

# Impact of Social Security Reform on Labor Force Participation: Evidence from Chile

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# Chilean reform of 1981

- Much concern about declining labor force participation (LFP) of older men
- Studies (e.g. Gruber and Wise) show workers respond to incentives in DB pension systems
- 1981 Chilean reform allows us to test whether large system change produces large change in LFP
- Prior to 1981 Chile had PAYGO DB system with high payroll tax, low allowable pension age, benefits not adjusted in actuarially fair way
- Labor supply of older workers increased dramatically after 1981. Was this due to 1981 reform? Which rule changes?

# 3 rule changes that affect LFP

- Nonpensioners under 65 face lower implicit tax due to shift from DB to DC—actuarial fairness (EPV of incremental benefits=incremental contributions; EPV from postponed pension=benefits foregone)  
(only partial if greater time preference or want flexibility)
- Tighter early retirement pre-conditions before age 65, so more remain as nonpensioners, who must work longer due to liquidity constraints
- Pensioners (and nonpensioners over 65) exempt from pension payroll tax—work incentive
- We expect greatest impact from #2 & 3—could be adopted in U.S.

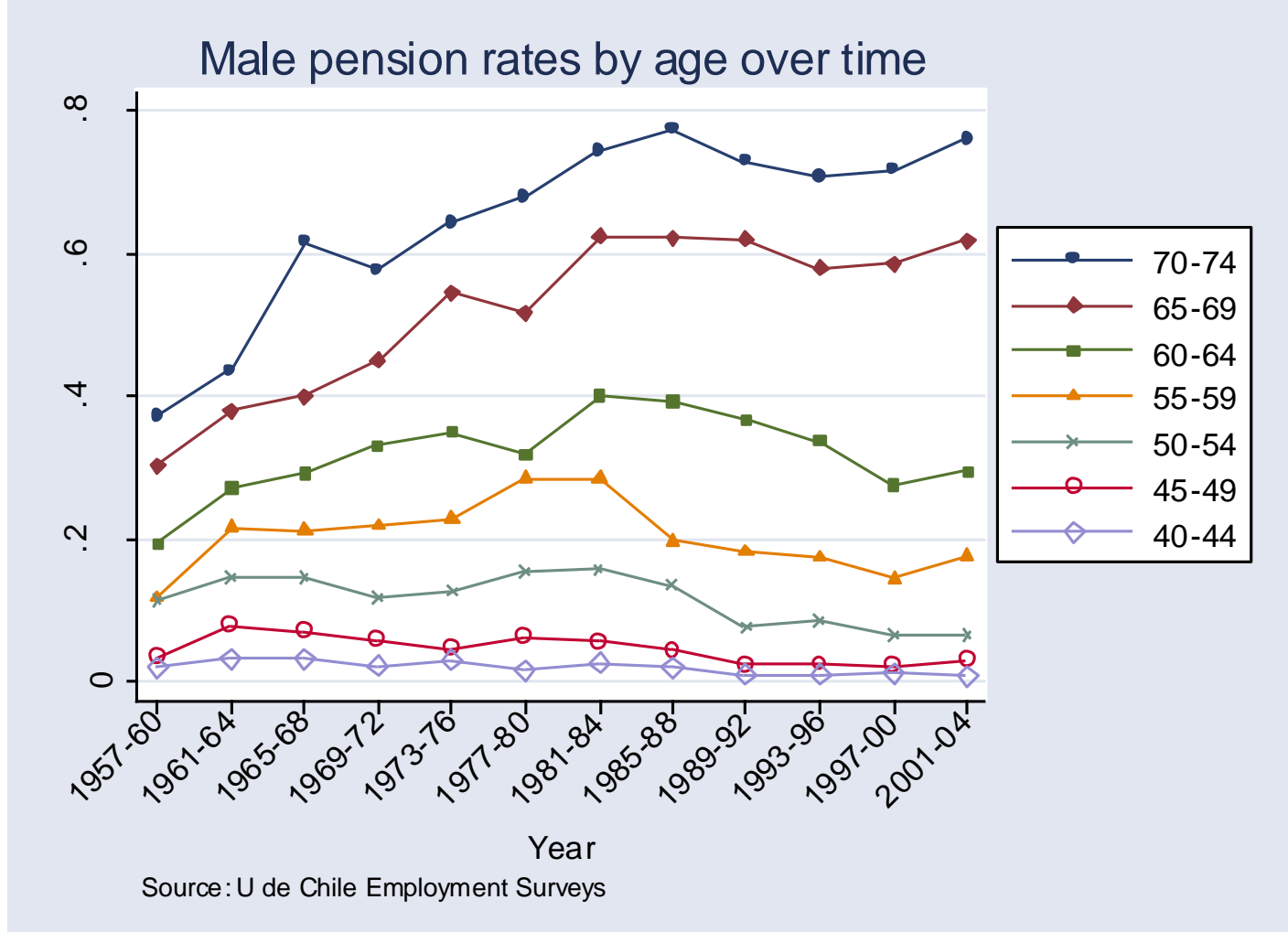
# Data: 47 years of household surveys from Santiago Area, 1957-2004

