DOCUMENTOS DE TRABAJO

The impact of the Covid Pension Fund Withdrawals in Chile on the future retirement income of the Social Security affiliates and their households

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Abstract

During the COVID-19 pandemic, Chile enacted three exceptional laws to allow withdrawals from the affiliates' pension accounts. We analyse the impact of these withdrawals on the pension savings and projected future retirement income of the individual affiliates and their households. We document heterogeneous withdrawal behaviors among income levels, with lower income households using up a higher percentage of their retirement savings. Additionally, we simulate the workers' contributions to retirement, showing an average reduction of 21% in their contributory pensions. However, due to the increase in non-contributory pension benefits, the average loss in the total pension income is just 8%.

Resumen

Durante la pandemia de COVID-19, en Chile se aprobaron una serie de leyes que permitieron el retiro excepcional, por hasta tres veces, de parte de los ahorros previsionales de los afiliados al sistema de pensiones. En este trabajo, analizamos el impacto de estos retiros en el ahorro previsional de los afiliados, al igual que en su futura jubilación, considerando tanto una perspectiva individual, como de hogares. Documentamos la existencia de comportamientos heterogéneos respecto de los retiros a través de los distintos niveles de ingreso, donde los hogares de menor ingreso retiraron una mayor porción de sus ahorros previsionales. Adicionalmente, simulamos las futuras contribuciones de los trabajadores, mostrando una reducción promedio de un 21% en su pensión contributiva. Sin embargo, dado un incremento en la porción no contributiva (social) de las pensiones, el ingreso total por pensiones se reduciría solamente en un 8%.

1 Introduction

As a measure to provide liquidity to the Chilean households, which faced mobility restrictions and reduced activity in the context of the COVID-19 pandemic (Madeira (2023)), three laws (in July 2020, December 2020, and April 2021) were approved allowing for the exceptional withdrawal of part of the pension savings of members of the pension system (Madeira (2022)). The Chilean pension withdrawals, as a reply to the social unrest during the pandemic, were 4 times larger in terms of the GDP than those of any other country (OECD (2021), Madeira (2022)), reducing the pension assets in around 18% of the pre-pandemic GDP and affecting the contributory pension savings of almost 11 million workers (Evans et al. (2014), Fuentes et al. (2021)). The Chilean withdrawals resulted in an immediate drop in the balances of the pension savings accounts, weakening the financial position of the workers with respect to their future retirement, who will see a reduction in the self-financed portion of their expected pension (Fuentes et al. (2021)). Additionally, the local capital market suffered a negative impact due to the reduced availability of pension savings for long-term investments such as stocks, corporate bonds, and mortgage loans (Evans et al. (2014)). Furthermore, the current low level of contributory pension savings increases the demands for a pension reform (Evans et al. (2014), Parada-Contzen (2022), Madeira (2022)).

This study analyses the impact of the withdrawals on the pension savings of the Chilean social security affiliates [1] and their households, as well as its implications for their retirement income. We use a unique combination of administrative information for the universe of the social security affiliates in Chile, which is then used to calibrate the pension savings' losses of a representative survey sample of households. We use information on the withdrawals from the Superintendency of Pensions' anonymous affiliate database and cross-referenced it with socioeconomic information on affiliates from the Unemployment Insurance Fund. Using this anonymous affiliate database, we obtained the average withdrawal amounts for each of the three withdrawals, as well as the average residual balance after the withdrawals, according to the age, gender, educational level, and the affiliate's taxable income quintile. We then use the Chilean Household Finance Survey (*Encuesta Financiera de Hogares*, in Spanish, hence EFH) of 2021 and imputed the average value of the three withdrawals and the residual balance for each household member, using their age, gender, educational level, and quintile of taxable income. Thus, after imputing the value of the withdrawals and residual balance for each household member, we estimate the average withdrawals experienced by the households,

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[1]For further information on the chilean pension system and withdrawal related legistation see Appendix A.

according to the characteristics of its members.

Our analysis confirms that 36.5% of the Chilean social security affiliates depleted their contributory pension balances entirely. We find that both lower-income individuals and the low income households withdrew a higher percentage of their individual accounts. Thus, the effects of pension withdrawals are very similar for the populations of affiliates and households. This is due to two factors: i) 11% of households have only one adult member; ii) many households mix affiliated members of different genders (i.e., male and female partners), but in most cases these are members with similar age, education, and income.

We then simulate the workers' labor path until retirement age with the accumulated pension contributions until their retirement at 65 years old[2]. At the time of retirement, the future pension is estimated as a life annuity using sex and age predicted life expectancy values (from the United Nations' forecasts, ECLAC (2020)), and solidarity contributions to the total pension (contributory pension plus solidarity contributions) are calculated. Our simulation exercise considers the two counterfactuals: i) with the pension withdrawals and the new non-contributory pension law of 2022, ii) without the pension withdrawals and the pension legislation that increased the non-contributory pension benefits in 2022.

We show that the withdrawals' effect on the contributory component of the pension income is large and persists over several years. However, due to a large expansion of the public non-contributory pensions in Chile with the new legislation in 2022, the withdrawals' effect is substantially reduced once the total pension income is taken into account (that is, contributory and non-contributory pensions). The results show an average reduction of 21% in the contributory pension, but a reduction of only 8% in the total pension. Government contributions in present value represent a fiscal cost equivalent to 73.1% of the pension withdrawals.

This paper is organized as follows. Section 2 describes the data sources used. Section 3 explains the methodology for simulating the workers' future employment, income and pension contributions until retirement at age 65. Section 4 shows the major results and the withdrawals' effects on the population of future retirees. Finally, Section 5 concludes with a summary of the findings.

