.048	0.213	0	1
Ethnicity	40,732	0.098	0.297	0	1
People_in_household	40,732	2.243	1.040	1	9
Children	40,732	0.500	0.500	0	1
Older	40,732	0.145	0.352	0	1
Monetary subsidies (10,000 pesos)	40,732	3.473	6.685	0	184.919

2 Source: Authors' calculations based on the data from the CASEN 2022.

3 Note: Expansion weights are used.

1 Table A4. Estimation results of the first-stage probit model for household-level analysis.

	Dependent variable: Withdraw		
	Full (1)	Male (2)	Female (3)
Female	-0.0165** (0.0083)	-0.0374*** (0.0118)	0.0040 (0.0115)
Married	0.0260*** (0.0082)	0.0291** (0.0141)	0.0122 (0.0096)
Age	0.0029 (0.0031)	0.0026 (0.0037)	0.0137*** (0.0041)
Age_squared	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0001*** (0.0000)
Primary	-0.0174* (0.0098)	-0.0053 (0.0118)	-0.0175* (0.0105)
Technical_incomplete	0.0252 (0.0187)	0.0178 (0.0251)	0.0317 (0.0242)
Technical_completed	-0.0022 (0.0142)	-0.0145 (0.0171)	0.0085 (0.0168)
Professional_incomplete	-0.0108 (0.0195)	-0.0012 (0.0232)	-0.0202 (0.0240)
Professional_completed	0.0182 (0.0157)	0.0071 (0.0187)	0.0334** (0.0152)
Postgraduate	-0.0020 (0.0226)	-0.0060 (0.0208)	0.0047 (0.0263)
Ethnicity	0.0354** (0.0142)	0.0424*** (0.0152)	0.0349** (0.0159)
People_in_household	0.0095** (0.0040)	0.0053 (0.0042)	0.0068 (0.0048)
Children	0.0020 (0.0110)	0.0051 (0.0122)	0.0022 (0.0130)
Older	-0.0133 (0.0129)	-0.0125 (0.0152)	-0.0066 (0.0138)
Monetary subsidies	0.0027*** (0.0007)	0.0033*** (0.0008)	0.0029*** (0.0008)
Observations	40,732	29,566	27,685

2 Note: The coefficients represent the marginal effects of the probit estimation. \*\*\*, \*\*, and \* indicate  
3 statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in parentheses represent  
4 standard errors clustered by municipality. Expansion weights are used.

1 Table A5. Descriptive statistics of variables using the final weights in Equations (2) and (3) for household-level analysis.

	Control	Treatment	Full	<i>P</i> value
Workhour	63.208 (37.526)	64.271 (36.977)	63.739 (37.256)	0.078
Repair	0.304 (0.460)	0.337 (0.473)	0.321 (0.467)	0.001
Female	0.428 (0.495)	0.428 (0.495)	0.428 (0.495)	0.987
Married	0.637 (0.481)	0.636 (0.481)	0.636 (0.481)	0.947
Age	44.377 (10.299)	44.350 (10.298)	44.364 (10.298)	0.859
Age_squared	2,075.385 (923.138)	2,072.967 (922.150)	2,074.176 (922.633)	0.858
Primary	0.137 (0.344)	0.137 (0.344)	0.137 (0.344)	0.995
Technical_incomplete	0.030 (0.171)	0.030 (0.171)	0.030 (0.171)	0.955
Technical_completed	0.102 (0.303)	0.102 (0.303)	0.102 (0.303)	0.957
Professional_incomplete	0.049 (0.216)	0.049 (0.216)	0.049 (0.216)	0.972
Professional_completed	0.226 (0.418)	0.226 (0.418)	0.226 (0.418)	0.996
Postgraduate	0.045 (0.208)	0.046 (0.209)	0.046 (0.209)	0.908
Ethnicity	0.105 (0.306)	0.105 (0.306)	0.105 (0.306)	0.982
People_in_household	2.291 (1.054)	2.291 (1.057)	2.291 (1.055)	0.969
Children	0.508 (0.500)	0.509 (0.500)	0.508 (0.500)	0.964
Older	0.150 (0.357)	0.149 (0.356)	0.149 (0.357)	0.883
Monetary subsidies (10,000 pesos)	3.766 (7.254)	3.746 (6.946)	3.756 (7.101)	0.827
Observations	17,905	22,827	40,732	

2 Note: Numbers in parentheses represent standard deviations. The *P* values show the results of *t*-test assessing the hypothesis that the means of the control and treatment  
3 groups are equal.

Table A6. The effects of the early pension withdrawal on home repairs: Second-stage estimation results for household-level analysis.

	Dependent variable: Repair		
	Total (1)	Male (2)	Female (3)
Withdraw	0.0325*** (0.0085)	0.0324*** (0.0087)	0.0385*** (0.0108)
Female	-0.0120 (0.0081)	-0.0137 (0.0093)	-0.0222** (0.0100)
Married	0.0373*** (0.0086)	0.0426*** (0.0123)	0.0324*** (0.0096)
Age	0.0186*** (0.0029)	0.0183*** (0.0032)	0.0198*** (0.0041)
Age_squared	-0.0002*** (0.0000)	-0.0002*** (0.0000)	-0.0002*** (0.0000)
Primary	-0.0222** (0.0087)	-0.0221** (0.0109)	-0.0072 (0.0115)
Technical_incomplete	0.0788*** (0.0176)	0.0884*** (0.0205)	0.0806*** (0.0224)
Technical_completed	0.0233** (0.0100)	0.0309*** (0.0109)	0.0247 (0.0151)
Professional_incomplete	0.0445*** (0.0156)	0.0376** (0.0175)	0.0476*** (0.0172)
Professional_completed	0.0314*** (0.0110)	0.0331*** (0.0117)	0.0275** (0.0120)
Postgraduate	0.0784*** (0.0187)	0.0834*** (0.0204)	0.0748*** (0.0233)
Ethnicity	0.0153 (0.0113)	0.0121 (0.0119)	0.0152 (0.0113)
People_in_household	0.0099*** (0.0037)	0.0086* (0.0045)	0.0107** (0.0043)
Children	0.0207*** (0.0063)	0.0223*** (0.0079)	0.0231*** (0.0073)
Older	0.0078 (0.0096)	0.0149 (0.0108)	-0.0014 (0.0119)
Monetary subsidies	0.0022*** (0.0004)	0.0019*** (0.0005)	0.0022*** (0.0005)
Municipality dummies	Yes	Yes	Yes
Observations	40,712	29,550	27,596

Note: The coefficients represent the marginal effects of the probit estimation. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Numbers in parentheses represent robust standard errors clustered by municipality. The final weights in Equations (2) and (3) are used. Observations with no within-municipality variation in the dependent variable (i.e., municipalities where the dummy equals 1 or 0 for all observations) were excluded.