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# CHILE

## SELECTED ISSUES

April 2021

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# CHILE

## SELECTED ISSUES

April 2, 2021

Approved By
**Western Hemisphere Department**

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# CHILE'S PENSION SYSTEM IN THE AFTERMATH OF COVID-19: IMPACT AND REFORM OPTIONS[1]

*Chile's pension system came under close scrutiny in recent years. This paper takes stock of the adequacy of the system and highlights its challenges. Chile's defined contribution system was quite influential when introduced, and was taken as an example by other countries. However, it is now delivering comparatively low replacement rates, as its parameters did not adapt over time to changing demographics and global returns, while informality persists in the labor market. In the absence of reforms, the system's inability to deliver adequate outcomes for a large share of participants will continue to magnify, as demographic trends and low global interest rates will continue to reduce replacement rates. In addition, recent legislation allowing for pension savings withdrawals, to counter the effects from the COVID-19 pandemic, is projected to further reduce replacement rates and increase fiscal costs. A substantial improvement in replacement rates is feasible, via a reform that raises contribution rates and the retirement age, coupled with policies that increases workers' contribution density.*

## A. Introduction

**1. Initially praised for its positive impact on private savings, Chile's pension system has come under scrutiny in recent years.** Chile was the first country to replace a traditional pay-as-you-go (PAYG) system with a fully funded pension system based on individual capital accounts managed by private fund managers (AFPs). The switch was motivated by efficiency and fiscal concerns, and "by a desire to reduce the role of the government in economic affairs" (OECD, 1998). Early assessments linked the new pensions system with growing private savings and with the development of local financial markets (Roldos, 2007). The apparent success of the Chilean experience sparked a wave of pension reform in Latin America and other emerging markets. As the system matured, however, its limitations became apparent. First, to encourage participation in the new system, mandatory contribution rates were set at relatively low levels. This, in turn, resulted in low replacement rates relative to initial expectations at the time of the transition and by international standards (Barr and Diamond, 2016). In addition, informality and self-employment, together with low job tenure, resulted in relatively low contribution densities and coverage.

**2. The system's limitations, which are expected to become even more apparent in the future, put pension reform at the center of the political debate in recent years.** The introduction of the solidarity pillar in 2008, marked the beginning of a reform agenda aimed at improving the system's fairness and overall functioning, which continues to this day, as witnessed by the 50 percent increase in the minimum pension introduced in December 2019. Demographic trends and low global returns are expected to weaken the system's ability to yield adequate pensions and prompted the last two administrations to propose reforms to increase contribution rates. Moreover, the extraordinary measures taken in 2020 to support households during the COVID crisis, which

[1] Prepared by Chris Evans and Samuel Pienknagura.

included allowing individuals contributing to the pension system to withdraw funds from their pension account balance, added to the challenges. The resulting withdrawal of assets amounted to 14 percent of GDP and resulted in about 30 percent of individuals who withdrew funds depleting their pension accounts (as of February 2021).

**3. This paper contributes to the debate around the adequacy of Chile's pensions system and reform options, by leveraging publicly available data to project key outcomes of the system under different scenarios.** The analysis focuses mainly on those who are currently contributing to the system and who are expected to retire in the future. Thus, it provides a prospective view of Chile's pension system. In particular, the paper assesses the impact of the COVID-related withdrawals on expected replacement rates and fiscal costs and explores reform options affecting future retirees.

**4. Prior to the COVID-related withdrawals, Chile's pension system yielded an average replacement rate that compared unfavorably to OECD peers, although there is a large degree of heterogeneity across cohorts and income groups.** Chile's relatively low average replacement rate reflects policy parameters (contribution rates and retirement age) that were originally set to yield higher replacement rates but have not kept up with higher life expectancy, declining interest rates, and a low contribution density, and which are expected to lead to declining replacement rates for younger cohorts. In fact, Chile has a lower effective contribution rate than most OECD countries. Furthermore, replacement rates would be even lower in absence of the solidarity pillar introduced in 2008, which sets a pension floor for those in the bottom 60 percent of the income distribution. Indeed, low-income pensioners, who benefit from the solidarity pillar, have relatively high replacement rates compared to the country average.

**5. The withdrawals are expected to further deteriorate the system's outcomes: for current affiliates, the average withdrawal is projected to result in a 5 percent decline in pension at retirement.** The two rounds of withdrawals, which amounted to 14 percent of GDP by end-2020, are expected to reduce the self-financed portion of pensions of current affiliates by 16 percent, on average (i.e. in the absence of any compensating government support). However, this impact will be partly offset by an increase in the government-funded pension supplement, triggered by the reduction in self-funded pension, leading to a reduction in total pensions of about 5 percent and a decline in the average expected replacement rate, from 37 percent to 35 percent.

**6. This buffering role of the solidarity pillar will lead to an additional fiscal cost estimated at a net present value of over 3.5 percent of GDP in 2020.** The withdrawals could affect costs associated to the solidarity pillar by increasing (i) the number of recipients of the pension supplement (to the extent that some pensioners are expected to fall into the lower 60 percent of the income distribution) and (ii) the amount received by each recipient. The sum of these effects will lead to a gradual increase in the additional fiscal costs which are expected to peak in 2060 between 0.06 and 0.12 percent of GDP depending on assumptions. The increasing profile of additional fiscal costs would be equivalent, in net present value, to a one-off fiscal cost of between 2 and 3.5 percent of GDP in 2020. Of course, future increases in the solidarity contributions would increase such a cost.

**7. Turning to reforms, our projections show that increases in contribution rates, retirement age, and contribution densities could lead to significant improvements in expected replacement rates.** Moreover, many combinations of reforms that adjust several parameters in tandem can lead to sizeable increases in expected replacement rates. For example, a reform package that simultaneously increases the contribution rate to 16 percent, the retirement age for men and women to 67 and improved the contribution density to 70 percent would raise the average expected replacement rate to 50 percent from 35 percent, for the average worker; for young people (who have more time to benefit from the changes) the effect would be much larger: the expected replacement rates would increase to 70 percent for males aged 20-25 and close to 60 percent for females aged 20-25. In practice, reforms may need to be phased-in to address political economy considerations.

**8. Finally, the analysis highlights the heterogeneous impact of different reforms across cohorts and showcases the importance of adapting the system's parameters to demographic trends and to global returns.** Changes to contribution rates and policies that increase the contribution density have a large positive effect on expected replacement rates of younger cohorts, while leaving expected replacement rates of older cohorts virtually unchanged. Changes on the retirement age, on the other hand, results in non-negligible improvements in expected replacement rates for all cohorts. Importantly, the resiliency of the system can be improved by allowing periodic revisions to key parameters to reflect secular changes in life expectancy and global financial conditions.

**9. The rest of this paper is organized as follows.** Section B describes the state of the pension system under current legislation prior to the withdrawals and benchmarks the system's outcomes relative to Latin American and OECD peers. Then, using data from the pension supervisory agency, it projects replacement rates and fiscal costs pre-withdrawals. Section C describes the withdrawals and quantifies their impact on expected replacement rates and fiscal costs.[2] Section D studies the impact of different pension reform avenues on expected replacement rates and on expected fiscal costs taking into account the effect of withdrawals. Finally, Section E concludes.

## B. The Pre-Pandemic State of the Pension System

**10. Under current legislation[3] and prior to the pandemic, replacement rates in Chile were comparatively lower than in peers.** Comparing replacement rates is far from a straightforward task because they are very sensitive to assumptions. This caveat notwithstanding, both regional and global comparisons show that Chile's pension system yields relatively low replacement rates. Altamirano et al. 2018 show that, at 38 percent, the expected replacement rate for an average Chilean worker retiring in 2015 was lower than in the average LAC country.[4] OECD analysis shows a similar picture—the OECD's pension model projects that a Chilean retiring around 2060 would have

[2] For an analysis of the macroeconomic consequences of pension reform, see Santoro (2017).

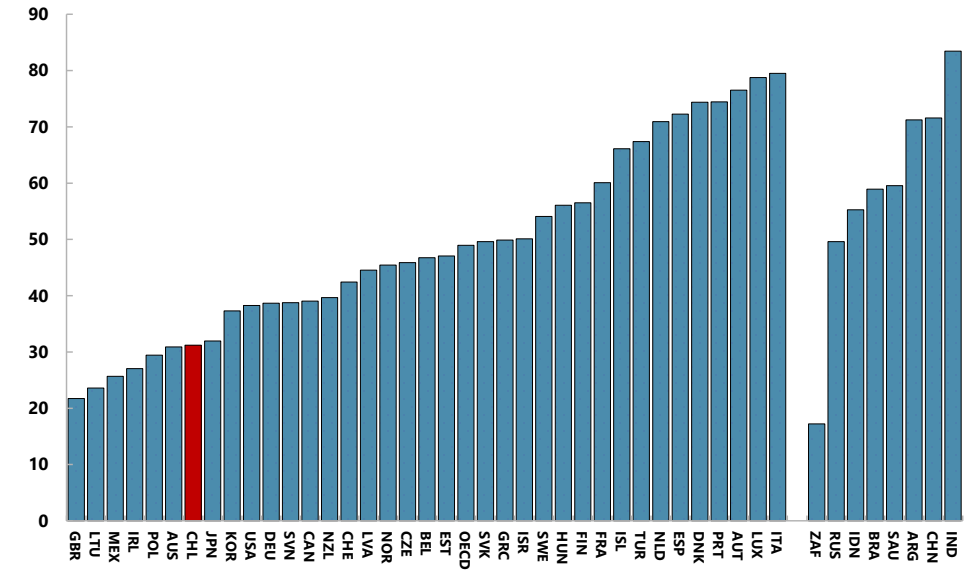
[3] See Annex 1 for a description of the system under current legislation.

[4] This holds even when comparing benchmarking Chile's replacement rates relative to those in countries with defined contribution pensions systems.

a replacement rate of about 30 (lower than the above one due to future demographics and possibly different assumptions about future returns), which is 20 percentage points below the OECD average (Figure 1). In addition to highlighting cross-country differences, the analysis in Altamirano et al. 2018 and in OECD shows that replacement rates are expected to decline over time due to a number of factors that are described below.

**Figure 1. Projected Gross Replacement Rates in OECD Countries and Selected Comparators in 2060**

**In Percent**



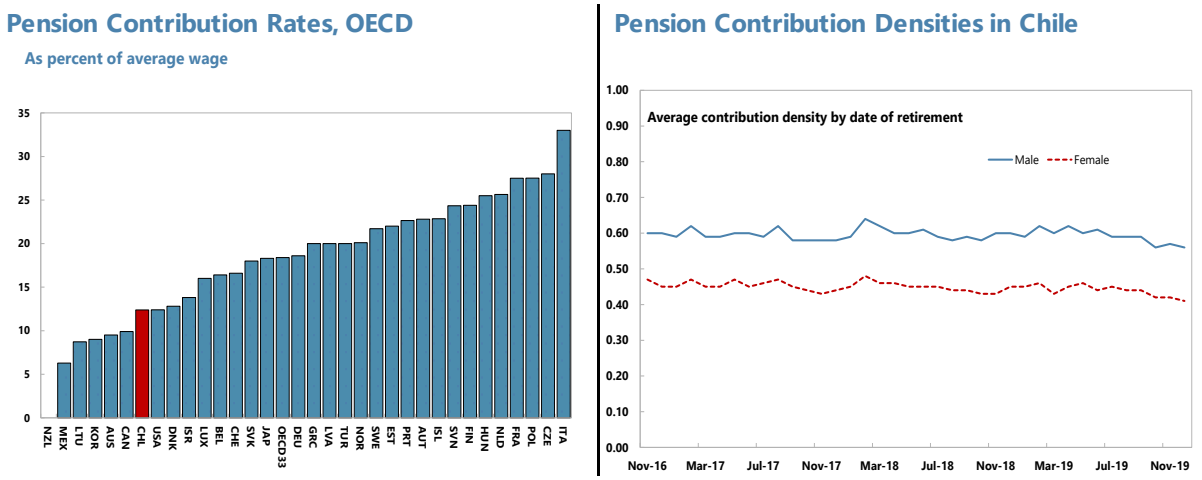

Source: OECD Pension at a Glance (2019)

**11. A combination of factors related to the design of the system, the functioning of Chile's labor markets, demographic trends and global macroeconomic are behind the low replacement rates. The first factor is the low contribution rate.** Chile's effective contribution rate is lower than most OECD countries (Figure 2, Panel A). Contribution rates were initially set at relatively low levels to encourage workers to transition from the PAYG system to the privately funded system and have not been increased since. However, as the first cohorts under the new system started retiring, it became clear that the resulting replacement rates were much lower than anticipated.

**12. A second factor is the low contribution density**. Self-employment and worker turnover have resulted in low contribution densities over workers' careers, especially among women (Figure 2, Panel B). On average, the probability that a male worker contributes to his pension account in a

given month is 60 percent, compared to 50 percent for women.[5] Low propensity to contribute, combined with a lower mandatory retirement age (60 compared to 65 for men), result in lower pensions and replacement rates for women (Figure 3).

**Figure 2. Factors Underlying Low Replacement Rates**




Source: OECD Pension at a Glance (2019) and Superintendencia de Pensiones.

**13. A third factor is demographics.** Based on data from the supervisory agency and under the assumption described in Annex 2, male workers who are 60-65 years old today are expected to receive a pension of about 45 percent of their final wage prior to retirement (Figure 3, Panel A). By contrast, male workers who entered the labor market recently (those who are 20-25 year old in 2020) are expected to have replacement rates of roughly 40 percent.[6] This reduction in expected replacement rates is in part related to the fact that younger generations face the prospects of longer life horizons. Compared to those who are 65 today, estimates of increasing life expectancy imply that workers that will retire in 40 years' time will have to spread their savings over an additional five years (four years for women, Figure 3 panel B).

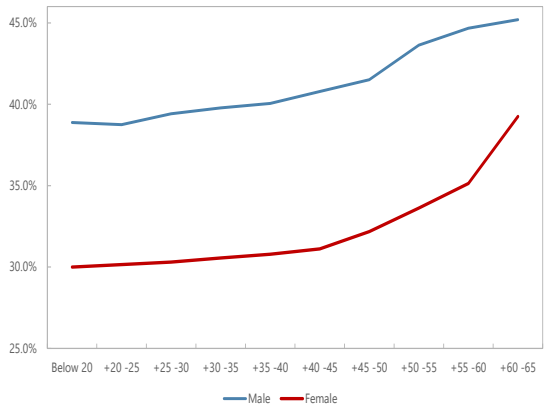
**14. A fourth factor is lower future expected returns on savings.** Real interest rates have gradually declined since the adoption of the defined contribution system (Figure 3, panel C), and are expected to remain low over the medium term. This means that today's youngest cohorts will accumulate assets at a lower rate compared to what older cohorts have achieved so far.

[5] The average contribution density for males retiring between 2017 and 2020 was 60 percent and 46 percent for females.

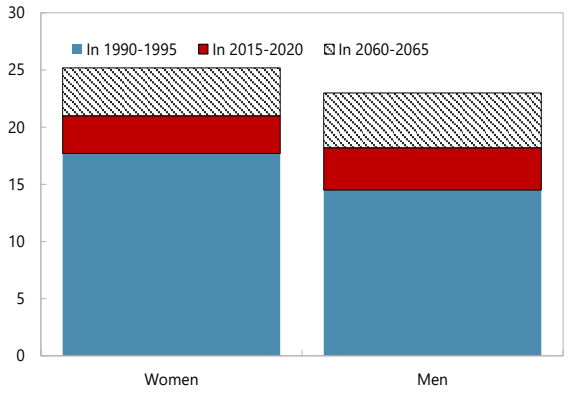
[6] A similar pattern is observed for women—the 60 to 65 age group have average projected replacement rates of roughly 40 percent, while those who are those who are 20 to 25 years old are expected to have replacement rates of 30 percent at retirement.

**Figure 3. Replacement Rates in Chile**

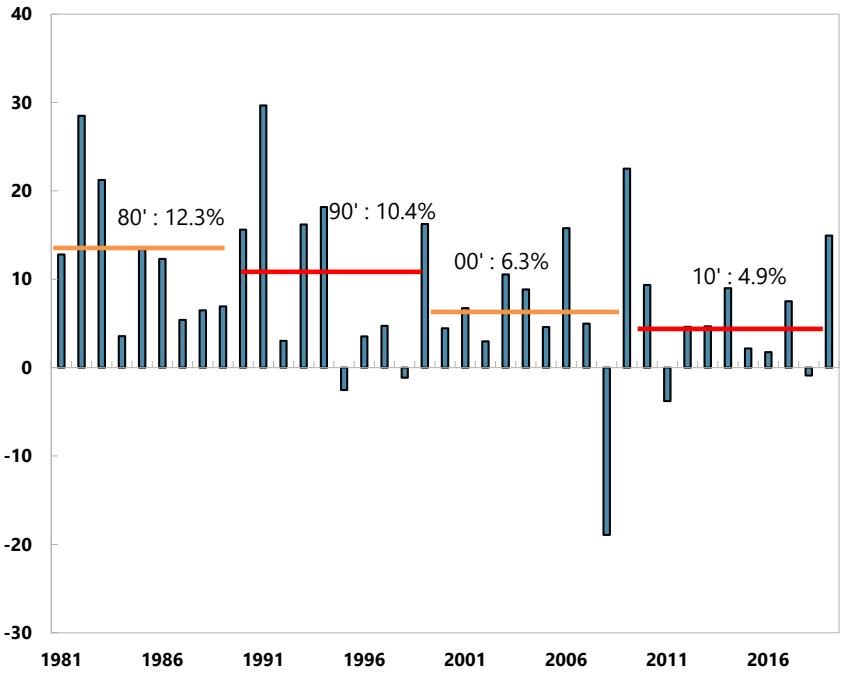
**Average Expected Replacement Rates by Cohort and Gender**




**Remaining Life Expectancy at 65 in Chile (in years)**




**Annual Real Returns of Pension Funds (Fund C, in percent)**




Sources: Authors' calculations based on data from *Superintendencia de Pensiones* and OECD.

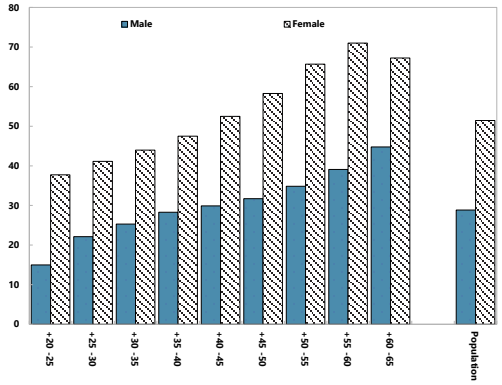
**15. Demographic trends and declining global returns also explain differences between expected replacement rates at the time the system was adopted and those observed when the first cohorts retired.** The impact of these two factors is studied in Evans and Pienknagura (forthcoming), who compute the expected pension of a hypothetical male worker who entered the labor force in 1981 and calculate his replacement rate at retirement under different assumptions related to life expectancy and returns. They show that the combined effect of increased life

expectancy from 1981 levels (when the system was adopted) to today's levels and the decline in interest rates seen from 1981 until today, reduces the expected replacement rate of the average person who is currently in the system to 38 percent from 90 percent.[7] Their result illustrates that at its inception the system was well positioned to deliver adequate pension levels and replacement rates. However, as life expectancy and real interest rates changed, while the parameters of the pension system (i.e. contribution rates and replacement rates) did not change accordingly, the system's outcomes ended up being subpar.

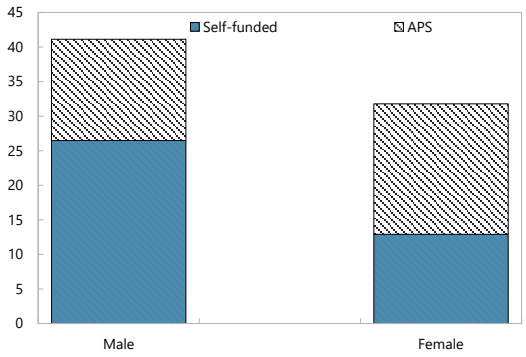
**16. According to projections of outcomes for future retirees, average replacement rates would be significantly lower in absence of the solidarity pillar.** In 2008 Chile introduced a solidarity pillar to supplement pensions of individuals with low self-financed pensions, to address poverty among retirees.[8] Benefits stemming from the solidarity pillar were (before the 2020 pension withdrawals) projected to account for approximately 30 percent of total expected pensions at retirement for the average male retiree and 50 percent for the average woman prior to withdrawals (Figure 4).[9, 10] In turn, the solidarity pillar increases the expected average replacement rate for those who contributed to the pension system in 2020 by almost 15 percentage points for men, and by close to 20 percentage points for women.

**Figure 4. The Impact of the Solidarity Pillar on Pensions of Future Retirees**

**APS as a share of Total Pensions, by Age Groups and Gender (in percent)**




**Contribution of APS and Self-funded Pensions to Replacement Rates (in percent)**




Source: Authors' calculations based on data from the *Superintendencia de Pensiones*.

[7] In their exercise, Evans and Pienknagura (forthcoming) assume that the real interest rate falls from 6 percent to 4.15 percent. This is a conservative decline, as real interest rates in the 1980s were 12.3 percent, on average.

[8] See Annex 1 for a description of the element of the solidarity pillar.

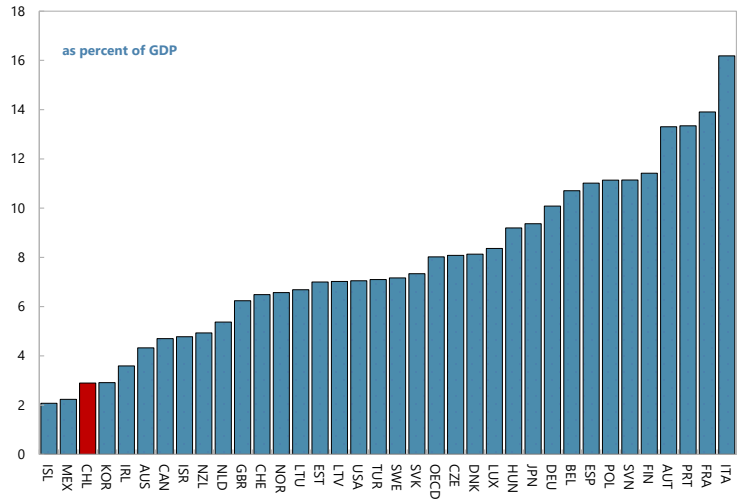
[9] See Annex 3 for a detailed exposition of the characteristics of the pensions system across cohorts and asset balances. The averages presented in Figure 4 reflect the fact that for some retirees in the lower 60 percent of the income distribution, the solidarity pillar can represent close to 100 percent of their pension.

[10] This is consistent with Fajnzylber (2019), who argues that the solidarity pillar has provided transparent and targeted subsidy to individual who need it the most and compensates for gender differences.

**17. The fiscal footprint of the Chilean system is relatively small and expected to decline as total costs converge to those associated with the solidarity pillar.** The fiscal cost of the pensions system has been trending downward in Chile, although this mainly reflects the decline in the share of retirees receiving benefits from the old PAYG system. Compared to other countries, many of which have PAYG or hybrid systems, Chile currently devotes a relatively small share of GDP to the civilian pension system. OECD (2019) shows that in 2015 fiscal costs associated with old-age and survivors benefits were smaller in Chile than in other OECD countries, except for Iceland and Mexico (Figure 5, panel A). By 2020, the fiscal costs were approximately 2.2 percent of GDP, of which 1.1 percent stem from the solidarity pillar. Total fiscal costs will converge to the costs of the solidarity pillar, which prior to withdrawals were projected to increase gradually to 1.6 percent of GDP by 2060[11], assuming that the parameters of the solidarity pillar related to a minimum pension to individuals with no self-funded pension (*pensión básica solidaria*, PBS) and a government supplement to individuals with low self-funded pensions (*Aporte previsional solidario*, APS) remain unchanged (Figure 5, panel B). However, in an alternative scenario where the parameters of the solidarity pillar, PBS and APS, are assumed to grow at the same rate as wages (1.25 percent per year in real terms), then the fiscal costs can be expected to reach 3 percent of GDP in 2060.

**Figure 5. Fiscal Costs Associated with the Pension System—Pre-Withdrawal**

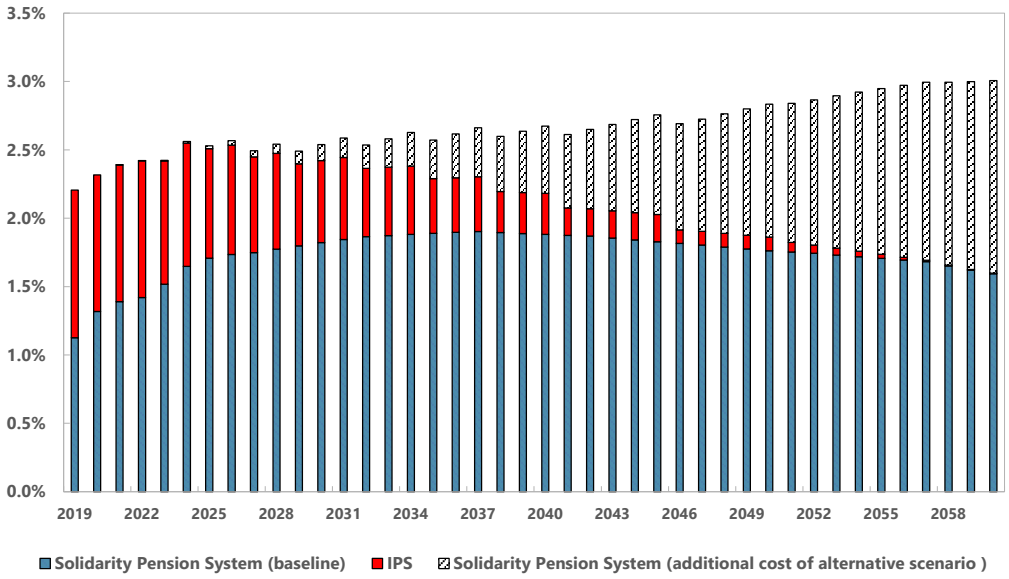
**Cross-Country Comparison of Fiscal Costs—2015**




[11] Fiscal costs reflect the authorities' projections of future costs associated with the old PAYG system up to 2050.

**Figure 5. Fiscal Costs Associated with the Pension System—Pre-Withdrawal (Concluded)**

**Fiscal Costs in Chile, *Baseline and Alternative Scenario (% of GDP)***

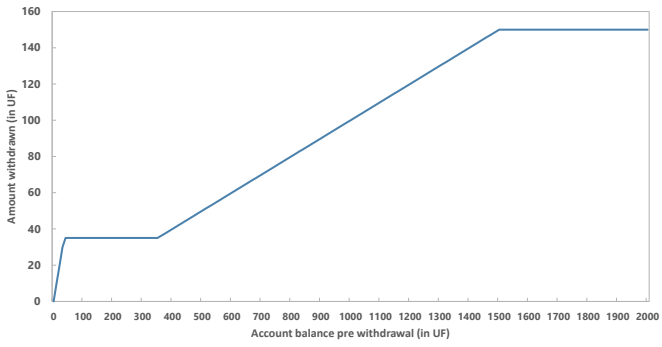



Sources: Authors' calculations based on OECD (2019) and *Superintendencia de Pensiones*.

## C. Assessing the Impact of Withdrawals

**18. As part of the policy response to mitigate the adverse economic effects of COVID-19, Congress authorized workers to tap into their private pension accounts.** Two rounds of withdrawals were approved, in July 2020 and December 2020. Total withdrawals reached US$36bn (or about 14 percent of GDP) by February 2021. The allowed amount for each withdrawal was generally 10 percent. However, the introduction of minimum and maximum withdrawals, set at 35 UF and 150 UF respectively (Table 1), meant that the share of assets that could be withdrawn varied with balances (Figure 6). The first withdrawal was tax-exempt, while the second one was exempt only for those who earned on average below a certain threshold (see Table 1).

**Figure 6. Pension Account Balances and Maximum Withdrawal Amount**




Sources: Authors' calculations.

**Table 1. Details of Pension Withdrawals**

| Main Characteristics | | 1st Withdrawal | 2nd Withdrawal |
|---|---|---|---|
| Withdrawal Amount: | Up to 10% of funds: | ✓ | ✓ |
| | Maximum amount: | US$ 5,593 (150 UF as of 23-Jul) | US$ 5,769 (150 UF as of 3-Dec) |
| | Minimum amount: | US$ 1,305 (35 UF as of 23-Jul) | US$ 1,346 (35 UF as of 3-Dec) |
| | Those below minimum may withdraw all | ✓ | ✓ |
| Tax exempt: | Earn < US$1,986 a month ($1.5 MM as of 3-Dec) | ✓ | ✓ |
| | Earn > US$1,986 a month ($1.5 MM as of 3-Dec) | ✓ | ✗ |
| Legal Status: | | Constitutional reform | Law |
| Date of Publication: | | 30-Jul-20 | 10-Dec-20 |

Note: Authors' elaboration based on legislation.

**19. Official data shows that, up to February 2021, close to 10.5 million people withdrew money from their pension accounts and, of those, 30 percent depleted their accounts.**[12] Roughly 95 percent of all people with positive pension balances in June 2020 made use of at least one of the two withdrawals, and over 7 million people withdrew twice (almost two thirds of people with positive balances). The average amount withdrawn in each round was about US$2,000 and the average individual took 40 percent of their account balance in the first withdrawal and slightly over 30 percent in the second withdrawal (Table 2). This reflects the fact that a large share of people in the system had balances below the 35 UF threshold, and close to 3 million people depleted their account balance. Furthermore, the distribution of pensions accounts saw a leftward shift following the withdrawals, with a significant reduction in the number of people with intermediate balances and a large increase in individuals with low balances (Figure 7).

**20. On the long-term, withdrawals are projected to have an adverse effect on future pensions, and the individual effects will depend on various factors.**[13] Several factors affect the impact of withdrawals on pensions at retirement. First, other things equal, larger withdrawals result in larger reductions in pensions, because of their impact in the balance of pensions accounts. Second, the longer an individual has to rebuild assets, the smaller the impact of withdrawals on pensions. Third, individuals with low wages withdrew proportionally more and hence will not be able to replenish balances as quickly as those with higher wages. Fourth, the expected level of self-funded pensions prior to withdrawals will be important in determining the impact of withdrawals—individuals for whom self-funded pensions were a relatively small component of total pensions (as they were already relying more on the public solidarity contribution) are expected to see a smaller decrease in pensions. Finally, post-withdrawal balances will affect the extent to which an individual becomes eligible for the APS supplement and the value she will receive.

[12] Close to 3 million people depleted their accounts up to February.

[13] For an analysis of the short-term impact of withdrawals see Central Bank of Chile (2020) and Barrero et al. (2020).

**Table 2. Distribution of Withdrawals by Initial Balance**

**Amount Withdrawn in the *First* Pension Withdrawal, by Account Balance**
(As of January 22, 2021, in US$)

| Balance and allowed withdrawal | | Amount withdrawn | Amount withdrawn (% of balance) | People | |
|---|---|---|---|---|---|
| **Balance in AFP (US$ as of July 23)** | **Allowed withdrawal** | **Mean** | **Mean** | **Number** | **%** |
| Less than $1,305 | 100% of balance | $527 | 100% | 2,120,496 | 20.5% |
| Between $1,305 - $13,050 | $1,305: >10% of balance | $1,307 | 35.5% | 4,427,410 | 42.9% |
| Between $13,050 - $55,928 | 10% of balance | $2,716 | 10.0% | 3,058,099 | 29.6% |
| More than $55,928 | $5,593: <10% of balance | $5,549 | 6.2% | 666,369 | 6.5% |
| No information | - | - | - | 54,298 | 0.5% |
| Total | | $1,842 | 39.3% | 10,326,672 | 100% |

**Amount Withdrawn in the *Second* Pension Withdrawal, by Account Balance**
(As of January 22, 2021, in US$)

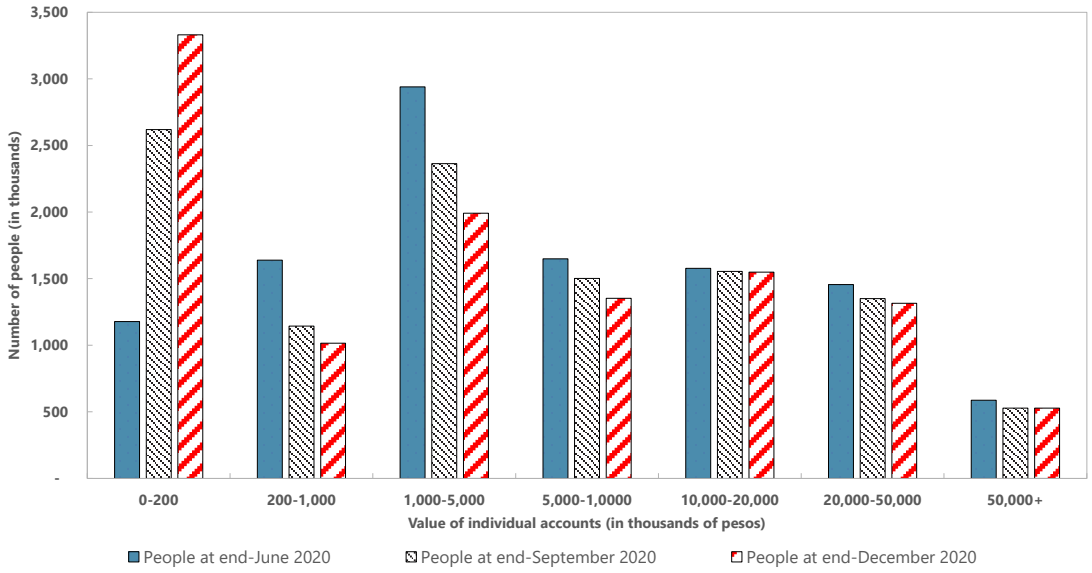
| Balance and allowed withdrawal | | Amount withdrawn | Amount withdrawn (% of balance) | People | |
|---|---|---|---|---|---|
| **Balance in AFP (US$ as of December 3)** | **Allowed withdrawal** | **Mean** | **Mean** | **Number** | **%** |
| Less than $1,346 | 100% of balance | $571 | 100% | 1,005,815 | 14.1% |
| Between $1,346 - $13,461 | $1,346: >10% of balance | $1,348 | 33.2% | 3,260,178 | 45.7% |
| Between $13,461 - $57,690 | 10% of balance | $2,693 | 10.0% | 2,457,057 | 34.4% |
| More than $57,690 | $5,769: <10% of balance | $5,727 | 6.4% | 379,277 | 5.3% |
| No information | - | - | - | 37,625 | 0.5% |
| Total | - | $1,940 | 33.2% | 7,139,952 | 100.0% |

Source: *Superintendencia de Pensiones*. Note: Data on withdrawals are converted from UFs to US$ using the exchange rate at the time of the announcements. For the first withdrawal this was July 23, 2020 and for the second withdrawal it was December 3, 2020.