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[2]Note that the model assumes that there are no pension reforms until 2055 and therefore the current system remains unchanged. This assumption crucially affects the results. If the retirement age is postponed or the social security contribution rate is raised, the contributory pension levels would increase and the fiscal burden would decrease.

2 Data

Our analysis combines information from various sources to associate the withdrawn amounts and remaining balances with Chilean households. First, we use the anonymous withdrawal register reported by the private Pension Fund Manager companies to the Superintendency of Pensions[3]. This information on the social security affiliates' withdrawals and pension balances has no socioeconomic information[4]. However, using a fictitious identifier, we cross-reference the individual workers' observations from the Superintendency of Pensions with the data from the public Unemployment Insurance Fund[5]. This gives us information on the age, gender, level of education attained, and taxable income of each social security affiliate. This allows us to calculate the average percentages withdrawn by each group of policyholders given their gender-age-education-income quintile and associate these average balance values to the same groups of individuals in other datasets such as surveys.

Subsequently, we use as a reference the members of the households surveyed by the EFH, which is conducted by the Central Bank of Chile, and in its 2021 wave included 4,400 urban households nationwide. The EFH survey is useful because it asks for a wide range of information on every household member's demographic characteristics, its labor occupation and non-labor income, their social security affiliation and knowledge of their account balances, plus self-reported values of other real and financial assets (including bonds, stocks, ownership of private companies, housing, other real estate properties and vehicles) and debts (including mortgage, educational, auto, retail and consumer loans). The EFH survey has an over-representation of richer households, since rich households have more complex finances in terms of assets and debts and undertake a higher portion of the economic activity. To adequately correct for the over-representation of wealthier households, all the statistics

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[3]This study was developed within the scope of the research agenda conducted by the Central Bank of Chile (CBC) in economic and financial affairs of its competence. The CBC has access to anonymized information from various public and private entities, by virtue of collaboration agreements signed with these institutions.

[4]To secure the privacy of workers and firms, the CBC mandates that the development, extraction and publication of the results should not allow the identification, directly or indirectly, of natural or legal persons. Officials of the Central Bank of Chile processed the disaggregated data provided by the Superintendency of Pensions, Unemployment Insurance Fund and the Household Financial Survey. All the analysis was implemented by the authors and did not involve nor compromise the Central Bank of Chile or the institutions that share their data with the Central Bank of Chile.

[5]In Chile, both the pension savings for retirement and the contributions for the unemployment insurance are invested in the financial markets through bonds and equity instruments. The pension fund managers are private companies, but the manager of the unemployment insurance is a public institution.

in this article use expansion factors (or population weights), meaning each observation is weighted with a number f_i representing the statistical number of households equivalent to i (Madeira (2019)).

We link the pension account balances and the withdrawn percentages of the demographic groups of the administrative Superintendency of Pensions dataset by pairing these statistics with the gender-age-education-income quintile characteristics of the EFH survey household members. We then use the reported balances of the interviewees as a starting point and calculate the withdrawals using the withdrawal percentage according to their socioeconomic characteristics, while for the rest of the household members, we construct their balance and withdrawal history based solely on their characteristics and affiliation status to the pension system.

This methodology allows us to associate the withdrawals with the households surveyed by the EFH. It should be noted that we used the EFH to identify households, because it includes information on the financial balance of the Chilean households, which can be enriched with the average value of the withdrawals according to the affiliate's characteristics. Additionally, the EFH survey sample indicates a considerable knowledge on the part of affiliates regarding their pension balances, as can be seen in Figure 1, with 44% of those interviewed stating that they know their pension balance in 2021, a substantial increase compared to 2017 (25%). It also shows that affiliates report having lower balances in their accounts, consistent with the withdrawals, as seen in Figure 2.

FIGURE 1. Knowledge of the funds accumulated in the personal account
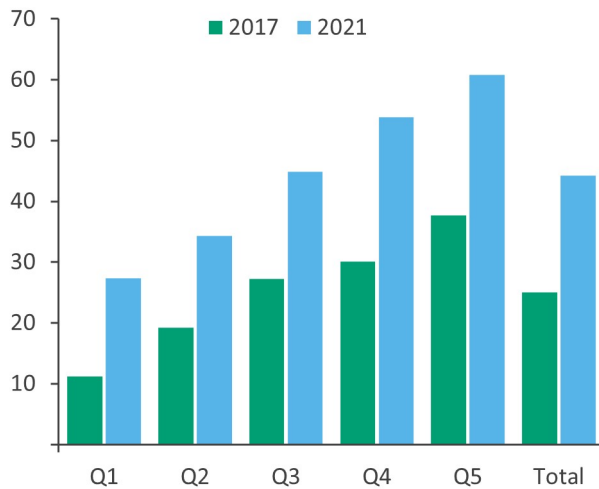
Note: The chart shows the percentage of total households by income quintile that know the amount of funds accumulated in their personal retirement accounts for the periods of 2017 and 2021. The data are retrieved from the Chilean Financial Household Survey.

