Econ 281 Class Project
Final Submission

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Abstract

I estimate the causal effect of the implementation of Chile's Universal Guaranteed Pension (PGU) at the age threshold of 65 on labor supply decisions. Leveraging a natural experiment and using a regression discontinuity design and event study approach, I examine both the intensive and extensive margins. I find small but suggestive reductions in hours worked (intensive margin) following PGU eligibility, particularly among women. However, I detect no significant effects on labor force participation (extensive margin). These findings suggest the need for a framework that accounts for a smooth function of present value of transfers across the age distribution, rather than a sharp cutoff at 65.

1 Introduction

Motivation and Theoretical Objective This project is motivated by the desire to study wealth effects on labor supply—specifically, how permanent income or annuitized wealth changes influence individuals' labor supply. Understanding these responses is crucial for macroeconomic policy design, particularly as populations age and public transfer programs expand. A common strategy in the literature is to examine labor supply reactions to exogenous increases in unearned income, such as lottery winnings or inheritances. These designs typically identify a first stage mapping the income change, and a second stage mapping it to employment decisions. However, these settings often require strong assumptions to quantify the annuity-equivalent wealth shock.

Natural Experiment I exploit a natural experiment created by the implementation of Chile's Universal Guaranteed Pension (PGU) in early 2022. This policy extended non-contributory pension coverage to 90% of the population aged 65 and older, providing a monthly transfer of approximately $200. Eligibility is determined solely by age and income percentile, with the age threshold set at 65. Importantly, this transfer is unconditional on retirement or employment status, making it a clean source of variation in wealth for older adults. While age 65 is also the statutory retirement age for men in Chile, women become eligible for retirement benefits at age 60. This institutional detail allows me to identify the effect of PGU eligibility on labor supply using a Regression Discontinuity (RD) design for women only, where age 65 is not confounded by retirement incentives.

Empirical Strategy and Myopic Benchmark My first empirical approach treats the PGU transfer as a one-time, myopic increase in income at the age of 65. That is, I estimate the causal effect of crossing the age threshold on labor outcomes as if individuals did not anticipate or smooth the value of future transfers before reaching 65. While clearly restrictive, this provides a benchmark for understanding intensive and extensive margin responses to the transfer. In the RD specification, I compare individuals just below and above the age 65 threshold using data from the 2022 wave of CASEN, a nationally representative household survey in Chile. I also use the 2017 wave of CASEN to implement a pre-policy placebo test.

To complement the RD analysis, I implement an event study using data from the 2021–2022 waves of the Employment and Unemployment Survey of Gran Santiago (EOD), a quarterly survey covering the Santiago metropolitan area. Although not nationally representative, Gran Santiago accounts for approximately 40% of Chile's employed population and 45% of its economically active population, making it a highly relevant setting for studying aggregate labor market adjustments.

Next Steps and Structural Perspective While the current strategy provides local evidence around the threshold, it ignores the dynamic and forward-looking nature of the wealth shock implied by PGU. Moving forward, I aim to estimate a model-based measure of the perceived present value of the transfer schedule across the age distribution. This will allow me to go beyond the RD and develop a continuous exposure strategy that better captures how individuals respond to changes in permanent income. Ultimately, the goal is to integrate these responses into a macroeconomic framework that can inform the design of optimal transfer and retirement policies.

2 Identification Strategy

PGU PGU was implemented in Chile in February 2022. This benefit replaced the Solidarity Pillar and expanded coverage to include 90% of the population aged 65 and over, excluding only the top 10% of the income distribution. The former Solidarity Pillar only covered 60% of the population. The PGU provides a monthly cash transfer that complements self-funded pensions, with the maximum amount adjusted annually according to the Consumer Price Index (CPI).

Importantly, being employed or not yet retired does not disqualify individuals from receiving the PGU. The benefit is intended to supplement income for older adults regardless of labor market status, thereby avoiding disincentives for continued workforce participation.