**21. The self-funded portion of pensions is projected to decline on average by 15 percent for men and by almost 20 percent for women, with larger effects among older cohorts (Figure 8).** The self-funded pension is the part that excludes government solidarity support. Males in their 20s are projected to experience average reductions in self-funded pensions of 5 to 10 percent after withdrawals.[14] By contrast, older cohorts experience reductions that can go up to over 53 percent, with higher numbers for elderly with lower balances that withdrew proportionally more. Women exhibit a similar pattern, but the reductions tend to be larger. This is due to lower wages and contribution densities, and a lower mandatory retirement age. The reduction in self-funded pensions are smaller when we weight by assets. This is due to the fact that, by design, the share of individual assets that were withdrawn declined with the individual pension account balance and that a large share of the population has low pension balances.

[14] Lorca (2020) also studies the impact of withdrawals on pensions. However, the author focuses exclusively on the first round of withdrawals.

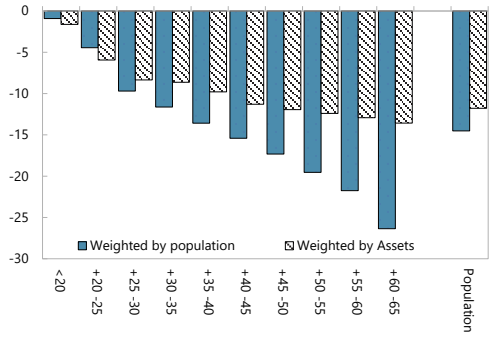
**Figure 7. Distribution of Pension Account Balances**



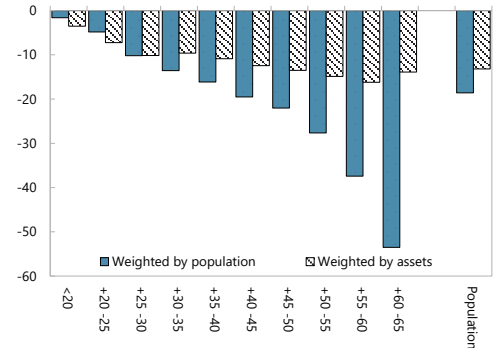

Source: Authors' Calculation Based on Data from *Superintendencia de Pensiones*

**Figure 8. Reduction in Projected Self-Funded Pensions After Withdrawals, by Gender and Age**

**Male (in percent)**




**Female (in percent)**

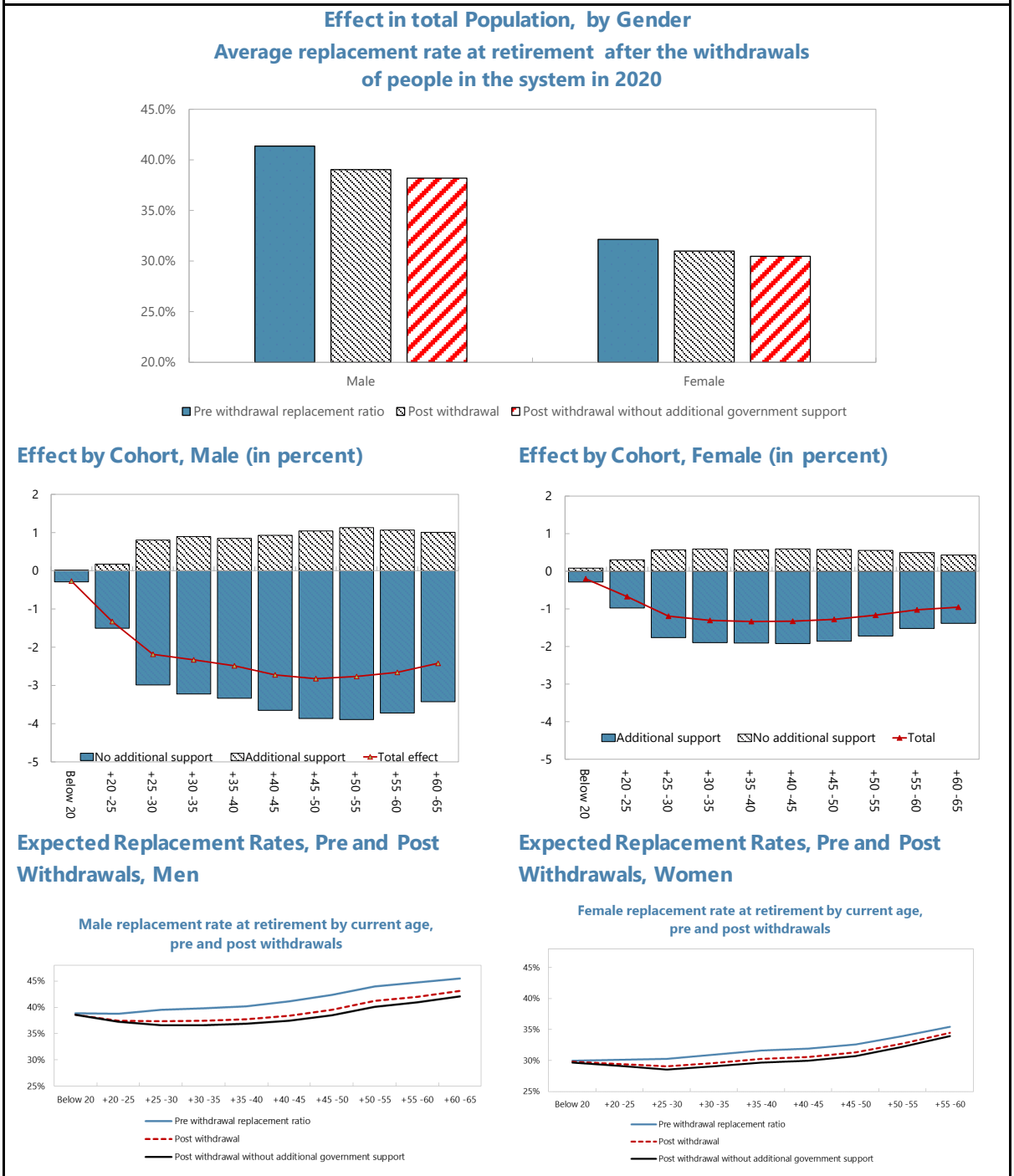



Source: Authors' calculations based on data from Superintendencia de Pensiones.

**22. The projected reductions in self-funded pensions are expected to increase public costs associated with benefits of the solidarity pillar, which would automatically buffer the impact of withdrawals on pensions and replacement rates.** Replacement rates are projected to decline by close to 2.5 percentage points after withdrawals for the average male worker, and by over one percentage points for female workers (Figure 9, panel A). The smaller impact on women's expected replacement rates is due to the fact that, on average, PBS and APS accounts for a large share of their pension, which makes pensions less sensitive to self-funded account balances. The adverse impact of withdrawals on expected replacement rates is partly mitigated by the increase in government support due to the decline in self-funded pensions. The projection exercise shows that, in absence of additional government support, replacement rates would fall by over 3 percentage points for men

and by over 1.5 percentage points for women. For men, the mitigating effect of government support is largest for the 50-55 age group—APS dampens the adverse effect of withdrawals on expected replacement rate by 1 percentage point (Figure 9, Panel B). For women, the additional impact of APS is largest for the 40-45 age group (Figure 9, Panel C).

**Figure 9. Change in Replacement Rates due to Withdrawals**




Source: Authors' calculations based on data from *Superintendencia de Pensiones*.

**23. The increase in the number of people receiving government supplements (PBS and APS) and in the average amount received are expected to increase fiscal costs over time.**[15] Under the baseline scenario, close to 230,000 additional people are projected to receive self-funded pensions below PMAS at retirement, making them eligible to APS after the withdrawals if they fall into the lower 60 percent of the income distribution (160,000 under the alternative scenario, Figure 10)[16]. In addition, current recipients are expected to see an increase in APS due to the adverse effect of withdrawals on the self-funded portion of pensions. This leads to an expected increase of 8 percent in the average supplement received by males and a 5 percent increase for females (7.3 and 3.6 percent, respectively, in the alternative scenario). The sum of these effects leads to a gradual increase in the fiscal costs, as new cohorts with lower pension account balances retire and get access to additional APS payments. Additional fiscal costs stemming from the solidarity pillar peak around 2060 (Figure 10 panel C), with additional payments of close to 0.1 percent of GDP, (0.12 percent in the alternative scenario). The net present value of the additional fiscal costs stands at over 3.5 percent of 2020 GDP. Notice that these fiscal costs represent an upper bound on the actual costs of withdrawals as some of the individuals that fall below the PMAS line will not fall into the lower 60 percent of the income distribution, and thus will not be eligible to receive benefits stemming from the solidarity pillar. For example, if we assume that withdrawals do not affect the income distribution, such that beneficiaries of the solidarity pillar remain unchanged after withdrawals, fiscal cost would peak at about 0.06 percent of GDP under the baseline, and would amount to a net present value of 2 percent of GDP in 2020. On the other hand we do not assess the fiscal cost derived from withdrawals by current pensioners, which represent about 5 percent of the population that withdrew funds.[17]

**24. The two rounds of withdrawals will also impact fiscal accounts by lowering tax revenue.** Self-funded pensions in Chile are taxable. Thus, the reduction in self-funded pensions is expected to affect tax collection in the future. To quantify foregone revenue, we match current tax brackets to the self-funded pensions pre and post withdrawals. The implicit assumption is that the structure of income tax in Chile will remain constant over the next 40 years. Under this assumption, the government would lose over USD 1 billion dollars over 40 years, expressed in net present value 2020 terms. Foregone revenue would peak around 2060, at approximately 0.006 percent of GDP. An alternative way to quantify loss revenue due to withdrawals is to compute tax losses resulting from the tax exemptions included in the law. If the two withdrawals would have been fully taxable, the tax collection in 2021 would have increased by over USD 1 billion, or 0.45 percent of GDP.

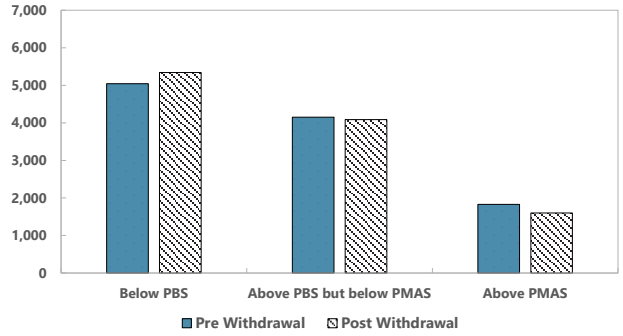
[15] When assessing the fiscal impact of withdrawals, we only calculate the cost of the new beneficiaries. In reality some of those who are current pensioners could withdraw (those with programmed withdrawals could), but we do not have the balance pensioners with programmed withdrawals.

[16] In the alternative scenario the number of additional people is lower than in the baseline scenario because in the former the higher PMAS results in a larger number people receiving a government supplement pre-withdrawal, making the change post-withdrawal smaller. A higher PBS, however, implies that the post-withdrawal amount received by beneficiaries (people who cross the PMAS threshold post-withdrawal as well those who received a supplement pre-withdrawal) is larger. The overall effect is a slight increase in fiscal cost relative to the baseline scenario, as visible in Figure 12 panel D versus C.

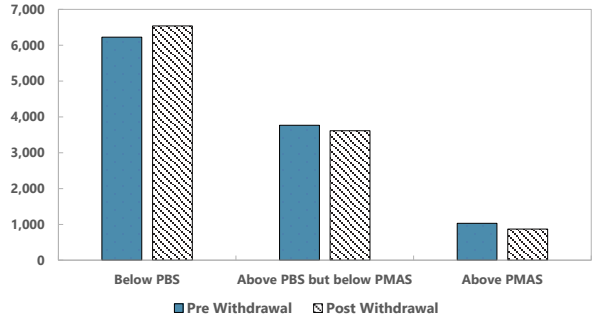
[17] Pensioners with life annuities were excluded from the pension withdrawals while pensioners with programmed withdrawals were allowed to access the withdrawals.

**Figure 10. Fiscal Impact of Withdrawals**

**People with Self-Funded Pensions Between and Above PBS and PMAS (*Baseline*, in Thousands)**

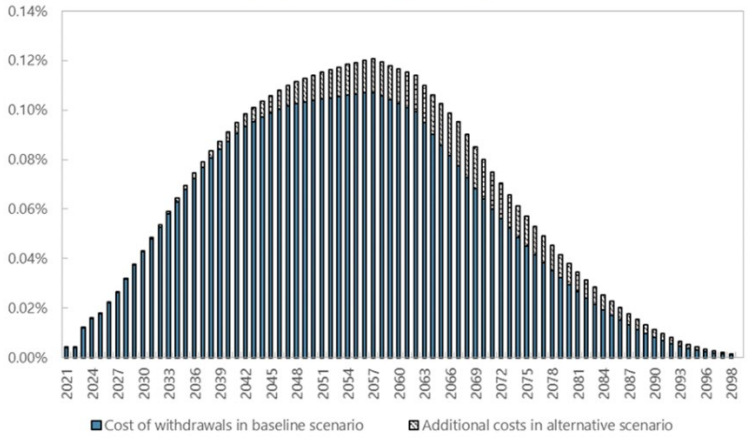



**People with Self-Funded Pensions Between and Above PBS and PMAS (*Alternative*, in Thousands)**




**Additional APS Costs from Withdrawals, *Baseline and Alternative (% of GDP)***

**Fiscal cost of pension withdrawals as a % of GDP (5 year moving average)**




Source: Authors' calculations.

## D. Reform Options

**25. Pension reform has been a central part of the political debate in the last two decades and has renewed urgency in the aftermath of the withdrawals.** As discussed, the prospects of less favorable global financial conditions hamper the system's ability to accumulate enough assets. An aging population (Figure 11) will further strain the current pension system, stretching pension balances over a longer retirement, while the solidarity component will be financed by a slowing workforce. As life expectancy of men and women increases, their accumulated assets at retirement will need to support additional pension years. The population eligible for pension is expected to double from about 3 million in 2021 to 6 million in 2050, adding extra pressure on the pension system and solidarity pillar. The Marcel commission in 2006 proposed a series of parametric changes to strengthen the system and to address equity concerns. The recommendations of the commission laid the foundations for the solidarity pillar, introduced in 2008. More recently, the Bravo commission (2015) proposed further adjustments to the system to account for demographic trends

and low contribution rates. The importance of many of these proposed changes have become more prominent in the aftermath of the withdrawals.

**Figure 11. Projected Population of Those of Pension and Working Age**
(in Thousands)


Source: Authors' calculation based on Data from *Instituto Nacional de Estadística*

**26. The latest proposed reform by President Piñera of March 2021, which revamps the January 2020 proposal, aims to increase the contribution rate to 16 percent, expand the coverage of the solidarity pillar, and to add more competition to the system.** The additional 6 percent contribution rate will be paid by the employer and managed by a public autonomous body. Half of this increase (3 percent) will go to employees' individual pension savings, the other half will go to a collective saving fund. Earnings from the collective saving fund will be used to incentivize contribution to the system by providing additional payments as years of contribution rise. The reform aims to bolster the solidarity pillar, increasing coverage from 60 percent to 80 percent of the population.

**27. This section explores the impact of different reform scenarios, related to key parameters, on the adequacy of pensions and the reduction of fiscal cost which would arise from a decline in necessary government support.** It quantifies the impact of an increase in the contribution rate to the level in the current proposal. In addition, it studies the impact of a reform package that increases in tandem contribution rates, the retirement age and the contribution density. Finally, it gauges the cost of a universal basic pension. Importantly, the exercises presented in this section assume immediate implementation of reforms. In practice, reforms may need to be phased-in to address political economy considerations. Thus, our results should be taken as upper bounds of the potential benefits of reforms.

**28. An increase in expected replacement rates from the defined benefit portion of the pension can be achieved by increasing contribution rates, the retirement age[18], or the contribution density.[19]** The interaction of these three components on replacements rates is highlighted below in the isoquant exercise of Figure 12. Panel A outlines the possible combinations of contribution rate and retirement age that allow to obtain a given population average expected replacement rate. For example, the isoquants show that a population average 40 percent expected replacement rate can be achieved by either increasing the female retirement age to 65 and increasing the contribution rate to 13.5 percent, or by keeping the current contribution rate but increasing the retirement age to 69. In addition, Figure 12 shows that an increase in the expected replacement rate can be achieved by either larger changes in one parameter and keeping the other constant, or by changing both parameters incrementally. The relationship between parameters is, however, affected by the contribution density. Indeed, an increase in the contribution density can ease the necessary increase in contribution rates and retirement age to reach a 40 percent population average expected replacement rate. For example, if contribution density increases to 70 percent (from 60 for males and 50 for females) then a population average 40 percent expected replacement rate can be reached with an increase in the retirement age to 66. For the younger cohorts, those aged 20–25 shown in Panel B, who benefit most from an increase in the contribution rate and contribution density it is possible to reach an expected replacement rate of 70 percent, through an increase in the contribution rate to 18 percent and retirement to 70. If contribution density increases to 70 percent, then the same expected replacement rate (70 percent) can be reached assuming an 18 percent contribution rate and a retirement age of 67, three years earlier than if contribution density did not increase.

**29. Increasing the mandatory contribution from 10 to 13 percent would increase the average expected replacement rate from 35 to 38 percent and lower the fiscal cost of the system.** The average expected replacement rate for young affiliates, those aged between 20 and 25, increases from 37 to 45 percent for males and 29 to 33 percent for females after a 3 percentage point increase in the contribution rate. This increase benefits the younger cohorts more as they have more working years ahead of them to contribute at a higher rate and they can benefit from the interest earnt on a larger pension balance. This rise in the mandatory contribution rate lowers the support needed by the government to complement private pensions and therefore reduces the fiscal cost of the system (note that due to data constraints the analysis does not account for the additional fiscal costs for the government as an employer associated with its higher contribution to

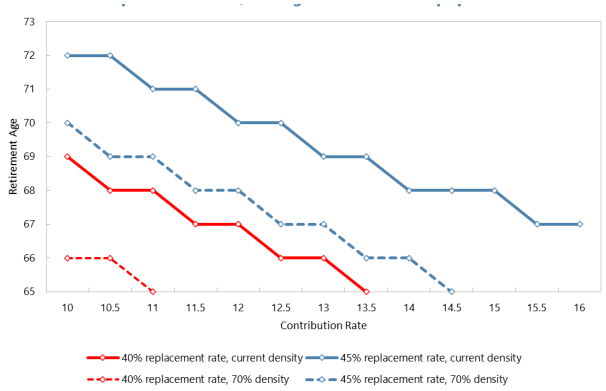
[18] The baseline assumption is that females retire at 60 and males at 65, which is close to the effective retirement age for females (61.2) and males (65.3) for those that retired in January 2021.

[19] The policy analysis abstracts from potential unintended consequences of a change in the system's parameters and, therefore, interpretation of the results should be mindful of these limitations. For example, informality, which can create low contribution densities, could be exacerbated if workers are required to contribute a larger share of their wage to the pension system or contribute to a system with retirement income transfers, weakening the direct link between contributions and final benefits (Piggot et al., 2009). Using data on Chilean households linked with administrative pension system data in a life-cycle model Joubert (2015) finds that raising contribution rates by 5 percentage points increases the size of the informal sector by 12.5 percent for men and 9.3 percent for women. This evidence suggests that when interpreting our results, the reader must be aware of the uncertainty surrounding the exercise.

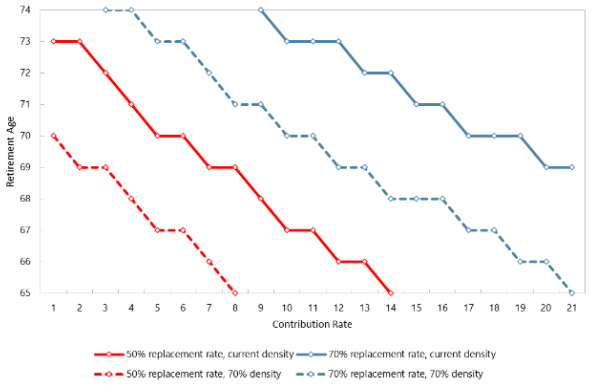
public pensions). However, even for the youngest cohorts an increase in the contribution rate to 13 percent will not bring expected replacement rates above 50 percent, which is the OECD average, motivating the need for a greater increase in the contribution rate.

**Figure 12. Isoquant of Expected Replacement Rate by Age of Retirement, Contribution Rate and Contribution Density**

**Contribution rate and retirement age targeting 40% and 45% replacement rate, average for the current population**



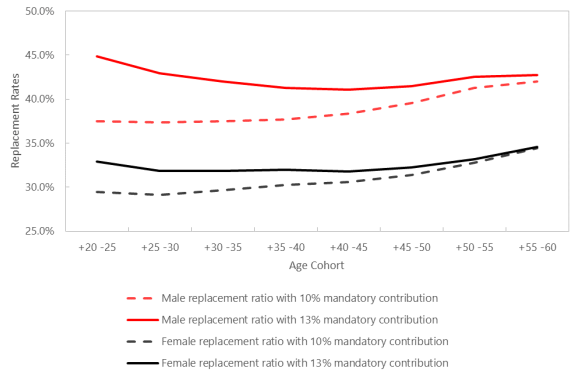

**Contribution rate and retirement age targeting 50% and 70% replacement rate at retirement for the 20-25 year old cohort**



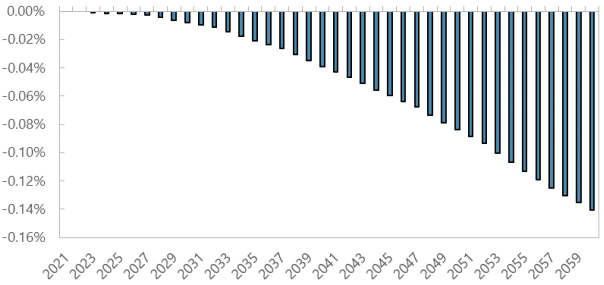

Source: Authors' calculations

**Figure 13. Impact of Increase in Contribution Rate to 13% on the Pension System**

**Replacement rate at retirement by current age, increasing contribution rate from 10% to 13%**




**Fiscal cost in % of GDP of increasing contribution rate from 10% to 13%**
(smoothed)



Source: Authors' calculations.

**30. Increasing the contribution rate, retirement age, and contribution density is required to bring the replacement rate for the youngest cohorts above 60 percent.** As an example of possible combinations of parameters and reforms, increasing the contribution rate from 10 percent to 16 percent, the retirement age to 67 (from 65 for men and 60 for women), and reaching a contribution density of 70 percent (from 60 percent for men and 50 percent for female) would bring the expected replacement rate above 60 percent for the young cohorts (59 for women and 66 for men, Figure 14, panel A), while the expected replacement rate for the average person currently

contributing would reach 50 percent. The combination of measures reduces support needed through the solidarity pillar, lowering the fiscal cost of the pension system, which is expected to be 0.8 percent of GDP lower in 2060. Such fiscal space could be used to strengthen the solidarity component of pension in a targeted way. Even after equalizing retirement age and contribution density, inequality in replacement rates between genders still exists due to differences in life expectancy, which is the principal driver of the difference between young men and women, and current accumulated assets, which causes a larger difference for the older generations.

**31. Notice that the three policies implemented in isolation would have a significantly lower impact on expected replacement rates.** Out of the three independent exercises the largest increase in the expected replacement rate at retirement for current affiliates, and particularly the younger cohorts, is due to an increase in the contribution rate from 10 to 16 percent (Figure 14, panel C). This change causes the expected replacement rate to increase from 34 percent to 45 percent for those aged between 20 and 25, and the population average increases from 35 percent to 41 percent. Increasing the contribution density to 70 percent raises the expected replacement rate for the current pension affiliates from 35 percent to 37 percent, with a larger increase (from 34 percent to 38 percent) for those between the age of 20 and 25. Changing the retirement age to 67 would increase pensions in three ways: allowing contributors to build more assets and accumulate additional returns on past assets, while reducing the number of years the pension is expected to cover. This boosts the expected self-financed portion of the pension at retirement; however, this does not fully pass through into an equivalent increase in replacement rates. In our model the increase in real wage, assumed at 1.25 percent, dampens the response in the replacement rate, since their pension (self-financed plus additional government support) increases but so does their final wage. The increase in retirement age to 67, increases the expected average replacement rate by 3 percentage points (from 35 percent to 38 percent).

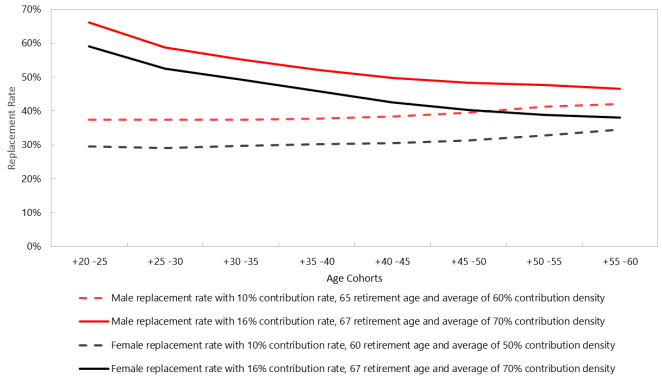
**32. A universal basic pension, providing a fraction of the minimum wage to everyone of eligible pension age (65+ for males and 60+ for females), would reach a cost of anywhere between 2.5 and 6 percent of GDP by 2050 (5 to 10 percent of today's GDP), depending on the choice of parameters.** One proposal currently under consideration is the introduction of a minimum pension tied to the minimum wage. To quantify the cost of this reform, independently of its source of financing, we consider four scenarios: (i) one where the universal basic pension (UBP) is set today at half real minimum wage and remains constant in real terms, (ii) one where the UBP is set at 75 percent of today's real minimum wage and remains constant in real terms, (iii) one where the UBP is set at 50 percent the real minimum wage and then grows at the same rate as overall wages, and (iv) one where the UBP is today 75 percent of the minimum wage and then again grows at the same rate as wages. Just to compare to the current solidarity pillar, a UBP of half the minimum wage is roughly equivalent as paying todays PBS value to every retiree, a pension level that falls slightly below the poverty line. The fiscal cost of a UBP of half the minimum wage, 5.6 UF or about US$230,[20] would be approximately 2.5 percent of GDP each year, as the increase in old age population over time is compensated by the decline over time of the minimum pension with respect to GDP per capita (Figure 15, Panel A). This, in turn, would amount to close to 5 percent of GDP in

[20] Using the exchange rate at end-February 2021.

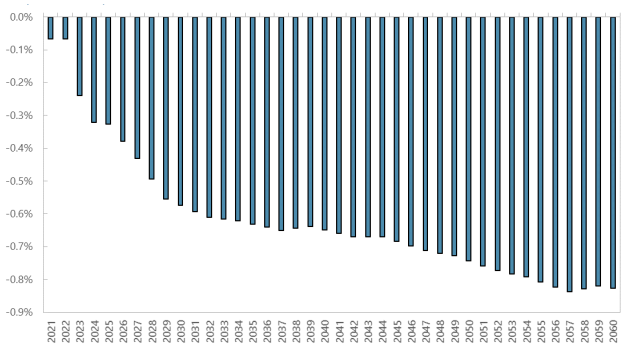
2020. If the basic pension is assumed to increase with wages, the cost of a UBP of half the minimum wage would increase to over 3.5 percent of GDP by 2050 (close to 8 percent of today's GDP). A pension of 75 percent of today's real the minimum wage, which is above the poverty line, will create a fiscal cost of 3.9 percent of GDP by 2050 assuming zero growth of pension, and 5.6 percent of GDP by 2050 if we assume a real growth of the pension of 1.25 percent (8 percent and over 10 percent of GDP in 2020, respectively).

**Figure 14. Impact of Increasing Contribution Rate, Retirement Age and Contribution Density**

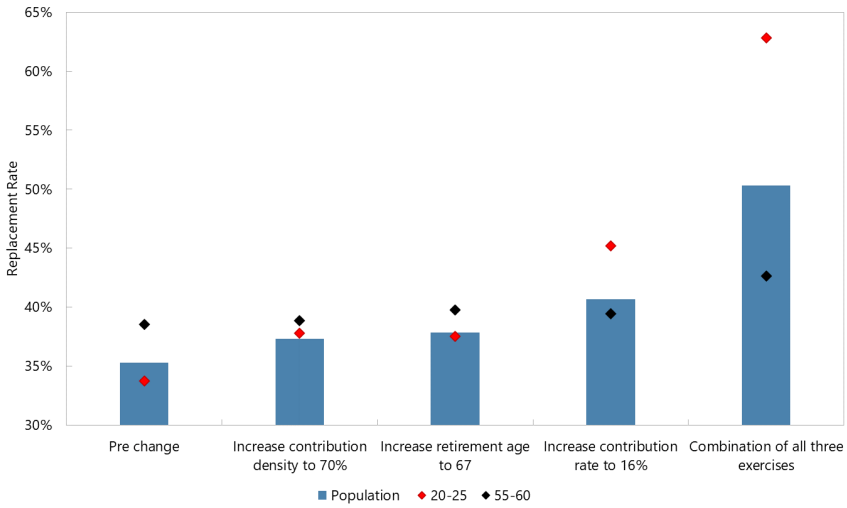
**Replacement rate at retirement by current age, increasing contribution rate, retirement age and contribution density**




**Fiscal cost in % of GDP of 16% contribution rate, 67 retirement age and contribution density of 70%** (smoothed)



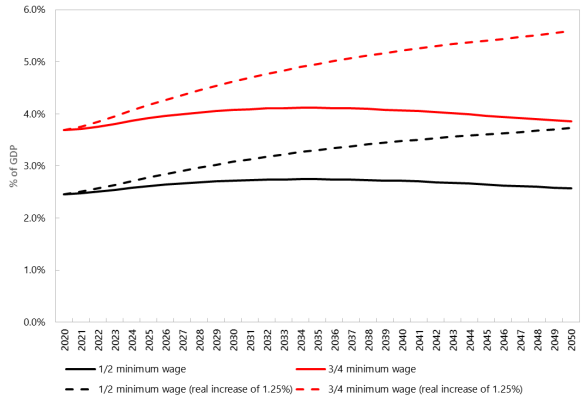

**Impact of changing parameters of pension system on replacement rates**




Source: Authors' calculations.

**Figure 15. Universal Basic Pension**

**Basic universal pension to all eligible as a % of GDP**




**Basic universal pension to all eligible as a % of 2020 GDP**


Source: Authors' calculations.

## E. Conclusions

**33. Chile's pension system served as a blueprint for reform because of its virtues but needs to adapt to changing circumstances.** The pension system would have delivered good pensions for people contributing regularly, if demographics and global returns had not changed since its inception. The pension system has also contributed to macroeconomic stability more broadly, by channeling savings into domestic investment and growth, and to developing domestic financial markets. However, the challenges posed by demographic changes—common to many countries—have been calling for years for reforms to safeguard the system. The system's initial focus on efficiency has been gradually broadened to bring equity into the mix, addressing challenges for poorer people or those that have not been able to contribute regularly. Now, it is time for a more comprehensive overhaul that preserves the sound core of the system, the self-funded portion, while addressing solidarity needs. Moreover, its parameters should be updated regularly to adapt to evolving demographics and global returns.

**34. Replacement rates are low by international standards and are expected to fall further, especially after the two rounds of withdrawals in response to the pandemic.** Using internationally comparable data, the paper shows that replacement rates in Chile compare poorly to other countries. Moreover, demographic trends, global international conditions, and a system that has not adapted its parameters to keep up with these changes, are expected to contribute to a further decline in the replacement rates of future retirees. These problems will likely be compounded by the recent pension withdrawals which exhausted the pension accounts of a large share of participants of the system.

**35. The sharp reduction in self-funded pensions will be buffered by the pension supplement embedded in the solidarity pillar, which in turn will gradually increase the fiscal costs associated with the system.** This paper's projections suggest that self-funded pensions would fall, on average, by 16 percent due to the withdrawals. This decline, however, will trigger an

increase in the government supplement associated with the solidarity pillar, resulting in a lower decline in total pensions (5 percent). The increase in government supplements will lead to a gradual increase in fiscal costs relative to current levels. At the peak (2060), the withdrawals are expected to lead to an increase of 6 percent in fiscal costs relative to pre-withdrawal levels (or an annual 0.12 percent of GDP). The net present value of these flow of additional costs stands at roughly 2 to 3.5 percent of 2020 GDP (depending on assumptions), but could be much more in the case of increases in the public solidarity contribution.