We found heterogeneous amounts and percentages withdrawn by households according to their
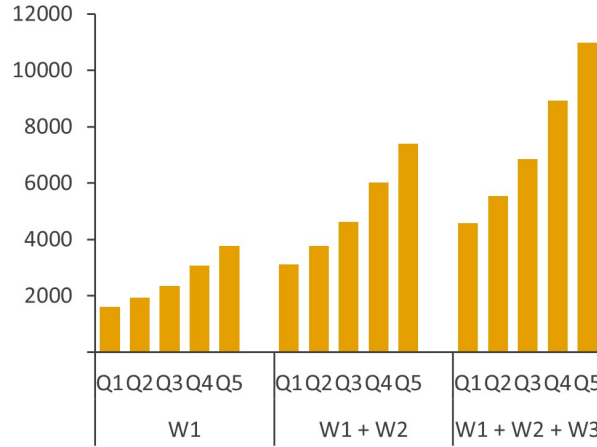
FIGURE 2. Amount saved in personal account
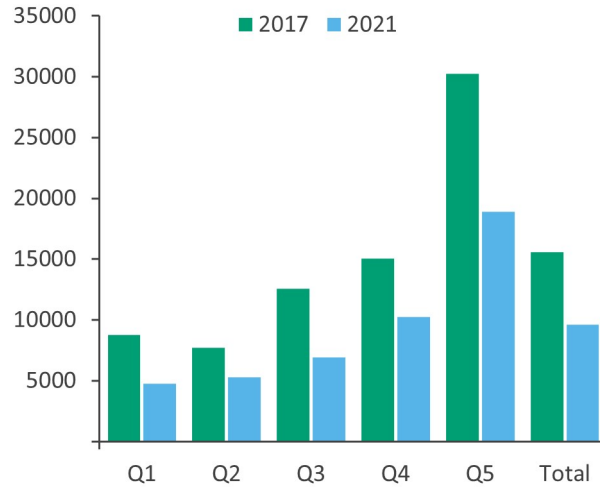
Note: The chart shows the median amount of savings in personal retirement accounts by income quintile. The data are retrieved from the Chilean Financial Household Survey.

income level. Figure 3 shows the amounts withdrawn by the total households in each quintile, and accumulates the values for each subsequent withdrawal. It can be observed that the poorest income quintiles were able to access lower withdrawal amounts than the households in the higher income quintiles. The richest income quintiles accessed higher withdrawal amounts and their accumulated withdrawals grew substantially, since - unlike some poor households that withdrew their entire pension savings - their pension savings' accounts were not depleted. Figure 1 provides information on the average percentage withdrawn from individual accounts, accumulated over time. The households in the different quintiles withdrew a proportion greater than 10% of their savings, which also increased over time. On average, households with lower incomes withdrew 42% of their pension savings, while the highest income quintile only withdrew 26%.

The association of the withdrawals with the Household Financial Survey enriches the analysis of the Chilean households in this anomalous period. According to the EFH, household labor income decreased, although this effect was more than offset by higher subsidies, especially for the lower income quintiles, resulting in an effective income without significant variations. Figure 5 complements this information by recognizing withdrawals as an additional source of liquidity for households when added to their effective income at the rate of a withdrawal divided equally over the twelve months of the year. Again, the results show a higher liquidity benefit from the withdrawals which is increasing with household income. This means that households with lower incomes had less additional liquidity available compared to richer households.

FIGURE 3. Cumulative withdrawn amount

Note: The chart shows the total amount of retirement savings withdrawn from personal accounts by income quintile, in billions of pesos, we provide the cumulative amounts after the first, second and third withdrawal. The data are retrieved from the Chilean Financial Household Survey and withdrawals information provided by the Pension Supervisor.

FIGURE 4. Cumulative withdrawals as a percentage of the initial balances of the individual accounts
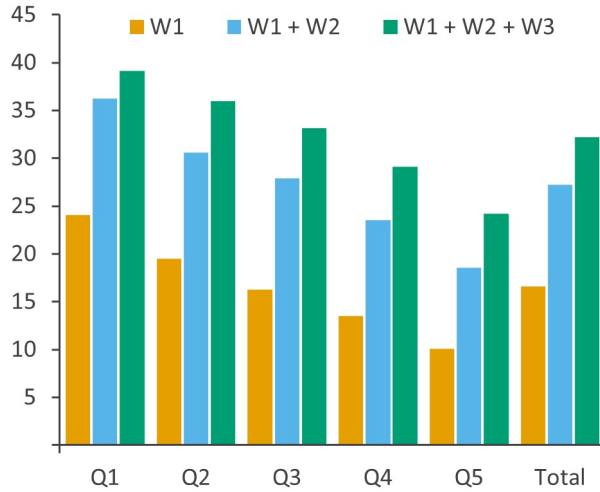

Note: The chart shows the average requested percentage of retirement saving accounts by income quintile, we provide the cumulative amounts after the first, second and third withdrawal. The data are retrieved from the Chilean Financial Household Survey and withdrawals information provided by the Pension Supervisor.

3 Methodology

We simulated the future accumulation of pension contributions until age 65 for all household members aged 26 or older. The accumulation of contributions in each member's individual account takes into account the probability of contributing, which is determined by the probability of each member

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FIGURE 5. Household monthly liquidity given by income plus the withdrawals
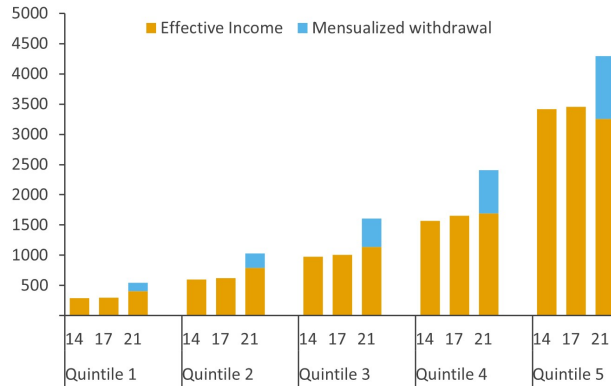
Note: The chart shows the median household liquidity by income quintile in thousands of pesos and the additional liquidity perceived by the withdrawals which is measured as the total household withdrawal amount equally distributed over a period of 12 months. The data are retrieved from the Chilean Financial Household Survey and the withdrawals information provided by the Pension Supervisor.

being in formal employment, conditional on their gender, age (3 categories: lower than 35, 35 to 54, above 55), education level (3 categories: secondary or less, technical, college or more), industry of occupation (3 sector categories: primary, secondary, tertiary), geographical area (Metropolitan Region or Other Regions), and national income quintile. Additionally, we consider that the expected income has an annual real growth rate, conditional on gender, age, and education. The probability of being in formal employment and the annual income growth rate are calibrated with the Chilean Income Survey (*Nueva Encuesta Suplementaria de Ingresos*, in Spanish, hence on NESI), a module of the Chilean Employment Survey (*Nueva Encuesta Nacional de Empleo*, in Spanish, hence on NENE).