Under the previous system—the Solidarity Pillar, which included the Pensión Básica Solidaria (PBS) and the Aporte Previsional Solidario (APS)—eligibility was also not formally tied to retirement. However, the criteria were more restrictive, possibly creating incentives to avoid formal income in order to qualify. Specifically, the PBS required that individuals not receive any other pension, and the APS required a self-financed pension (from individual savings) below a certain threshold.[1]

The transition to the PGU in 2022 simplified and broadened eligibility. Individuals aged 65 or older could now receive the benefit regardless of employment or pension status, provided they met the residency and income criteria. The impact of this reform is evident in the data: the number of recipients increased substantially from around 1.66 million under the Solidarity Pillar (591,000 receiving PBS and 1,066,000 receiving APS) to approximately 2.4 million beneficiaries as of early 2025. By November 2023, there were already 1.97 million PGU recipients. Of these, roughly 1,488,547 received the PGU alongside their self-financed pensions, while 482,109 individuals without self-financed pensions received the full benefit.

Empirical Design and Identification To estimate the causal effect of PGU eligibility on outcomes such as hours worked, employment status, and labor income, I employ two complementary strategies. First, I estimate a standard sharp Regression Discontinuity (RD) design, leveraging the eligibility cutoff at age 65. The RD specification is given by:

$$Y_i = \alpha + \tau \cdot \mathbb{1}(age_i \geq 65) + f(age_i - 65) + X_i'\gamma + \varepsilon_i \tag{1}$$

where Y_i denotes the outcome variable of interest for individual i, such as hours worked, employment status, or labor income. The term $\mathbb{1}(age_i \geq 65)$ is an indicator function equal to 1 if individual i is eligible for the PGU (i.e., age 65 or older), and 0 otherwise. While the age threshold is expressed in years for interpretability, the estimation uses age in days to accurately capture the eligibility discontinuity. The coefficient τ is the main parameter of interest and captures the causal effect of PGU eligibility on the outcome. The function $f(age_i - 65)$ is a smooth function of age centered at the cutoff, typically specified as a linear or quadratic polynomial and estimated separately on each side of the threshold to flexibly control for age trends. The vector X_i includes additional covariates—such as gender, education level, and region—that improve the precision of the estimates. The coefficients γ correspond to these controls, α is an intercept, and ε_i is an error term capturing unobserved heterogeneity.

However, a potential identification concern arises: age 65 is not only the threshold for PGU eligibility but also the statutory retirement age for men in Chile. This dual institutional change complicates the interpretation of a discontinuity at age 65, as observed labor market shifts may reflect retirement incentives rather than the effect of the PGU per se. I address this concern in two ways. First, I limit the RD sample to women, for whom the legal retirement age is 60. This ensures that any discontinuity at 65 is driven by PGU eligibility alone, as there is no competing institutional change at that age for women. Second, as a robustness check, I propose comparing the RD estimate in 2022 to an equivalent RD estimate using a pre-reform wave. If a discontinuity is observed only after PGU implementation,

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[1] The threshold was the Maximum Pension with Solidarity Contribution (PMAS), set at CLP 255,000 as of July 2011 and indexed to inflation.

this would strengthen the interpretation of τ as a PGU effect. A more formal version of this comparison would involve a difference-in-discontinuities approach, which is what I turn to discuss next.

I implement an event study design using the full population to estimate dynamic effects around the policy implementation. The specification is:

$$Y_{it} = \alpha_t + \sum_{k \neq 0} \beta_k \cdot \mathbb{1}(t = k) \cdot treatment_{it} + \epsilon_{it} \tag{2}$$

where Y_{it} is the outcome for individual i at time t, and the coefficients β_k trace the evolution of the treatment effect relative to the reference period ($k = 0$, omitted). The variable $treatment_{it}$ indicates whether individual i is eligible for PGU in quarter t, and α_t captures time fixed effects. The event time t ranges from 2021q2 to 2022q4, with 2022q1 marking the policy's implementation. This design allows me to study both pre-trends and post-implementation dynamics across the population.