**36. The paper shows that a reform agenda that increases contribution rates, the retirement age, and that improves the contribution density would strengthen the system by improving the adequacy of pensions.** An increase in the contribution rate of 6 percentage points devoted to the self-funded pension would increase the expected replacement rate for the average of all current affiliates to 40 percent from 35 percent, and it would increase it to 45 from 34 percent for the 20-25 years old. However, reforms that tackle multiple parameters could achieve similar results with more gradual changes, could have a broader impact across cohorts compared to reforms that focus on a single parameter of the system, and could ease the political economy of reform. For instance, an increase in contribution rates to 16 percent, the retirement age increased to 67 and contribution density to 70 percent will cause expected replacements rate for young people to increase to 59 percent for females and 66 percent for males. It is worth pointing that the contribution density is not a policy parameter per se—increasing it will require implementing policies (labor market, structural and fiscal) that encourage labor market participation and boost job creation in the formal sector. The analysis does not discuss the role of future returns of pension fund investments, which can be influenced not only by global developments, but also by policies affecting competition and portfolio allocations, or imposing performance-related penalties.

**37. Strengthening the self-funded portion of the pension would open fiscal space to also enhance the solidarity component**. Indeed, our simulation show that increasing expected replacement rates implies less people in need of the public solidarity pillar at current parameters. For example, the combination of measures highlighted in the previous paragraph will entail a reduction in the fiscal cost of the system by 0.8 percent of GDP in 2060. Such fiscal space could be used to strengthen the solidarity component of pension in a targeted way.

**38. The analysis also highlights the importance of establishing a periodic review process whereby the parameters of the system are adapted to changes in life expectancy, global returns, and the labor market**. It would be valuable to develop a more automated system of updating the key parameters of the pension system such as the contribution rate and the retirement age. This could be done at regular reasonable interval, such as five or 10 years, and specific institutions could be tasked with preparing analysis and proposals. In this respect, the recent pension reform proposal is a step in the right direction, as it proposes that the Social Security Advisory Council reviews demographic, economic and labor market trends every three years to suggest amendments to the system.

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# Annex I. The Structure of the Chilean Pension System

**Chile's pension system consists of two separate parts: a PAYG kept for the military and a defined-contribution system for the civilians.** The pension system for the police and armed forces is managed by the Social Security Department of the Chilean Police and the National Defense Social Security Fund.[1]

**The current civilian pension system rests on three pillars.**

a. A solidary pillar provided by the government, targeted to the poorest 60% of the population. This pillar includes a base solidarity pension for individuals with no pension savings, a supplement to individuals with very small pension savings, a Survivor pension in case of death, a Child bonus for mothers, and a Young Workers Subsidy.

The supplement (APS, *aporte previsional solidario*) is calculated according to the following formula:

$$APS = \begin{cases} PBS - \left(\frac{PBS}{PMAS} * PBase\right) & if \quad 0 \leq PBase < PMAS \\ 0 & if \quad PMAS \leq PBase \end{cases}$$

where PBS is the minimum pension (pension básica solidaria), PMAS is the threshold to receive the government supplement, and *Pbase* is the self-financed pension accruing from the private pension account. Thus, two parameters govern the solidarity pillar: PBS and PMAS. After setting initial levels and after some gradual adjustment, the 2008 law established that PBS and PMAS should remain constant in real terms after 2012, so the whole solidarity pillar is inflation-indexed. In 2019 there were further adjustment to align the parameters with poverty lines. Adjustments will be gradually implemented over three years (2019-2022). The projection exercise considers two alternative scenarios for the parameters of the solidarity pillar after 2022: a baseline with inflation indexation and an alternative with real growth of 1.25 percent.

[1] These systems were exempt from the 1981 and 2008 pension reforms. This paper focuses exclusively in the civilian system.

b. The second is a mandatory-contribution pillar in which employees contribute to their individual accounts. The mandatory contribution is 10% of gross salary. These mandatory saving accounts are managed by a few Pension Fund Administrators. Affiliates can choose their AFP, of which there are currently 7, and subsequently the fund to invest their pension, between the 5 available, which provide an expected return with varying degrees of risk. Contributors and pensioners pay a fee set by AFPs, which is a percentage of the contributors' salary or a percentage of the pensioners' withdrawal.

c. The third is a voluntary saving pillar, with tax benefits offered to encourage participation.

# Annex II. Data and Methodology

## Data

To study details of Chile's pension system, the paper relies on data from the national pension supervisory agency (*Superintencia de Pension, SP)*. SP provides data of pension affiliates by gender, account balance and age. SP also provides data on wages by age and by account balance, which helps approximate the wage distribution of contributors in the pension system.[1] Finally, SP provides data on contribution density, the portion of months that an affiliate contributed out of the total eligible contribution periods. The average contribution density between January 2017 and December 2020 is 60% for males and 46% for females.[2]

## Withdrawals

For the projection exercise, the paper assumes that individuals in each age-gender-account balance cell withdraws from their pension account the maximum amount allowed for each withdrawal. Following the rules in the law, the formula that implements the maximum withdrawal assumption is:

$$Withdrawal = \min\left\{max\left(min(35, Balance)\ , \frac{Balance}{10}\right), 150\right\}$$

## Projecting Pensions: Methodology and Assumptions

To calculate the expected evolution of replacement rates and fiscal costs, and to assess the impact of withdrawals, we project total pensions and wages that current affiliates will receive at retirement. This is done by combining SP data on balances and wages with assumptions on the real return of pension fund assets, real wage increases, and contribution density. Projections begin in June 2020 data, one month before the 1st withdrawals, so that we can create a theoretical counterfactual.

The projection of pensions at retirement is done in steps.

1) The first step is to project for each cohort a path for wages from 2020 until the retirement year. This is done by assuming a common growth rate for the wages observed in June 2020. Thus, the wage distribution within cohorts will remain unchanged over time.

2) Once the path for wages is set, we use assumptions on the real return on pension funds and of contribution densities to calculate the private account balances at retirement for each cohort, according to the following formula:

[1] This comes from a sample of 47 percent of contributors.

[2] A distribution of contribution density is assumed by age-gender-account balance to match the gender-wide averages presented in Table 1.

$$F_n = P(1+r)^n + A\sum_{i=1}^{n}(1+w)^i(1+r)^{n-i}$$

where *P* is the initial account balance (in the current year), *n* are years until retirement for the cohort, *r* is the assumed (constant) return on pension funds, *w* is the common growth rate of wages, and *A* is a variable that subsumes the wage in 2020, the contribution density, and the mandatory contribution rate of 10%.

3) Once pension account balances at retirement are calculated, we calculate a retiree's monthly private pension as the annuity of its assets at retirement evenly divided over twelve months. Thus, the monthly self-financed pension received by an individual is equal to:

$$Per\ month\ self\ financed\ pension\ = \frac{Balance}{CNU\ x\ 12}$$

where CNU is *Capital Necesario Unitario*, or capital unit necessary. CNU is the amount of capital that a member requires to finance one pension unit, which takes into account the life annuity rate and the life expectancy of the individual.[3] For simplicity our exercises calculates the CNU assuming that the new pensioner is single and without children. It is possible to calculate the CNU for members with a spouse, which would increase the CNU as part of the pension will go to the spouse upon death of the individual, lowering the per month self-funded pension.

To calculate CNU the paper uses the 2014 mortality tables for Chile, for men and women separately. The table provides an adjustment factor that allows for the probability of survival to be calculated for each year into the future. Let $l_x$ be the number of people that have survived at age $x$, which can also be understood as the probability of survival at age $x$ and after $t$ years of retirement. The probability of survival at $T = 110$ is assumed to be zero and therefore no pensioner lives beyond this age. Given this assumption, CNU is equal to:

$$CNU = \sum_{t=0}^{T}\frac{\frac{l_{x+t}}{l_x}}{(1+i)^t} - \frac{11}{24}$$

[3] CNU is explained in detail in a technical note by the Superintendencia de Pensiones as well as in Vega (2014).

4) Having calculated the self-financed pension for each retiree, we calculate the government supplement paid to the individual, as part of the solidarity pillar introduced in 2008, which is a function of the self-financed pension at retirement. Details on the solidarity pillar are deferred to next section.

5) The final step is to compute replacement rates using total pensions (self-financed pensions plus government supplement) and projected wages, and the fiscal costs of the systems, which amount to total supplement payments to beneficiaries of the solidarity pillar.

Parameter assumptions are presented in Table A1 and are chosen as follows:

**Real returns on pension accounts:** 4.15% per year. The value is motivated by the July 2018 edition of the projection of the pension system published by the Superintendencia de Pensiones. Based on the same report, we assume a rate of 3.36% for the life annuity rate.

**Real wage growth:** 1.25% per year. The number is based on wage growth projections from Chile's budget office (DIPRES). They project that real wage growth will be above 2% between 2021 and 2026, gradually decreasing to 1.1% by 2050. For simplicity, we opted for a constant growth rate which roughly matches DIPRES' profile.

**Parameters of the solidarity pillar:** The values up to 2022 for the minimum pension (PBS, pensión básica solidaria) and the threshold to receive government support (PMAS, pensión máxima con aporte solidario) are set according to the announcement made in 2019. From 2022 onwards we present results under two assumptions. The first assumption follows the inflation indexation rule put forward by the 2008 reform. In an alternative scenario we allow PBS and PMAS to grow at the same real rate as wages.

**Table A1. Parameter Assumptions**

| | Baseline | Alternative |
|---|---|---|
| Real wage growth | 1.25% | 1.25% |
| Real return on pension fund assets | 4.15% | 4.15% |
| Real interest rate on life annuity | 3.36% | 3.36% |
| Average male contribution density | 60% | 60% |
| Average female contribution density | 50% | 50% |
| **Real increase in PBS & PMAS** | **0%** | **1.25%** |
| Mandatory contribution rate | 10% | 10% |
| Male retirement age | 65 | 65 |
| Female retirement age | 60 | 60 |
| CPI inflation | 3.00% | 3.00% |
| Medium-run nominal GDP growth | 5.50% | 5.50% |

# ELEMENTS FOR A REVENUE-ENHANCING TAX REFORM[1]

*It may be necessary to adjust Chile's tax system to increase public revenue, once the current economic recovery consolidates. Chile's tax regime has been subject to several changes in the last six years, as succeeding governments aimed at balancing higher revenues and efficiency. As the country converges towards an advanced economy status, the corresponding demands in terms of public provision of goods, while addressing fiscal contingencies, rebuilding buffers, and preserving debt stability in the context of long-term declining mining revenues, are likely to require—among other things—a progressive increase in tax revenues. The changes in the taxation system would have to effectively balance the efficiency and equity of the system, taking into account international experience, and realizing that a reduction in income inequality would not come only from a more progressive taxation system, but can also be more effectively achieved via an adequate redistribution of the spending that can be financed by higher revenues. The Ministry of Finance called in October 2020 a Commission of Experts to examine options for a tax reform. Their first report issued in January 2021 offers suggestions related to exemptions and special regimes. This paper offers additional areas for exploration for enhancing the taxation system.*

*While OECD and EU countries, on average, collect PIT for around 8 percent of GDP, Chile receives about 2 percent. On the one hand, about 75 percent of individuals do not pay income tax, as the exempt threshold (around US$11,500) is relatively high compared to the income per capita. Also, the PIT rates at the lower end of the scale are modest compared to other countries, and only rise slowly to the top marginal rate. On the other hand, some capital income is tax exempt, such as gains from traded shares (which is typically earned by high income individuals). Additionally, some deductions that mostly benefit high income earners could be reduced or eliminated. Moreover, strengthening tax administration would allow for a more effective enforcement.*

*Chile's CIT and VAT revenues are relatively high as a percentage of GDP, but there are still significant opportunities to further raise revenue. Some special regimes could be revisited, such as the presumptive income, as well as the exemptions to cooperatives and to entities operating in free trade zones. Indirect tax revenues (the sum of VAT, excises, and trade taxes) are robust in Chile (and the associated compliance gap is small), consistently with European peers (after controlling for the income level), but could be reinforced, notably excises on fuels and especially on diesel. Additionally, green taxes in Chile are low by international standards. Chile's mining tax regime, which includes an additional profit based tax, would be also an area to explore, but it is beyond the scope of this paper.*

[1] Prepared by Roberto Schatan and Jose Torres.

## A. Introduction

**1. More revenues are needed.** Fiscal policy has been successful in countering the effects of the pandemic. In the near term, it will need to keep supporting social and economic groups that continue to face hardship during the recovery. But, over the medium term, permanent revenue and spending measures are likely to be needed to finance additional social spending, face fiscal contingencies, and rebuild buffers, while preserving debt stability. Reforms will need to balance efficiency and fairness, while recognizing that a meaningful increase in redistribution will necessarily require permanent revenue increases. Unfortunately, this challenge rises after frequent and significant reforms in the last few years (some in opposing directions), not always giving enough time for a full implementation or evaluation, which added uncertainty to complexity. At the same time, it should remain clear that higher revenues will allow for greater spending redistribution necessary to build a more equitable social system, while the quality of spending will also have to be guarded.

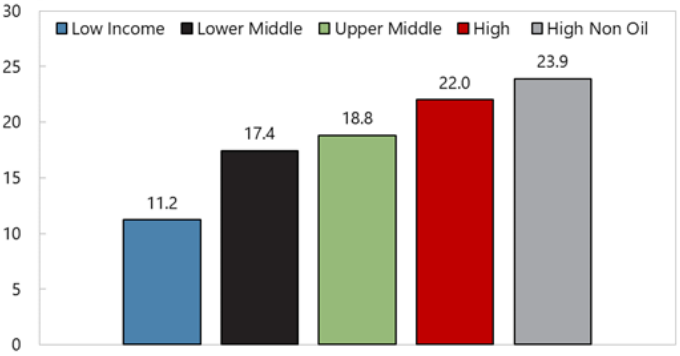
**2. This paper discusses some elements for a revenue enhancing tax reform**. It argues that beyond curtailing tax exemptions, deductions, and special regimes (along the lines recommended by the Commission of Experts), revenues could be raised by revising the PIT thresholds and rates, the capital gains tax exemption, the mining regime, excises and green taxes. Section 2 identifies comparative weak links in Chile's tax structure, particularly for PIT, and includes a discussion on tax compliance. The following sections analyze possible areas for increasing revenue.
Section 3 examines direct taxation. Section 4 looks at rationalizing indirect taxes. Section 5 refers to green taxes. Finally, Section 6 summarizes the conclusions.

## B. How Does Chile's Government Revenue Structure Compare Internationally?

### Growth of Chile's Revenue and Declining Reliance on Copper

**3. Chile's tax-to-GDP ratio increased as it became a high-income country**.[2] Tax revenues, excluding social security contributions (SSC)[3], increased by four percentage points since 1990 to about 19 percent in 2017. Its tax ratio now stands between the averages of upper-middle and high-income countries. Chile's tax revenues are higher than in Peru and Mexico but lower than in Argentina and Brazil (Table 1).

**Figure 1. Average Tax Revenue Per Country Income Group, 2018**
(In percent of GDP)




Source: IMF WoRLD (World Revenue Longitudinal Data) Database.

[2] Generally, there is a positive correlation between tax share of GDP and GDP per capita. See Baunsgaard & Keen (2005); Bird & Zolt (2005); Bersley & Persson (2014).

[3] While SSC are generally considered a tax, compulsory pension contributions in Chile are paid to individual retirement accounts and thus not formally classified as taxes. Therefore, SSC are excluded for the purpose of comparability across countries.

**4. In the last decade, Chile's mining revenues declined by about 3 percentage points of GDP.** This is partly explained by changes in copper prices but also by lower taxable profits given the carry-forward of losses from past investments (Box 1).

**Table 1. Revenue, 2017**
(In percent of GDP)

| Country/Region | Tax Revenue | Non-tax Revenue | Total Revenue |
|---|---|---|---|
| Peru | 13.4 | 4.9 | 18.3 |
| Mexico | 14.0 | 10.7 | 24.7 |
| Latam average | 18.2 | 6.8 | 25.0 |
| Chile | 18.7 | 4.2 | 22.8 |
| Colombia | 18.8 | 8.0 | 26.8 |
| Brazil | 20.4 | 10.0 | 30.5 |
| Argentina | 23.1 | 11.4 | 34.5 |
| OECD average | 24.9 | 14.8 | 39.7 |
| EU average | 25.2 | 17.2 | 42.4 |

Source: IMF WoRLD (World Revenue Longitudinal Data) Database.

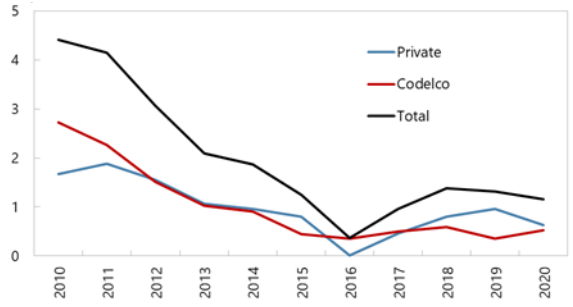
## International Comparison of Chile's Tax Structure

**5. Chile relies relatively more on indirect taxes compared to peers.** Chile's revenue from direct taxes (CIT, PIT, and property) as a percentage of GDP is similar as that of its regional peers. However, Chile collected proportionally more indirect taxes (VAT, excises, and trade taxes). Remarkably, in OECD countries the reliance on direct taxes as percentage of GDP is higher than the reliance on indirect taxes, as witnessed by a ratio of direct to indirect tax revenue, while the inverse holds in Chile and on average in Latin America. (Table 2).[4]

### Box 1. Declining Copper Revenue in Chile

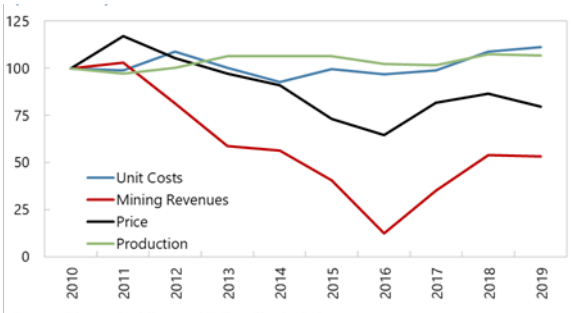
Mining revenues declined to about 1.2 percent of GDP in 2020 from about 4.4 percent in 2010.[1/] Changes in copper prices only partly explain the decline in revenues, as production and unit costs have remained broadly stable over the same period.[2/] The rest of the fall in revenues is attributed to the amortization of prior large capital expenditures (which benefit from accelerated depreciation for tax purposes).

**Figure 1. Chile: Mining Revenues**
(In percent of GDP)




Source: Dipres and IMF staff calculations.

**Figure 2. Chile: Exports, Costs, and Mining Revenues**
(2010=100)




Source: Dipres, Cochilco, and IMF staff calculations.

1/ Mining revenues in Chile come from both the state-owned company Codelco and from private-mining companies. They include both non-tax and tax revenues (both from CIT and a mining-specific tax).

2/ Firms have been successful in preserving competitiveness with various cost-saving initiatives to counter the effects from declining ore grades, tighter environmental regulations, and water scarcity.

[4] In general, lower-income countries tend to rely more heavily on trade taxes, while others, like Argentina, collect significant revenue from commodity-export taxes. Other countries, like Bolivia and Paraguay, allow deducting VAT on personal consumption from PIT, notably tilting collection in favor of VAT. For a full breakdown of revenue per tax instrument, see Table A1 in Annex 1.

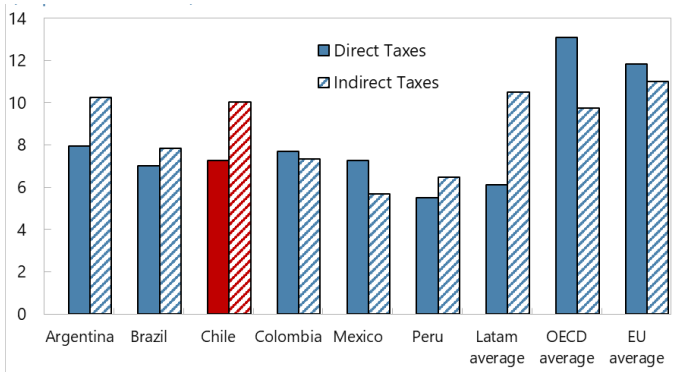
**Table 2. Direct and Indirect Taxes, 2017**

| Country/Region | Revenue, % GDP | | Ratio |
|---|---|---|---|
| | Direct 1/ | Indirect 2/ | |
| Argentina | 7.9 | 10.3 | 0.77 |
| Brazil | 7.0 | 7.8 | 0.89 |
| Chile | 7.3 | 10.0 | 0.73 |
| Colombia | 7.7 | 7.4 | 1.05 |
| Mexico | 7.3 | 5.7 | 1.27 |
| Peru | 5.5 | 6.5 | 0.85 |
| Latam average | 6.1 | 10.5 | 0.58 |
| OECD average | 13.1 | 9.7 | 1.34 |
| EU average | 11.8 | 11.0 | 1.08 |

Source: IMF WoRLD (World Revenue Longitudinal Data) Database.
1/ Direct taxes includes: CIT, PIT, and Property taxes.
2/ Indirect taxes includes: VAT, Excises, and Trade taxes.

**Figure 2. Revenue, Direct vs. Indirect Taxes, 2017**

(In percent of GDP)




Source: IMF WoRLD (World Revenue Longitudinal Data) Database.

**6. Chile's largest deficit with respect to international comparators is in PIT.** Chile collects less than 2 percent of GDP in PIT, which is especially low compared to the 8 percent of GDP average in both the EU and the OECD, but also below the Latin American average (Table 3). The difference could be explained by different factors: rates, exemption thresholds, width of brackets in the schedule, personal deductions, exempt income, and credits (including the credit for CIT, in a fully or partially integrated income tax system).[5] These factors are further discussed in section 4 below. By contrast, Chile does well on CIT. However, this could be partially due to the fact that the top PIT marginal rate has been consistently and significantly higher than the CIT rate, creating an incentive for high-income individuals to incorporate, as noted by Tanzi & Zee (2001);[6] However, the gap has narrowed since the CIT rate has increased to 27 percent from an initial 15 percent rate, though such a gap recently broadened again with the increase in the top marginal PIT rate.

**Table 3. Tax Revenues, 2018**

(In percent of GDP)

| | Total | PIT | PIT/Total |
|---|---|---|---|
| Chile | 19.6 | 1.4 | 0.07 |
| Peru | 14.5 | 1.8 | 0.13 |
| Argentina (2017) | 22.4 | 2.2 | 0.10 |
| Colombia | 21.3 | 2.4 | 0.11 |
| Latam average | 19.2 | 2.5 | 0.13 |
| Brazil | 24.1 | 2.8 | 0.12 |
| Mexico (2017) | 14.0 | 3.4 | 0.25 |
| EU average | 25.2 | 7.7 | 0.30 |
| OECD average | 25.3 | 8.1 | 0.32 |

Source: IMF WoRLD (World Revenue Longitudinal Data) Database.

[5] Most countries currently have a 'classical system' where profits are taxed with CIT at the company level and again with PIT at the shareholder level when dividends are distributed, although often at a reduced rate, without a credit for the CIT.

[6] " ... in some countries the top marginal PIT rates exceed the CIT rates by a significant margin, providing strong incentives for taxpayers to choose the corporate form of doing business for purely tax reasons. Professionals and small entrepreneurs can easily siphon off profits through expense deductions ... and escape ... the PIT permanently."

**7. The comparative deficit in PIT revenue is not compensated by the CIT revenue.** On average, the sum of PIT and CIT revenue in OECD countries is 11 percent of GDP. In Chile, they only add to 6 percent of GDP. Accordingly, PIT contributes with 32 percent of total tax revenue in OECD countries, while in Chile the share is only 10 percent (Table 4). By contrast, CIT in Chile represents 23 percent of total tax revenue, while in the OECD this proportion is 12 percent. The outperformer in Chile is the VAT, with 45 percent of total tax revenue. Figure 3 shows the percentage point difference in participation between Chile and the OECD average, by type of tax (as presented in Table 4), where PIT clearly stands out.

**Table 4. Composition of Total Revenue by Type of Tax, 2017**

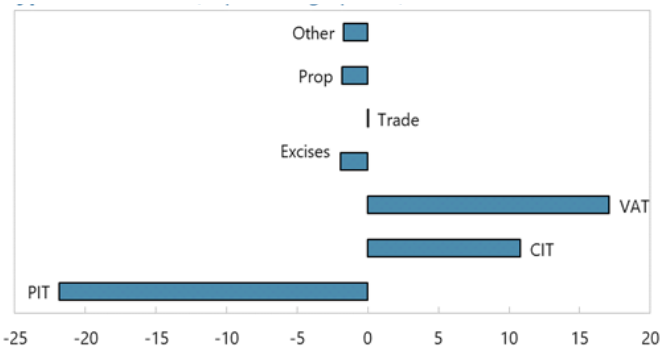
| | PIT | CIT | VAT | Excises | Trade | Property | Other (*) |
|---|---|---|---|---|---|---|---|
| | *% share of total revenue* | | | | | | |
| OECD aver | 32.3 | 12.0 | 27.7 | 9.9 | 0.9 | 7.6 | 9.5 |
| Chile | 10.4 | 22.8 | 44.8 | 8.0 | 1.0 | 5.8 | 7.8 |
| | *% of GDP* | | | | | | |
| OECD aver | 8.1 | 3.0 | 6.8 | 2.5 | 0.1 | 1.9 | 2.4 |
| Chile | 1.9 | 4.2 | 8.4 | 1.5 | 0.2 | 1.1 | 1.3 |

Source: IMF/WoRLD (World Revenue Longitudinal Data)
(*).Excludes SSC

**8. A low PIT contribution to total revenue is also concerning from an equity perspective.** A weak PIT undermines the progressivity of the tax system, for it is the more direct instrument to obtain vertical equity. In fact, the potential redistributive effectiveness of the PIT might be significantly diminished from the possible income underreporting by the wealthiest individuals in household surveys (Agostini et al, 2011). However, a progressive PIT schedule should not be considered the main tool to alter the income distribution. Indeed, potentially income distribution can be more effectively influenced by how expenditure is allocated, as long argued in the literature (see Bird & Zolt, 2005: Engel et al, 1998; Fontaine & Vergara,1997).

**9. The latest tax reform in 2020 is expected to raise revenues, but will not fundamentally alter the relative revenue structure, including the low reliance on PIT versus other taxes.** Its main elements include: (i) unifying the CIT regime to a semi-integrated system with a 27 percent flat rate; (ii) a new simplified regime for SMEs (cash-flow based, with a fully-integrated system and a 25 percent rate); (iii) a higher top PIT marginal rate at 40 percent; (iv) a VAT for digital services by non-resident providers and (v) the introduction of digital sales receipts. The expectation is that it will gradually raise tax revenues by about 1 ppt of GDP in the medium term.

**Figure 3. Difference in Participation in Total Tax Revenue by Type of Tax, 2017**
(In percentage points)




Source: IMF WoRLD (World Revenue Longitudinal Data) Database.

## Tax Compliance, A Comparative Overview

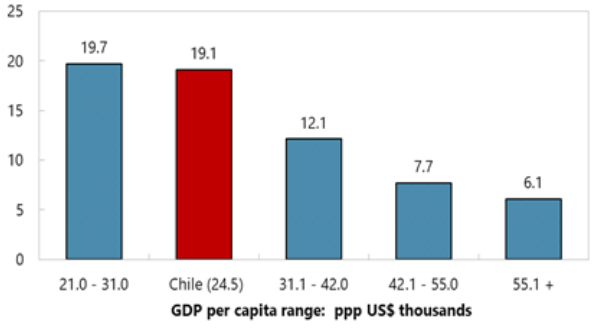
**10. The tax compliance gap is defined as the difference between the potential revenue that could have been collected given the existing policy framework and actual revenues.** An international comparison of compliance gaps provides a rough measure of the additional revenues that could be realistically expected if Chile improved its administrative effort (tax enforcement). Extensive comparable data is available for the VAT compliance gap but not for the income tax, especially for PIT.

### *VAT Compliance Gap*

**11. An IMF study (Ueda, 2017) found that in 2015 the VAT compliance gap in Chile was 19 percent of potential revenue**. This seems close to the average of EU countries with lower GDP per capita (see Table 5). This gap represented 1.9 percent of GDP, marginally below the prior seven-year average. More recent estimates by Chile's *Servicio de Impuestos Internos* (SII) indicate that the gap continued to decline, though modestly.[7] Data on VAT compliance gap in Latin America are scant, outdated and methodologically disperse, but estimates are generally higher than in Chile's, averaging slightly above 30 percent (Pecho et al, 2013).

**12. Chile's VAT compliance is roughly comparable to EU countries with similar income per capita** (Figure 4). EU countries with a higher per capita income, on average, have a lower compliance gap. A number of variables could explain the difference: institutional effectiveness in enforcing the tax, structural features of the economy (e.g., prevalence of retail or zero-rated export sectors), or the population's 'tax morale'.[8] To increase VAT collections by 1 percent of GDP through administrative improvements alone, Chile would need to halve its VAT compliance gap, which would bring it to a level more typical of countries with a considerably higher GDP per capita (US$31,000 - 42,000 bracket).[9]

**Figure 4. EU and Chile: VAT Compliance Gap and GDP per Capita, 2016** (In percent)




Sources: EC (2018), WB Databank, and IMF; Chile (2015).

[7] The SII estimation of the VAT compliance gap is slightly higher than the IMF (by less than 2 percentage points), but the series show a similar slowly declining trend.

[8] See European Commission, 2018 and European Commission, 2018a. This EC report presents various results from a regression analysis of VAT compliance gap using explanatory variables associated with the attitude of final consumers, firm behavior and some economic structural features. Income per capita, however, appears to be not significant, suggesting that it is mainly a proxy for the other explanatory factors, which are also correlated with income per capita.

[9] Individual country data in Appendix, Table A2.

***Income Tax Compliance Gap***

**13. The CIT compliance gap estimates are complex and uncertain**. They are often 'top-down' calculations starting from the "gross operating surplus" as defined in national accounts, which is then adjusted in multiple steps to approximate the potential CIT base. Ueda (2017) argues that the estimations for Chile could be fine-tuned, reducing the CIT compliance to a range of 16 to 25 percent of potential revenue, a figure similar to the estimate for the VAT compliance gap.[10]

**14. The range of estimates of lost revenue due to the CIT compliance gap are generally lower than for VAT compliance gaps.** This is because the potential revenue from CIT is lower. A high estimate of a CIT compliance gap of 40 percent, for example, implies an average fiscal loss of 1.3 percent of GDP. A lower CIT gap as adjusted by Ueda (2017) represents a revenue loss of only 0.8 percent of GDP.

**15. It is difficult to make international comparisons about CIT compliance gap.** Few counties produce such estimates. Moreover, cross-country studies employing common methods are rare, making comparisons problematic (Gomez-Sabaini & Moran, 2016; p.43). Unlike the case for VAT, there are no common EU estimates for CIT compliance gaps. Only a few countries within the EU publish CIT compliance estimates using different methods, as there is no consensus approach (EC, 2018).

**16. The SII has not estimated a compliance gap for PIT**. Determining the potential tax base is more complicated and uncertain than for the CIT, since it would typically rely on household income and expenditure surveys, which are well known for the underreporting of high-income individuals.[11] Also, few countries produce such estimates.[12] However, despite the difficulties, more attention should be paid to measuring and evaluating individuals' tax compliance.[13] To evaluate in some detail the performance of the Chilean tax administration and identify areas of improvement that may reduce compliance gaps, the authorities may consider applying the Tax Administration Diagnostic Assessment Tool (TADAT), developed by FAD to generate an objective measure of strengths and weaknesses of tax administration performance.

[10] Ueda (2017), p. 45. These estimates do not capture tax avoidance by transfer pricing. Profit shifting would not be reflected in potential tax revenue, since national accounts are based on market prices as contracted by parties.

[11] There is no consensus method for producing a "top-down" estimate of the personal income tax gap – most countries who produce a PIT gap use a bottom-up method, which is a costly exercise, often involving results from an audit program which may have its own shortcomings.

[12] The European Commission recently estimated a partial measure of PIT evasion arising from offshore wealth holdings. Offshore wealth held by individuals in EC countries was estimated at 9.7 percent of GDP (2016). The corresponding tax evasion was 0.32 percent of the regional GDP (EC, 2019). This number is 0.35 percent for the group of eight countries with the lowest GDP per capita in the EU.

[13] The perception by government officials and analysts is that tax enforcement has improved, and many loopholes have been closed, especially on the particular problem of personal expenditures being deducted as company expenses. Some argue, however, that the SII does not have expeditious access to the financial information it needs to fully enforce tax obligations.

## C. Increasing Direct Taxation

**17. Several features of direct taxation should be explored in order to increase revenue.** PIT and CIT exemptions, deductions and credits, many classified as tax expenditures, constitute one set of elements that can be reduced or eliminated, with the potential added benefit of lessening distortions. PIT exemption thresholds and rates should also be considered. PIT and CIT are discussed in turn below.

### PIT Base and Rate Schedule

**18. Increasing PIT revenue will probably require a combination of measures**. On one hand, as recommended recently by the Commission of Experts[14], measures should include eliminating or reducing some exemptions and deductions, which mostly benefit high income taxpayers. On the other, it will also be necessary to increase the number of taxpayers (by adjusting the exempt threshold), shorten the brackets (i.e., the speed at which the scale reaches higher marginal rates) and raise the lower and middle marginal tax rates in the schedule. However, the combined impact of these measures on the progressivity of the PIT schedule would have to be explored further.