At the time of retirement, the future pension is estimated as a life annuity, using a duration based on the life expectancy in Chile at age 60 by gender for each annual cohort of pensioners until 2060 (ECLAC (2020)). Using the life expectancy $T_{k,t}$ by sex-age for each year t from United Nations estimates (ECLAC (2020)), the total pension solidarity contributions are then calculated based on the Guaranteed Universal Pension (PGU) legislated in January 2022.

Table 1 summarizes the main components of the labor market and future pension contribution model for workers. It should be noted that there are idiosyncratic labor risks (unemployment, formal employment, labor force participation), but there is no economic cycle; therefore, the labor market is the same as in 2018 (prior to the 2019 social crisis and the 2020-2021 pandemic crisis in Chile) and with a constant real interest rate of 4%. The model is very similar to the one used to analyze the

pension reform proposals discussed in 2015 (Madeira (2021)) and the effects of pension withdrawals on household saving rates in 2022 (Madeira (2022)).

TABLE 1. Labor Market and Future Pension Contribution Model for Workers

Variable	Description
Annual Income	Real annual growth (by gender, age and education)
Probability of Contributing	Labor market participation x employment x formal employment
	(by gender, age, education, industry, region and income quintile)
Labor Market	Calibrated with NENE-NESI (without cicle, base 2018)
Retirement Parameters	We assume no change in retirement system
	Maximum taxable income (81.6 UF), Contributiory rate (10%)
	Real interest rate (4%) after 2022
	Retirement age at 65 years old for men and 60 to 65 for women(*)
Pension Amount	Life Annuity (life expectancy by gender for those over 60 years of age,
	according to the United Nations office (CEPAL) for 2022 to 2060)
Discount Factor	1/1.04 (constant real interest rate)

Source: Madeira (2021), Madeira (2022). (*) For women we estimate retirement age based on a simulated workforce absence greater than 3 years after turning 60.

Contributory pension wealth for each worker k is obtained as the sum of the value of the past pension contributions since joining the labor force at age 25 until his current age ($S(t,k)$) plus the present value of the future pension contributions until the retirement age R_k (which is age 65 for men and age 60 for women). The contributory rate from formal labor income in each period is cr, with mc being the top value of income considered for social security contributions. The probability of the worker k making a pension discount at time t, $pc_{k,t}$, is equal to the probability of being in the labor force times the probability of doing formal work, $pc_{k,t} = lfp_{k,t} \times fw_{k,t}$, with $lfp_{k,t} = \Pr(LFP_{k,t} = 1 \mid x_{k,t})$ and $fw_{k,t} = \Pr(FW_{k,t} = 1 \mid x_{k,t})$. The individual k members wealth $PWI_{k,t}$ is given by:

$$PWI_{k,t} = 12 \times cr \left(\sum_{h=25}^{S(t,k)-1} \bar{r}_h pc_{k,t} \min(mc, P_{k,h}) + \sum_{h=0}^{R_k - S(t,k)} \beta^h pc_{k,t} \min(mc, P_{k,h}) \right), \qquad (1)$$

with the permanent labor income of each worker k expressed as $P_{k,t} = W_{k,t}(1 - u_{k,t} + u_{k,t} RR_k)$,

where $W_{k,t}, u_{k,t}, RR_k$ denote, respectively, the labor income of the worker while employed, the probability of unemployment and the replacement ratio of income during unemployment, conditional on the characteristics $x_{k,t}$. Using the NENE and NESI surveys, we estimate the labor force participation, formal work, income growth, and unemployment risk parameters $(lfp_{k,i,t}, fw_{k,i,t}, G_{k,i,t}, u_{k,i,t}, RR_{k,i,t})$, using the methodology in Madeira (2021), with around 538 mutually exclusive worker types given by the characteristics $x_k \in \{$Santiago Metropolitan area or not, Industry (primary, secondary, tertiary sectors), Formal sector, Gender, Age (3 brackets, ≤ 35, $35 - 54$, ≥ 55), Education (secondary school or less, technical degree, college), and Household Income quintile$\}$. These parameters are then used to calibrate the present value of future earnings $FE_{i,t}$ and pension wealth $(PW_{i,t} + SPW_{i,t})$.

The calibration considers the current parameters of the pension system: $cr = 0.10$, mc=78.3 UF[6]. $\bar{r}_h = \prod_{l=t+h-S(t,i)}^{t-1} (1+r_l)$ is the accumulated real asset returns of the Chilean pension system between the past period $t + h - S(t, i)$ when the worker made its pension contribution and the current time t. Future accumulated pension contributions earn the riskless interest rate, $r = \beta^{-1} - 1 = 0.04$. If member k from the household i retires at age R_k in year t, its accumulated pension turns into a monthly annuity for their life, $\tilde{p}a_{k,t}(R_k) = \dfrac{rPWI_{k,t}(1/\beta)^{R_k - S(t,k)}}{1 - (1/\beta)^{-12 \times (T_{k,t} - R_k)}}$.