3 Data Description

I use data from the 2022 wave of CASEN, a nationally representative household survey conducted by Chile's Ministry of Social Development. CASEN collects detailed information on demographic characteristics, labor market outcomes, income, education, and participation in social programs. This survey allows me to observe employment status, hours worked, and labor income for all individuals, including those aged 65 and over. The fieldwork for CASEN 2022 was carried out between November 1, 2022 and February 2, 2023, capturing the period shortly after the implementation of the PGU in early 2022.

To evaluate how PGU changed labor supply incentives relative to the previous non-contributory pension system (the Solidarity Pillar), I consider applying the same regression discontinuity strategy to an earlier wave of CASEN. The immediately preceding wave, CASEN 2020, was conducted before the implementation of PGU. However, due to the COVID-19 pandemic, its fieldwork was carried out primarily via telephone interviews using a reduced questionnaire, which may limit comparability. For a more robust pre-reform comparison, I therefore consider using CASEN 2017, which was collected through traditional in-person interviews and offers a more consistent baseline. This would allow me to compare labor supply responses around the age 65 threshold under the Solidarity Pillar regime.

In addition to CASEN, I use the Employment and Unemployment Survey of Gran Santiago (EOD) for the event study analysis. The EOD is a long-standing, quarterly household survey jointly administered by the Central Bank of Chile and the *Universidad de Chile*'s Microdata Center. It focuses on the metropolitan area of Santiago and collects high-frequency labor market information, including employment status, hours worked, wages, and sector of employment. The survey is particularly well suited for studying short-run dynamics, as it allows me to track quarterly changes in labor market outcomes before and after the implementation of PGU. While not nationally representative, the EOD covers the Gran Santiago area, which accounts for approximately 40% of the country's employed population and nearly 45% of its economically active population. This makes it a highly relevant setting for analyzing aggregate labor supply responses to the reform.

4 Results

Regression Discontinuity (RD) Estimates I begin by estimating the impact of PGU eligibility on labor outcomes using a sharp regression discontinuity design centered at age 65, focusing on women only (since their statutory retirement age is 60). This isolates the effect of the wealth transfer from confounding retirement incentives.

Figure-based results show no strong discontinuity at age 65 in hours worked, employment probability, or labor income. In the 2022 wave of CASEN—post-PGU implementation—there is a small visible drop in hours worked at the threshold (Figure 2), but the magnitude appears modest and is not precisely estimated. Similarly, the probability of declaring a willingness to work more does not exhibit a clear jump (Figure 4). These patterns are broadly consistent with what I observe in the 2017 CASEN wave (pre-reform), shown in Figures 1 and 3, which serve as placebo tests and confirm that no strong pre-existing discontinuity existed at age 65. I also do not detect meaningful breaks in labor income at the threshold (Figures 6 and 5).

Overall, the RD results suggest that PGU eligibility at age 65 did not induce large immediate adjustments in labor supply behavior for women. These findings are consistent with a small or delayed intensive-margin response, or with individuals anticipating the transfer and adjusting behavior before the threshold.

Event Study Results   To complement the RD results, I estimate an event study using quarterly data from the Employment and Unemployment Survey of Gran Santiago (EOD) for the 2021–2022 period. This strategy compares the evolution of labor outcomes at age 65 relative to younger cohorts before and after PGU implementation in 2022.

The event study shows weak but suggestive evidence of a decline in labor market participation for individuals aged 65 in the post-reform period (Figure 7). The estimated treatment effects on participation are negative after 2022q1 (the implementation quarter), but they remain small in magnitude and only marginally significant. An alternative specification that uses 2021q4 as the event time confirms similar patterns (Figure 8). The effects on hours worked are more variable and noisy, with no consistent trend emerging over time (Figure 9).

Summary and Interpretation   In both the RD and event study designs, I find limited evidence of strong short-run labor supply responses to PGU eligibility. If the transfer operates as a wealth shock, its effects on labor behavior appear small and concentrated—if at all—on the intensive margin. These results do not yet allow me to claim robust evidence of wealth effects, particularly since the design does not account for forward-looking behavior or the perceived present value of future transfers.

