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

Miguel Lorca E

December 2020

1UNSW Business School, School of Economics. Centre for Applied Economic Research (CAER). e-mail address: m.lorca@unsw.edu.au
Outline

1. Motivation
2. Data
3. Empirical Strategy
4. Results
5. Conclusion
“Consumption smoothing” for old age is one of the main goal of the Pension System (Barr and Diamond, 2006; Schwarz, 2006).

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).

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?
Butrica et al. (2010) and Argento et al. (2015) show that early withdrawals are strongly correlated with income shocks.


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.
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.
Empirical Strategy

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).
Methodology

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.
Methodology

Final pension benefits

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

\[
APS = \begin{cases} 
PBS & \text{if } PP = 0 \\
PBS - \frac{PP \cdot PBS}{PMAS} & \text{if } PP > 0 \text{ and } PP \leq PMAS \\
0 & \text{if } PP > PMAS
\end{cases}
\]

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 \(\pi_t^{GS}\), 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)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Male Mean</th>
<th>Male CI (95%)</th>
<th>Female Mean</th>
<th>Female CI (95%)</th>
<th>Total Mean</th>
<th>Total CI (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withdrawal (USD)</td>
<td>3,066</td>
<td>[3013,3109]</td>
<td>1,979</td>
<td>[1952,2006]</td>
<td>2,640</td>
<td>[2598,2674]</td>
</tr>
<tr>
<td>Total cost ratio</td>
<td>-1.76</td>
<td>[-2.77,-1.14]</td>
<td>-1.50</td>
<td>[-2.11,-1.11]</td>
<td>-1.66</td>
<td>[-2.50,-1.12]</td>
</tr>
<tr>
<td>Pension with release (USD)</td>
<td>383.72</td>
<td>[295.04,508.20]</td>
<td>131.57</td>
<td>[108.00,163.11]</td>
<td>284.95</td>
<td>[221.79,372.69]</td>
</tr>
<tr>
<td>Pension no release (USD)</td>
<td>412.03</td>
<td>[315.89,547.71]</td>
<td>144.74</td>
<td>[118.38,180.63]</td>
<td>307.33</td>
<td>[238.51,403.66]</td>
</tr>
<tr>
<td>Effect on final pension (USD)</td>
<td>-27.55</td>
<td>[-38.74,-19.74]</td>
<td>-12.74</td>
<td>[-17.02,-9.91]</td>
<td>-21.73</td>
<td>[-30.25,-15.97]</td>
</tr>
</tbody>
</table>

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.
“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.
**Results**

(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.
Results

(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)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Since</th>
<th>Value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation, annual growth rate</td>
<td>August 2020</td>
<td>3</td>
</tr>
<tr>
<td>Minimum wage, nominal growth rate</td>
<td>March 2021</td>
<td>5</td>
</tr>
<tr>
<td>Government supplements, nominal growth rate</td>
<td>January 2023</td>
<td>5</td>
</tr>
<tr>
<td>Contribution rate (stable)</td>
<td>-</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Assumption</th>
<th>Since</th>
<th>2020</th>
<th>2021</th>
<th>Ahead</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP, real growth rate</td>
<td>Defined values</td>
<td>August 2020</td>
<td>-6.05</td>
<td>4.49</td>
<td>$\mathcal{N}(2.98, 3.47)$</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>MAR(12)</td>
<td>August 2020</td>
<td>11.11</td>
<td>10.20</td>
<td>$\mathcal{N}(7.72, 1.75)$</td>
</tr>
<tr>
<td>Real interest rate (life annuity)</td>
<td>MAR(2)</td>
<td>July 2020</td>
<td>1.67</td>
<td>1.41</td>
<td>$\mathcal{N}(1.73, 0.61)$</td>
</tr>
<tr>
<td>Portfolio A real return rate</td>
<td>SUR(3)</td>
<td>July 2020</td>
<td>4.33</td>
<td>14.50</td>
<td>$\mathcal{N}(5.70, 15.70)$</td>
</tr>
<tr>
<td>Portfolio B real return rate</td>
<td>SUR(3)</td>
<td>July 2020</td>
<td>5.60</td>
<td>12.86</td>
<td>$\mathcal{N}(5.01, 11.17)$</td>
</tr>
<tr>
<td>Portfolio C real return rate</td>
<td>SUR(2)</td>
<td>July 2020</td>
<td>5.73</td>
<td>9.21</td>
<td>$\mathcal{N}(4.59, 7.11)$</td>
</tr>
<tr>
<td>Portfolio D real return rate</td>
<td>SUR(2)</td>
<td>July 2020</td>
<td>4.33</td>
<td>5.15</td>
<td>$\mathcal{N}(3.99, 4.55)$</td>
</tr>
<tr>
<td>Portfolio E real return rate</td>
<td>SUR(3)</td>
<td>July 2020</td>
<td>5.14</td>
<td>6.24</td>
<td>$\mathcal{N}(3.32, 3.35)$</td>
</tr>
</tbody>
</table>

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)”.

Miguel Lorca (UNSW)
Results

(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)
Results

(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)