**19. The special treatments which cost revenue in the PIT are important.** PIT tax expenditures are estimated at 1.2 percent of GDP (SII, 2019a), which is reduced to 0.9 percent if the deferral of the tax on undistributed profits is excluded, as the IMF/OECD (2020) Report suggests.[15] The main benefits in question, as listed by the Commission of Experts, are: the exempt thresholds for the capital gains on the sale of housing and shares, the deduction of voluntary contributions to pension plans, the (partial) exemption of pension income (*excedente de libre disposicion*), the mortgage interest deduction and some housing rental income.[16] No agreement within the Commission was reached on the exemption of capital gains on the sale of traded shares; this is a relevant issue where arguments on efficiency and equity are not easy to balance. An updated quantification of tax expenditures remains pending and should take priority, so that more informed decisions can be made about eliminating exceptional tax regimes. At the same time, additional measures will have to be explored, and the rationale for some of them is explored here.

**20. In Chile, ¾ of individuals are tax exempt**. In 2019, only 2.7 out of the 10.7 million registered individual taxpayers had income that exceeded the tax-exempt threshold (13.5 UTA, or about US$11,400).[17] In the U.S., for example, 44 percent of tax returns filed in 2018 did not pay PIT,

[14] Comisión Tributaria para el Crecimiento y la Equidad, 2021.

[15] The IMF/OECD Report also referenced in this paper as Brys et al (2021). The argument in the report is that since deferring the taxation of undistributed profits was one of the optional regimes available to taxpayers after the 2014 tax reform, it does not qualify as a deviation from the general regime, and thus it is not a tax expenditure.

[16] DFL2 housing, meaning properties up to 140 m2.

[17] The threshold in 2019 was CHP 8 million, equal to 84 percent of the average annual taxable income of Chilean employees. The median income was CHP 6.6 million, well below the threshold; MoF, *Coordinacion de Politicas Laborales*.

after accounting for the exemption threshold, allowances and credits.[18] It is noteworthy, however, that the proportion of individuals within the exempt bracket in Chile has declined from 84 percent in 2005 to 74 percent in 2019 (Table 6) and the system has become more progressive, as the share of total revenues from persons in the highest bracket (above 120 UTA) has increased (from 44 percent in 2005 to 61 percent in 2019).

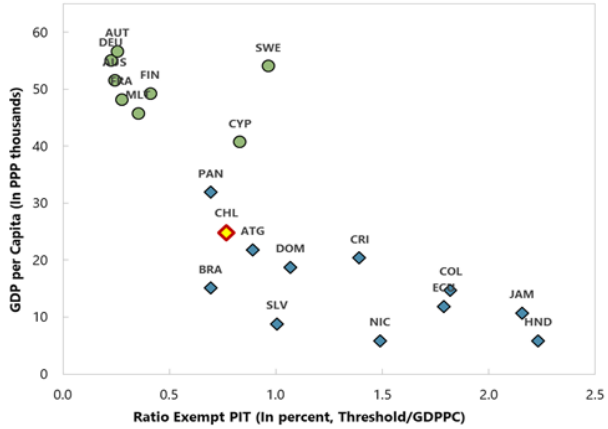
**Table 5. Share of Taxpayers and of Total Tax Revenue by Income Bracket** (In percent)

| UTA (rate) | Taxpayers | | Tax revenue | |
|---|---|---|---|---|
| | 2005 | 2019 | 2005 | 2019 |
| 0 - 13.5 (Exempt) | 84.1 | 74.2 | 0.3 | 0.2 |
| 13.5 - 30 (4%) | 10.5 | 16.9 | 7.4 | 5.1 |
| 30 - 50 (8%) | 2.9 | 4.8 | 11.5 | 7.7 |
| 50 - 70 (13,5%) | 1.2 | 1.8 | 11.7 | 7.5 |
| 70 a 90 (23%) | 0.6 | 0.9 | 11.2 | 7.4 |
| 90 - 120 (30,4%) | 0.4 | 0.6 | 13.8 | 10.8 |
| 120 + (35/40%)* | 0.4 | 0.8 | 44.1 | 61.2 |

Source: Own calculations based on SII data
*40% top PIT rate above 150 UTA eliminated 2017-2019
Unidad Tributaria Anual -- UTA (2019) = CHP 595,476

**21. Chile's personal income tax threshold was nearly 80 percent of the country's GDP per capita in 2018.** This is high compared to an average of 40 percent of GDP per capita for EU and other high-income countries which have an exemption threshold (Figure 5). Some countries instead of an exemption threshold grant a general allowance, which, on average, is even lower, close to 20 percent of their GDP per capita.[19] Chile's exemption is relatively low compared to other Latin American countries, but these have a lower income per capita.[20] Thus, as a high-income country, in Chile individuals start paying taxes at a relatively high income level. So, incorporating more individuals into the tax net is an option that should be explored.

**Figure 5. Ratio Exempt PIT and GDP per Capita, 2018**
(In percent and US$)



Sources: IMF WoRLD (World Revenue Longitudinal Data) Database, International Tax Rates

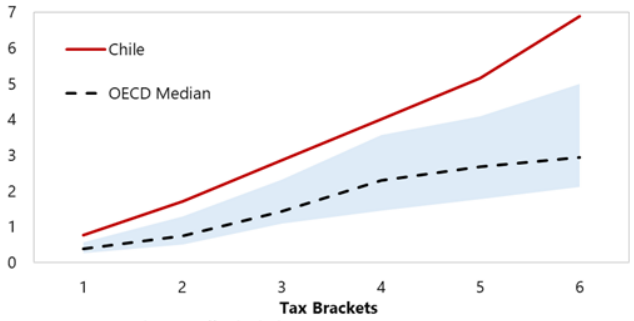
[18] Tax Policy Center, https://www.taxpolicycenter.org/taxvox/tcja-increasing-share-households-paying-no-federal-income-tax

[19] Eleven OECD countries grant an allowance, an amount that can be deducted against total taxable income (OECD dataset, Central government personal income tax and thresholds, 2019). This relief method is not equivalent, as the allowance reduces the taxable income that is subject to the higher rates in the schedule.

[20] Only 23 countries have a tax-exempt threshold: 13 in LAC and 10 in the EU plus Australia and Switzerland.

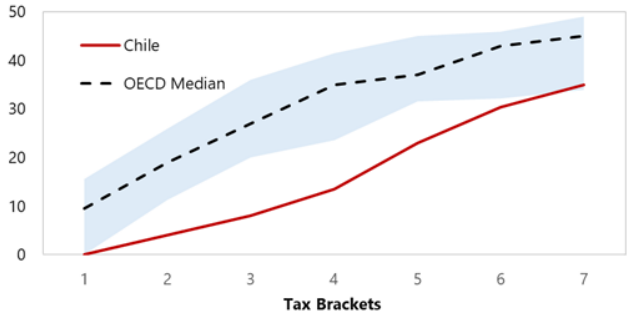
**22. Adjustments to the tax rates of the PIT schedule could also be considered.** Compared to other OECD and high-income countries, in Chile individuals only start paying taxes at a relatively high income and the top brackets reach a very small proportion of taxpayers (Figures 6 and 7).[21] These figures show, first, that each income bracket in the Chilean PIT schedule begins at a higher income per capita than in 75 percent of countries in the OECD and, second, that the tax rate for each PIT income bracket in per capita terms is lower in Chile than in 75 percent of the same sample of countries. Indeed, the tax rates for each of the lower and middle brackets are modest and the increase in the rates is relatively slow; and the top brackets reach a very small proportion of taxpayers (only 0.8 percent of the total was in the top PIT bracket in 2019, see also Table 6). Until end-2019, the highest bracket applied to individuals with an income 7 times higher than the per capita income (compared to an average of about 3 times in OECD and high-income countries). Since then Chile introduced a new top marginal rate of 40 percent for individuals with income higher than 8.5 times the per-capita income. The OECD Survey for Chile (2021), points that an overhaul of the PIT schedule that lowers the thresholds and increases the rates (particularly for the middle brackets) would substantially raise revenues and increase the redistributive profile of the income tax. Similarly, Fuentes and Vergara (2021) argue that the main deficiency in Chile's PIT is the structure of the schedule (brackets and lower and middle rates), and they estimate that revenues could be increased significantly if the tax code of peer countries was applied in Chile, and that the inequality would also fall substantially if the additional resources were spent in redistribution.

**Figure 6. Chile and OECD: PIT Brackets Income Thresholds, 2019**
(In multiples of income per capita)




Sources: OECD and IMF staff calculations.
Note: Shaded line corresponds to the 25th and 75th percentiles.

**Figure 7. Chile and OECD: PIT Rates per Bracket, 2019**
(In percent)




Sources: OECD and IMF staff calculations.
Note: Shaded line corresponds to the 25th and 75th percentiles.

**23. By contrast, the new statutory top marginal rate for PIT is within the interquartile range among OECD countries.** In fact, although not visible in Figure 7, in 2020 this rate was raised back to 40 percent (where it was until 2016), and this level is above the 34 percent average of the top marginal rate for OECD countries.[22] However, a higher top marginal rate does not necessarily

[21] The comparison of the PIT brackets is only indicative as the definition of taxable income varies across countries depending on exemptions, tax allowances and tax credits.

[22] Own calculation from OECD dataset, Central Governments PIT and Thresholds, year 2019.

translate into a proportional increase in revenues, as it also strengthens the incentives for evasion by high income individuals by opening the gap between top marginal PIT and CIT rates.[23]

**24. PIT revenue is also relatively low in Chile because the system is (partially) integrated, though this effect on PIT revenues seems small**. Crediting CIT against PIT, which does not occur in most countries, inevitably lowers the latter tax. In principle, PIT revenues would increase by reducing the CIT credit, but the effect would critically depend on the share of profits that is distributed as dividends.

**25. Finally, the effective PIT rates are uncertain and should be evaluated.** The effective PIT rate—as it could be measured by available data on the ratio of 'determined' PIT to be paid (*impuesto determinado)* to 'determined' income *(renta determinada)* for each bracket of the schedule—would not yield a representative measure because they would not consider credits and deductions applied by taxpayers, and exclude income not subject to PIT (like capital gains on traded shares), which is not reported to the SII. Knowing the actual effective rates per income bracket would allow to assess more specifically the effects of the individual measures being explored on the progressivity of the PIT.

## Revisiting CIT Exemptions

**26. CIT revenue is comparatively high for international standards, with relatively small tax expenditures.** Chile's CIT revenue in 2017 was 4.3 percent of GDP, while the average in OECD and Latin America countries was 3 percent and 3.6 percent respectively (see table A1 in Appendix). At the same time, SII estimates CIT tax expenditures at 1 percent of GDP for 2019.[24] Its main components are: the leasing regimes (0.3 percent of GDP), accelerated depreciation of investment (0.2 percent of GDP) and the deduction of the amortization of intangible assets (0.2 percent of GDP). However, according to the IMF/OECD Report, the tax expenditure on leasing and intangibles might be considerably overstated due to methodological deficiencies. Furthermore, the report by the Commission of Experts argues that the special regime related to leasing should not be considered a tax expenditure.[25]

**27. However, some special regimes should be revisited.** For example, cooperatives' profits are fully exempt of income taxes (when income arises from internal transactions), not just for the entity but also when distributed to members. Companies operating in the Free Trade Zones are also CIT exempt. These tax expenditures are not estimated by SII or the calculation is notably outdated. The 'presumptive income' regime (r*enta presunta*) determines the taxation of small enterprises in some sectors (agriculture, mining, and transport sectors) on the basis of sales or assets instead of

[23] One incentive is to incorporate and distribute profits as deductible expenses. Fairfield & Jorrat (2014) estimated that accrued profits constitute 84 percent of the income of the top 0.1 percent of taxpayers, of which only 13 percent are formally distributed and thus subject to PIT.

[24] SII, 2019a; p.6.

[25] Comisión Tributaria para el Crecimiento y la Equidad (2021).

profits, and is intended to lessen the requirements for small taxpayers.[26] However, this regime could be used by highly profitable activities to lessen their tax bill. This regime is now redundant given the introduction of the special SME regime (in the 2020 tax reform), which is in fact more efficient and fairer.[27] The additional regime applying to the mining sector could also be revisited, via a comparison with international practices. This is, however, beyond the scope of this paper.

## D. Rationalizing Indirect Taxes

### VAT Exemptions

**28. Chile has few VAT exemptions, and the most important ones are standard policy in most countries.** Education, public transport, unfurnished rental housing, financial transactions, for example, are VAT exempt in Chile, as is typically elsewhere. The total VAT tax expenditure for 2019 was estimated at 0.76 percent of GDP (SII, 2019a), including several of those just listed (health, transport and education, but excluding financial services). However, the exemption for professional services, provided either by individuals or legal persons, is uncommon internationally and could be revisited. Its tax expenditure is estimated at 0.14 percent of GDP,[28] but its overall effect could be larger as it can facilitate income tax evasion. The tax expenditure from a 65 percent VAT credit for construction companies (applicable up to a price limit of the property) could be also reconsidered (amounting to 0.19 percent of GDP), as the Commission of Experts has argued.

### Excises

**29. The main revenue gap is with the diesel excise**. This tax does not correct for negative externalities from the use of diesel (emissions, accidents, congestion, road erosion) and is only ¼ of the excise on gasoline. Additionally, trucking companies benefit from a tax credit ranging from 50 to 80 percent of the diesel excise paid. These two benefits amount to about 0.55 percent of GDP. Also, excises on fuels are excluded from the VAT base, which distorts the structure of relative prices and represent another loss of revenue of 0.15 percent of GDP (Brys et al, 2020; p,113). So, there is significant room for higher revenue in fuel excises, but changes would have to be gradual over many years and should start only after the economic recovery strengthens.

**30. Excises for other products face various challenges.** Novel tobacco products should be taxed (e-cigarettes and heated tobacco products). Also, there is evidence of an increasing amount of illicit trade of cigarettes (Brys et al, 2020). Hence, administrative measures are warranted to protect the tax base. Alcohol consumption is relatively high in Chile, but the ad valorem tax for alcohol does not effectively target consumption, while the tax burden is relatively low for international standards (Brys et al, 2020): an additional specific excise based on alcohol per volume could be considered and

[26] A 10 percent rate for agriculture and transport, and a progressive rate scale of 4 to 20 percent on mining.

[27] The tax expenditure for *renta presunta* might not be large given that its benchmark is the new, low tax burden, *PYME* transparent regime.

[28] SII (2019) estimates a tax expenditure for "*Servicios Diversos*", which approximates the exemption to professional services. See B. Brys (2020), p. 100.

the excise should be included in the VAT base. Finally, introducing a tax on added sugar consumption, rather than the existing tax on sugary drinks, could more effectively reduce the substitution between sugary drinks and sugary foods (Agostini et al, 2018).

## E. Green Taxes

**31. In 2014, Chile introduced taxes to green-house and carbon emissions.** While sophisticated in design (as it taxes pollutants other than CO2)[29], the tax rate (of US$5 per ton of CO2) is low for international standards and far from the level (US$75 global carbon tax per ton of CO2) needed to achieve the COP21 target of limiting global warming to 2 degrees (Celsius) by 2030 (IMF, 2019a, IMF/OECD, 2020)[30]. A US$75 carbon tax would instead decrease CO2 emissions in Chile by 31 percent by 2030 (IMF/WB, 2020).[31]

**32. In 2019, Chile's green tax collected US$186 million from all fixed sources of emissions**.[32] This represents only 34 percent of the general diesel excise tax credit given to the industrial sector[33], a tax that, if actually collected, would fall short of correcting for the negative externalities. The green tax collected from diesel combustion was CHP7.8 billion[34], equivalent to only 2 percent of the general credit on the industrial use of diesel. Thus, there seems to be ample room to raise the green tax on CO2 closer to international efficiency levels.

## F. Conclusions

**33. The Chilean tax system might need another change to find additional resources in the medium term.** There is a broad agreement that more revenues are likely to be necessary to fund a permanent increase in social spending. This paper discusses some elements of the tax system that could be changed to mobilize additional revenue, without harming the economic recovery.

**34. When comparing Chile's tax structure with the one in other OECD countries, the largest deficit is in the personal income tax.** Such a tax contributes less than 2 percent of GDP, while other high-income countries receive four times that amount. A number of exemptions and deductions, which mainly favor high-income individuals, could be reduced or eliminated, as the Commission of Experts has recently recommended. However, the structure of the PIT schedule could

[29] Other emissions include particulate matter, nitrogen oxides (NOx) and sulfur dioxide (SO2). Since 2017, green taxes in Chile also include a tax on new light vehicles, depending on their fuel efficiency. The 2020 tax reform eliminated the threshold for a minimum amount of power generation (50 MWt) for the tax to apply to local pollutants.

[30] COP21 refers to the 21st Conference of Parties, held in Paris in 2015, to the 1992 United Nations Framework Convention on Climate Change, when participating countries committed to contribute to the mitigation of CO2 emissions.

[31] The Paris Agreement requires a US$75 average global carbon tax per ton of CO2 to achieve its climate objective of limiting global warming to 2oC by 2030; IMF (2019a). Independent estimates are that the efficient tax is US$130 per CO2/ton; Mardones and Flores, (2017).

[32] Ministerio del Medio Ambiente, Gobierno de Chile (2019). 2019 annual exchange rate = CHP702.6/US$1.

[33] The 'general credit' on the diesel excise was CHP 379.4 billion in 2019 (SII).

[34] Ministerio de Medio Ambiente, Gobierno de Chile (2019).

also be strengthened. Compared to international practice, the income brackets are wide, so that the top marginal rate is paid by very few taxpayers, while the marginal rates at the middle and lower income brackets are below those in most countries. Also, the exemption threshold is high for OECD standards. Although the proportion of individuals above the threshold has increased over time, today only 25 percent of Chilean taxpayers actually pay income tax.

**35. Although VAT and CIT revenues in Chile are relatively high, opportunities exist for increasing revenue while improving horizontal equity**. Construction costs of housing (up to a certain limit) and professional services are exempt from VAT, a special treatment uncommon internationally, which can facilitate income tax evasion. Several special regimes in the CIT should be reexamined as well. For example, the privileged tax treatment to cooperatives, companies operating in free trade zones, and taxpayers on the presumptive income regime (*renta presunta*) not only introduces a distortion but also the opportunity for arbitrage which is difficult to control by the tax authority. Also, among direct taxes, the additional regime applying to the mining sector could be revisited, but this is beyond the scope of this analysis.

**36. There is also significant room to gradually increase revenue from excises and green taxes**. Excises on fuels are particularly deficient, especially on diesel. The tax on diesel is only ¼ of that on gasoline, which is below the corrective level for externalities. Moreover, trucking companies obtain a credit up to 80 percent of the excise paid on diesel. Further, the excise is not in the base of the VAT. The same applies to the taxation of alcohol; the excise on alcohol is also low for international standards, though not to the scale of diesel. Carbon tax in Chile is comparatively low as well, and there is ample room for increasing it to meet the Paris Agreement on climate change.

**37. The tax reform strategy should thus prioritize raising revenue by eliminating or reducing special regimes which are distortive.** It will be essential to assess the broad spectrum of aspects of the tax system, avoid placing the taxation burden unevenly, and aim also at increasing its efficiency and equity. Most likely this would require small steps on many fronts, each contributing a possibly a modest share of the total revenue increase. The approach to reform should be gradual, as economic recovery consolidates, safeguarding continuity in the overall strategy.

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# Annex I. Comparative Data on Revenue as Percentage of GDP, Per Tax

**Table A1. Revenue as a Percentage of GDP (2017)**

| Country/Region | Total Revenue | Non-tax Revenue | Total Tax Revenue | PIT | CIT | VAT | Excise | Trade Taxes | Property | SSC | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Argentina | 34.48 | 11.42 | 23.05 | 2.24 | 2.81 | 7.25 | 1.73 | 1.28 | 2.87 | 6.95 | 4.86 |
| Brazil | 30.46 | 10.03 | 20.43 | 2.70 | 2.80 | 7.25 | 0.09 | 0.50 | 1.50 | | 5.59 |
| Chile | 22.81 | 4.16 | 18.65 | 1.94 | 4.25 | 8.36 | 1.49 | 0.18 | 1.08 | 1.46 | 1.35 |
| Colombia | 26.83 | 7.98 | 18.84 | 2.35 | 4.01 | 5.56 | 1.33 | 0.46 | 1.34 | 4.19 | 3.80 |
| Mexico | 24.67 | 10.71 | 13.96 | 3.44 | 3.51 | 3.72 | 1.73 | 0.25 | 0.31 | 2.13 | 1.00 |
| Peru | 18.30 | 4.92 | 13.38 | 1.86 | 3.40 | 5.36 | 0.90 | 0.21 | 0.25 | 2.11 | 1.40 |
| Latam average | 24.50 | 5.99 | 18.52 | 2.16 | 3.59 | 6.34 | 2.18 | 1.42 | 0.70 | 2.34 | 2.14 |
| OECD average | 39.74 | 14.82 | 24.93 | 8.14 | 3.02 | 6.81 | 2.51 | 0.14 | 1.92 | 8.82 | 2.40 |
| EU average | 42.37 | 17.16 | 25.20 | 7.59 | 2.84 | 7.88 | 3.10 | 0.01 | 1.40 | 11.11 | 2.39 |

Source: IMF/WoRLD (World Revenue Longitudinal Data)

**Table A2. EU: VAT Compliance Gap and GDP per Capita***

| Country | (%) | US$ (ppp) |
|---|---|---|
| Bulgaria | 13.6 | 21,371 |
| **Chile** | **19.1** | **24,548** |
| Croatia** | 7.7 | 26,674 |
| Romania | 35.9 | 27,192 |
| Greece | 29.2 | 28,594 |
| Latvia | 11.3 | 28,664 |
| Hungary | 13.3 | 29,832 |
| Poland | 20.8 | 30,168 |
| Slovakia | 25.7 | 30,942 |
| *Ave 21-31,000* | *19.7* | |
| Portugal | 10.2 | 33,086 |
| Lithuania | 24.5 | 33,827 |
| Estonia | 6.8 | 33,936 |
| Slovenia | 8.0 | 36,670 |
| Cyprus | 4.7 | 37,767 |
| Czech R | 14.2 | 38,974 |
| Spain | 2.7 | 39,575 |
| Italy | 25.9 | 41,785 |
| *Ave 31-42,000* | *12.1* | |
| Malta | 2.7 | 42,856 |
| France | 11.9 | 44,827 |
| UK | 11.7 | 45,910 |
| Finland | 8.0 | 47,502 |
| Belgium | 9.7 | 50,615 |
| Sweden | 1.1 | 52,739 |
| Germany | 9.4 | 53,255 |
| Austria | 7.3 | 54,496 |
| *Ave 42-55,000* | *7.7* | |
| Netherlands | 4.0 | 55,348 |
| Denmark | 8.5 | 55,517 |
| Ireland | 11.1 | 78,128 |
| Luxembourg | 0.9 | 112,823 |
| *Ave 55,000 +* | *6.1* | |
| *EU Average* | *12.2* | *43,324* |

Sources: CASE(2018); WB Databank

* Gap (2016); GDP/pc (2017)

* *WB (2020)

# FX INTERVENTION AND LIQUIDITY PROGRAMS[1]

*This note explains the exceptional measures introduced by the Central Bank of Chile (BCCh) to address the financial market disruptions during the 2019 social unrest crisis and during the Covid-19 pandemic. In this context, the primary focus is on describing the set of operations affecting the FX market and their effectiveness. Until late 2019, the BCCh had not intervened in support of the Chilean peso since 2001-2002, when the interventions took place in response to the regional turmoil. In late 2019, following the outbreak of social unrest, the BCCh undertook liquidity and FX intervention programs, providing timely and extensive support and liquidity to the FX as well as the local peso markets. In addition, the BCCh intervened in the local currency market to stabilize the fixed-income segment and limit adverse spillovers in the long-term funding costs of banks and corporations, as well as short circuit adverse negative feedback loops through fixed-income investment funds and insurance companies. The measures, grounded in the strong credibility of the Central Bank, contributed to restoring market functioning, preserving financial stability, keeping the flow of credit to the economy uninterrupted, and facilitating a decline in asset price volatility, which contributed to a recovery of capital inflows and the appreciation of the peso.*

*Subsequently, in the wake of the Covid-19 outbreak, Chile experienced significant capital outflows in March-April 2020, in line with the general trend for emerging markets. Such developments renewed pressures on the currency and the onshore FX funding market. In March 2020, building on the earlier set of measures undertook in response to the challenges posed by the social unrest, the BCCh extended the time window for possible interventions and expanded the amount of FX swaps, but notably did not resume the interventions outright FX spot nor expanded those in the FX forward market. In parallel, the BCCh intensified its intervention on the local currency market mainly to provide additional monetary policy accommodation. Financial market and FX stability was restored again in the rest of the second quarter of 2020, helped by a more favorable international financial environment. Overall, this was the first significant set of FX intervention since the early 2000s (thus pointing at the BCCh's high tolerance for exchange rate volatility), and the most forceful intervention in the domestic liquidity market in decades, that were justified on the basis of a comprehensive assessment that unusual circumstances had led to market disruptions and accompanying excessive bouts of exchange rate volatility. The recovery of financial market conditions, although aided by international factors, has pointed to the effectiveness of the programs put in place.*

[1] Prepared by Metodij Hadzi-Vaskov and Romain Veyrune.

## A. Episode I: The 2019 Social Unrest

### The Context and Rationale

**1. Social unrest erupted on October 18, 2019, resulting in the largest demonstrations over the last several decades.** In response, the authorities declared the first curfews since the end of the military regime in 1990. Protests across the country lasted several weeks and resulted in over 30 deaths, over 2,500 injured security officers, over 10,000 detained persons, and hundreds of looted stores and vandalized buildings. In mid-November 2019, such exceptional circumstances, coupled with intensifying public discussions about changing the Constitution, induced the exchange rate to fluctuate considerably, with intraday volatility of 4.15 percent at its peak on November 12, 2019 (compared to an average intraday volatility of 0.74 percent over the past decade).

**2. Two key developments affected the functioning of Chile's financial markets in this period, triggered by the domestic investors' *flight to safety*** (see Annex). First, domestic investors—mainly pension and mutual funds, but also wealthy individuals—began selling long-term fixed-income securities and shifting their funds into short-term liquid assets (also as a step for conversion into FX), which led to liquidity shortages in the domestic market and a sharp increase in long-term rates. Second, investors moved from peso-denominated assets into FX, which led to an increase in the onshore cost of financing in US$, visible in a sharp jump in the onshore US$ spread (the difference between the US$ short-term interest rate implied by a local-market forward contract and the US$ Libor rate), from about 100 bps on November 12 to about 330 bps a week later. The associated higher costs were particularly felt by banks without credit lines from abroad, albeit—to a lesser extent—also by banks with access to foreign lines of credit. The exchange rate volatility was particularly fueled by a temporary drop in FX market liquidity that prevented normal price formation, the shift from peso-denominated to FX-denominated assets, as well as some self-fulfilling elements (convergence of bets about a peso depreciation catalyzed by the ongoing unrest, its violence, and discussions about changes to the Constitution). The authorities were concerned about the market disruption, the sharp increases in the cost of financing, and the volatility of financial asset prices, and assessed such conditions to be excessive and hostile to the healthy formation of economic agents' production and expenditure decisions and the normal functioning of the economy.

#### *The Intervention Measures*

**3. The BCCh implemented a broad set of measures to address the above concerns about market liquidity and the temporary market disfunction that resulted in excessive financial volatility**. The set implemented by BCCh included the following measures:

- **Communication.** On November 12, 2019, amid high financial market turbulence fueled by political uncertainty and violent demonstrations, the Governor made a public statement that the BCCh stood ready to act against anomalous market situations using its broad toolkit.

- **FX Swaps and repos.** On November 13, 2019, the BCCh aimed to increase liquidity in FX and peso markets. The BCCh announced that it would offer 30-day and 90-day FX swaps (at Libor plus 200 bps) up to a maximum amount of US$ 4 billion over two months, as well as open the window for 30-day repo operations (at the monetary policy rate), which provided a longer time period and somewhat lower cost (by 25 bps) compared to the existing overnight liquidity facility. The aim of repos was to facilitate access to liquidity. The aim of the FX swaps was to avoid that some (small) banks would find themselves unable to roll over their FX liabilities due to the excessively high cost of access to US$ funding. Indeed, by offering swaps at a predetermined rate, the BCCh aimed to put a ceiling on the cost of accessing US$ liquidity in the non-deliverable forward (NDF) market, and the 200-bps premium was aimed at ensuring that the facility would be used as a backstop and discourage excessive recourse to it. The use of FX swaps was rather limited—centered mainly at the height of the US$ liquidity shortage—because the cost of funding returned reasonably quickly to somewhat more normal levels; the peak of the outstanding amount was US$ 1.1 billion in late-November/early December, 2019.
- **Securities buyback and broader swaps and repos.** On November 14, 2019, the BCCh expanded the liquidity support by: (i) suspending the issuance of new central bank paper/securities (to avoid draining liquidity); (ii) initiating buyback of the BCCh securities (to inject liquidity); (iii) increasing the frequency of FX swap and repo operations (to facilitate access to liquidity); (iv) extending the maturity of repo operations (to facilitate access to term funding); and (v) expanding the set of assets eligible to be used as collateral for repo operations to commercial bank bonds and deposits (to address problems due to a shortage of instruments that financial institutions could use as collateral for accessing BCCh liquidity—as short-term paper was in high demand—as well as to help ease pressure on the longer end of the curve, and as a second-order effect, the passthrough beyond treasury securities). Overall, the aim of these operations was to improve peso liquidity in the domestic financial market (suspension of new issuances, buyback of securities, and repo operations) and reverse the sharp increase in long-term peso rates (buyback of longer-term securities and extension of maturity of repo operations) amid the massive selloff of fixed-income long-term peso securities.
- **FX spot and forward interventions.** On November 28, 2019, the BCCh announced the start of FX interventions on the spot and forward markets (up to a maximum amount of US$ 10 billion in each market) over the next six months (with an initially announced end-date of May 29, 2020). The BCCh began offering US$ 200 million per day (on spot and forward each) in the first week, and then gradually reduced the offered amounts, as the demand abated (see Figure 1). In early January, the BCCh decided to pause the spot intervention amid the return of normalcy on the FX market and the stabilization of the peso, as well as to limit the forward program to the renewal of maturing forward contracts (see Figure 1). Overall, the total amount of the spot and forward interventions amounted to about US$2.5 billion and US$4.5 billion, respectively. With the spot FX interventions, the BCCh aimed to tame excessive exchange rate volatility that threatened to produce a self-fulfilling run on the peso and possibly result in a full-blown panic on the financial markets. The spot interventions were complemented by FX forward operations (non-deliverable forwards—NDFs—settled in pesos) given the importance of the forward market (mainly NDFs) for FX hedging in Chile and its connection with the spot FX market (for instance,

when hedging becomes too expensive—see Annex for evolution of hedging costs—, economic agents are likely to buy spot to pre-finance their obligations). The announced maximum amounts of the spot and forward interventions were chosen as identical, given the similar size of the corresponding spot and forward markets in Chile.[2]

- **Intervention in FX spot, forward, and swap markets did not target the same type of risks**. Both the spot and the NDF interventions transferred exchange rate risk from the market, while the swap operations helped financial institutions cope with rollover risk (temporary loss of US$ funding access). As the three markets are interconnected, intervention in one market could contribute to stabilize the others, although this has not necessarily been the primary purpose of the multitude of parallel operations but has produced positive externalities.

***The Effects of the Interventions***

**4. Overall, the FX swaps and the direct liquidity operations helped some market participants obtain temporary liquidity in both US$ and peso markets at a critical juncture.** The FX swap provided an efficient backstop to the market, halting the increase in onshore US$ funding cost. Market access quickly normalized, and counterparties swiftly repaid most of the US$ loans as market access was restored.

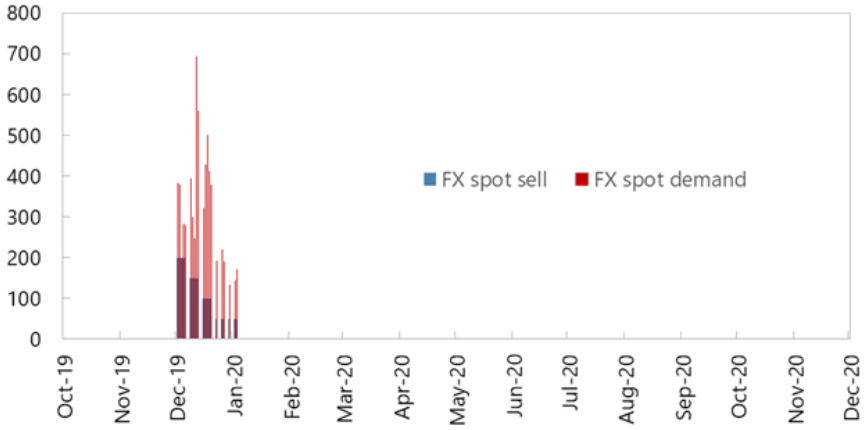
**5. The announcement of the FX spot intervention (complemented with FX forwards) was essential in bringing back confidence and stabilizing financial markets.** It restored normal market functioning, avoided exchange rate overshooting, and reduced expectations of depreciation. Financial market operators highlighted that the announced intervention—also owing to the unprecedented size—helped reassure market participants about the readiness and strong commitment of the BCCh to restore stability, in turn resulting in a more limited need for actual intervention. Indeed, the exchange rate started appreciating after the FX intervention announcement, reversing most of the November depreciation, and then stabilized in late December, also helped by the recovery of copper prices, and the local political developments. Financial market transactions steadily recovered, allowing the price formation process to normalize, and fixed-income markets stabilized.

