Effects of COVID-19 early release of pension funds: The case of Chile

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Outline

Motivation

1. "Consumption smoothing" for old age is one of the main goal of the Pension System (Barr and Diamond, 2006; Schwarz, 2006).
2. Buffer stock savings are consistent with the life-cycle theory (Gourinchas and Parker, 2002). They are not popular or are insufficient in Latin American (Bosch et al., 2020).
3. Under the COVID-19 pandemic and its unprecedented economic effects, policymakers have turned to retirement accounts to "smooth consumption".

Research question

- How much would retirement savings adequacy and financial sustainability of public pension benefits be affected by this kind of early access to pension funds?
- How are those effects distributed across the population?
- How could those impacts be mitigated?

Literature

- Butrica et al. (2010) and Argento et al. (2015) show that early withdrawals are strongly correlated with income shocks.
- Copeland (2009), Engelhardt (2002), Engelhardt (2003), Hurd and Panis (2006) conclude that pension assets are used to buffer economic shocks. Limited erosion for older and high-income workers.
- Long-term impacts of such measures on retirement savings adequacy and fiscal sustainability have been scarcely studied. Even less considering the existence of government supplements.

What do I do?

Using a nationally representative survey data linked with administrative information about the pension system, this study considers Monte Carlo simulations to:

- Simulate a 10% release of private savings accounts.
- Forecast labor trajectories and future retirement saving balance.
- Compute effects on private pension benefits and government supplements.
- Analyze four mitigation policies.

- Social Protection Survey in Chile allows to create a representative panel data set with 5,920 individuals, containing socio-demographic attributes, pension benefits and labor variables.
- The Chilean Minister of Labor and Social Security publishes this data joined with administrative information about labor and pension savings histories.
- An eligible population of 4,940 individuals of at least 20 years old, affiliated with the DC scheme, and who do not serve in the army.

Macroeconomic variables

- Monte Carlos simulations. Real GDP growth rates for 2020 and 2021 correspond to IMF projections.
- Future values from 2022 are assumed and consider some persistence about recent events under three different economic scenarios; mild (2%), moderate (3%) and remarkable (4%).
- Future unemployment and return rates used to calculate life annuity are forecasted considering a multivariate autoregressive (MAR) process with forecasted real GDP growth rates as covariates.
- Return rates for 5 different portfolios are estimated by a SUR specification (Westerlund and Narayan, 2015; Phan et al., 2015).

Labor variables and government support

- For monthly administrative taxable wage and self-reported wage:
  - Multivariate autoregressive (MAR) method is used.
  - A rolling forecast method to get future values.

- For monthly working, working&contributing, and government support probabilities:
  - Dynamic Probit (DP) models are used.
  - A rolling forecast probability is compared with a random variable uniformly distributed between 0 and 1 to define the success cases.

Simulation of early access

- Each worker withdraws 10% of her funds during the first month of implementation, with:
  - A minimum of USD1,322 and a maximum of USD5,664.
  - Those with less than USD1,322 have access as much as they had.
- The private savings balance for t+1 is defined as:

$$SB_{t+1} = (1 + r_t) \cdot (SB_t + 0.1 \cdot TW_t \cdot WC_t)$$

Private pension benefits

- Private pension benefits (PP) using immediate life annuity (chosen by 85% of retirees) and following Vega (2014).
- Self-funded pension benefit at t when retiring at period r is:

$$PP_t(r) = \frac{SB_r}{12 \cdot CNU_r}$$

where CNU denotes the amount of capital that a pensioner needs to finance one annual unit of the life annuity pension benefit.

Final pension benefits

- The government support amount (APS) is calculated as:

$$APS = \begin{cases} PBS & \text{if} \quad PP = 0 \\ PBS - \frac{PP \cdot PBS}{PMAS} & \text{if} \quad PP > 0 \;\&\; PP \leq PMAS \\ 0 & \text{if} \quad PP > PMAS \end{cases}$$

  with monthly minimum benefit is called “Pensión Básica Solidaria” (PBS) and maximum threshold to receive support called “Pensión Máxima con Aporte Solidario” (PMAS).