- 31,547 men in 50 cohorts born 1900-1950, observed at ages 50-70 between 1957-2004
- Individual level data on
  - Labor force participation
  - Demographic characteristics
  - Labor and pension income
- Shortcomings:
  - It is not longitudinal, no retrospective data
  - We don't know which system individual is in
  - But we can build synthetic cohorts--people with same birth year—as indicator of system

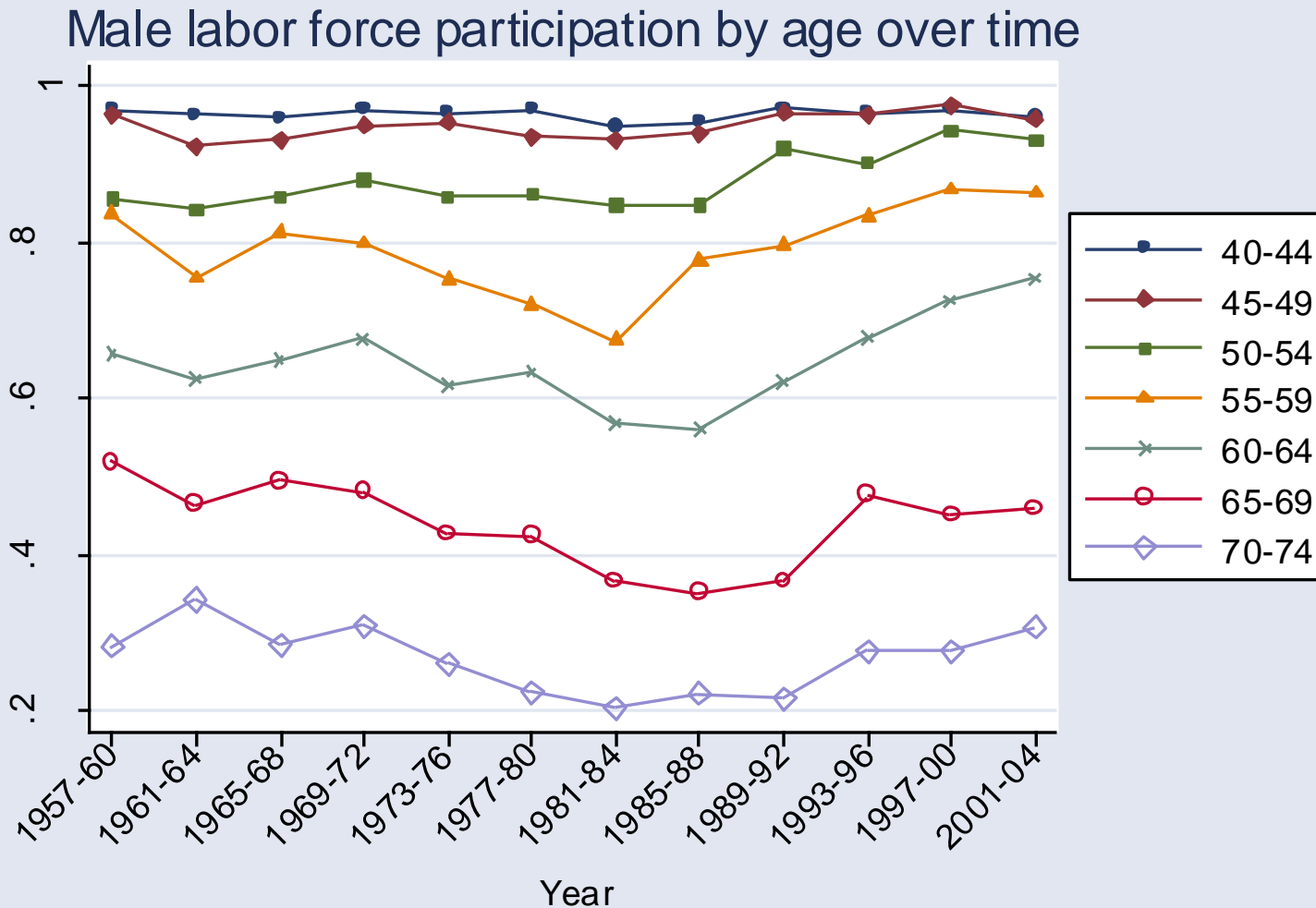
# Birth cohort indicates probability of new system membership

- After 1981, new workers must join new system but existing workers could choose.
- Younger workers more likely to join new system. Proportion in new system rises with each cohort.
- “Post-reform” cohorts born after 1931 (50% in new system), “pre-reform” born before 1926, bridge gen. born 1926-31 (40% in new system)
- 6 cohort groups (5 years each) after 1926, in new system with increasing probability
- Transition: Reform effect is predicted to grow with each cohort group, until new equilibrium with everyone in new system.