**6. The demand for precautionary reserves normalized following the BCCh announcement of liquidity measures.** The take-up at the liquidity operation was limited and the BCCh was able to drain some liquidity, as soon as December 2019, reflecting the lower demand from the market. Yields decreased, credit spreads compressed, and the yield curve flattened in January 2020 compared to their December peak, but remained nonetheless worse than in the pre-unrest period, reflecting a higher liquidity premium. Via the buyback program, the BCCh reduced the average residual maturity of its sterilization securities from several years to a few weeks, which contributed (with the bank bond purchase) to flatten the yield curve, especially in the 1 to 5-year segment.

[2] As the operation moved forward, BCCh increased the amount of forward contracts and reduced the amount of spot operations.

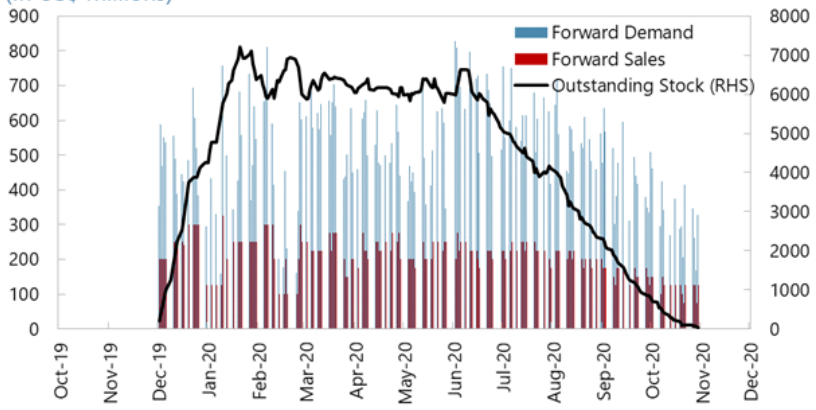
## Figure 1. Interventions

**Chile: Spot Exchange Rate**
(In US$ millions)



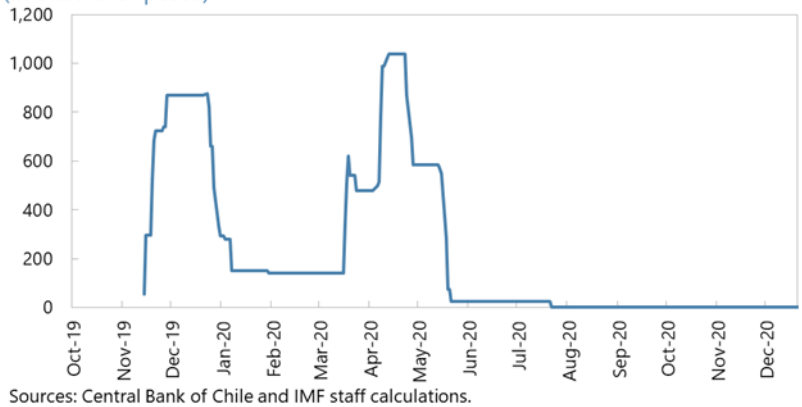

Source: Central Bank of Chile.

**Chile: FX Contracts Outstanding Stock**
(In US$ millions)



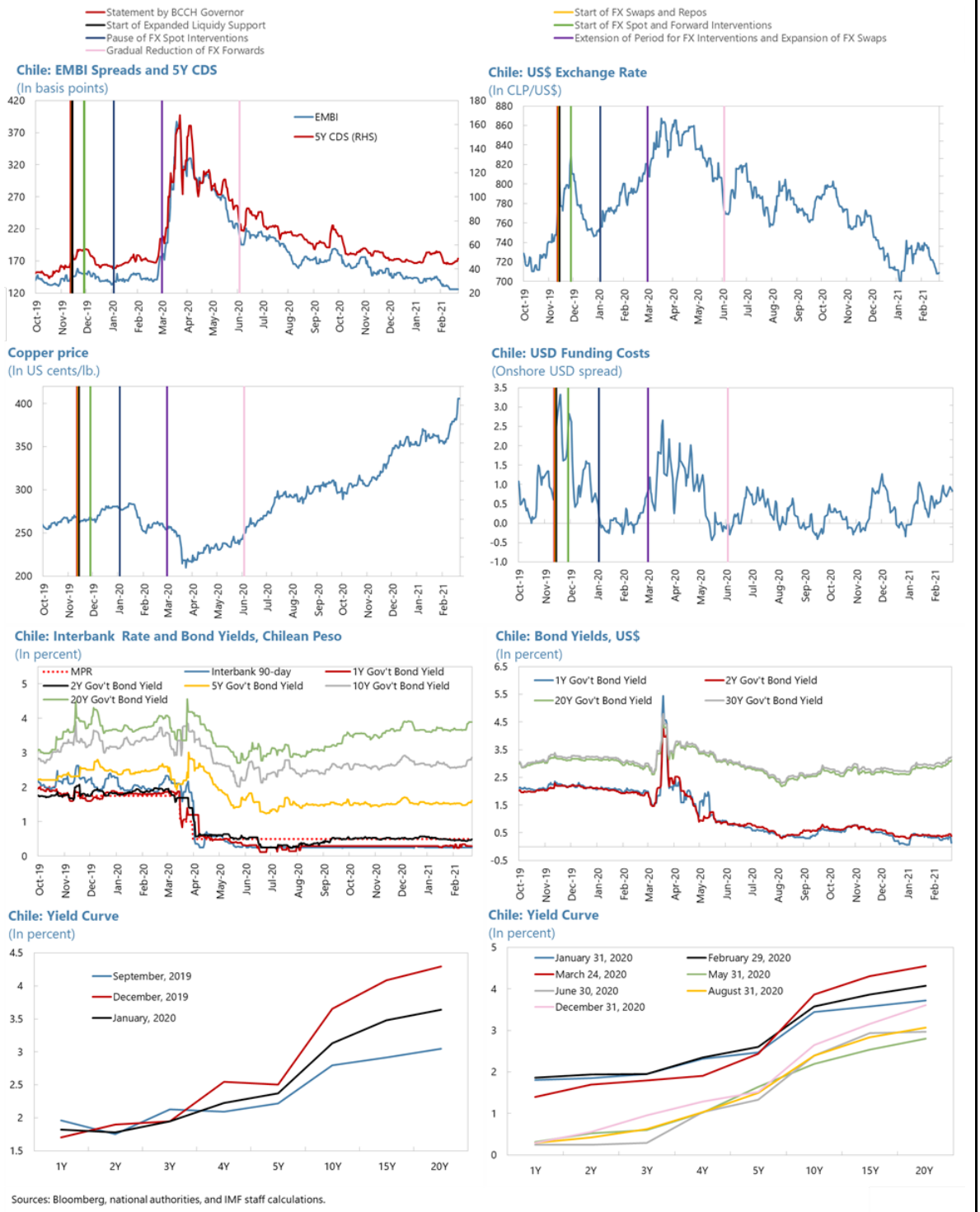

Sources: Central Bank of Chile and IMF staff calculations.

**Chile: Swap Lines**
(In billions of pesos)




Sources: Central Bank of Chile and IMF staff calculations.

## Figure 2. Financial Market Indicators




Sources: Bloomberg, national authorities, and IMF staff calculations.

## B. Episode II: COVID-19 outbreak

### The Context

**7. After a period of relative stability in early 2020, market turbulence returned with the Covid-19 outbreak, in line with global developments among emerging markets.** Following an early-2020 associated with a recovery of capital inflows (particularly FDI), a decline in asset price volatility, and the appreciation of the peso, Chile experienced capital outflows in March, in the wake of the Covid-19 outbreak and in line with the general trend in emerging markets. Such developments renewed pressures on the peso exchange rate as well as on the on-shore US$ funding market. On the peso-market side, a new increase in the preference for liquidity put the bank funding market under pressure, while concerns about non-financial corporates' profitability arising from the Covid-19-related business disruption threatened to interrupt the flow of credit to the economy. On the US$ funding side, the onshore US$ spread increased again—albeit less than during the social unrest—complicating the access to US$ liquidity for banks without credit lines abroad.

***The Intervention Measures*** [3]

**8. Amid the increase in uncertainty related to pandemic, BCCh implemented a broad set of measures to provide liquidity, support credit, and preserve financial stability.** Such actions were in addition to the direct measures focused on the FX market.

- **Extending the window for FX spot, forward, and swaps**. On March 16, 2020, the BCCh announced that the time window for possible FX spot and forward interventions as well as FX swap contracts would be extended from May 29, 2020 until January 9, 2021. Regarding FX swaps, the BCCh also extended the available maturities to 90 and 180 days (in additional to the existing 30 days) and increased the maximum daily amounts. The authorities did not implement any FX spot intervention and only rolled over expiring forward contracts until June 2020.
- **Lower policy rate and broader repos.** On March 16, the BCCh reduced the policy rate by 75 basis points; on March 31, the policy rate was cuts by additional 50 basis points to the historically low 0.5 percent, considered effective lower bound by the BCCh, as a lower policy rate could undermine money market funds with corresponding consequences for financial stability and the transmission of monetary policy. On March 16, the available maturities of repo transactions were expanded to satisfy inclusion of corporate bonds as collateral for banks' access to BCCh liquidity.
- **Funding-for-lending**. On March 20, 2020, the BCCh introduced the funding-for-lending program. Initially based on one funding-for-lending facility (FCIC1), it was expanded by two more facilities until early-2021. The first facility (FCIC1) consisted of: (i) a basic component that provides long-term funding up to 4 years to refinance up to 3 percent of the bank's existing portfolio (about US$4.8 billion); and (ii) an additional component conditional on the banks'

[3] These measures are also discussed in the Annex to the Staff Report for 2021 Article IV Consultation, and are repeated here for convenience.

provision of loans, with a bonus allocation for loans to SMEs, in the total amount of US$19.2 billion. On June 16, the BCCh announced the establishment of the second funding-for-lending facility (FCIC2) in the total amount of US$16 billion, which became operational in July 2020 with a lifespan of 8 months. On January 28, 2021, BCCh announced the third funding-for-lending facility (FCIC3) with a maximum amount of about US$10 billion, corresponding to the unused amount of FCIC2. Hence, the overall funding-for-lending program can reach up to about US$40 billion in total.

- **Bank-bonds buying program.** On March 20, 2020, the BCCh announced that it will buy up to 5-year maturity bank bonds at a premium from the local OIS curve, which depends on the issuer rating. The measure aimed at backstopping the large bank-bond market that came under pressure owing to the Covid-19 shock (similar as done in response to the social unrest) as mutual funds—which are heavily invested in bank bonds—faced unusually large redemptions. On June 16, 2020, BCCh introduced a second asset purchase program, encompassing purchase of bank bonds as well as buyback of BCCh securities, in the total amount of US$8 billion. This second program was framed as a regular QE operation and did not have a fixed spread over OIS. In the case of BCCh-securities buyback program, BCCh discounted the remaining flows at the monetary policy rate for those bonds maturating up to 3 years, which was consistent with the FCIC facility and made this operation very attractive for the market.
- **Phasing out.** On June 3, 2020, amid signs of stabilization in financial markets, the BCCh announced its intention to gradually reduce the stock of NDFs (maintained at the same level of about US$4.5 billion since January) through partial renewal of maturing NDFs, such as to phase out its participation in the FX hedging market over the next four months. By end-October 2020, the stock of outstanding NDFs dropped to zero (Figure 1). The BCCh has also maintained the option to engage in FX swaps until January 2021, with a maximum amount of US$4 billion; however, demand dropped and by end-June the outstanding amount of FX swaps declined to zero.

***The Effectiveness of the Measures***

**9. Following the extension of the timeline for possible FX interventions until January 2021 as a result of the Covid-19 shock—from the initially envisaged end-May deadline—the BCCh did not sell any FX on the spot market nor increased the stock of NDFs.** The demand for forwards has remained high until June 2020, nonetheless, reflecting lasting appetite for hedging against exchange rate depreciation amid elevated uncertainty. The demand for FX swaps peaked in mid-April (with the overall stock reaching about US$1.2 billion), but has since declined steadily to zero by late June.

**10. Yields decreased and credit spreads compressed again in May-June, compared with the peak of uncertainty in March-April 2020.** Nonetheless, they remained worse than in January-February, the period prior to the Covid-19 outbreak. Meanwhile, the yield curve in May-June shifted downwards compared to March-April (but also relative to January-February), while remaining somewhat steeper than in January-February. Over the second half of 2020, the

movements in the yield were generally limited, keeping the curve relatively stable until December 2020 (Figure 2). In this context, the bond-buying programs allowed a movement into risky assets by institutional agents, and boosting demand for corporate bonds.

## Overall

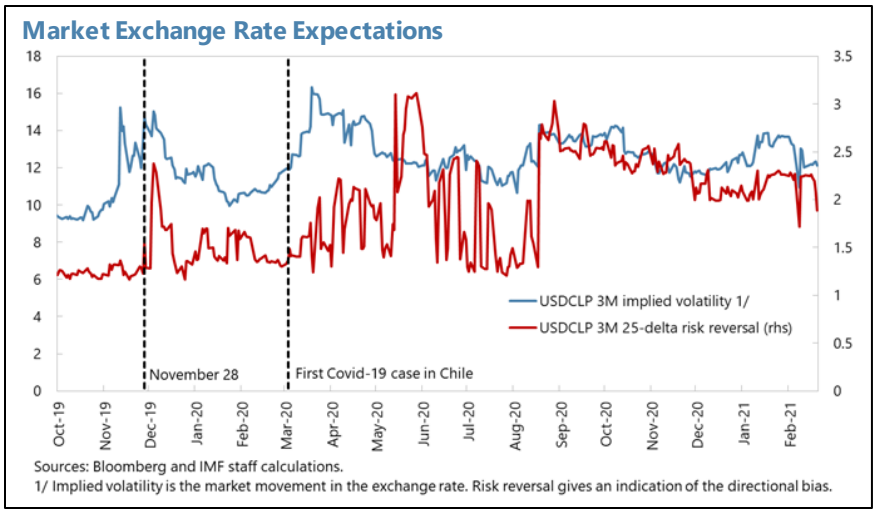
**11. The FX interventions by BCCh in response to the social unrest demonstrated the effectiveness of exceptional measures under extreme circumstances.** The FX interventions from late 2019 were the first significant set of FX intervention since the early 2000s—thus pointing at BCCh's high tolerance for exchange rate volatility—and were rationalized on the basis of a comprehensive assessment that unusual circumstances had led to an impairment in the function of financial markets and excessive bouts of exchange rate volatility that could be harmful to the correct formation of economic decisions. In turn, the fast stabilization of financial market conditions has pointed to the effectiveness of the programs put in place. The BCCh actions restored normal market functioning, avoided exchange rate overshooting, and reduced expectations of depreciation. In addition, the announced intervention—also owing to the unprecedented size—helped reassure market participants about the readiness and strong commitment of the BCCh to restore stability, in turn resulting in a more limited need for actual intervention.

**12. The extraordinary nature of the FX interventions in response to the social unrest was confirmed by the lack thereof in unprecedented global shocks, such as the market turbulence in the aftermath of the Covid-19 outbreak.** The BCCh implemented measures aimed at restoring market functioning, preserving financial stability, and keeping the flow of credit to the economy uninterrupted, but notably did not resume the interventions outright FX spot nor expanded those of FX forward market. Anchored in BCCh's very strong policy track record and credibility, these measures—together with a more favorably global developments—contributed to restoring market functioning, relative stability, witnessing a recovery of capital inflows, and the appreciation of the peso.

# Annex I. Flight to Safety, Liquidity Premium, and Cost of Hedging

## The Flight to Safety

Domestic investors—mainly pension and mutual funds, but also high-wealth individuals—sought to protect the value of their assets by selling domestic fixed income, often invested via mutual funds, and placing the proceeds abroad in US$ denominated assets. This initial flight to safety was enough to put pressure on the domestic foreign exchange market, which experienced its highest level of volatility since the introduction of the floating exchange rate in 1999, including a five percent intraday depreciation on November 12. This occurred notwithstanding a counterbalancing position taken by non-residents that contributed toward stabilizing of the FX and fixed-income markets at the beginning of this episode. In turn, the volatility boosted exchange rate depreciation expectations, triggering more relocation from peso to US$ assets, this time between different types of pension funds, as pension members could reallocate at short notice large part of their investment from peso denominated funds to US$ denominated funds. Reflecting the heightened uncertainty, exchange rate expectations became skewed toward the extremes.

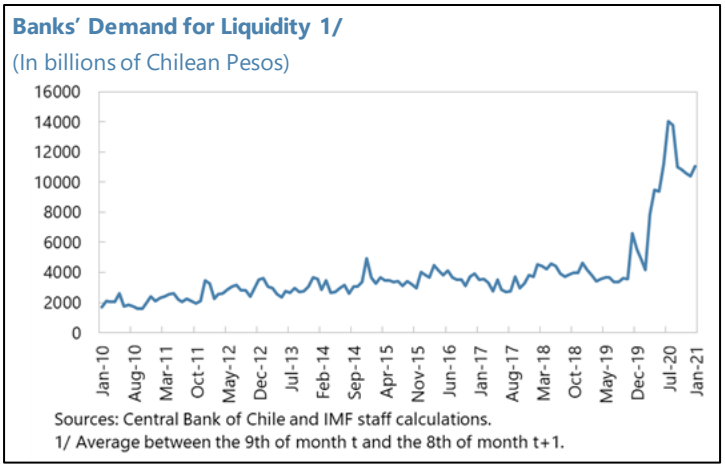



By buying US$, investors aimed at transferring the exchange rate risk of holding peso assets, but also affected the availability of US$ funding in the domestic market, as fewer counterparties were willing to lend US$ (thereby increasing the US$ funding roll-over risk). This led to an increase in the onshore cost of financing in US$, depicted by a sharp jump in the onshore US$ spread (the difference between the US$ interest rate implied by a local-market forward contract and the US$ Libor rate) from about 100 bps on November 12 to about 330 bps a week later. The higher costs were particularly felt by banks without credit lines abroad, albeit—to a lesser extent—also by those with foreign lines of credit.

## The Liquidity Premium

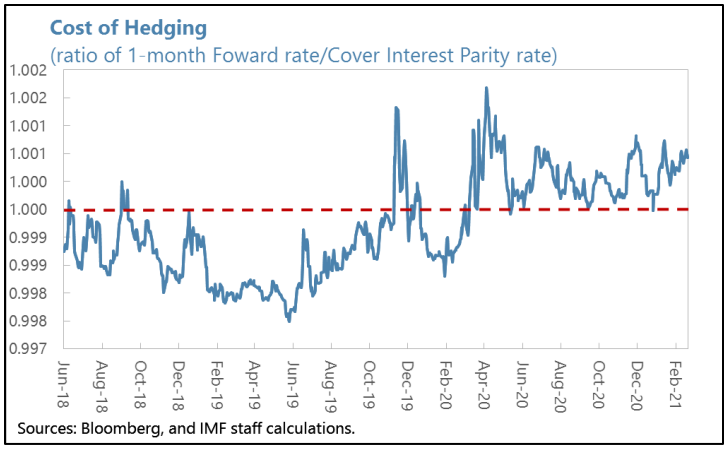
The flight to US$-denominated assets was accompanied by the sale of peso fixed-income assets and an increase in the precautionary demand for liquidity. Hence, fixed-income markets—which mainly consist of bank and corporate bonds—were impaired, resulting in a considerable increase in yields, term premia, and credit spreads. The mutual fund industry, which took increasing transformation risk

during the past decade (the average maturity of fixed income under management increased from 280 days to 716 days), faced high demand for redemption, reaching 30 percent of the portfolio on average. In this context, banks demanded unprecedented amounts of reserves at the central bank, the safest peso-denominated assets, for precautionary reasons.




## Cost of Hedging

The cost of FX hedging in Chile, as measured by the ratio between the forward rate and the rate implied by the covered interest parity, changed considerably in the two episodes of market turbulence. First, it spiked sharply in mid-November 2019 at the time of the social unrest before stabilizing amid the interventions introduced by BCCh. Second, the cost of hedging spiked again amid the high uncertainty with the Covid-19 outbreak in March 2020 and, despite some normalization with the stabilization of financial market conditions in May 2020, it has remained elevated relative to normal times, but still below the two spikes during the turmoil episodes.

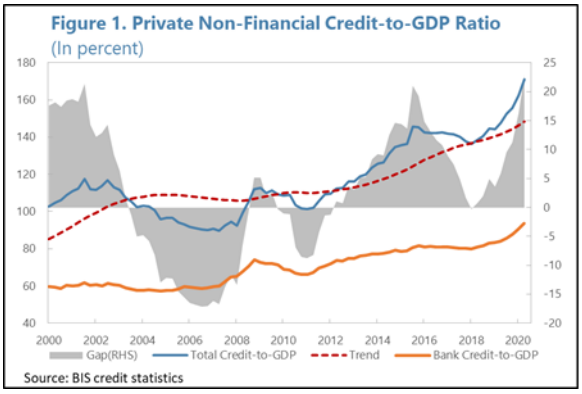


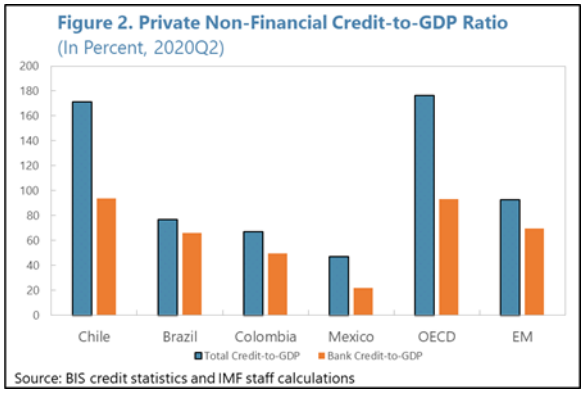
# FINANCIAL SECTOR DEVELOPMENTS DURING THE COVID-19 CRISIS[1]

*This note presents the financial sector developments during the Covid-19 crisis, focusing on the exposure of the banking sector to households and corporates. The Covid-19 crisis substantially slowed down the loan growth, especially consumer loans, due to the high uncertainty. The government's measures helped households and corporates to maintain access to credit as well as banks to maintain the asset quality in the short-term. Medium-term risks to the banking sector (once the temporary policy measures expire) appear to be limited at this moment, but they nonetheless warrant close and vigilant monitoring.*

## A. Background

**1. Credit to the private non-financial sector[2] has steadily expanded.** The total credit-to-GDP ratio, including both loans and securities, has increased rapidly since the early 2010s and reached 171.2 percent in 2020Q2[3]. It is substantially higher than those in neighboring economies or other emerging markets, and close to the OECD average, 176.5 percent. The positive credit-to-GDP gap[4] in the last decade might reflect sound growth in financial intermediation, and financial deepening, followed by the recent policy responses to the Covid-19 crisis.



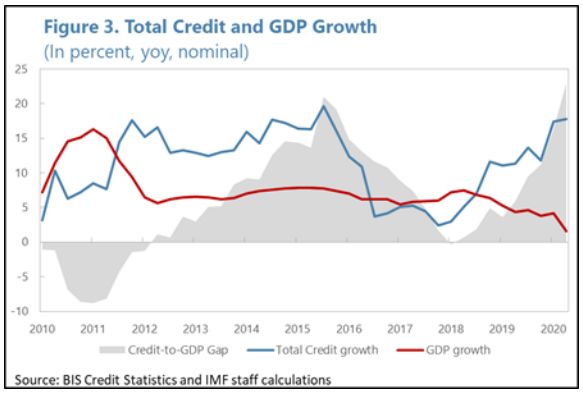

[1] Prepared by Junghwan Mok.

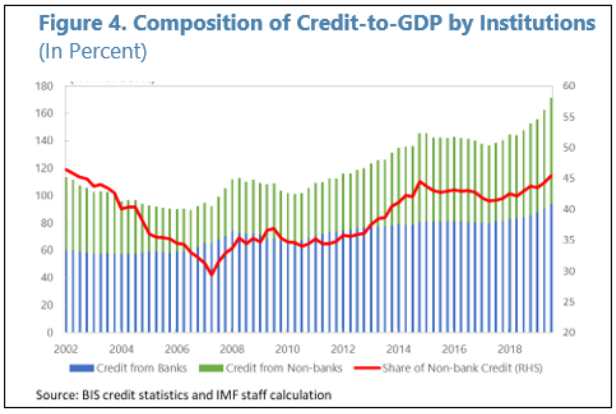
[2] The credit covers both loans and debt securities provided by domestic banks, all other sectors of the economy, and non-residents. The "private non-financial sector" includes non-financial corporations, households, and non-profit institutions serving households. In terms of financial instruments, credit covers loans and debt securities.

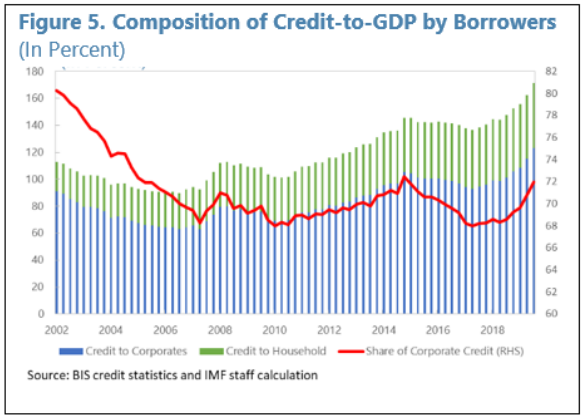
[3] The total credit includes the FDI related debt, especially in the mining sector. The ratio of credit provided by domestic banks to GDP is 93.5 percent in 2020Q2, which is close to the OECD average.

[4] The credit-to-GDP gap is the deviation from its long-run trend calculated by the HP filter with the smoothing parameter of 400,000 (Drehmann and Tsatsaronis, 2014).

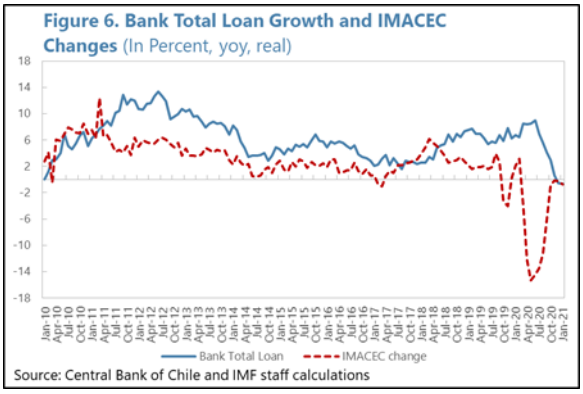
**2. Faster credit growth relative to GDP growth widened the credit-to-GDP gap.** The growth rate (yoy) of nominal credit to private non-financial sector has jumped from 3.0 percent in 2018Q1 to 17.8 percent in 2020Q2, while the nominal GDP growth rate dropped from 7.2 percent to 1.6 percent. The recent credit growth after 2018 is associated with the increase in credit from non-banks and credit to corporates.[5]



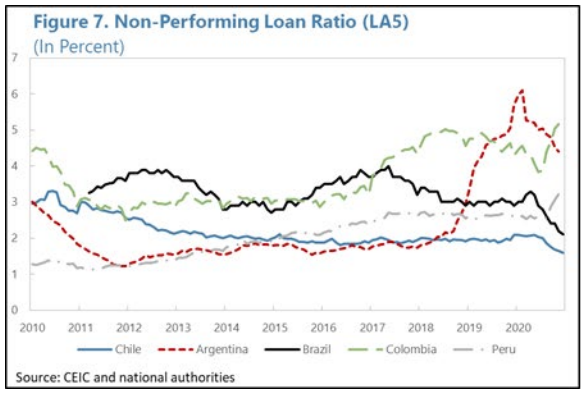

**3. The COVID-19 crisis put a break on the credit expansion.** Following the social unrest in 2019H2 and nation-wide lockdowns due to the pandemic, with the heightened uncertainty, the loan growth rate from the banking sector plummeted from 8.4 percent in March 2020 to -0.6 percent in January 2021. This change mainly came from the decline in consumer loans, followed by slower corporate loan growth in 2020H2, which will be discussed in the following sections in detail.

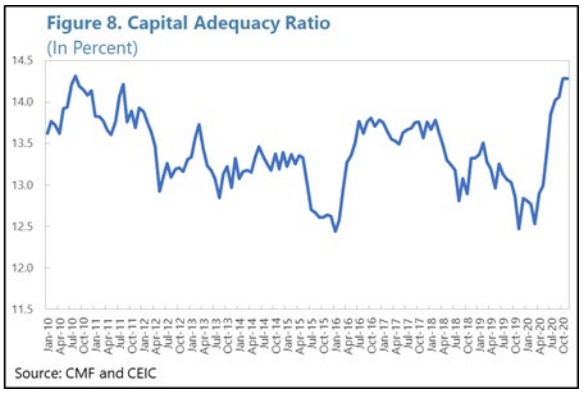



**4. Financial soundness indicators suggest that the Chilean banking sector appears resilient, also thanks to the temporary emergency measures.** The non-performing loan ratio reached 1.6 percent as of December 2020, the lowest among LA5 countries, thanks to the supervisory support for banks that allowed them to extend payment installments on their loan portfolios. For example, as of July 31, about 38% of the mortgage loan portfolio in Chile had extensions, 19% of consumer loans, and 37% of commercial loans. The capital adequacy ratio

[5] This trend is usually found in periods with considerably low economic activity. As Núñez and Urbina (2017) show, the demand for credit from SMEs is countercyclical and increases due to liquidity reasons.

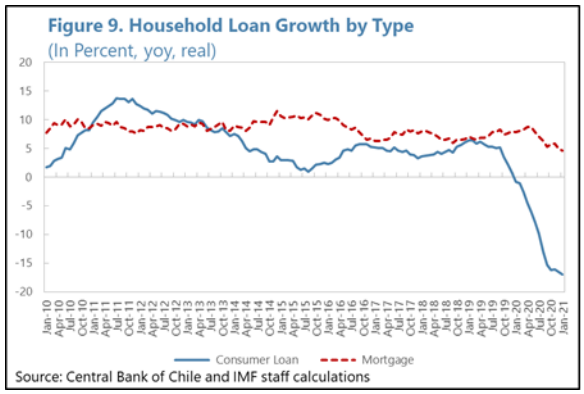
increased rapidly in the last year and reached 14.3% in October 2020, the highest in the last decade. However, the recent increase comes from the decline in the risk-weighted assets, due to the changes in risk-weights and the decline in consumer loans as well as strengthened supervisory standards. Also, the liquidity coverage ratios (LCR) for all banks remain above regulatory limits (70%).

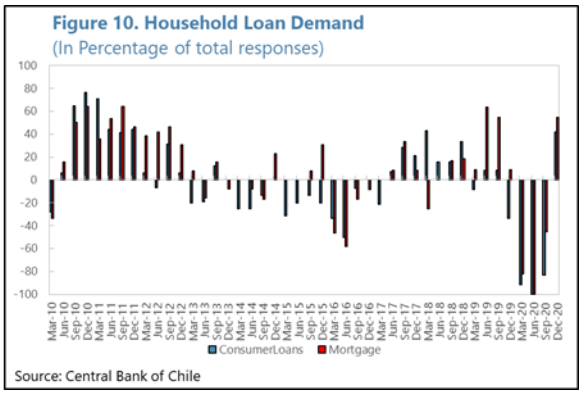



## B. Exposure to Household Sector

**5. The COVID-19 crisis, following the social unrest, substantially slowed down the growth of household loans.** The consumer loans showed a dramatic drop of -17.0 percent in January 2021 from an expansion of 5.2 percent in September 2019. The upward trend of mortgage loans also has been reversed since June 2020. Both demand and supply factors contributed to these contractions. According to the bank loan survey[6], the downward trend of loan demand for both consumer and mortgage loans after the social unrest was accelerated by lockdowns due to the pandemic.

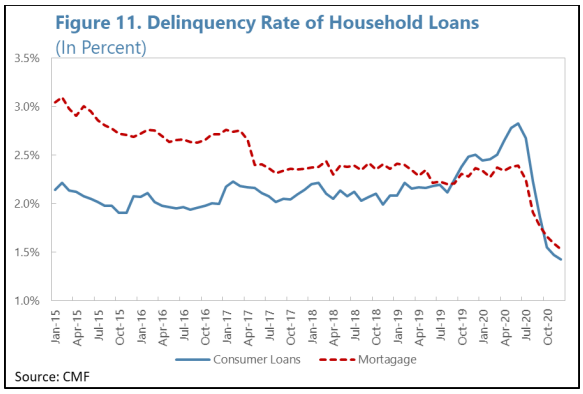



**6. The delinquency rate of household loans remains low thanks to the government's support.** The repayment flexibility measures, such as voluntary mortgage and consumer loan

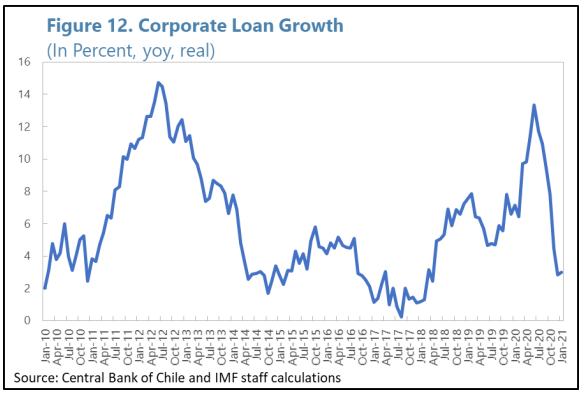
[6] The loan demand corresponds to the difference between the number of surveyed banks with more credit applications and the number of those with less applications as a percentage of the total responses.