- Given the probability of claiming and receiving this government support π_t^{GS}, the final pension benefit of retiring at r in period t is:

$$FP_t(r) = PP_t(r) + APS_t(r) \cdot \pi_t^{GS}$$

Table 1: Withdrawals and their effects (Scenario 2)

Variable	Male Mean	Male CI (95%)	Female Mean	Female CI (95%)	Total Mean	Total CI (95%)
Withdrawal (USD)	3,066	[3013,3109]	1,979	[1952,2006]	2,640	[2598,2674]
Withdrawal (%)	16.10	[15.68,16.51]	33.16	[32.30,33.88]	22.78	[22.35,23.22]
Total cost ratio	-1.76	[-2.77,-1.14]	-1.50	[-2.11,-1.11]	-1.66	[-2.50,-1.12]
Pension with release (USD)	383.72	[295.04,508.20]	131.57	[108.00,163.11]	284.95	[221.79,372.69]
Pension no release (USD)	412.03	[315.89,547.71]	144.74	[118.38,180.63]	307.33	[238.51,403.66]
Effect on pension (USD)	-28.31	[-39.51,-20.41]	-13.17	[-17.61,-10.29]	-22.38	[-30.97,-16.56]
Effect on pension (%)	-6.85	[-7.41,-6.23]	-9.08	[-9.76,-8.46]	-7.26	[-7.80,-6.68]
Effect on final pension (USD)	-27.55	[-38.74,-19.74]	-12.74	[-17.02,-9.91]	-21.73	[-30.25,-15.97]
Effect on Gov. Support (USD)	7.46	[5.93,9.16]	4.30	[3.38,5.43]	6.22	[4.95,7.65]
Effect on Gov. Expenditure (%)	6.42	[4.05,9.11]	2.35	[1.22,4.09]	4.71	[3.04,6.57]

Source: Author's calculation based on EPS and Chilean Pension Superintendency data.

Note: Real values at US dollars on July 30, 2020. USD 37.76 = 1 UF.

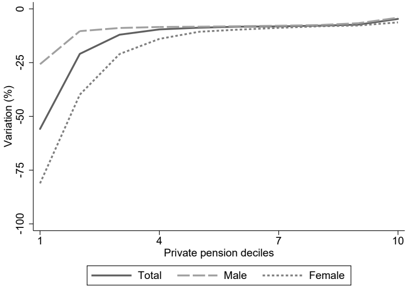
Mean and CI come from a Monte Carlo simulation with 200 replications.

Results

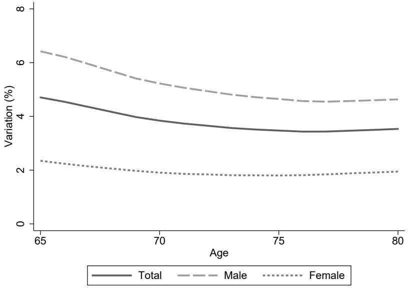
- "Life cycle" theory and permanent consumption state that each withdrawn dollar would reduce 0.66 dollars total consumption.

$$C_t = \frac{1}{T}[Y_t + (N-1)\bar{Y} + A_t]$$

- Early access to retirement accounts reduces by 7.26% private pension benefits, eroding income adequacy in retirement.
- This impact is not homogeneous, women are less affected in levels but with a higher percentage loss given their lower pension levels.



(a) Effect on PP by private pension deciles



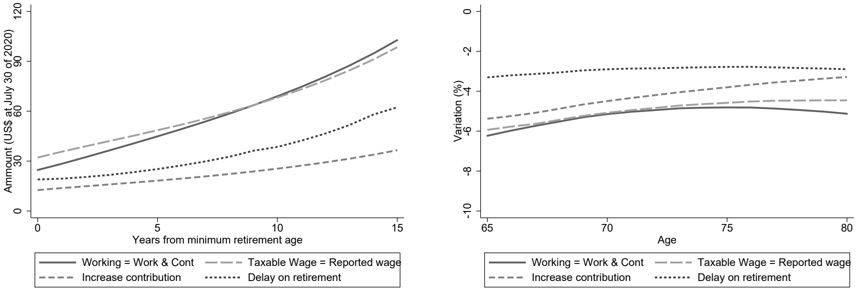
(b) Fiscal expenditure variation (%)

Source: Author's construction based on EPS and Chilean Pension Superintendency data.
Note: Real values at US dollars on July 30, 2020. USD 37.76 = 1 UF = CLP 28,668.36.
Values come from a Monte Carlo simulation with 200 replications.

Figure 1: Policy effects (Scenario 2)

Results

- Highest percentage losses are concentrated in women and workers with a low private pension. So, income inequality in retirement raises.
- This outcome is reinforced by the fact that high-income workers have additional savings out of the pension system and are less likely to get into financial difficulties that force them to ask for early access to savings accounts.
- Thus, government supplements must raise (4.71%) to mitigate those effects. More fiscal and political pressure on the pension system.



(a) Effect on private pension (USD)

(b) Fiscal expenditure variation (%)

Source: Author's construction based on EPS and Chilean Pension Superintendency data.
Note: Real values at US dollars on July 30, 2020. USD 37.76 = 1 UF = CLP 28,668.36.
Values come from a Monte Carlo simulation with 200 replications.