# Pension probabilities among 50-64 fall after 1981 reform (up before)



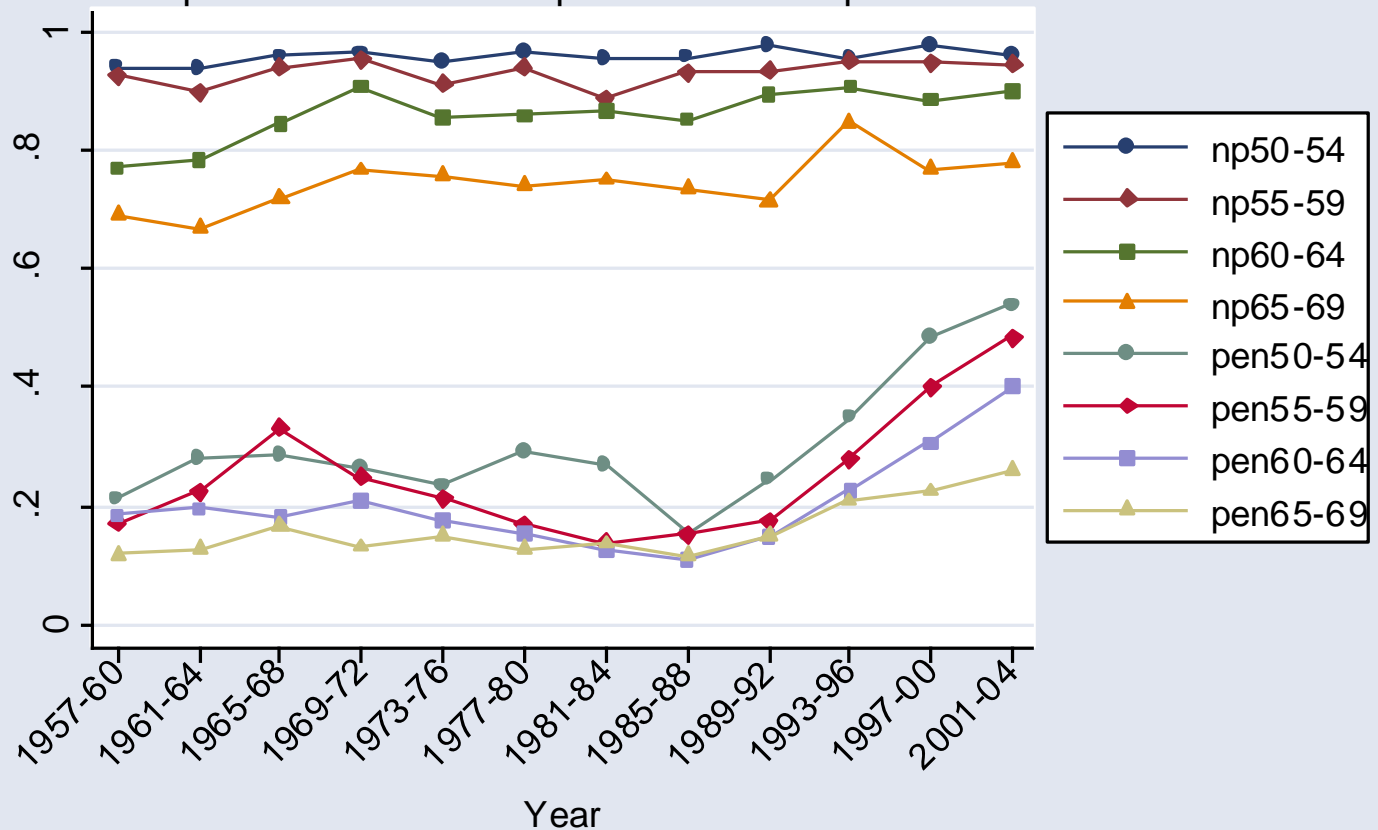
# LFP trends reverse after reform (went down before, up afterwards)



Source: U de Chile Employment Surveys

# particularly among pensioners

Male labor force participation rates by age:  
pensioners and non-pensioners compared



Source: U de Chile Employment Surveys

# Aggregate trends are consistent with our hypotheses.

- Does reform effect remain after controlling for variations in individual and macro-economic variables? Answer: Yes, with some caveats
- Also remains after tests for selection bias
- We measure marginal behavioral change by successive cohorts and cumulative post-reform change (from 1926 to 1950 birth cohorts)