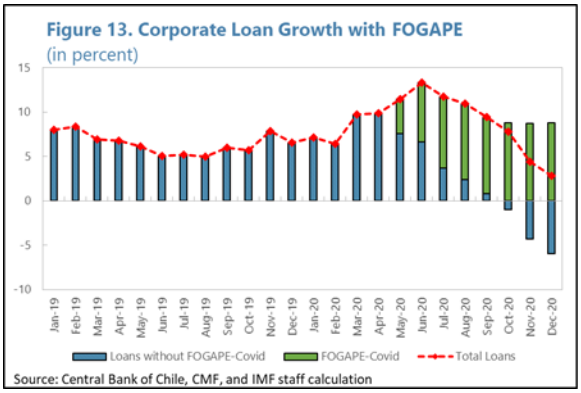
payment relief, and forbearance programs, helped to lower the deliquency rate after July 2020. Two pension fund withdrawals, amounting to 14 percent GDP (USD 36 bn), accompanied by the direct income transfers and other policies supporting the labor market, also enabled households to pay off their past-due debts. During 2020H2, about 600,000 people paid past-due maturities with financial entities in the system and exited from the listing of delinquent debtors (DICOM).[7]

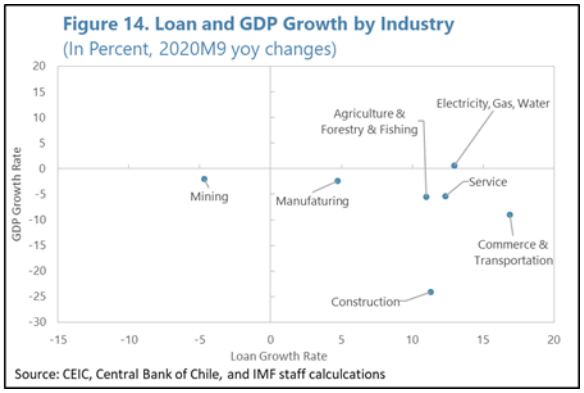



## C. Exposure to Corporate Sector

**7. The COVID-19 crisis also affected the growth of commercial loans adversly, but the policy supports have promoted the countercyclical growth of commercial loans.** The growth rate (yoy) of real commercial loans fell from 9.9 percent in April 2020 to 3.0 percent in January 2021. The increase in loan growth rates in May and June was mainly due to the launch of the government guaranteed FOGAPE-COVID line in conjunction with the Central Banks' lending facitilies and asset purchase programs. It compensated the declines in commercial loan growth by a total of 9.1 trillion Chilean pesos (as of December 2020). While the construction, commerce, and service industries have been the most severely affected by the pandemic, the commercial loans to these sectors expanded until September 2020.

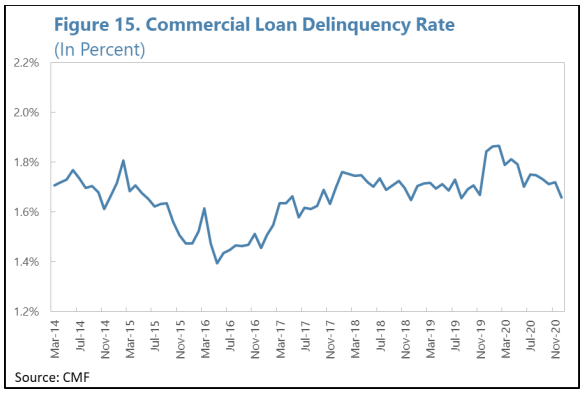


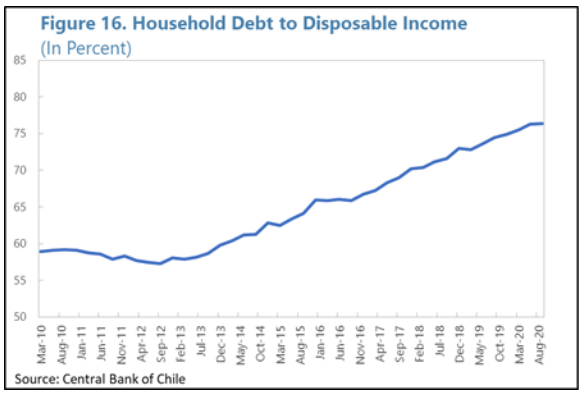

[7] According to "The XXXI Report on Delinquent Debt" (XXXI Informe de *Deuda Morosa*) by the *Universidad San Sebastián* and Equifax, the number of people were listed in the listing of delinquent debtors decreased by 12.2% from 4,959,145 in 2020Q2 to 4,352,102 at the end of 2020. Note that the definition of delinquency in DICOM refers to the delayed payment overdue for more than one day.

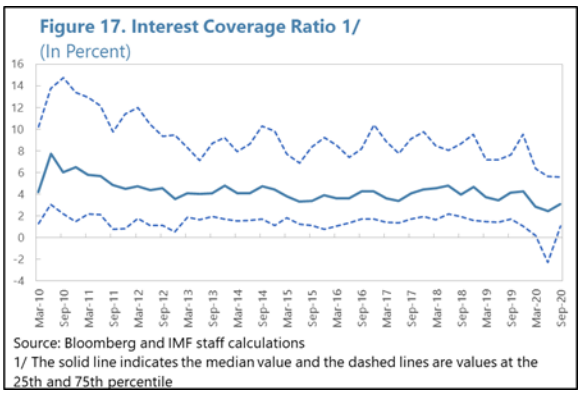
**8. Despite the economic downturn, the delinquency rate of commercial loans also remains low.** Similar to household loans, the delinqueny rate of commercial loans declined from 2.1 percent in December 2019 to 1.6 percent in December 2020, largely due to the extraordinary support measures and the temporary regulatory changes allowing banks to adjust their credit term for SMEs up to 6 months without such rescheduling being treated as renegotiations for provisioning purposes.




## D. Risks and Mitigating factors

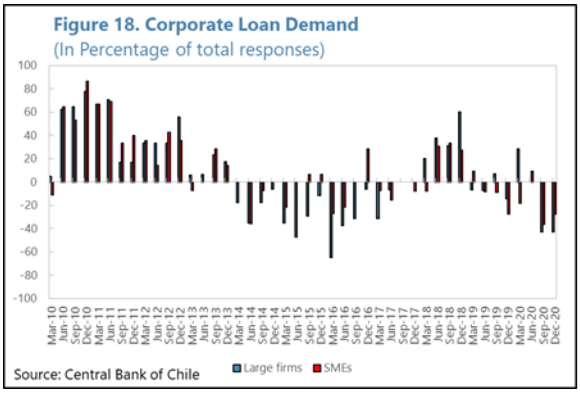
**9. Although the banking sector appears resilient and has experienced no immediate deterioration in NPLs, pockets of stress could emerge as the COVID-19 policy measures expire.** If the pandemic lasts longer or the recovery is slower than expected, higher leverage in the context of low output could pose financial risks in the future. Aggregate household debt to disposable income ratio has been steadily increasing since 2013 and reached 76.4 percent in 2020Q3, associated with increased mortgage debt and financial deepening. However, there is substantial heterogeneity and market segmentation of household debt: for example, a sizable share of the households' debt is mortgage credit, which is generally allocated to less risky households. It is also important to note that annual growth of consumer loans has contracted, the interest coverage ratios of some listed firms have already turned to negative territories, suggesting some firms are facing difficulties in servicing their debts. The higher leverage and banks' lower interest margins can make both firms and banks more vulnerable under stressed scenarios.

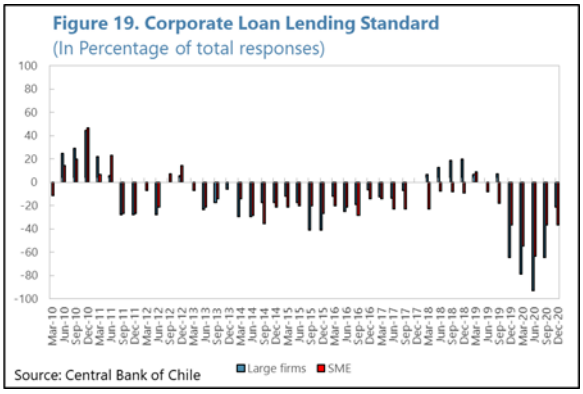


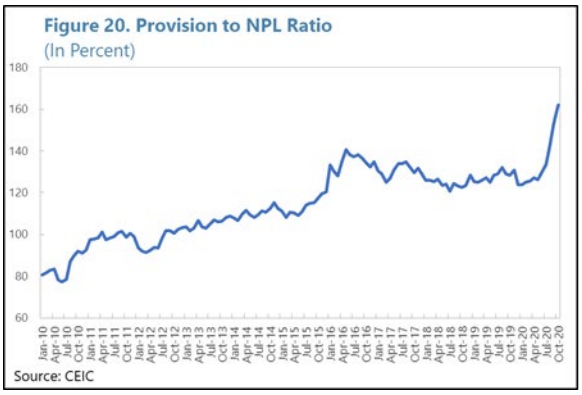

**10. Against this backdrop, banks imposed stricter lending standards to new loans to household and firms since the social unrest in 2019.** According to the Central Bank's Financial Stability Report 2020H2, FOGAPE-COVID was allocated to firms with low historical delinquency ratios that had an important drop in sales and were able to recover faster. Although the FOGAPE-COVID line gave banks incentives to approve loans to SMEs which mostly rely on bank loans for

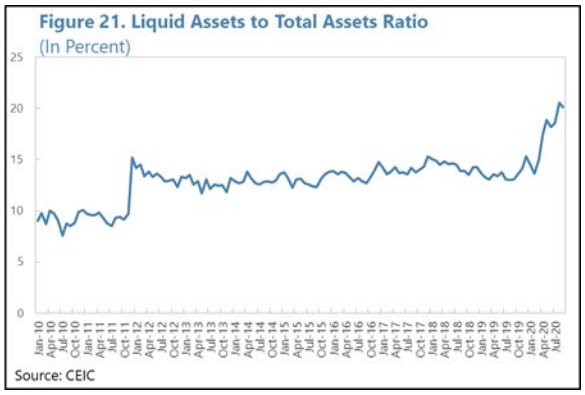
funding, their lending standards were much tighter than previous years. In part, banks' incentives to lend to SME were constrained by the deductible in FOGAPE loans and the low cap for the interest rate.




**11. Banks have also taken precautionary measures to minimize the adverse effect from the potential deterioration of asset quality.** Banks have increased provisions more than 1.6 times of NPL to address credit risks, expecting higher NPL ratio in the future. They also have reduced the lines of credit from riskier clients. The liquid asset to total asset ratio is at the historically highest level, 20.5% as of Sep. 2020. According to the Central Bank's stress test, published in their Financial Stability Report 2020H2, the banking system is well capitalzed even in the stressed scenario.




**12. Authorities have taken actions to facilitate firms access to market finance.** Several regulatory changes where introduced to expedite the authorization process for firms issuing bonds and commercial paper, while at the same time authorities eased restrictions on private debt placements. Legal changes were also introduced to expedite the issuance of convertible debt so as to facilitate debt restructuring processes.

**13. The authorities needs to continue their sounds monitoring and supervision efforts to mitigate the concerns on the medium-term risks.** The recent introduction of the refinancing scheme (FCIC3), FOGAPE-Reporgramacion and FOGAPE-Reactiva are expected to alleviate firms' financial burdens, by allowing them to rollover obligations. The bank stress testing helps

authorities to monitor the system's vulnerability in various adverse scenario. The scheduled implementation of the Basel III standards in the end of 2021 will enhance the resiliance of the banking system. Careful vigilance and supervision will be essential to contain financial sector risks going forward.

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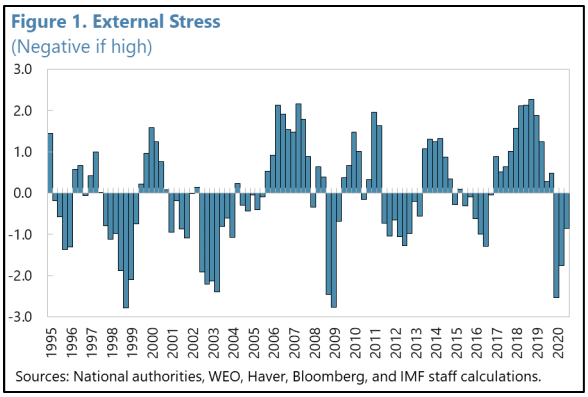
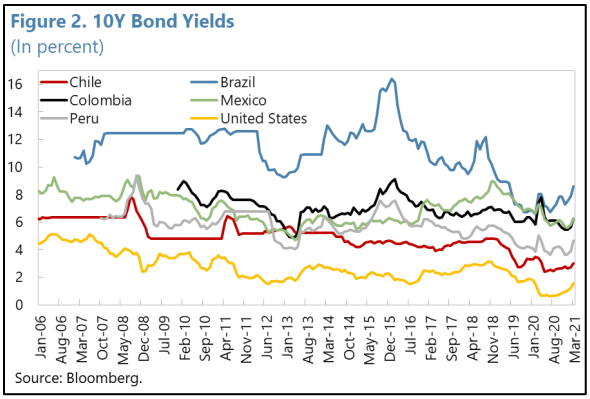
# ASSET PRICES AND CAPITAL FLOWS DURING THE COVID-19 PANDEMIC[1]

*Despite intense external stress and global financial turmoil, the exchange rate was allowed to act as shock absorber and Chilean asset markets rebounded steadily—especially the currency—reaffirming the resilience of the financial sector. Non-residents were net sellers of Chilean assets, and these flows were offset by residents' repatriation of foreign assets, helping to stabilize net capital flows, and illustrating the role of large domestic institutional investors in local securities markets. There are no clear indications that the substantial liquidity support caused asset price bubbles. Indeed, except for the currency which ended 2020 stronger than it started (buoyed by copper prices), asset prices remain somewhat subdued: bond yields recovered across the term structure and the slope of the yield curve steepened; the stock market quickly recovered much of the abrupt losses of March 2020, but remains about 20 percent below its early early-2020 market capitalization; and the ratio of housing prices to income has been relatively stable.*

## A. External shock

**1. A microbe forced much of the globe into lockdown in 2020: economic activity halted; financing conditions tightened.** World economic activity collapsed in the second quarter of 2020, pushing commodity prices down; risk aversion spiked, prompting capital outflows from emerging markets. The text chart shows the evolution of a compact measure of external stress faced by the Chilean economy, capturing risks to exports, the copper industry, foreign direct investment, and global financing—see IMF (2020). The Covid-19 pandemic, and the response to it, led to a level of external economic pressure on Chile unseen since (and comparable to) the global financial crisis of 2008. The initial market response was fierce, reflecting the extraordinary level of uncertainty.




**2. The macroeconomic policy response was fast and extensive** (see Annex I of the Chile 2021 Article IV staff report for details). The central bank of Chile cut the policy rate to what it regards as the effective lower bound of 0.5 percent, introduced funding-for-lending facilities and asset purchases programs, increased

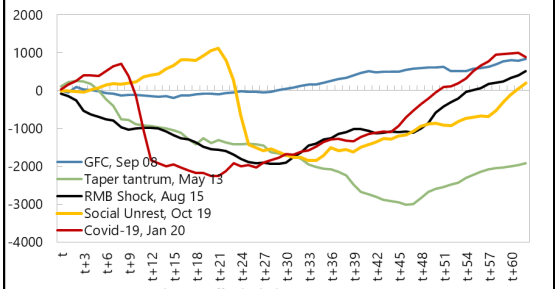
[1] Prepared by Shakill Hassan and Ivan Burgara.

the set of currencies eligible for the maintenance of FX reserve requirements, and expanded the set of securities admissible as collateral in repo transactions. Fiscal measures have been providing a multi-year additional stimulus of about US$28bn (11 percent of GDP). Financial regulation also was adapted to support credit flow. The domestic policy response was reinforced by the stabilizing effect of policy measures in advanced economies.

## B. Capital Flows

**3. Non-residents sold Chilean securities promptly.** The onset of the Covid-19 pandemic triggered rapid capital outflows, as in other emerging markets. Following large FDI and portfolio debt inflows in January, non-residents were net sellers of Chilean assets between February and March—debt and derivative securities in particular. The pace slowed in April, but non-residents were cumulatively net sellers of Chilean assets for the year 2020, for the first time in a decade, to the tune of US$7.2bn. Gross inflows, i.e., net purchases of Chilean assets by non-residents, were equal to US$13.8bn in 2019, and US$18.3bn on average over the past decade.

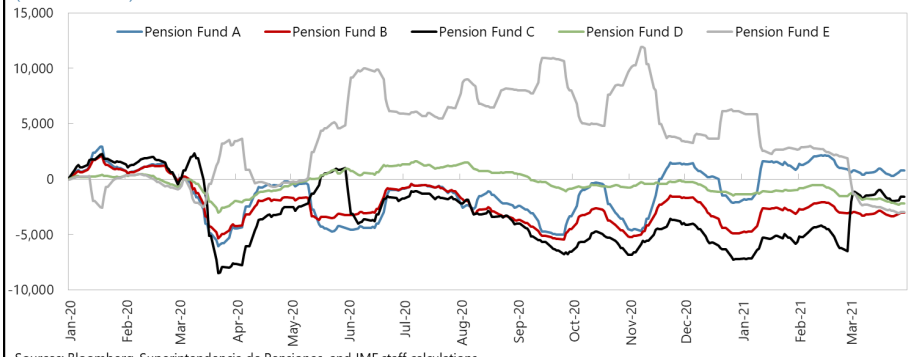
**Figure 3. Cumulative Total Portfolio Flows in Weeks**
(In US$ Millions)




Source: EPFR, Haver, and IMF staff calculations.

**4. The negative gross inflows were however offset by residents' repatriation of foreign assets.** Gross outflows (i.e., net purchases of foreign assets by residents) spiked in January 2020, as residents increased sharply their holdings of portfolio securities and deposits abroad, in the aftermath of social unrest in late 2019 to early 2020. These were however followed by net repatriation of funds between February and March 2020, as fund managers shifted their asset allocation from foreign assets to low risk domestic assets. Indeed, repatriation by pension funds during March 2020 was approximately equal to the sum of pension fund outflows between January and February 2020. Cumulatively for 2020, gross outflows were minus US$7.1bn: residents, including pension and some sovereign funds, were net sellers of foreign assets, particularly equities and debt securities held abroad. The resulting increased holdings of safe domestic assets in funds' portfolios helped ensure availability of liquid resources to meet demand for pension withdrawals, approved as part of the exceptional measures in response to Covid-19. The tendency by resident investors to repatriate foreign assets when non-residents exit local markets, which were closely matched 2020, acted as a stabilizer, alleviating the need for external buffers.

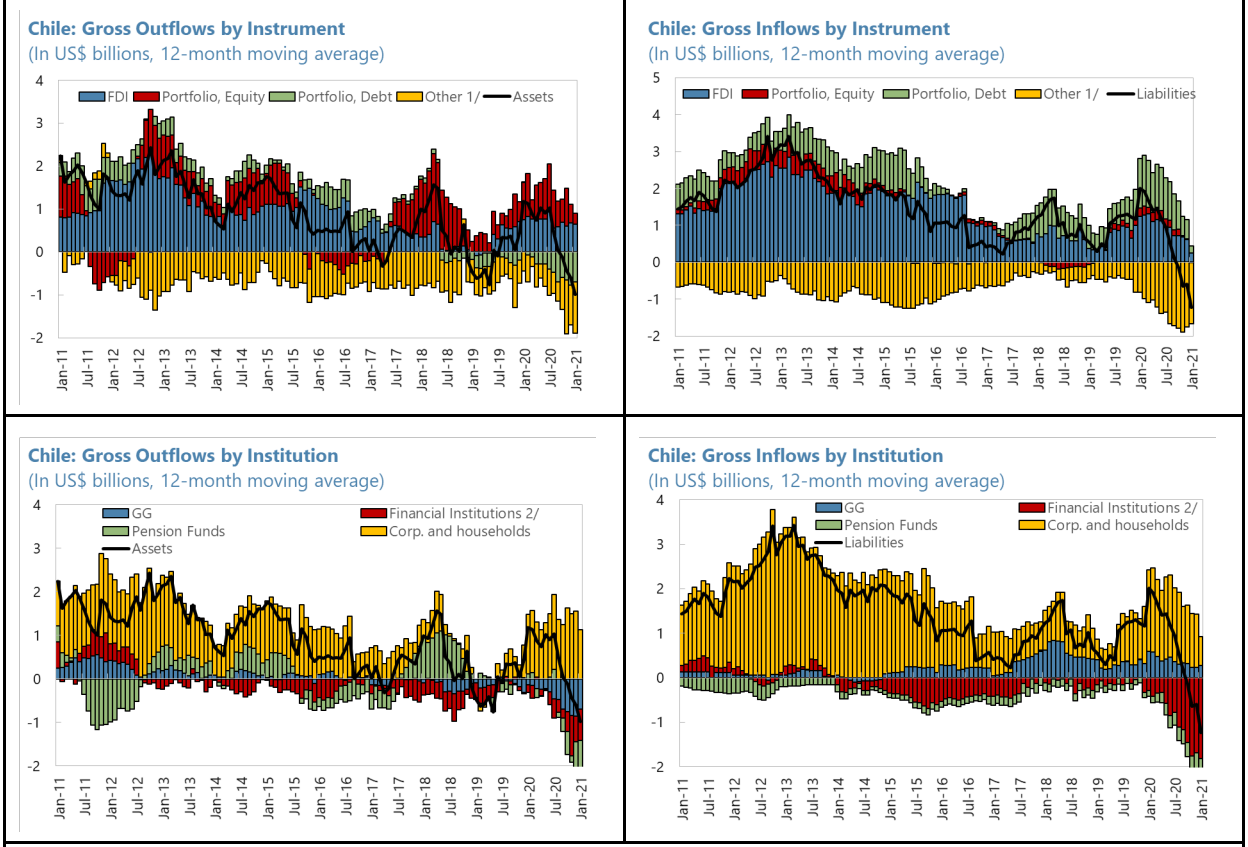
**Figure 4. A.F.P. Total Cumulative Flows 1/ 2/**
(In CLP billions)




Sources: Bloomberg, Superintendencia de Pensiones, and IMF staff calculations.
1/ Pension funds range from riskier foreign assets (Pension A) to safer domestic assets (Pension E).
2/ Excludes A.F.P. Uno.

**5. The net result of capital allocation decisions by residents and foreigners was a balanced financial account.** The financial account of the balance of payments is close to zero for the year (US$80m in net outflows), compared to US$8.5bn of net inflows in 2019.

**Figure 5. Capital Flows**
Financial account flows in US$ billions, 12-month moving average

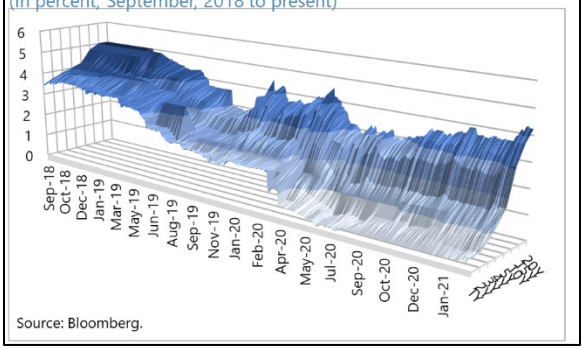



Sources: Central Bank of Chile and IMF staff calculations.
1/ Other includes: financial derivatives, reserve assets, and other investment for assets; financial derivatives and other investment for liabilities.
2/ Financial institutions includes: Central Bank of Chile, private banks, and other financial instiutions.

## C. Asset Prices

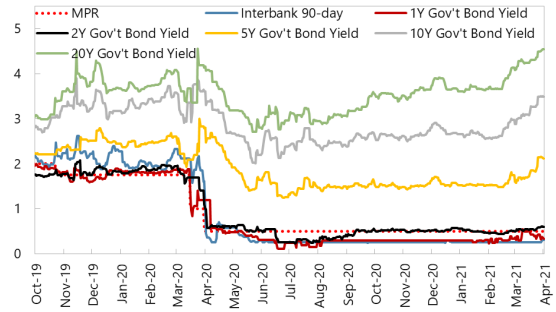
**6. Bonds.** The sudden stop and negative gross inflows between February and March 2020 were largely concentrated in portfolio debt securities, as non-resident investors exited the bond market. (Non-residents' share in government securities holdings fell from about 18 to 13 percent between March and May 2020.) This drove bond prices down and yields up, especially along the medium- and long-term segments of the yield curve. In addition to the ample liquidity measures

**Figure 6. Government Bond Yield Curve Evolution**
(In percent; September, 2018 to present)



by the central bank (see Box 2 and Annex I of Chile 2021 Article IV staff report), the Treasury aligned its debt issuance with the fluid market developments. First, it reduced the maturity of peso-denominated securities issued domestically, in response to lower investor demand for long maturities (the drop in demand was in part due to pension funds' need for liquidity, following the pension withdrawals). Second, it tapped the international markets, moving slightly away from the long-term practice of keeping external bond issuance to one-fifth of total (towards 23 percent), which helped preserve space for private sector issuers in the domestic fixed-income market. Third, it issued also at the short end of the curve, taking advantage of the temporarily low rates.[2] The combination of market developments—including spillovers from US monetary policy to domestic long-term yields—and monetary and fiscal policy actions, contributed to lower short-term rates, but the yield curve steepened.

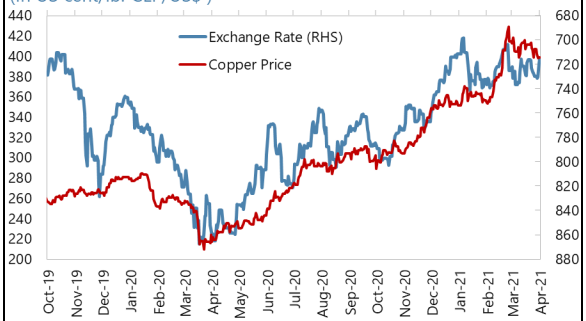
**Figure 7. Interbank Rate and Bond Yields, Chilean Peso**
(In percent)




Source: Bloomberg.

**7. Currency.** The peso recovered steadily from the Covid-19 shock, buoyed by a vigorous rebound in copper prices. This is consistent with the weight of copper exports in Chile's merchandise trade, and with its effect on the expected path of interest rates (through the effect of copper prices on output, e.g., Spilimbergo, 1999). This occurred despite the absence of official intervention in the spot FX market, and very limited intervention through derivatives (essentially an extension of the terms of FX forwards and swaps used in response to the social upheaval that preceded the pandemic—see FX Intervention and Liquidity Programs, p. 48). Despite high short-term currency volatility, the market remained functional, obviating the need for intervention given the authorities commitment to a fully flexible exchange rate.

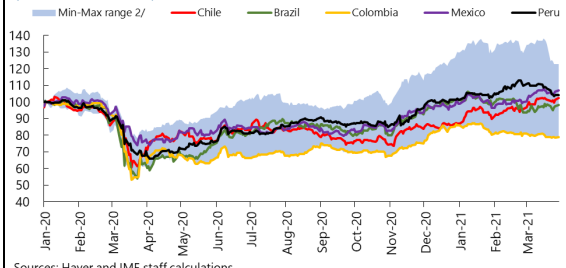
**Figure 8. US$ Exchange Rate and Copper Price**
(In US cent/lb. CLP/US$ )




Source: Bloomberg.

**8. Equities.** The stock market, which was already subdued since the beginning of 2020, fell sharply in March, along global markets, amid the peak of Covid-19 uncertainty, which triggered a

**Figure 9. Domestic Equity Indices 1/**
(Jan 03, 2020=100)

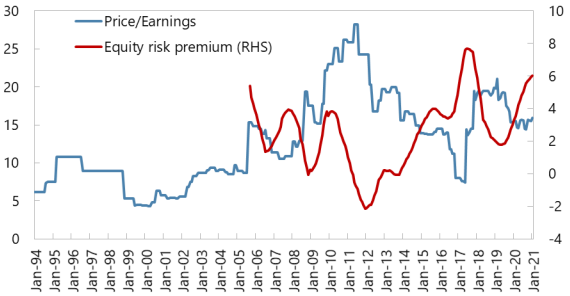



Sources: Haver and IMF staff calculations.
1/ Selected sample of emerging market countries including Brazil, Chile, Colombia, Mexico, Peru, Uruguay, Czech Republic, Croatia, Hungary, Poland, Russia, Turkey, India, Indonesia, Malaysia, Philippines, Thailand and Vietnam.
2/ National benchmark share price indices.

[2] On May 5, 2020, the Treasury issued 1.46 billion in US$ denominated bonds at 2.45% with subscription exceeding 5.7 times the intended allotment. The results indicate ample access to international market at favorable terms for the sovereign. On the domestic market, the treasury issued US$ 3.7 billion of bonds and bills with an average maturity in 2023 and US$ 1.4 billion of inflation-linked bonds with average maturity in 2021.

sharp increase in global risk aversion and the rebalancing of portfolios towards safe haven assets (cash in particular). The stock market lost approximately one-third of its value within two weeks in March. The fast policy response allowed a relaxation of domestic financing conditions (along with the global ones). As a consequence, the stock market recovered partially from April 2020. By May, the local bourse was about 20 percent below its level in the beginning of the year, and it has broadly remained there, despite the copper price boom—the largest copper mining operations in Chile are owned by foreign-listed entities or fully owned by the state; this characteristic of the Chilean economy limits the direct effect of copper prices on the market capitalization of the local stock market. As with other major asset classes, there are no obvious indications of an asset price bubble in Chile's stock market. Despite extensive liquidity support, the price-earnings ratio is close to its long-term average.

**Figure 10. Stock Market Price-Earnings Ratio & Equity Risk Premium**

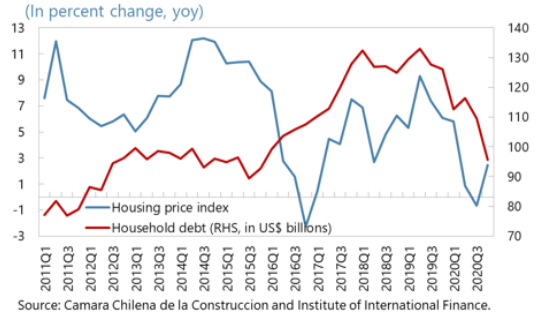



Source: Refinitiv Datastream.

**9. Housing.** There are no obvious signs of an incipient housing bubble in response to the ample liquidity support. The rate of growth of housing prices has been moderate; household indebtedness has been falling; the ratio of residential housing prices to income has been relatively stable and is now among the lowest in the region.

**Figure 11. Real Residential Price Index and Household Debt**

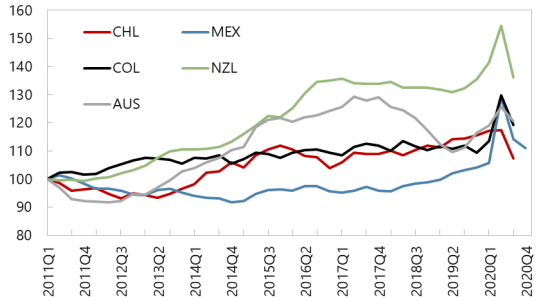
(In percent change, yoy)




Source: Camara Chilena de la Construccion and Institute of International Finance.

**Figure 12. Residential Price-to-Income Ratios**

(2011Q1=100)




Sources: National authorities, Central Bank of Chile, and Haver.

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# POVERTY AND DISTRIBUTIONAL IMPACTS OF THE COVID-19 PANDEMIC IN CHILE[1]

*Chile reported its first confirmed COVID-19 case on March 3, 2020. Since then, the economic contraction caused by the COVID-19 pandemic has significantly impacted household welfare. This note presents microsimulation estimates of the short-term impacts of the COVID-19 pandemic on income-based poverty and inequality. The microsimulation model accounts for labor and non-labor income shocks during the pandemic and assesses the effectiveness of selected social protection measures implemented by the government to mitigate the impacts of the pandemic. The results suggest that social protection measures have cushioned the very worst effects of the crisis on household income. In 2020, both the estimated share of the population living on an income of less than US$5.5 a day and the level of income inequality are expected to have remained stable. However, female-headed, vulnerable, and lower middle-class households experienced a downward slide in income. The expected labor market recovery will reduce poverty rates, although it is not yet clear whether the incomes of the vulnerable and lower middle class will return to pre-pandemic levels in 2021. The findings underline the need to ensure the sustainability of government transfers, especially to support vulnerable groups with limited options to return to the labor market.*

## A. Introduction

**1. The coronavirus pandemic has significantly impacted the Chilean economy and household welfare**. Lockdowns, mobility restrictions, and social distancing measures implemented to contain the spread of the virus led to substantial job losses. Data from Chile's National Statistical Office (INE) show that over one million jobs were lost in 2020, especially in the commerce, agriculture, and hospitality sectors[2]. Further, data from the Social COVID-19 Survey[3] show that almost 60 percent of households experienced declines in total household income at the beginning of the pandemic[4].

**2. The pandemic has deepened pre-existing inequalities as already vulnerable or disadvantaged groups have been affected most**. Data from high-frequency phone surveys conducted by the World Bank to monitor households' socio-economic situation in the context of the

[1] This Selected Issues Paper was written by Trinidad Saavedra and Jacobus de Hoop of the World Bank. The paper was prepared as background documentation for the IMF Article IV consultation in Chile. It is based on the information available at the time it was completed on March 10, 2021. The authors gratefully acknowledge suggestions received from colleagues in the World Bank, the IMF, and Chile's Ministerio de Hacienda.