A possible interpretation is that the annuity-like nature of PGU may generate muted responses if individuals either do not perceive it as a significant lifetime wealth increase, or if labor-leisure tradeoffs are inelastic at older ages. Alternatively, responses could be occurring earlier in the age distribution due to anticipation effects, which the current RD setup cannot capture.

This motivates future work that takes the full transfer schedule seriously and adopts a model-based continuous exposure strategy to better estimate the present value of the policy across ages.

5   Conclusion

This paper studies the short-run effects of Chile's Universal Guaranteed Pension (PGU) on labor supply using both regression discontinuity and event study methods. I focus on the age 65 eligibility threshold and find modest evidence of reduced hours worked, with no significant changes in participation.

Rather than conclusive evidence of behavioral inelasticity, these findings may reflect that individuals adjust labor supply decisions in anticipation of PGU or that the perceived value of the transfer is smoothed over time. The current design—which treats the transfer as a discontinuous shock—may not capture such dynamics.

Future work should incorporate a forward-looking framework to model the annuitized present value of PGU across the age distribution. This would allow for a more structural understanding of how wealth effects shape labor supply, particularly in the context of aging populations and expanding non-contributory pension systems.

A RD Figures

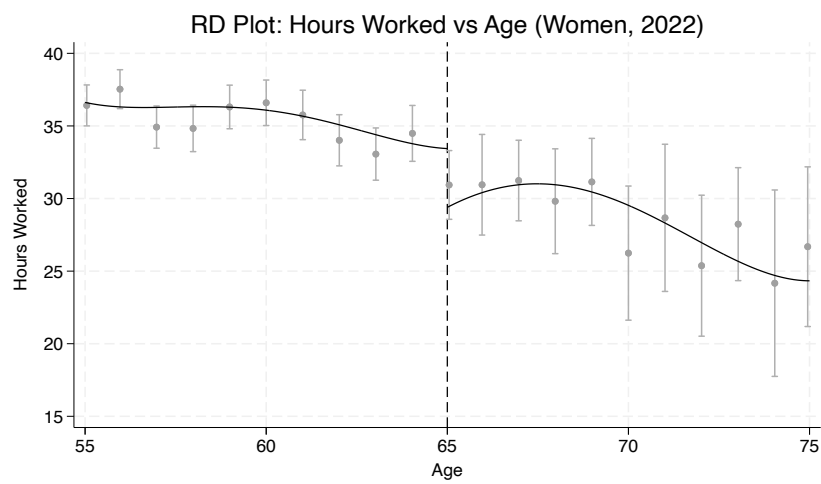Figure 1: RD Plot: Hours Worked vs Age (Women, 2017)

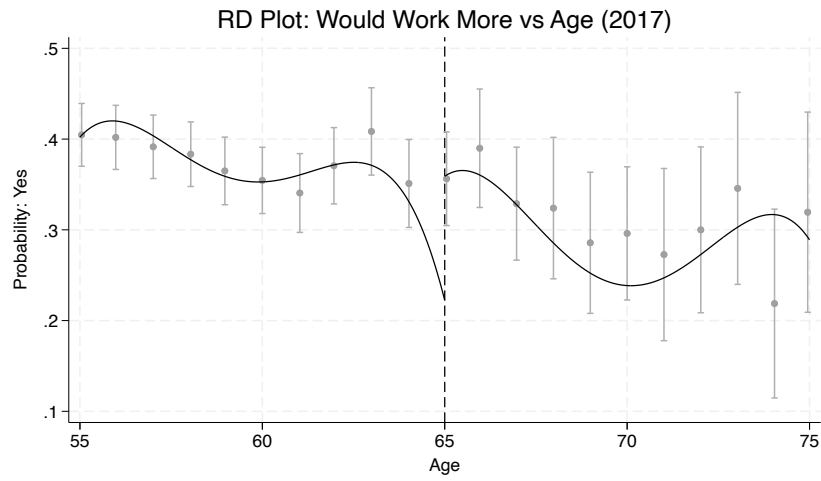Figure 2: RD Plot: Hours Worked vs Age (Women, 2022)