In July 2020, the Chilean Congress implemented an exceptional measure that allowed all workers to withdraw a significant amount of their accumulated pension contributory wealth. A second and a third withdrawal were legislated in December 2020 and April 2021. All withdrawals were structured in the same way. Each withdrawal legislation allowed every individual worker to withdraw an amount up to 150 UF of their accumulated individual pension account. Any account member of the defined contribution pension system (that is, anyone who has held a formal job in the past) could withdraw up to 100% of its funds for accounts with a value below 35 UF, up to 35 UF for accounts between 35 and 350 UF, up to 10% of the funds for accounts between 350 and 1,500 UF, and 150 UF for accounts above 1,500 UF.

Let $pw_{k,i,t=2020}^{d=1}$, $pw_{k,i,t=2020}^{d=2}$ and $pw_{k,i,t=2021}^{d=3}$ denote the amount of the first, second and third pension withdrawals, respectively. Let with $PWI_{k,t=2020}^{d=1} = PWI_{k,t=2020}$, $PWI_{k,t=2020}^{d=2} = PWI_{k,t=2020} - pw_{k,i}^{d=1}$ and $PWI_{k,t=2021}^{d=3} = PWI_{k,t=2021} - pw_{k,i}^{d=1} - pw_{k,i}^{d=2}$ denote the contributory wealth of worker k from household i before the first, second and third pension withdrawal. The counterfactual pension wealth in 2021 corresponds to the value of 2020 plus an additional year of contributions: $PWI_{k,t=2021} = PWI_{k,t=2020} + cr \min(mc, P_{k,t=2021})pc_{k,t=2021}$. The value of each pension withdrawal

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[6]UF is a real monetary unit applied in Chile, which is updated according to the official consumer price inflation (CPI) index. 1 UF was roughly equivalent to 35 USD during 2020.

is given by $pw_{k,i,t}^d = \min(PWI_{k,t}^d, 35UF)1(PWI_{k,t}^d \leq 35UF) + 35UF \times 1(35UF < PWI_{k,t}^d \leq 350UF)$ $+ 0.10 \times 1(350UF < PWI_{k,t}^d \leq 1500UF) + 150UF \times 1(PWI_{k,t}^d > 1500UF)$. The accumulated contributory pension wealth of worker k $(PWI_{k,t}^{d=1+2+3})$ and household i $(PW_{i,t})$ after the three withdrawals is given by:

$$PW_{i,t} = \sum_k PWI_{k,t}^{d=1+2+3} \tag{2}$$

with $PWI_{k,t}^{d=1+2+3} = PWI_{k,t} - pw_{k,i,2020}^{d=1} - pw_{k,i,2020}^{d=2} - pw_{k,i,2021}^{d=3}$

The expected contributory pension value of each worker k after the three pension withdrawals is

$$\tilde{p}a_{k,t}^{d=1+2+3}(R_k) = \frac{rPWI_{k,t}^{d=1+2+3}(1/\beta)^{R_k-S(t,k)}}{1-(1/\beta)^{-12\times(T_{k,t}-R_k)}},$$

The Chilean government in December 2019 had established a minimum pension as 169,649 pesos for any retired member above 65 years of age from a family within the three lowest income quintiles. Each retiree k would receive as non-contributory ("solidarity") benefits of $B_{k,t}^{2019} = SB_i^{2019} \max(a_1 - \tilde{p}a_{k,t}(R_k), B(\tilde{p}a_{k,t}(R_k)))$, with $a_1 = 187,045$ and SB_i^{2019} denoting a household within the lowest 3 quintiles of income. $B(\tilde{p}a_{k,t}(R_k))$ is the "Solidarity Pension" scheme that existed in Chile until 2019, which gives each member k one basic pension BP which is the lowest value for all pensions and then reduces this payment at the rate of $\frac{BP}{MP}$ until it reaches a maximum pension equal to MP: $pa_{k,t}(R_k) = \tilde{p}a_{k,t}(R_k) + B(\tilde{p}a_{k,t}(R_k))$, with $B(\tilde{p}a_{k,t}(R_k)) = (BP - \frac{BP}{MP}\tilde{p}a_{k,t}(R_k)) \times 1(MP > \tilde{p}a_{k,t}(R_k))$, with $BP = 109,880$ and $MP = 357,167$.

The law legislated in January 2022 gave all the retirees in households within the lowest 9 deciles of income (therefore almost universal coverage, except for the richest 10%) a solidarity monthly pension of 185,000 pesos for retirees with monthly pensions below 630,000 pesos and then a decreasing linear amount until the benefit reaches 0 pesos for pensions equal or above one million pesos. The new solidarity benefits of each retiree k can therefore be expressed as $B_{k,t}^{2022} = SB_i^{2022}(b_1 1(\tilde{p}a_{k,t}(R_k) \leq b_2) + b_1(1 - \frac{\tilde{p}a_{k,t}(R_k)-b_2}{b_3-b_2})1(b_2 < \tilde{p}a_{k,t}(R_k) < b_3))$, with $b_1 = 185,000$, $b_2 = 630,000$, $b_3 = 1,000,000$ and SB_i^{2022} being a dummy for whether the household i is within the lowest 9 deciles of income.

The loss in the contributory pensions of each worker k is therefore obtained as:

$$Contributory - Pension - Loss_{k,t^*} = \frac{\tilde{p}a_{k,t^*} - \tilde{p}a_{k,t^*}^{d=1+2+3}}{\tilde{p}a_{k,t^*}} \tag{3}$$

with $t^* = 2022 + 65 - S(t, k)$ denoting the year in which worker k reaches age 65 and becomes eligible for solidarity benefits.