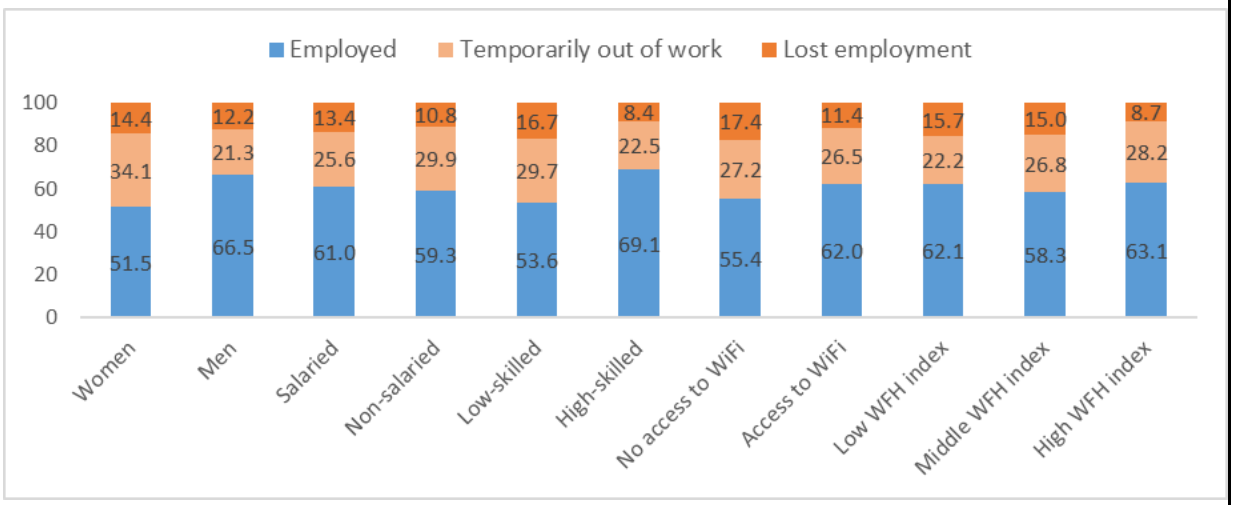
[2] https://www.ine.cl/docs/default-source/ocupacion-y-desocupacion/boletines/2020/pa%C3%ADs/bolet%C3%ADn-empleo-nacional-trimestre-m%C3%B3vil-octubre-noviembre-diciembre-2020.pdf?sfvrsn=32560e06_4

[3] The survey was conducted jointly by Chile's National Statistics Office (INE), the Ministry of Social Development and Family, and the United Nations Development Programme to monitor the socio-economic situation in the context of the pandemic.

[4] http://observatorio.ministeriodesarrollosocial.gob.cl/vizdata/covid19/empleo-e-ingresos.html

pandemic[5] show that job losses have disproportionately affected women, low-skilled workers, and those unable to work from home due to lacking internet access or occupations that are not amenable to working from home. Moreover, data from the Social Covid-19 Survey show that female-headed households and households at the bottom of the income distribution experienced higher income reductions than male-headed households and households at the top of the income distribution.

**Figure 1. Labor Force Status of Population 18+ Employed Before the Onset of the Crisis**



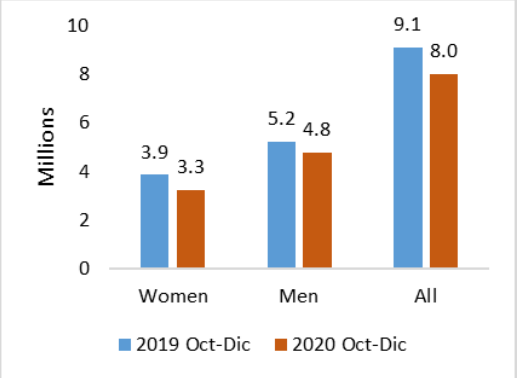

Source: World Bank High Frequency Phone Survey, Chile, round 3 (August 2020).
Note: (1) Salaried refers to salaried workers in either public or private institutions, while non-salaried refers to self-employed workers or unpaid family workers. (2) Low-skilled refers to workers with less than tertiary education and high-skilled to workers with tertiary education or above. (3) WFH refers to amenability to work from home. Details about how the index is calculated can be found in the following link: https://openknowledge.worldbank.org/handle/10986/33753

**3. Women have been especially heavily affected by the crisis.** Sectors employing predominantly women have been hit the hardest, and consequently, women accounted for 57 percent of job losses in 2020. Indeed, female labor force participation decreased by 7.4 percentage points in 2020 from 52.7 to 45.3, *undoing more than a decade of growth in women's labor force participation*[6]. Also, women experienced a significant burden on their time due to child-care obligations, domestic work, and parenting during school closures and virtual schooling. These developments have potential long-term implications for working time and there is a risk that they lead to a permanent exit from the labor market.

[5] https://www.worldbank.org/en/data/interactive/2020/11/11/covid-19-high-frequency-monitoring-dashboard

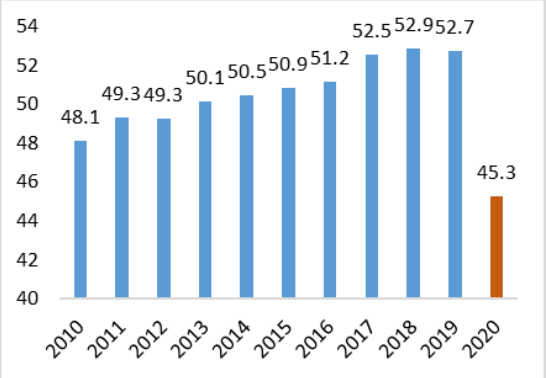
[6] Male labor force participation decreased by 5.3 percentage points in 2020 from 73.8 percent to 68.5 percent.

**Figure 2. Employment (millions), Years 2019–2020**




Source: National Statistical Office (INE)

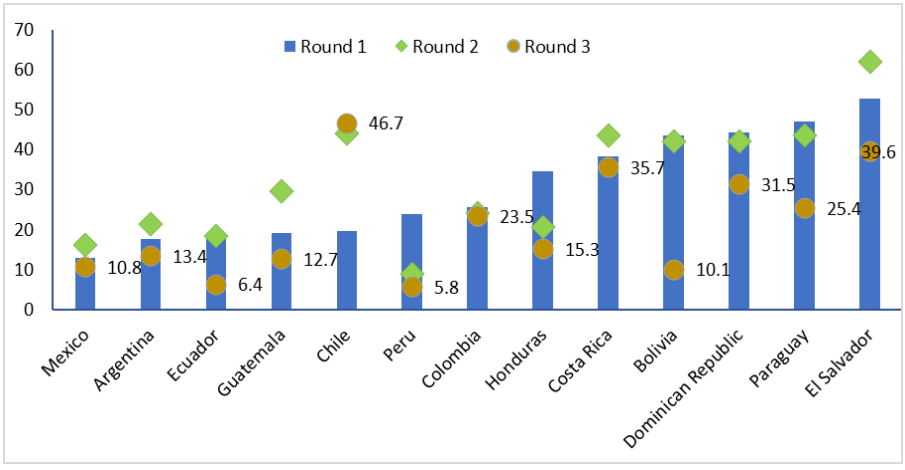
**Figure 3. Female Labor Force Participation, Years 2010–2020**




Source: National Statistical Office (INE). Note: Figures for each year corresponds to October-December mobile quarter

**4. The Chilean government implemented a wide range of policy measures to help households and firms overcome the crisis.** The government's response to the pandemic included measures to support employment and firms' liquidity (enhanced subsidies and unemployment benefits, tax deferrals, and liquidity provision to SMEs), programs targeted to the most vulnerable population with little or no formal income (direct cash and in-kind transfers), and programs targeted to the middle class suffering severe income losses (soft loans from the treasury, mortgage payment delays, subsidies for rentals, and direct cash transfers). Data from the high-frequency surveys conducted by the World Bank show that Chile is among the countries in the region that increased public transfers targeted to individuals and households the most during the pandemic. Around 46.7 percent of surveyed households in the third round of the World Bank's high-frequency phone survey in August reported having received either direct in-kind or cash transfers.[7]

**Figure 4. Percentage of Households that Received Direct In-kind or Cash Transfers**




Source: World Bank High Frequency Phone Surveys, rounds 1-3. In Chile, round 1 was conducted during May and June 2020, round 2 during June and July 2020, and round 3 during August 2020.

[7] The large increase in the percentage of Chilean households indicating that they receive benefits from round 1 to round 2 is explained by the expansion of in-kind transfers (canastas de alimentos) and increased coverage of the Emergency Family Income to the 80 percent most vulnerable in the Household Social Registry.

**5. The World Bank developed a microsimulation model to track the evolution of household welfare during the pandemic.** This article presents the findings of the model. It describes how income poverty and income inequality are expected to have changed because of increased unemployment, reduced wages, and changes in non-labor income. And it provides insight into the governments' social protection measures and the extent to which they mitigated the impacts of the crisis on poverty and inequality. As the analysis focuses on income poverty, the article does not discuss pension withdrawals and how they may have affected contemporaneous consumption poverty. The article ends with a few reflections and recommendations.

## B. Data and methodology

**6. The distributional impacts of the pandemic on household welfare were simulated using a combination of different sources of data.** The latest round of Chile's representative national socioeconomic survey – known as "Encuesta de Caracterización Socioeconómica" (CASEN) – formed the cornerstone of the analysis. The CASEN is administered by the Ministry of Social Development and Family and provides information on a wide range of topics, such as income, education, health, labor markets, housing, and social cohesion[8]. In addition, data from Chile's Labor Force Survey – known as "*Encuesta Nacional de Empleo*" (ENE) – administrated by the National Statistical Office were used to estimate the evolution of labor force participation during the pandemic. These micro-data were also combined with macro-economic projections on non-labor income shocks and information on policy measures implemented by the government.

**7. The microsimulation model examines how sectoral employment shocks are expected to have affected households in 2020.** This section briefly summarizes the steps involved in the implementation of the microsimulations. A more detailed description of the simulation model can be found in Appendix 1. Sectoral employment shocks were calculated based on Labor Force Survey data. The microsimulation model then estimates how individual workers (in the CASEN data) are likely to have been affected by employment shocks (i.e. whether they lost their employment). Subsequently, the model calculates how household income was affected by these employment losses, as well as reductions in earnings for workers who kept their employment, unemployment insurance payments, and changes in non-labor income. Finally, the model estimates how social protection mitigation measures implemented by the government affected household income. The resulting household income estimates are used to explore how COVID-19 affected income poverty and inequality and the extent to which mitigation efforts helped to offset the negative effects of the crisis.

[8] More details on the survey can be found on the following website: http://observatorio.ministeriodesarrollosocial.gob.cl/encuesta-casen

**Summary of The Steps Involved in the Microsimulation Model**

| Inputs | Model | Household income: COVID-19 | Household income: COVID-19 + mitigation |
|---|---|---|---|
| •Labor Force Survey data are used to estimate sectoral employment changes<br>•Macroeconomic projections of growth in income from remittances are used to estimate non-labor income shocks | •CASEN microdata are used to identify workers who are more likely to lose their jobs in line with sectoral employment changes | •For workers who lost their jobs, earnings from January, February, and mid-March are preserved<br>•Unemployment insurance payments are added for formal workers who qualified<br>•For workers who remained employed, assumptions on earnings losses are made<br>•Changes in non-labor income are taken into account | •Goverment measures targeted to individuals and households are included (see Diagram 2 for information on included measures) |

**8. The model accounts for a wide range of social protection measures targeted to individuals and households**. These include the Minimum Wage Guarantee[9] (*Ingreso Mínimo Garantizado*), the COVID benefit (*Bono COVID*), the Employment Protection Law (*Ley de Protección de Empleo*), the Emergency Family Income benefit (*Ingreso Familiar de Emergencia*), the middle-class benefit (*Bono COVID para la Clase Media*), and cthe Christmas COVID benefit (*Bono COVID Navidad*). Appendix 2 provides a more detailed discussion of these policy measures. The model can be used to determine which of these measures had the largest effect on poverty. Pension withdrawals are not included as part of the social protection measures simulated in the model. This is because the model simulates and examines *income* poverty, while pension withdrawals are a dissaving, similar to what would occur if households decided to sell valuable items or extract savings from other savings instruments. Indirect effects of the withdrawals are captured through a boost in sector growth rates [10].

[9] The Minimum Wage Guarantee was not implemented in response to the COVID-19 pandemic. Rather it was conceived in response to the social unrest that occurred in October 2019. However, we include this policy as part of the COVID19-response package since the payments started in May 2020.

[10] Of course, the pension withdrawals may have allowed households to maintain consumption levels and hence lowered contemporaneous *consumption poverty*. However, the microsimulation model is not used to project consumption poverty.

**Summary of the Social Protection Measures Included in the Microsimulation Model**

| | |
|---|---|
| Minimun Wage Guarantee (IMG) | •Targeted to formal employees with monthly gross salaries below $384,363 CLP and working hours of more than 30 hours up to 45 hours a week |
| COVID-19 benefit (BC) | •Targeted to beneficiaries of the Single-Family Subsidy, households that belong to the program Chile Securities and Opportunities, and the 60 percent most vulnerable households according to the Household Social Registry that have no formal income or pensions |
| Employment Protection Law (EPL) | •Targeted to formal workers affiliated to the Administrator of Unemployment Funds (AFC) and that fullfil eligibility criteria |
| Emergency Family Income (EFI) | •Targeted to the 80 percent most vulnerable households according to the Household Social Registry that have little or no formal income |
| Middle-class benefit (BCM) | •Targeted to middle-class workers suffering severe income losses due to the pandemic (at least 30 percent of income reductions) |
| Christmas COVID-19 benefit (BN) | •Targeted to families who were eligible to receive the last payment of the Emergency Family Income (IFE). |

Source: https://proteccionsocial.gob.cl/beneficios/covid https://www.chileatiende.gob.cl/fichas/84832-bono-covid-navidad#:~:text=El%20monto%20ser%C3%A1%20de%20%2455.000,24%20al%2030%20de%20noviembre).

**9. As in any simulation model, the validity of the estimates is critically dependent on the accuracy of the assumptions underlying the model**. The microsimulations for 2020 are limited to short-term static monetary effects of COVID-19. Behavioral responses and general-equilibrium effects are not incorporated. The microsimulations do not incorporate other effects that will likely result in longer-term economic impacts, including population health shocks, foregone human capital accumulation, or risks to gender equality in the context of lockdowns. Poverty and inequality are calculated as annual indicators, which do not capture temporary but important cases of impoverishment. The model relies on assumptions related to earnings losses for workers who preserved their jobs and related to exclusion errors in the implementation of the policy measures. Appendix 3. presents sensitivity checks and shows that the poverty estimates presented in this note are fairly robust to changes in the modeling assumptions.

## C. Results

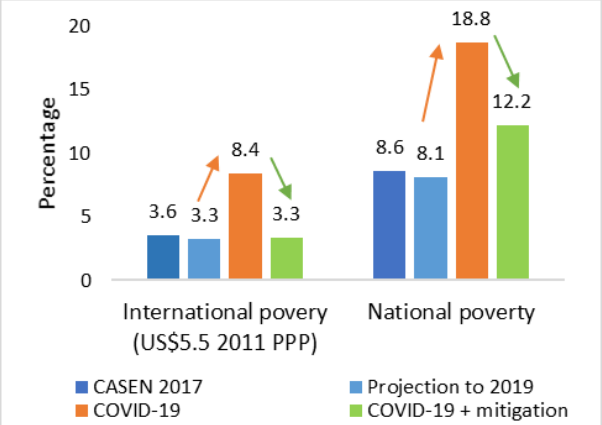
**10. Poverty rates would have increased dramatically in the absence of mitigation policies.** This holds both for poverty as measured against the international poverty line and for poverty as measured in accordance with Chile's national poverty definition. In the 2019 calendar year[11],

[11] The analysis shows annual results only. Hence, the 2019 benchmark covers the full calendar year, including the months before, during and after the social unrest and protests.

3.3 percent of Chileans had an income below the international poverty line of US$5.5 per day in 2011 PPP. Estimates from the microsimulation model show that this figure would have increased by 5.2 percentage points to 8.4 percent in 2020 in the absence of social protection measures, implying that around nearly one million people would have fallen into poverty according to this metric. The national poverty rate[12] – based on equivalized income and a more ambitious poverty line – would have increased by 10.6 percentage points, from 8.1 percent in 2019 to 18.8 percent in 2020 in the absence of mitigation measures. In other terms, about 2.0 million people would have been pushed into poverty as measured according to Chile's national definition. Further, income inequality measured by the GINI index would have increased from 44.5 percent in 2019 to 46.5 percent in 2020.

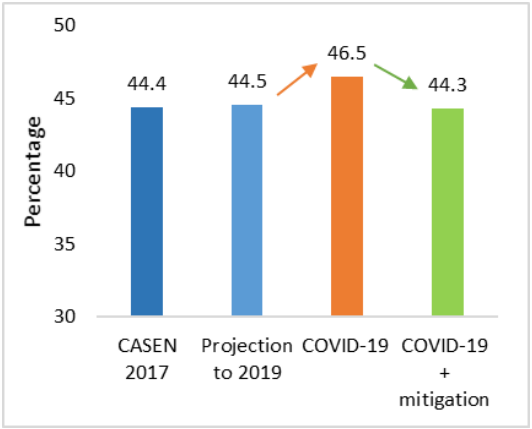
**11. Although social protection programs helped to offset the very worst effects of the COVID-19 crisis, they did not prevent a downward slide in incomes of the vulnerable and lower-middle-class**. Once social protection programs are accounted for, the share of the population living on less than US$5.5 per day is expected to have remained stable at 3.3 percent. Inequality is also expected to have remained effectively unchanged in 2020. As shown in Appendix 3, the offsetting effect of the social protection mitigation measures in Chile appears to be strong when compared to selected other countries in the region. Nonetheless, a slide in income among the vulnerable and lower- middle-class was not prevented by the social protection measures. As a result, poverty as measured against the national definition is expected to have increased by 4.1 percentage points, from 8.1 to 12.2 percent. About 780 thousand people are expected to have fallen into poverty.

**Figure 5. Poverty Estimates During the COVID-19 Pandemic**




Source: Microsimulation model based on CASEN 2017, Labor Force Survey 2019-2020, and World Bank's macroeconomic projections

**Figure 6. Gini Coefficient During the COVID-19 Pandemic**

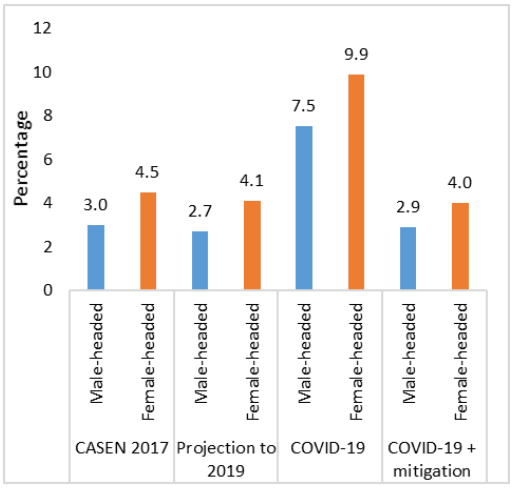



Source: Microsimulation model based on CASEN 2017, Labor Force Survey 2019-2020, and World Bank's macroeconomic projections

[12] National poverty is defined as the percentage of the population with an equivalized income below the national poverty line. The national poverty line is calculated as the minimum income necessary to satisfy a set of basic needs, based on consumption patterns observed in the population. It allows for comparisons over time but not across countries.

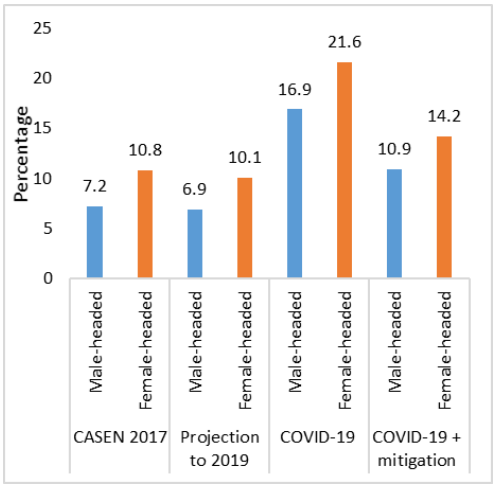
**12. Female-headed households were especially harmed by the crisis.** In 2019, prior to the COVID-19 outbreak, both the international and national poverty rates were already higher for individuals living in female-headed households than for individuals living in male-headed households. The simulations suggest that, in the absence of mitigation measures, in 2020 the international and national poverty rate would respectively have increased to 9.9 and 21.6 percent in female-headed households. With social protection measures, these poverty rates increased to 4.0 and 14.2 percent respectively. Although the social protection measures dampened the effect of the crisis, poverty in female-headed households remained well above that in male-headed households (2.9 and 10.9 percent respectively).

**Figure 7. Gendered Effects of the COVID-19 Pandemic on International Poverty**
($5.5 USD 2011 PPP)




Source: Microsimulation model based on CASEN 2017, Labor Force Survey 2019-2020, and World Bank's macroeconomic projections

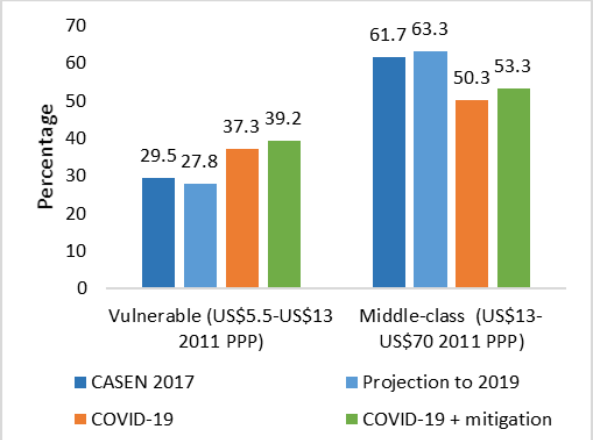
**Figure 8. Gendered Effects of the COVID-19 Pandemic on National Poverty**




Source: Microsimulation model based on CASEN 2017, Labor Force Survey 2019-2020, and World Bank's macroeconomic projections

**13. An important share of the population is expected to have experienced downward mobility**. The pandemic has interrupted a long period of growth in Chile's middle class. Chile's vulnerable population – defined as the population with daily per capita income between US$ 5.5 and US$13 in 2011 PPP – is expected to have increased from 27.8 to 39.2 percent. Chile's middle-class – defined as the percentage of the population with daily per capita income between US$13 and US$70 in 2011 PPP – is expected to have contracted from 63.3 to 53.3 percent. In other words, the income of almost 19 percent of the pre-pandemic middle-class – around 2.3 million people – is expected to have fallen below the vulnerability threshold (US$13) or even the international poverty threshold (US$5.5). Nearly 2.8 million people – about 15 percent of the population – are expected to have experienced downward mobility.

**Figure 9. Poverty Estimates During the COVID-19 Pandemic**




Source: Microsimulation model based on CASEN 2017, Labor Force Survey 2019–2020, and World Bank's macroeconomic projections

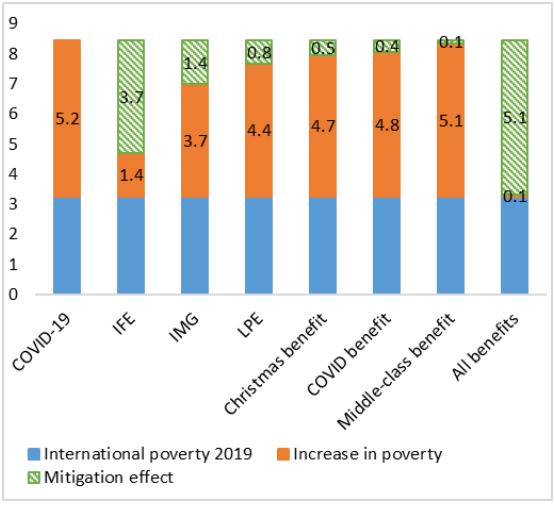
**Table 1. Transitions Across Income Classes**

| | | COVID-19 + mitigation | | | | |
|---|---|---|---|---|---|---|
| | | Poor (<$5.5 USD 2011 PPP) | Vulnerable ($5.5-$13 USD 2011 PPP) | Middle-class ($13-$70 USD 2011 PPP) | Upper-class (>$70 USD 2011 PPP) | Total |
| Panel A. Transitions as a percentage of the population in each income class before the pandemic | | | | | | |
| Pre-COVID-19 | Poor | **58.6** | 41.4 | 0.0 | 0.0 | 100.0 |
| | Vulnerable | 4.9 | **93.3** | 1.8 | 0.0 | 100.0 |
| | Middle-class | 0.1 | 18.8 | **81.1** | 0.0 | 100.0 |
| | Upper-class | 0.0 | 0.0 | 26.6 | **73.4** | 100.0 |
| | Total | 3.3 | 39.2 | 53.3 | 4.1 | 100.0 |
| Panel B. Transitions in total number of individuals x 1000 | | | | | | |
| Pre-COVID-19 | Poor | **366** | 258 | 0 | 0 | 624 |
| | Vulnerable | 261 | **4,964** | 94 | 0 | 5,319 |
| | Middle-class | 9 | 2,276 | **9,816** | 0 | 12,101 |
| | Upper-class | 0 | 0 | 285 | **786** | 1,072 |
| | Total | 637 | 7,498 | 10,195 | 786 | 19,116 |

Source: Microsimulation model based on CASEN 2017, Labor Force Survey 2019-2020, and World Bank's macroeconomic projections

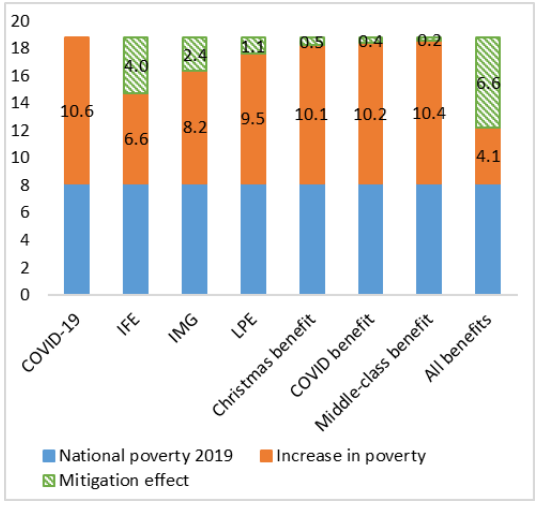
**14. The Emergency Family Income benefit played a particularly important role in limiting the impacts of the crisis on poverty rates.** Figures 10 and 11 show the mitigating effect of the different social protection measures. The simulations suggest that the Emergency Family Income benefit (IFE) was the measure that mitigated the increase in poverty the most, followed by the Minimum Wage Guarantee (IMG) and the Employment Protection Law (LPE). *The IFE offset 71 percent of the total increase in international poverty* (3.7 out 5.2 percentage points of poverty increase), the IMG 27 percent, and the LPE 15 percent. The IFE offset 38 percent of the increase in national poverty, while the IMG and LPE canceled out 23 percent and 10 percent of the increase in national poverty, respectively.

**Figure 10. International Poverty Rate Estimated under COVID-19 and Mitigation Effects of Each Simulated Policy**




Source: Microsimulation model based on CASEN 2017, Labor Force Survey 2019–2020, and World Bank's macroeconomic projections

**Figure 11. National Poverty Rate Estimated under COVID-19 and Mitigation Effects of Each Simulated Policy**




Source: Microsimulation model based on CASEN 2017, Labor Force Survey 2019-2020, and World Bank's macroeconomic projections

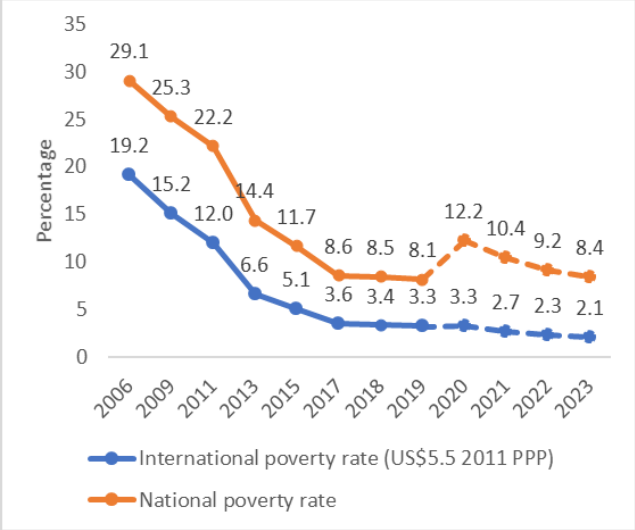
**15. The projected economic recovery is expected to lead to a reduction in poverty rates.** The microsimulation model used in this article cannot be used to forecast poverty rates. However, a sense of the expected trajectory of poverty can be inferred based on the World Bank's macroeconomic projections of per-capita GDP growth for the years 2021, 2022, and 2023. A strong recovery of GDP is expected in 2021 and GDP is expected to continue to grow in the subsequent two years. Assuming neutral distributional effects of GDP growth and a GDP to income pass-through rate of 0.8, the share of the population living on US$5.5 could decrease to 2.7 percent in 2021. However, a full recovery of the incomes of vulnerable and lower-middle-income Chileans is not certain in 2021. Under the same assumptions, the incomes of the vulnerable and the middle class would not yet recover – and national poverty would not revert – to pre-pandemic levels in 2021. Appendix 3 explores sensitivity of these forecasts and examines how poverty rates will develop under a higher pass-through rate. Of course, the development in income poverty in 2021 and beyond will depend on future policy actions and social protection measures, which cannot be accounted for in these projections. These poverty projections thus come with a significant degree of uncertainty.

**Table 2. World Bank Real Per-Capita GDP Growth Projections**

| | 2019 | 2020e | 2021f | 2022f | 2023f |
|---|---|---|---|---|---|
| Real GDP per-capita levels (x1000), LCU constant | 8,188 | 7,635 | 8,011 | 8,273 | 8,479 |
| Real GDP per-capita growth (annual percent), LCU constant | | -6.8 | 4.9 | 3.3 | 2.5 |

Source: World Bank, MTI Global Practice. Notes: e = estimate, f = forecast

**Figure 12. Actual and Projected International and National Poverty Rates**




Source: 2006-2017 CASEN, 2018-2020 microsimulation model based on CASEN 2017, 2021-2022 projections based on World Bank macroeconomic forecasts

## D. Reflections and Policy Implications

**16. Social protection measures are expected to continue to remain critical.** Although rapid economic growth is expected in 2021, the labor market and household incomes may not immediately return to pre-pandemic levels. Hence, continued emphasis on social protection is needed. The analysis showed that the Emergency Family Income benefit did most to offset the effects of COVID-19 on poverty, followed by the Minimum Wage Guarantee, and the Employment Protection Law. Social protection measures, including especially the Emergency Family Income benefits, are considered to remain critical for those who cannot return to employment, to address any setbacks in the recovery from the pandemic, but also for dealing with future macro-economic shocks.

**17. While social protection helped to offset the deepest effects of the economic crisis, vulnerable and lower-middle-income households require further attention.** They experienced a slide in income that was at best partially offset by the social protection measures. The estimates suggest that many have experienced downward economic mobility and that their incomes have not yet fully recovered. As a result, the pandemic has exacerbated the pre-existing inequalities that fueled social unrest prior to the pandemic. In the short term, these groups require special attention in economic recovery measures. The estimates underline the importance of discussing and critically assessing the structural factors that contribute to inequality, vulnerability and shared prosperity as part of the longer-term social policy agenda.

**18. Women were particularly affected by employment losses and must be part of economic re-activation.** Recent notes by the World Bank's Gender Innovation Lab for Latin America and the Caribbean[13] suggest a few avenues and key messages to set a path towards gender equality. In the immediate future, school reopening and availability and access to daycare and childcare are key for many women to be able to return to work. Women who cannot return to the labor market, and their families, will require sustained access to social protection. More fundamental changes will be needed to truly achieve gender parity in labor market outcomes, including more balanced division of caregiving duties and a more equal distribution of occupations by gender.

**19. The reliability of the presented estimates depends on the accuracy of the assumptions underlying the microsimulation model**. Empirical measurement is key to consolidate our understanding of the evolution of poverty and inequality in Chile. At the time of writing, Chile's National Statistics Office (INE) and Ministry of Social Development and Family were in the process of collecting a new round of CASEN data. These data are expected to be released in June of 2021 and will provide accurate insight into the true effect of the COVID-19 pandemic.

[13] http://documents1.worldbank.org/curated/en/675641612934705667/pdf/The-Gendered-Impacts-of-COVID-19-on-Labor-Markets-in-Latin-America-and-the-Caribbean.pdf and https://documents.worldbank.org/en/publication/documents-reports/documentdetail/459121613117667549/diez-mensajes-sobre-covid-19-y-trabajo-femenino-en-chile-impactos-y-desaf%C3%ADos

# Appendix I. Detailed Description of the Microsimulation Model

**1. Updating the CASEN data to reflect the 2019 pre-pandemic situation.** Since the latest round of the CASEN data was collected in 2017, some adjustments were needed. Population weights were adjusted to account for population changes between 2017 and 2019. Income sources were updated to 2019 nominal prices using the Nominal Remuneration Index (NRI) calculated by the National Statistical Office[1].

**2. Estimating the probability of employment by sector.** For individuals 15+ in CASEN data, the probabilities of being employed in a particular sector (disaggregated by formal/informal) were estimated through a multinomial logit model. The dependent variable includes seven mutually exclusive outcomes: employed in the formal agriculture sector, employed in the informal agriculture sector, employed in the formal industry, employed in the informal industry, employed in the formal services, employed in the informal services, and unemployed or inactive. The estimates include the following sociodemographic characteristics as explanatory variables: age, sex, marital status, ethnicity, household head status, within-household dependency rate, educational attainment, proxy of work experience, a dummy for households receiving remittances, and a set of geographic control variables (degree of urbanization and dummies for regions).

**3. Establishing employment changes by sector.** According to data from the Labor Force Survey ("*Encuesta Nacional de Empleo*"), total employment dropped by 11.7 percent in 2020 and over one million jobs were lost. The services sector was especially affected accounting for 60 percent of the total job losses, followed by the formal industry sector, which represented 23 percent. The agriculture sector accounted for 15 percent; however, the informal agriculture sector suffered the highest drop compared to its initial level in 2019 (31.6 percent).