Figure 2: Mitigation policies (Scenario 2)

Results

- Non-evasion and contribution enforcement have the highest effects, raising private pension considerably at minimum retirement age (USD 30), and reducing fiscal expenditure by 6% at 65 year old.
- One-year delayed retirement age has a lesser impact (USD 19), but it reduces fiscal expenditure by at least 3.3% from 65 years old.
- A rise in contribution rate by 4pp with an intra-generational redistributive tier increases private pension benefits by at least USD 13 and reduces fiscal expenditure by 5.4% at 65 year old.

Conclusion

- A 10% release of pension funds results in an 22.78% withdrawal.
- Life annuity benefits drop by 7.26% on average. Higher percentage losses on women and low-income workers.
- Government supplements must raise by 4.71% to compensate those effects, increasing fiscal and political pressure.
- Mitigation policies should be considered. Enforcing labor market regulations, such as non-evasion and contribution enforcement, provide the highest impacts.
- Incentives or conditions that aim to delay retirement age by at least one year, along with a rise in contribution rate by 4pp with an intra-generational redistributive tier have slightly lower effects.

Thanks

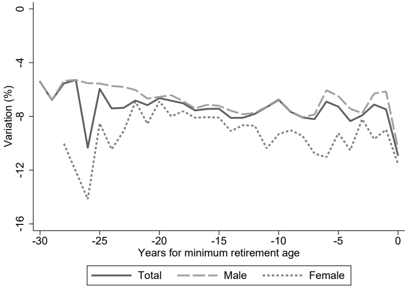
Table 2: Macroeconomic variables - Moderate economic growth (Scenario 2)

Variable	Assumption	Since	2020	2021	Ahead
Inflation, annual growth rate		August 2020	3		
Minimum wage, nominal growth rate		March 2021	5		
Government supplements, nominal growth rate		January 2023	5		
Contribution rate (stable)		-	10		
			Annual average (%)		
Variable	Assumption	Since	2020	2021	Ahead
GDP, real growth rate	Defined values	August 2020	-6.05	4.49	$\mathcal{N}(2.98, 3.47)$
Unemployment rate	MAR(12)	August 2020	11.11	10.20	$\mathcal{N}(7.72, 1.75)$
Real interest rate (life annuity)	MAR(2)	July 2020	1.67	1.41	$\mathcal{N}(1.73, 0.61)$
Portfolio A real return rate	SUR(3)	July 2020	4.33	14.50	$\mathcal{N}(5.70, 15.70)$
Portfolio B real return rate	SUR(3)	July 2020	5.60	12.86	$\mathcal{N}(5.01, 11.17)$
Portfolio C real return rate	SUR(2)	July 2020	5.73	9.21	$\mathcal{N}(4.59, 7.11)$
Portfolio D real return rate	SUR(2)	July 2020	4.33	5.15	$\mathcal{N}(3.99, 4.55)$
Portfolio E real return rate	SUR(3)	July 2020	5.14	6.24	$\mathcal{N}(3.32, 3.35)$

Note: In the first block the header is "Variable | Since | Value (%)"; the value spans the 2020–Ahead columns.

Source: Author's construction. Mean and SD come from a Monte Carlo simulation with 200 replications.

Note: A multivariate Autoregressive process of order "p" is denoted by "MAR(p)" and a seemingly unrelated regression of order "p" is denoted by "SUR(p)".

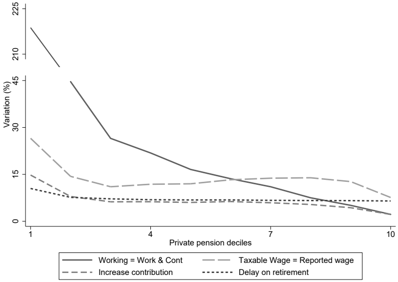


(a) Effect on private pension benefits (%)

(b) Total cost on retirement savings

Source: Author's construction based on EPS and Chilean Pension Superintendency data.
Note: Real values at US dollars on July 30, 2020. USD 37.76 = 1 UF = CLP 28,668.36.
Values come from a Monte Carlo simulation with 200 replications.

Figure 3: Early access by current age (Scenario 2)



(a) Effect by private pension deciles

(b) Fiscal expenditure variation (%)

Source: Author's construction based on EPS and Chilean Pension Superintendency data.
Note: Real values at US dollars on July 30, 2020. USD 37.76 = 1 UF = CLP 28,668.36.
Values come from a Monte Carlo simulation with 200 replications.

Figure 4: Mitigation policies (Scenario 2)

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