The total pension value is equal to the sum of the contributory pension and solidarity transfers. The total pension income in the scenario before the pension withdrawals and the solidarity pension law of 2022 is expressed as: $tp_{k,t^*} = \tilde{p}a_{k,t^*} + B_{k,t^*}^{2019}$. After the pension withdrawals and the solidarity pension law of 2022, the new projected total pension income is obtained as: $tp_{k,t^*}^{d=1+2+3} = \tilde{p}a_{k,t^*}^{d=1+2+3} + B_{k,t^*}^{2022}$. The total pension income loss[7] is, therefore, given by:

$$Total - Pension - Loss_{k,t^*} = \frac{tp_{k,t^*} - tp_{k,t^*}^{d=1+2+3}}{tp_{k,t^*}} \tag{4}$$

with $t^* = 2022 + 65 - S(t, k)$.

Finally, the fiscal cost of the pension withdrawals and the 2022 law is then obtained as a fraction of the total pension withdrawals:

$$FC = \frac{\sum_k B_{k,t^*}^{2022} - B_{k,t^*}^{2019}}{\sum_k pw_{k,i,2020}^{d=1} + pw_{k,i,2020}^{d=2} + pw_{k,i,2021}^{d=3}} \tag{5}$$

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[7]Note that to obtain the implied losses of the contributory pension and the total pension, it is not necessary to account for the purpose of the pension withdrawals expenditures. That is, households could have used the pension withdrawal money to pay down their debts, buy additional consumption, or keep a part of their withdrawal as cash or as a deposit in a checking or savings account. The reason is because the final pension income only depends on the compulsory pension contributions and the solidarity pension transfers.

4 Results

This methodology allows us to associate the average value of the withdrawals according to the members' characteristics with the households surveyed by the EFH. Furthermore, we calibrated a model of pension contributions over the entire life cycle of the workers to obtain the simulated impact of the withdrawals policies on the retirement income in the future.

We find that the Chilean households face a loss in their expected pensions as a result of the withdrawals. Graph 6 shows the distribution of estimated losses in the contributory pension among the population of affiliates and families, compared to a scenario without pension withdrawals. Graph 7 displays the distribution of losses incurred by the withdrawals in the total pension (contributory plus solidarity contributions) among affiliates and families.

FIGURE 6. Distribution of the loss (in percentage) in the contributory pensions
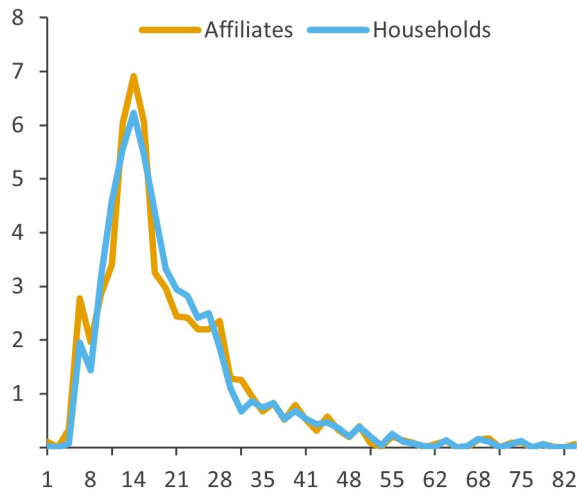
Note: The chart shows the calculated probability density function of the percentage point loss in contributory pensions for both affiliates and households. The data are retrieved from our model simulations, calibrated from the Chilean Financial Household Survey and with average withdrawal information provided by the Pension Supervisor.

The results indicate that households experience an expected loss of approximately 15% of their contributory pension at the median level (Figure 6) and 10% of their total pension (Figure 7). On average, there is a 21% loss in the contributory pension among the population of affiliates, with average values of 18% for men and 24% for women. The average losses in family pensions would be around 21%, with average values of 18.5% for families with male heads of household and 23% for families with female heads of household. As shown in Figure 8, losses in the contributory pension decrease as the income quintile rises, with average values of nearly 35% in the first quintile (the

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poorest) and decreasing to around 11% or 12% for the fifth quintile (corresponding to the wealthiest 20% of families).

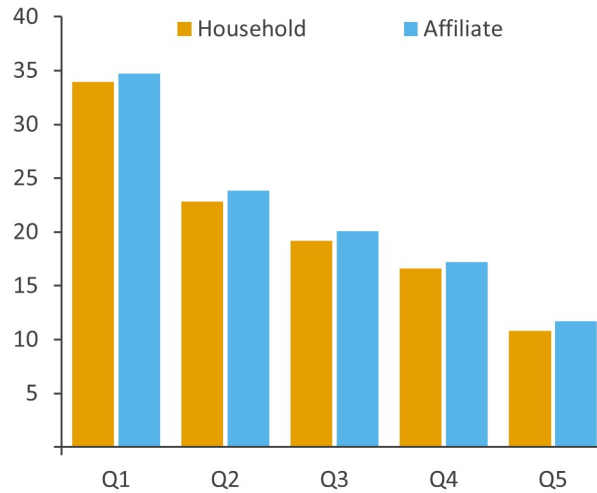FIGURE 7. Distribution of the loss (in percentage) in the total pensions
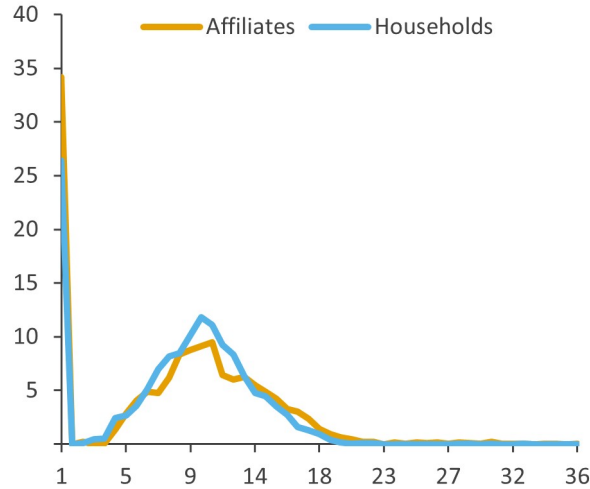
Note: The chart shows the calculated probability density of percentage point loss in total pensions for both affiliates and households. The data are retrieved from our model simulations, calibrated from the Chilean Financial Household Survey and with average withdrawal information provided by the Pension Supervisor.