**Table A1.1. Sectoral Employment Growth**

| | Employed (mobile quarter Oct-Dec 2019) | Employed (mobile quarter Oct-Dec 2020) | Employment growth 2019-2020 (percent) | Job losses | Share of jobs losses (percent) |
|---|---|---|---|---|---|
| **Total** | 9,087,132 | 8,026,217 | -11.7 | -1,060,915 | 100 |
| **Formal Agriculture** | 425,775 | 365,626 | -14.1 | -60,149 | 5.7 |
| **Informal Agriculture** | 304,551 | 208,444 | -31.6 | -96,107 | 9.1 |
| **Formal Industry** | 1,498,681 | 1,256,999 | -16.1 | -241,682 | 22.8 |
| **Informal Industry** | 518,435 | 492,229 | -5.1 | -26,205 | 2.5 |
| **Formal Services** | 4,578,125 | 4,238,284 | -7.4 | -339,841 | 32.0 |
| **Informal Services** | 1,761,567 | 1,464,635 | -16.9 | -296,931 | 28.0 |

Source: Labor Force Survey ("*Encuesta Nacional de Empleo*"), mobile quarter Oct-Dic 2019 and 2020
https://stat.ine.cl/Index.aspx?lang=es&SubSessionId=78e0518e-d028-4bf8-8d80-444b7277907c

[1] https://stat.ine.cl/Index.aspx?DataSetCode=IR_IR2016

**4. Ranking workers in terms of their employment probabilities**. Workers in the CASEN data were ranked in terms of the probability of losing their employment, in accordance with the outcomes of the multinomial logit model. For instance, the 7.4 percent of workers in the formal services with the lowest probabilities of being employed were assumed to have lost their jobs[2]. Note that workers in sectors not affected by the pandemic (utilities, public administration and defense, health, and extraterritorial organisms) were assumed to remain in their jobs.

**5. From employment shocks to income shocks.** For workers who lost their jobs, earnings from January, February, and mid-March were unaffected since lockdown measures started in mid-March 2020. Unemployment insurance payments were added for those formal workers who qualified. It is not possible to determine which individuals in the CASEN data are eligible to receive unemployment benefits when they lose their jobs. Instead, the share of formal workers affiliated with the unemployment insurance system and eligible to receive unemployment benefits was calculated using a data sample of unemployment insurance affiliates available on the Pensions Authority ("Superintendencia de Pensiones") website[3]. An identical share of affiliated workers in the CASEN data was randomly classified as eligible to receive insurance payments. Unemployment insurance payment amounts were calculated as a percentage of workers' average monthly salary in the last 12 months in accordance with the Unemployment Insurance Law[4]. Due to the lack of information on individual account balances, workers with a permanent contract were assigned five payments and workers with a fixed-term contract were assigned three payments.

**6. Earnings losses for workers who remained employed**. Almost 55 percent of salaried workers and almost 80 percent of non-salaried workers reported earnings losses in the first round of the World Bank high-frequency phone survey conducted in Chile. To account for these earnings losses, three scenarios were considered. In the scenario presented in the main text, salaried workers were assumed to have suffered an income loss of 30 percent, while non-salaried workers were assumed to have suffered an income loss of 50 percent. Appendix 3 shows estimates for scenarios with lower (10 percent for salaried and 25 percent for non-salaried workers) and higher (50 and 75 percent) income losses.

**7. Accounting for non-labor income shocks.** Shocks to income from remittances and capital and rent were accounted for in the model. According to World Bank macroeconomic projections, remittances dropped by 10.7 percent in 2020. However, this reduction is expected to have little effect on household income as less than one percent of households in CASEN data reported to have received remittances. Income from capital and rent were assumed to be reduced by 20 percent.

**8. Simulating the mitigating effects of targeted government social safety net measures.** To simulate the eligibility criteria of each measure and identify individuals and households that qualified to receive government transfers, administrative data, and information from government websites were used. Chile is known to have high precision in the targeting of its social protection

[2] Since macroeconomic projections of employment changes are not disaggregated by formality, we assume that employment growth in each economic sector is the same for both formal and informal employment.

[3] https://www.spensiones.cl/apps/bdp/index.php

[4] https://www.bcn.cl/leychile/navegar?idNorma=184979

measures.[5] Nonetheless, a modest exclusion error of 10 percent was assumed, for instance, because households may not have requested benefits or may not have been aware of some of the benefits for which they were eligible. Appendix 3 shows estimates also for 0 and 5 percent exclusion error rates.

**9. Estimating poverty and inequality during COVID-19.** First, household income in per-capita terms was calculated after accounting for labor and non-labor income shocks. This new household per-capita income is defined as household income under COVID-19. Then, the mitigation measures were incorporated, and household income per-capita was re-calculated. This household income is defined as COVID-19 plus mitigation. Finally, for both scenarios, COVID-19 and COVID-19 plus mitigation, income-based poverty and inequality indicators are estimated.

**Table A1.2. Regression Coefficients and Robust Standard Errors from the Multinomial Logit Model for Labor Force Status**

| Variables | Formal agriculture | Informal agriculture | Formal industry | Informal industry | Formal services | Informal services |
|---|---|---|---|---|---|---|
| Male | 1.791*** | 2.150*** | 2.597*** | 2.294*** | 0.829*** | 0.648*** |
| | (0.0406) | (0.0475) | (0.0390) | (0.0477) | (0.0235) | (0.0263) |
| Age | 0.242*** | 0.195*** | 0.331*** | 0.285*** | 0.283*** | 0.215*** |
| | (0.00837) | (0.00873) | (0.00707) | (0.00878) | (0.00496) | (0.00508) |
| Age^2 | -0.00308*** | -0.00236*** | -0.00408*** | -0.00325*** | -0.00345*** | -0.00250*** |
| | (9.23e-05) | (9.12e-05) | (7.83e-05) | (9.33e-05) | (5.48e-05) | (5.42e-05) |
| Household head | 1.021*** | 0.958*** | 1.072*** | 0.913*** | 1.104*** | 1.029*** |
| | (0.0449) | (0.0470) | (0.0353) | (0.0438) | (0.0269) | (0.0296) |
| Indigenous | -0.00490 | 0.260*** | 0.211*** | 0.207*** | 0.00986 | 0.0464 |
| | (0.0580) | (0.0553) | (0.0528) | (0.0601) | (0.0381) | (0.0421) |
| Married | -0.0824* | -0.406*** | -0.0528 | -0.306*** | -0.220*** | -0.339*** |
| | (0.0438) | (0.0447) | (0.0341) | (0.0427) | (0.0246) | (0.0281) |
| Enrolled in education | -2.179*** | -1.984*** | -2.178*** | -1.981*** | -1.626*** | -1.408*** |
| | (0.117) | (0.155) | (0.0944) | (0.130) | (0.0567) | (0.0592) |
| Incomplete primary education | 0.765*** | 0.691*** | 1.450*** | 1.017*** | 1.152*** | 0.804*** |
| | (0.266) | (0.120) | (0.182) | (0.270) | (0.145) | (0.101) |
| Complete primary education | 0.728*** | 0.822*** | 1.694*** | 1.399*** | 1.498*** | 0.960*** |
| | (0.265) | (0.121) | (0.181) | (0.270) | (0.144) | (0.101) |
| Incomplete secondary education | 0.477* | 0.269** | 1.765*** | 1.409*** | 1.633*** | 1.024*** |
| | (0.268) | (0.125) | (0.181) | (0.271) | (0.142) | (0.0998) |
| Complete secondary education | 0.389 | 0.0320 | 2.021*** | 1.356*** | 2.339*** | 1.190*** |
| | (0.263) | (0.122) | (0.177) | (0.271) | (0.140) | (0.0983) |
| Incomplete tertiary education | 0.160 | -0.227 | 1.868*** | 1.434*** | 2.642*** | 1.502*** |
| | (0.278) | (0.176) | (0.185) | (0.282) | (0.145) | (0.106) |
| Complete tertiary education | 0.368 | -0.995*** | 2.436*** | 0.326 | 3.359*** | 0.818*** |
| | (0.269) | (0.199) | (0.179) | (0.289) | (0.141) | (0.103) |

[5] https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-6469

**Table A1.2. Regression Coefficients and Robust Standard Errors from the Multinomial Logit Model for Labor Force Status (Continued)**

| Variables | Formal agriculture | Informal agriculture | Formal industry | Informal industry | Formal services | Informal services |
|---|---|---|---|---|---|---|
| Dependency rate | -0.511*** | -0.285*** | -0.148** | 0.0597 | -0.319*** | -0.114** |
| | (0.0757) | (0.0803) | (0.0622) | (0.0776) | (0.0451) | (0.0482) |
| Other household members employed in public sector | 0.549*** | 0.354*** | 0.604*** | 0.513*** | 1.411*** | 0.760*** |
| | (0.0641) | (0.0780) | (0.0460) | (0.0646) | (0.0310) | (0.0401) |
| Household receives remittances | -1.252*** | -1.149*** | -1.172*** | -0.622** | -1.353*** | -0.526* |
| | (0.292) | (0.325) | (0.310) | (0.269) | (0.299) | (0.292) |
| Urban | -0.976*** | -1.573*** | 0.471*** | 0.340*** | 0.559*** | 0.576*** |
| | (0.0401) | (0.0443) | (0.0409) | (0.0473) | (0.0302) | (0.0354) |
| Antofagasta | -2.455*** | -0.565*** | 0.159** | 0.0132 | -0.190*** | -0.453*** |
| | (0.410) | (0.176) | (0.0763) | (0.150) | (0.0587) | (0.0629) |
| Atacama | 0.584*** | 0.189 | 0.161** | -0.0345 | -0.312*** | -0.446*** |
| | (0.206) | (0.155) | (0.0806) | (0.113) | (0.0638) | (0.0749) |
| Coquimbo | 0.679*** | 0.479*** | -0.264*** | -0.325*** | -0.383*** | -0.728*** |
| | (0.189) | (0.128) | (0.0772) | (0.105) | (0.0565) | (0.0612) |
| Valparaíso | 1.153*** | 0.205 | 0.00746 | 0.0730 | -0.0583 | -0.285*** |
| | (0.177) | (0.126) | (0.0693) | (0.0915) | (0.0488) | (0.0515) |
| Lib. Gral. Bdo. O´Higgins | 2.224*** | 0.538*** | 0.0996 | -0.00460 | -0.0855 | -0.658*** |
| | (0.172) | (0.124) | (0.0715) | (0.0967) | (0.0525) | (0.0580) |
| Maule | 2.057*** | 0.856*** | -0.152** | 0.0509 | -0.182*** | -0.519*** |
| | (0.173) | (0.120) | (0.0762) | (0.0980) | (0.0538) | (0.0581) |
| Bío Bío | 0.921*** | -0.0450 | -0.0285 | -0.379*** | -0.230*** | -0.688*** |
| | (0.176) | (0.126) | (0.0673) | (0.100) | (0.0489) | (0.0553) |
| Araucanía | 1.015*** | 0.412*** | -0.296*** | 0.0359 | -0.201*** | -0.460*** |
| | (0.177) | (0.118) | (0.0735) | (0.0924) | (0.0517) | (0.0548) |
| Los Lagos | 1.409*** | 0.555*** | -0.00320 | 0.312*** | 0.0295 | -0.431*** |
| | (0.177) | (0.120) | (0.0761) | (0.0971) | (0.0543) | (0.0596) |
| Aysén | 1.542*** | 0.883*** | -0.0833 | 0.549*** | 0.360*** | -0.0954 |
| | (0.194) | (0.144) | (0.100) | (0.114) | (0.0670) | (0.0735) |
| Magallanes | 1.279*** | 0.283 | 0.181** | 0.270** | 0.223*** | -0.178*** |
| | (0.198) | (0.176) | (0.0827) | (0.110) | (0.0593) | (0.0643) |
| Metropolitana | 0.381** | -0.431*** | 0.309*** | 0.210** | 0.439*** | 0.000477 |
| | (0.181) | (0.133) | (0.0616) | (0.0829) | (0.0448) | (0.0468) |
| Los Ríos | 1.384*** | 0.0778 | -0.129 | 0.228** | -0.0909 | -0.366*** |
| | (0.178) | (0.129) | (0.0808) | (0.100) | (0.0568) | (0.0619) |
| Arica y Parinacota | 0.730*** | 1.038*** | -0.395*** | -0.0119 | -0.434*** | -0.390*** |
| | (0.197) | (0.126) | (0.0837) | (0.109) | (0.0591) | (0.0626) |

**Table A1.2. Regression Coefficients and Robust Standard Errors from the Multinomial Logit Model for Labor Force Status (Concluded)**

| Variables | Formal agriculture | Informal agriculture | Formal industry | Informal industry | Formal services | Informal services |
|---|---|---|---|---|---|---|
| Ñuble | 1.517*** | 0.822*** | -0.315*** | 0.254** | -0.244*** | -0.520*** |
| | (0.182) | (0.127) | (0.0936) | (0.107) | (0.0640) | (0.0689) |
| Constant | -8.347*** | -6.828*** | -11.35*** | -10.69*** | -8.764*** | -6.690*** |
| | (0.354) | (0.256) | (0.251) | (0.349) | (0.184) | (0.160) |
| Observations | 170,953 | 170,953 | 170,953 | 170,953 | 170,953 | 170,953 |

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

# Appendix II. Policy Measures

**1. This appendix provides detailed information on the policy measures included in the microsimulation model**. The government policy package in response to the COVID-19 pandemic included a wide range of policies aimed to help households and firms overcome the crisis. However, the microsimulations only accounts for policy measures targeted to individual and households due to limitations in the micro-data that prevent from accounting for policy measures targeted to firms. This appendix discusses eligibility criteria and payments amounts for each simulated policy measure in 2020. All amounts in the appendix are in Chilean pesos (CLP).

## COVID Benefit (*Bono COVID*)

The COVID benefit was a one-time cash transfer to support the most vulnerable households in the context of the pandemic.

Eligibility criteria and amount received:

a) Beneficiaries of the Single-Family Subsidy (*Subsidio Único Familiar*): The SUF is intended for vulnerable households (60 percent of the most vulnerable households according to the Household Social Registry "*Registro Social de Hogares*") [1] with informal income who are not eligible for Family or Maternity Allowances (*Asignación Familiar o Maternal*), as the latter are targeted to workers affiliated to the pension system. Beneficiary households received $50,000 CLP for each eligible household member (single mother with children under 18, children under 18, and disabled individuals of any age not receiving disability pension).

b) Households that belong to the program Chile Securities and Opportunities (Ethical Family Income Programme -IEF): Eligible households received $50,000 CLP per household

c) Other vulnerable households: 60 percent of the most vulnerable households according to the Household Social Registry that do not have incomes from formal work or pensions and are not eligible under (a) and (b). Eligible households received $ 50,000 CLP per household

## Employment Protection Law (Ley de Protección de Empleo)

This Law established extraordinary and transitory measures to protect the income and jobs of workers who cannot provide services or must adjust their working hours due to the Covid-19 pandemic. The extraordinary measures provided workers with access to unemployment benefits (either their unemployment insurance account or unemployment solidarity fund) without losing their jobs.

[1] The Household Social Registry (*"Registro Social de Hogares"*) is and administrative information system including socio-economic information of households in which households must register to apply for social benefits. Households in the "*Registro Social de Hogares*" are classified according to their level of vulnerability, which is calculated based on their self-reported income in the last 12 months adjusted by an equivalence scale that accounts for households' composition by age and dependent members. Then, the self-reported equivalized income is used to group the population in seven income brackets. Afterwards a means test is carried out based on administrative information on assets, health contributions, and school expenses which establishes the final position of the households in the income brackets.

The Law included three extraordinary measures: temporary suspension of the employment contract by government decree (quarantine), temporary suspension of the contract by mutual agreement, and reduction of working hours by mutual agreement. For eligible workers who apply for a suspension of the contract, the employer will continue to pay mandatory social insurance contributions excluding contributions for work-related accidents.

***Eligibility Criteria and Amount Received:***

a) Temporary suspension of the employment contract by government decree (quarantine): Workers who were affiliated to the Administrator of Unemployment Funds (*Asociación de Fondos de Cesantía* ), and who met any of the following requirements: 1) they had continuously contributed during the last 3 months before applying to the benefit; 2) they had contributed at least 6 months in the last year and the last two contributions had been made with the same employer during the last two months before the suspension. Unemployment insurance payments are calculated as a percentage of workers' average monthly gross salary in the last 3 months. In the first payment, workers receive 70 percent and then 55 percent until the funds of the individual account are exhausted. When the funds of the individual account are exhausted, the remaining payments are charged to the Solidarity Unemployment Fund. In the latter case, the payments are limited to five in the case of workers with a permanent contract and three in the case of workers with a fixed-term contract, and also limited to maximum and minimum values per month established by the Law[2].

b) Temporary suspension of the employment contract by mutual agreement. Employers may agree with their workers, individually or collectively, to temporarily suspend their contracts. Eligible workers and payments are the same as in (a).

c) Temporary reduction of working hours by mutual agreement[3]: Employers agreed with their workers, individually or collectively, to reduce their working hours by up to 50%. Workers with a permanent contract who had at least 10 continuous or discontinuous contributions and workers with a fixed contract who have 5 continuous or discontinuous contributions in the last year and the last two were made with the same employer during the two months before the reduction were eligible. Workers applying to this measure receive remuneration proportional to the hours worked and an additional supplement charged to the unemployment insurance, which could be up to 25 percent of their remuneration with a maximum of $225,000 CLP per month.

[2] https://www.afc.cl/ley-proteccion-al-empleo/preguntas-frecuentes-empleadores/

[3] This measure was not simulated due to lack of information to replicate the criteria in the micro-data.

## Emergency Family Income (Ingreso Familiar de Emergencia)

This benefit corresponds to the most generous direct cash transfer implemented by the government. The benefit was modified multiple times after the payments started. Initially, this benefit was intended to provide 3 monthly payments, with the amount received decreasing to 85 percent and 70 percent of the benefit in the second and third month, respectively. However, from the second payment, a decision was made to increase the coverage to 80 percent of most vulnerable households according to the Socioeconomic Emergency Indicator (*Indicador Socieconomico de Emergencia*)[4], to increase the amount of the benefit, and to provide a flat scheme of four payments. Subsequently, the benefit was extended with to two additional months. In these two additional payments, the amount received equaled respectively to 70 and 50 percent of the second payment amount.

***Eligibility Criteria for the First Payment and Amount Received:***

d) Households with no formal income, belonging to the 90 percent most vulnerable according to the Household Social Registry (*Registro Social de Hogares*) and the 60 percent most vulnerable according to the Emergency Socioeconomic Indicator (*Indicador Socieconomico de Emergencia)*.

e) Households with partially no formal income, belonging to the 90 percent most vulnerable according to the RSH and the 40 percent most vulnerable according to the ISE. These households received 50 percent of the benefit.

**Table A2.1. Amount Received by Beneficiary Households During the First Month (In Chilean Pesos), According to Household Size**

| Household size | Eligibility criteria (a) | Eligibility criteria (b) |
|---|---|---|
| 1 | $65,000 | $32,500 |
| 2 | $130,000 | $65,000 |
| 3 | $195,000 | $97,500 |
| 4 | $260,000 | $130,000 |
| 5 | $304,000 | $152,000 |
| 6 | $345,000 | $172,500 |
| 7 | $385,000 | $192,500 |
| 8 | $422,000 | $211,000 |
| 9 | $456,000 | $228,000 |
| 10 or more | $494,000 | $247,000 |

[4] To take into account the socioeconomic vulnerability of households in the shorth-term, the Ministry of Social Development and Family established the Socioeconomic Emergency Indicator, which -unlike the standard socioeconomic classification of households- is based on household income in the last month before applying to the benefit, rather than the average of household income in the last 12 months.

***Eligibility Criteria from Second to Sixth Payment and Amount Received:***

a) Households with no formal income, belonging to the 90 percent most vulnerable according to the RSH and the 80 percent most vulnerable according to the ISE. These households received 100 percent of the benefit for the second, third, and fourth payment, 70 percent of the benefit for the fifth payment, and 55 percent for the sixth payment.

b) Households with partially no formal income below the amount received by households in (a) belonging to the 90 percent most vulnerable according to the RSH and the 80 percent most vulnerable according to the ISE. These households received the difference between the amount received by households in (a) and their current household income. The amount received by households was set up at least to 25,000 Chilean pesos per member.

c) Households belonging to the 80 percent most vulnerable according to the ISE and that have at least one member over 65 years who received either Basic Old Age Pension (*Pension Básica Solidaria*) or Basic Pension Contribution (*Aporte Previsional Solidario*) or Basic Disability Pension (*Pension Básica Solidaria de Invalidez*) regardless of their age. These households received $100,000 CLP in the second, third, and fourth payments per household member that fulfilled the criteria; and received $70,000 CLP and $55,000 CLP in the fifth and sixth payment, respectively.

**Table A2.2. Amount Received by Beneficiary Households from Second to Sixth Payment (In Chilean Pesos), According to Household Size**

| Household size | Eligibility criteria (a) (second to forth payment) | Eligibility criteria (a) (fifth payment) | Eligibility criteria (a) (sixth payment) |
|---|---|---|---|
| 1 | $100,000 | $70,000.0 | $55,000 |
| 2 | $200,000 | $140,000.0 | $110,000 |
| 3 | $300,000 | $210,000.0 | $165,000 |
| 4 | $400,000 | $280,000.0 | $220,000 |
| 5 | $467,000 | $326,900.0 | $256,850 |
| 6 | $531,000 | $371,700.0 | $292,050 |
| 7 | $592,000 | $414,400.0 | $325,600 |
| 8 | $649,000 | $454,300.0 | $356,950 |
| 9 | $705,000 | $493,500.0 | $387,750 |
| 10 or more | $759,000 | $531,300.0 | $417,450 |

Source: https://proteccionsocial.gob.cl/fichas/ingreso_familiar_de_emergencia

## Middle-Class Benefit (Bono Clase Media)

The Middle-Class Benefit was a one-off benefit that aimed to support middle class families whose formal incomes had been substantially affected by the Covid-19 pandemic.

***Eligibility Criteria and Amount Received:***

Salaried workers, self-employed, and individual entrepreneurs whose wages before the pandemic ranged between $400 thousand and $2 million CLP, and who either lost their jobs or suffered at least a 30 percent reduction in their formal income.

The amount of the benefit ranged between $100,000 and $500, 000 CLP depending on their salary before the pandemic. The lower the salary before the crisis, the higher the amount received.

**Table A2.3. Amount Received by Beneficiaries According to Income Brackets (in Chilean Pesos)**

| Income brackets | Amount |
|---|---|
| [$400,000 - $1,500,000] | $500,000 |
| ($1,500,000 - $1,600,000] | $400,000 |
| ($1,600,000 - $1,700,000] | $300,000 |
| ($1,700,000 - $1,800,000] | $200,000 |
| ($1,800,000 - $2,000,000] | $100,000 |

Source: https://www.diariooficial.interior.gob.cl/publicaciones/2020/08/01/42720/01/1794389.pdf

## Christmas COVID Benefit (Bono COVID Navidad)

The Christmas COVID Benefit was a one-off benefit targeted to households who benefited from the last payment of the Emergency Family Income (IFE).

Eligibility criteria and amount received:

The benefit was automatically delivered to households who received the sixth payment of the Emergency Family Income (IFE). Eligible households living in districts ("comunas") that were quarantined during the last week of November (from November 24th to November 30th) received $55,000 CLP per household member. Eligible households living in districts that were not quarantined received $25,000 CLP per household member.

The districts of the following regions were quarantined during the last week of November:

- Biobío: Coronel, Cañete y Lota.
- Araucanía: Padre las Casas, Temuco, Cholchol, Freire, Lautaro y Traiguén.
- Los Ríos: Futrono, La Unión, Los Lagos, Valdivia y Lago Ranco.
- Los Lagos: Ancud, Calbuco, Chonchi, Los Muermos, Puerto Montt, Osorno, Puqueldón, Queilén, Quemchi, Maullín y Hualaihué.
- Magallanes: Puerto Natales y Punta Arenas.

## Minimum Wage Guarantee (Subsidio Ingreso Mínimo Garantizado)

The Minimum Wage Guarantee was conceived in response to the social unrest that occurred in October 2019. However, this policy is included as part of the COVID19-response package since the payments started in May 2020. The subsidy is targeted to full-time employees working more than 30 hours and up to 45 hours per week, allowing them to receive a net salary equal to $300,000 CLP.

***Eligibility Criteria and Amount Received:***

Salaried workers with a written contract were eligible to receive the benefit if their gross wage was lower than $384,363 CLP, and they worked more than 30 hours and up to 45 hours a week. Moreover, eligibility was restricted to workers in households classified within the 90% most vulnerable according to the Household Social Registry.

Eligible workers received the difference between $300,000 CLP and their current net salary, with a maximum net payment of $41,092 CLP for those who had the former minimum wage.

# Appendix III. Sensitivity to Modeling Assumptions

**1. The poverty estimates presented in this article are generally not highly sensitive to key modeling assumptions.** Panel A of Table A3 shows the original estimates presented in the main text. The subsequent panels respectively examine the sensitivity of the main estimate (COVID-19 + mitigation) to the percentage of wages lost by salaried and non-salaried workers and the exclusion error rate of social protection measures. Generally, the poverty and inequality estimates are not highly sensitive to changes in the modeling parameters and the overall story presented in this note does not change qualitatively when individual parameters are adjusted.

**2. Even if wage losses of workers who remained employed were much lower or higher than assumed in the simulations, the estimated poverty rate does not change much.** Difference in wage losses for the simulated low and high scenario is quite dramatic: 10 v. 50 percent for salaried workers and 25 v. 75 percent for non-salaried workers. Yet, the international poverty rate ranges only from 2.8 to 4.4 percent for these two scenarios. The conclusion for the national poverty rate remains qualitatively unchanged under the two scenarios. In both cases, poverty increases compared to the pre-COVID estimates. These findings underline the conclusions drawn above: the social protection measures played a key role in mitigating the worst effects of the economic crisis on poverty but could not fully offset strong income losses experienced by vulnerable and lower-middle-class households.

**3. Similarly, the exclusion error does not have a strong qualitative effect on measured poverty rates.** If the exclusion error rate is lower than assumed in the estimates presented in the main text, poverty -as measured against the international poverty rate- may have slightly decreased during the COVID-19 period. The estimated poverty rate would be 2.8 percent with perfect targeting, only half percentage point below the poverty estimate presented in the main text. Even with perfect targeting, poverty measured against the national poverty rate will have increased by about 3.5 percentage points.

**Table A3.1. Sensitivity of the COVID-19 + Mitigation Estimates to Modeling Assumptions**

| | International poverty ($5.5 USD 2011 PPP) | National poverty | Vulnerable ($5.5-US$13 2011 PPP) | Middle-class (US$13-US$70 2011 PPP) | Gini coefficient |
|---|---|---|---|---|---|
| | Percent of population | Percent of population | Percent of population | Percent of population | Range: 0-100 |
| Panel A. Estimates presented in main text: | | | | | |
| CASEN 2017 | 3.6 | 8.6 | 29.5 | 61.7 | 44.4 |
| Estimation for 2019 | 3.3 | 8.1 | 27.8 | 63.3 | 44.5 |
| COVID-19 + mitigation[1] | 3.3 | 12.2 | 39.2 | 53.3 | 44.3 |

| Table A3.1. Sensitivity of the COVID-19 + Mitigation Estimates to Modeling Assumptions (Concluded) | | | | | |
|---|---|---|---|---|---|
| Panel B: COVID-19 + mitigation, Sensitivity to percentage of wage losses for salaried and non-salaried workers | | | | | |
| low: 10 and 25 percent | 2.8 | 10.1 | 36.1 | 56.5 | 44.1 |
| high: 50 and 75 percent | 4.4 | 15.0 | 41.5 | 50.2 | 44.7 |
| Panel C: COVID-19 + mitigation, Sensitivity to exclusion error rate | | | | | |
| 5 percent | 3.0 | 11.9 | 39.5 | 53.5 | 44.2 |
| 0 percent | 2.8 | 11.6 | 39.6 | 53.6 | 44.1 |
| [1] In the main estimates, wage losses for salaried workers and non-salaried workers are assumed to be respectively 30 and 50 percent. The exclusion error rate is set at 10 percent. | | | | | |

**4. Higher pass-through rates from GDP to household income would lead to more rapid poverty reduction.** The projections for poverty in 2021, 2022, and 2023 presented in the main text assume neutral distributional effects of GDP growth and a pass-through rate of 80%. Under the alternative assumption of a 100% pass-through rate, poverty will decline more rapidly. Yet again, the differences are not strong and the qualitative story presented remains mostly unaltered.

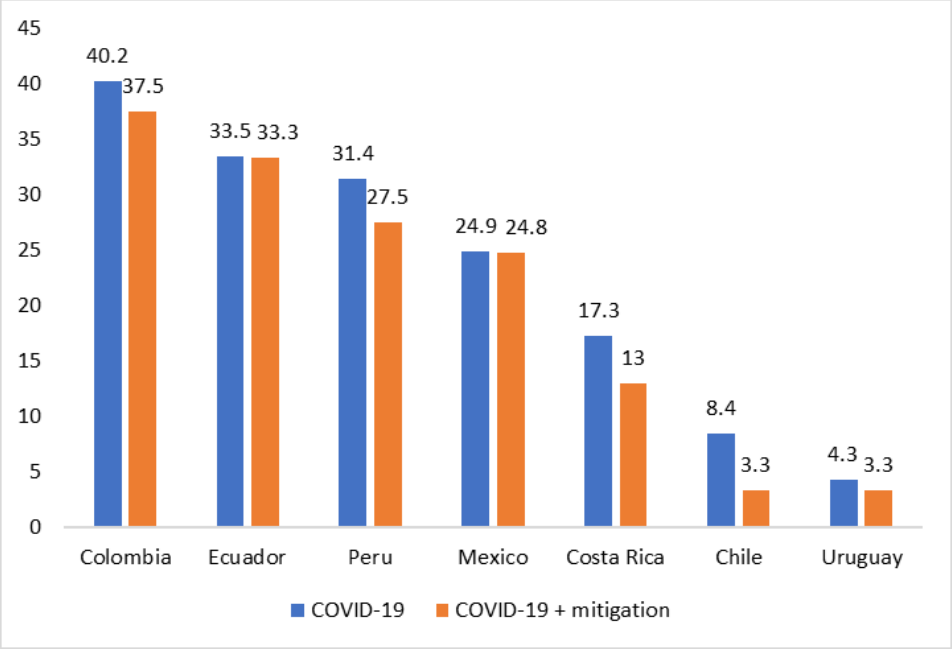
| Table A3.2. Sensitivity of 2021, 2022, and 2023 Poverty Projections to Modeling Assumptions | | | | | |
|---|---|---|---|---|---|
| | 2019 | 2020e | 2021f | 2022f | 2023f |
| Panel A. Estimates presented in main text[1] | | | | | |
| National poverty | 8.1 | 12.2 | 10.4 | 9.2 | 8.4 |
| International poverty | 3.3 | 3.3 | 2.7 | 2.3 | 2.1 |
| Panel B. Sensitivity to 100% GDP growth pass-through rate | | | | | |
| National poverty | | | 9.9 | 8.5 | 7.6 |
| International poverty | | | 2.5 | 2.1 | 1.8 |
| [1]The projections presented in the main text assume neutral distributional effects of GDP growth and a pass-through rate of 80%. | | | | | |

**5. The offsetting effects of the COVID-19 mitigation measures in Chile appear to be strong when compared to other countries in the region.** At the time of writing a comprehensive regional comparison of the poverty impacts of COVID-19 was not feasible. However, the 2020 poverty estimates for Chile can be compared to those for several other countries in the region based on simulation methods. Such a comparison suggests that the offsetting effects of the COVID-19 mitigation measures in Chile were comparatively strong. In countries with higher poverty rates than

Chile (Colombia[1], Ecuador[2], Peru[3], Mexico[4], and Costa Rica[5]) the offsetting effects of mitigation efforts were not as large either in percentage point or percentage terms. In Uruguay[6], which has a level of poverty comparable to that of Chile, the simulated mitigation efforts reduced poverty by 1.1 percentage points, compared to 5.1 percentage points in Chile. It is important to consider that there may be some differences in modeling choices across countries that are partly driving the findings. A true comparison would require further unification of modeling choices.

**Figure A3.1. Cross-country comparison of poverty estimates during the COVID-19 pandemic**

(US$5.50 Poverty headcount rate for 2020, percent)




Source: Chile estimates rely on microsimulation model based on CASEN 2017, Labor Force Survey 2019-2020, and World Bank's macroeconomic projections. For other country estimates, please refer to notes in the main text.

[1] Based on microsimulation results using the GEIH 2019 carried out by the World Bank (contact person: Maria E. Davalos).

[2] Olivieri, S. and Castillo, R. (Forthcoming) "Pincered: the welfare and distributional impacts of the 2020 triple crisis in Ecuador." Working paper, World Bank.

[3] Cueva, R. and Winkler, H. (Forthcoming) "Poverty Projections under Different Scenarios." Annex to IMF Peru Article IV Mission Report.

[4] Cadena, K. and Inchauste, G. (Forthcoming) "Poverty Projections for Mexico in the wake of the COVID-19 Pandemic." Background analysis for World Bank Macro-Poverty Outlook based on a microsimulation model using ENIGH 2018 and ENOE 2018-2020.

[5] Olivieri, S. and Arakaki, A. (Forthcoming) "The distributional impacts of the COVID-19 pandemic in Costa Rica." Working paper, World Bank.

[6] Rodriguez-Chamussy, L. and Tuzman, D. (Forthcoming) "The effects of the pandemic shock on labor and welfare in Uruguay." Technical note, World Bank.