# Probit analysis estimates 1) pension probabilities and 2) LFP rates as function of :

- New system impact, proxied by cohort groups
- Individual characteristics: Age, schooling, marital status, # young children, hh income
- Macro-economic conditions: economic cycle, unemployment rate
- LFP rate also depends on pension status, amount, replacement rate
- We simulate behavioral differences by cohort group and differences in reform impact by pensioner vs. nonpensioner status, age  $>$  or  $<$  65

## Results: 1) Pension probabilities fall for post-reform cohorts

	<b>50-59</b>	<b>60-64</b>	<b>65-70</b>
<b>Pre-reform pension probability (%)</b>	21	35	58
<b>Cumulative post-reform loss (pp)*</b>	<b>-10</b>	<b>-8</b>	<b>-1</b>

\*significant for ages 50-64 at 5% level

- Starting with post-reform cohort born after 1931, pension prob declines 2-6 pp for each successive cohort group, ages 50-64
- Cumulative decline is 8-10 pp
- Large relative to pre-reform pension prob (21-35%)
- No significant decline after 65—suggests that early retirement constraint, rather than actuarial fairness in conversion to annuity, explains postponed pensioning

## 2) LFP rates rise for post-reform cohorts in pooled sample of pensioners and nonpensioners

	<b>50-59</b>	<b>60-64</b>	<b>65-70</b>
<b>Pre-reform LFP (%)</b>	80	63	38
<b>Cumulative post-reform gain (pp)*</b>	<b>12</b>	<b>19</b>	<b>13</b>

\*All gains are significant at 5% level or better

- LFP was falling for pre-reform cohorts
- Starting with cohorts born after 1926, LFP rises 2-7 pp for each successive cohort group
- Cumulative gain is 12-19 pp
- Strong effect continues after age 65 (despite partial data, espec. large relative to pre-reform LFP)
- All 3 reasons are at work: 1) pension age postponed so more nonpensioners, high LFP; 2) smaller implicit tax for nonpensioners due to DC; 3) tax exemption for pensioners

### 3) Effect stronger for pensioners than nonpensioners

	<b>50-59</b>	<b>60-64</b>	<b>65-70</b>
<b>Pensioners</b>			
<b>Pre-reform LFP (%)</b>	28	19	12
<b>Cumulative post-reform gain (pp)*</b>	<b>28</b>	<b>29</b>	<b>15</b>
<b>Nonpensioners</b>			
<b>Pre-reform LFP (%)</b>	95	88	75
<b>Cumulative post-reform gain (pp)*</b>	<b>1</b>	<b>5</b>	<b>12</b>
<b>*All post-reform gains are significant at 1% or 5% level</b>			
<ul style="list-style-type: none"> <li>• Pensioner LFP was falling pre-reform</li> <li>• Rises by 5-16 pp for each post-reform cohort group</li> <li>• Cum. gain for age 50-64 is 28-34 pp--doubles pre-reform LFP</li> <li>• Strong effect continues after 65—despite partial data</li> <li>• Nonpensioners have much higher LFP than pensioners--+67 pp—so remaining nonpensioner longer raises aggregate LFP</li> <li>• But with status given, reform impact on nonpensioners is small until age 65—when they become exempt from payroll tax Suggests that actuarial fairness due to DC has smaller impact on LFP than tax exemption and postponed pension age</li> </ul>			

## 4) Other variables—significant but don't change reform impact

- Lower pension amount and replacement rate increase LFP—so if rising longevity reduces annuity payouts in DC system, this raises LFP
- Higher unemployment rate reduces LFP, mainly because it raises pension probabilities
- Individual characteristics have expected effects
- Tests for selection bias into new system or pensioner status don't change these results

# Macroeconomic effects

- LFP increase of 14 pp per year in pooled sample for 15 years ages 50-64 = 2.1 years
- Implies 21% increase in older labor force, more output and growth
- Further growth in ages 65+ not yet fully observed in our sample
- Total increase will be higher as % in older age groups grows

# Policy implications

- Incentives and constraints in new system have had positive effects on supply of older workers
  - DC makes pension growth actuarially fair
  - Pensioners exempted from payroll tax
  - Pre-conditions for early pension tightened
- Which rule change is most important?
  - Fall in pension prob before 65, not after: early pension constraints increase nonpensioners--who work longer
  - Larger LFP effect among pensioners: exemption from payroll tax plays a key role
  - About half total LFP effect due to tax exemption for pensioners and half due to postponed pension age
  - These could also be implemented in DB system
  - Smaller LFP effect among nonpensioners implies that actuarial fairness due to DC is there but less important