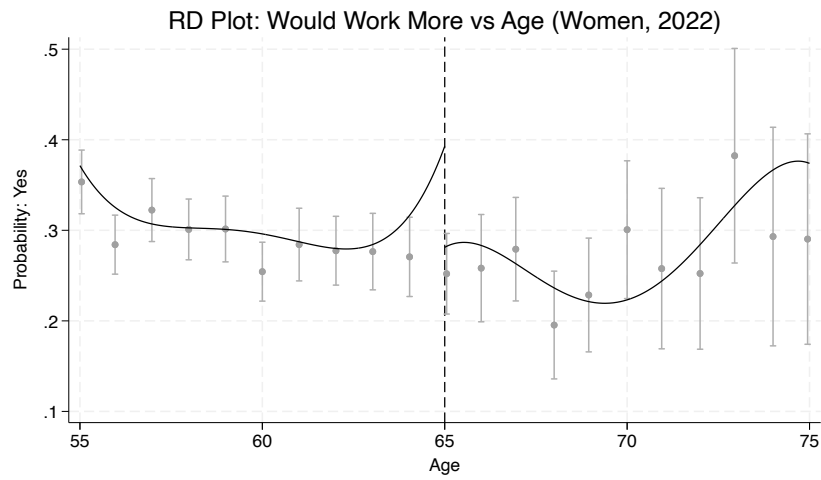Figure 3: RD Plot: Willingness to Work More vs Age (Women, 2017)

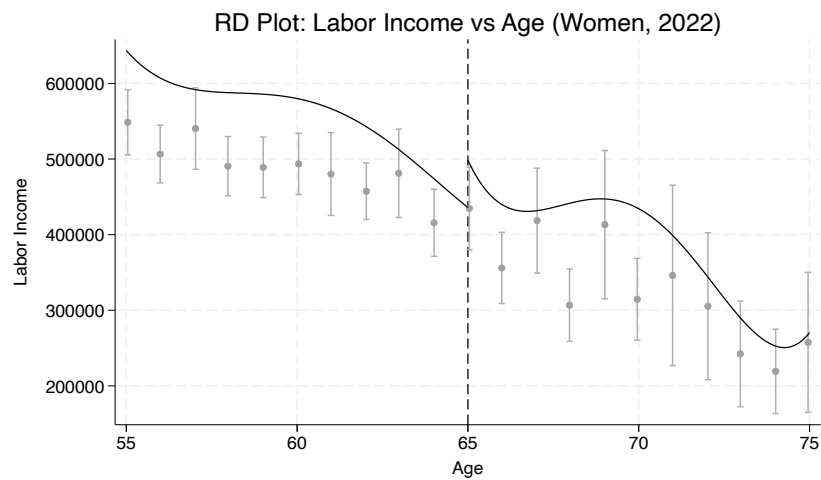Figure 4: RD Plot: Willingness to Work More vs Age (Women, 2022)

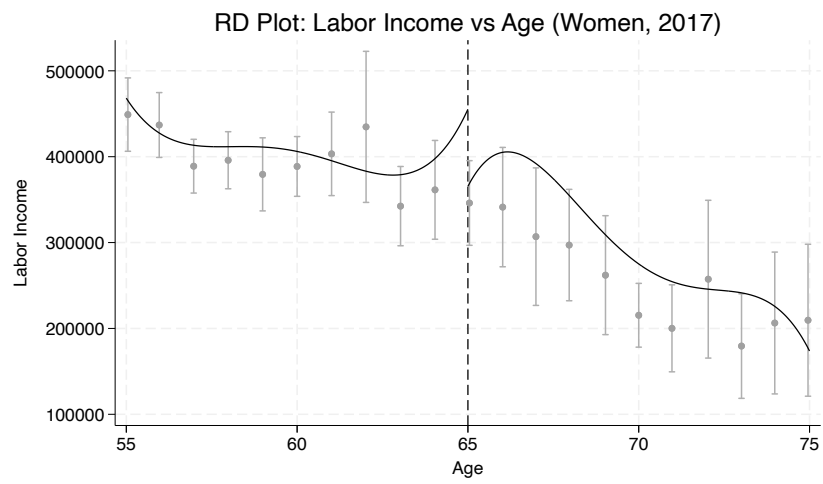Figure 5: RD Plot: Labor Income vs Age (Women, 2022)