However, when looking at the total pension, it is easy to observe that the losses are more limited, being lower for women and the poorest individuals. The average loss in the total pension for affiliates is 8.3%, with figures of 8.6% for men and 8% for women, respectively. The average loss in households is 8.5%, with similar values for households with male or female heads. As shown in Figure 9, the losses increase with income, ranging from approximately 6% in the first quintile to around 11% in the fifth quintile.

Figure 10 and Figure 11 present the average loss in the contributory and total pension for cohorts of affiliates and households (based on the retirement year of the household member who retires later) until 2060 for each income quintile. The loss in the contributory pension for the cohort retiring in 2022 is around 12% for the fifth quintile and reaches nearly 50% in the first income quintile. These losses gradually decrease until 2045 and then decline sharply. In terms of the total pension, all income quintiles experience a loss between 9% and 12% in 2022, which remains until 2040 and then declines sharply after 2045. Therefore, pension withdrawals will impact the income of retirees until the cohorts retiring in 2050 (which have a life expectancy of 84 and 89 years for men and women, respectively, according to projections by ECLAC for Chile in 2020).

Figure 8. Average loss in the contributory pension across income quintiles

Note: The chart shows the calculated percentage point loss in contributory pensions for both affiliates and households, by income quintile. The data are retrieved from our model simulations, calibrated from the Chilean Financial Household Survey and with average withdrawal information provided by the Pension Supervisor.

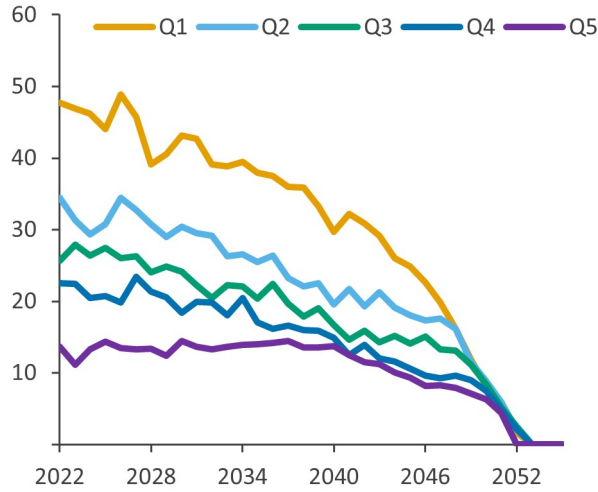Figure 9. Average loss in the total pension across income quintiles
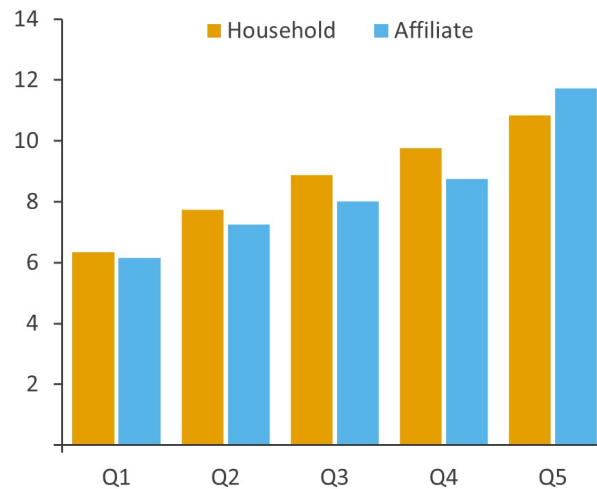
Note: The chart shows the calculated percentage point loss in total pensions for both affiliates and households, by income quintile. The data are retrieved from our model simulations, calibrated from the Chilean Financial Household Survey and with average withdrawal information provided by the Pension Supervisor.

5 Concluding Remarks

In conclusion, the pandemic crisis' withdrawals from the pension savings had a heterogeneous impact on Chilean households, with lower-income households benefiting less from the additional liquidity

FIGURE 10. Average loss in the household contributory pension across income quintiles and for the cohorts retiring in each year until 2055

Note: The chart shows the calculated percentage point loss in contributory pensions for households, by year. The data are retrieved from our model simulations, calibrated from the Chilean Financial Household Survey and with average withdrawal information provided by the Pension Supervisor.

FIGURE 11. Average loss in the household total pension across income quintiles and for the cohorts retiring in each year until 2055
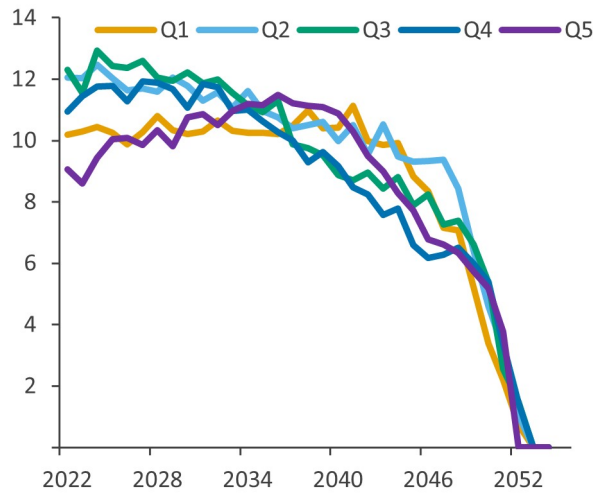
Note: The chart shows the calculated percentage point loss in total pensions for households, by year. The data are retrieved from our model simulations, calibrated from the Chilean Financial Household Survey and with average withdrawal information provided by the Pension Supervisor.

created by the withdrawals. Lower-income households also experienced a greater reduction in their pension balances and a higher loss in the value of their contributory pensions in the future. However,

it is noteworthy that the losses in total pensions (including contributory and solidarity contributions) are much more limited. In terms of the total pension, the majority of households could experience losses ranging from around 6% to 15% in their pension income.