Figure 6: RD Plot: Labor Income vs Age (Women, 2017)
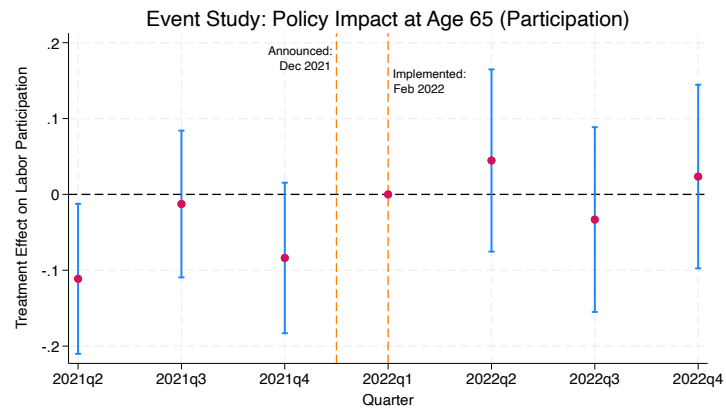
B   Event Study Figures

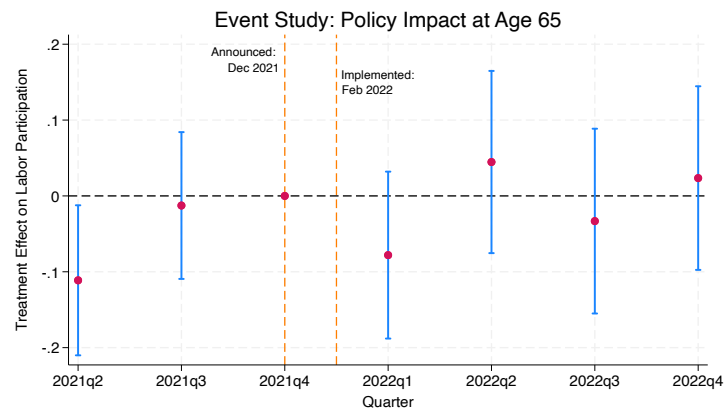Figure 7: Event Study: Policy Impact on Labor Participation

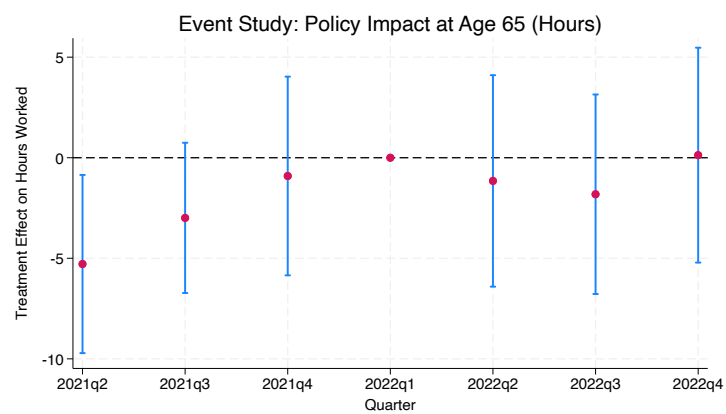Figure 8: Event Study: Policy Impact on Labor Participation using 2021q4 as Event Time

Figure 9: Event Study: Policy Impact on Hours Worked