In the model simulations for the scenario without pension withdrawals and with the solidarity pillar legislated in 2019, approximately 49.5% of the individuals in the current adult population could receive solidarity funds upon reaching retirement at age 65. In the simulations for the scenario after the withdrawals and with the PGU law of 2022, we estimate that around 71.2% of individuals could receive solidarity funds. In terms of households, the simulations indicate that 76.2% of households could receive Solidarity Pillar benefits before the withdrawals and the PGU law of 2022, but 88.4% of households will be eligible for contributions after the withdrawals and the PGU law of 2022.

Our work simulates an average loss in contributory pension income of 20.9% for the individuals, with losses of 17.9% and 23.9% for men and women, respectively. For the average household, the loss in contributory pension income is 21.1%. However, after accounting for the non-contributory solidarity transfers, the average loss in total pension income is just 8.3% for the individuals, with losses of 8.6% and 8.0% for men and women, respectively. For the average household, the loss in total pension income is 8.5%. These results show that the increased public transfers limit the negative effects for individuals from their contributory pension withdrawals.

According to our simulation using the 2021 Household Finance Survey (EFH), the state solidarity contributions in present value terms may cover up to 73.1% of the total value of pension withdrawals. It is worth noting that an analysis for the first pension withdrawal and with the 2020 solidarity system found that government contributions would be equivalent to 29% of the total amount of the first withdrawal (Lorca (2021)). However, the second and third pension withdrawals, along with the increase in solidarity contributions legislated in January 2022, have increased the fiscal burden.

It is important to highlight that these results assume that there will be no pension reform. This could significantly impact the results, particularly in terms of fiscal expenditures, as changes in parameters such as postponing the retirement age or increasing the contribution rate could lower the fiscal burden associated with pension solidarity contributions.

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A Chilean Pension System

A.1 Pension Funds[8]

During their lifetimes, Chilean employees contribute a portion (10%) of their gross income to the contributory pillar of the Chilean pension system, these funds are saved in personal accounts which are privately managed by Pension Fund Administrators (PFA). PFA's offer different funds to their affiliates, which vary by asset composition, thus their risk exposure, as we roughly show in Table A.1. Workers can choose their preferred PFA and fund, if they fail to do so, they will be assigned the more conservative fund at their designated administrator.

TABLE A.1. Investment Limits for Chilean Pension Funds

Fund	Type	Equity	
		Maximum	Minimum
A	Riskiest	80	40
B	Risky	60	25
C	Balanced	40	15
D	Conservative	20	5
E	More Conservative	5	-

Note: This table reports the maximum percent participation of equities in the Chilean pension fund portfolios, by fund type. This is only one of multiple law imposed structural portfolio restrictions.

Though the contributory pillar is the main retirement saving held by formal workers, the Chilean pension system also considers the voluntary and solidarity pillars. The voluntary part is an additional contribution by workers, with tax benefits. On the other hand, solidarity accounts for pensions provided to the most vulnerable, even if they have no retirement savings or very low savings.

A.2 Pension Fund Withdrawals

The Pension Fund withdrawals consisted of a series of laws that allowed the affiliates to exceptionally withdraw savings from their retirement accounts, which entails their personal savings as part of the contributory pillar. The first withdrawal process began on July 2020, which was then followed by

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[8]The information in this section corresponds to the current investment regime for pension funds valid from February 2022 to date, as retrieved from the Chilean Pensions Supervisor website.

two more on December 2020 and April 2021, each one could be requested during a period of 12 months after its approval. Once the withdrawal period was over, workers could no longer access these funds until retirement (therefore the usual retirement saving rules remained unchanged). Since the third withdrawal on April 2021, further withdrawals have been proposed, yet none have been approved.

The different withdrawal waves involved distinct requirements, as shown in Table A.2 both to retrieve the money and the taxation involved. However, all the withdrawals were available for anyone with available savings at the PFA's, irrespective of their employment status and wealth. None of the withdrawals considered that the affiliates should restore the funds in the future.

TABLE A.2. Pension Withdrawal Characteristics

Withdrawal	Taxable	Restoring Funds	Retirees can withdraw
First	No	Not considered	Only Programmed withdrawal
Second	Yes	Not considered	Only Programmed withdrawal
Third	No	Could contribute extra 1%	All Retirees

Note: This table highlights the main differences between withdrawal regulations. For a comprehensive regulatory analysis please visit the Chilean Pension Supervisor site.

Affiliates were allowed to withdraw up to 10% of their savings, however those with less than CLP 1.000.000 (USD 1,300 approximately) could retire their entire balance. Table A.3 provides the withdrawal limits.

TABLE A.3. Withdrawal Limits

Saved Amount	Max Withdrawal
Less than CLP 1.000.000	All Funds
CLP 1.000.000 - CLP 10.000.000	CLP 1.000.000
CLP 10.000.000 - CLP 44.000.000	Up to 10%
Over CLP 44.000.000	Up to CLP 4.400.000

Note: This table presents the retirement limits depending on the accumulated retirement savings. For a comprehensive regulatory analysis please visit the Chilean Pension Supervisor site.