Learning Dynamics in Tax Bunching at the Kink: Evidence from Ecuador

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UNU-WIDER Public Economics for Development
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Motivation

**Goal:** understand dynamic behavioral responses to tax incentives in a development context

- **tax incentives:**
  - theory predicts bunching at jumps in marginal tax rate
  - only limited empirical evidence for actual bunching
- **development context:**
  - very little evidence from developing countries
  - transition from informal to formal economy
  - growing number of taxpayers
- **dynamic perspective:**
  - do people learn how to bunch over time/experience?
  - how is this knowledge transmitted between people?
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Literature

- tax bunching:
  - Saez (2010)
  - evidence from Scandinavia: Chetty et al. (2011); Bastani and Selin (2014)
  - knowledge diffusion and spillovers: Chetty et al. (2013); Chetty and Saez (2013); Paetzold and Winner (2014)

- taxation and development:
  - Kleven and Waseem (2013); Bachas and Soto (2015); Best et al. (2015)
  - analyze corporate taxation in Ecuador: Carrillo et al. (2012, 2014)
  - transition to PIT: Besley and Persson (2013)
document bunching behavior in Ecuador
analyze learning effects in tax-adjustment opportunities
channels of information transmission:
▶ Do new workers adjust to firm-level bunching?
▶ Do incumbent workers learn from new co-workers who are bunching?
Preview of Results

- large spike in taxable income distribution at first kink
- entirely driven by reporting behavior (filing deductions)
- bunching increases over time and with experience
- strong impact of firm-level bunching rates on individual bunching
- evidence for firm-level learning
Tax Bunching

- discontinuous jumps in marginal income tax rates generate kinks in the budget set of individuals
- the kinks induce individuals to locate at the points of discontinuity
- empirically, this effect is less pronounced due to adjustment frictions, lack of knowledge, etc.
- reporting effects or real responses?
Institutional Background Ecuador

- since 2008: policies to increase tax compliance and formalization
  - data sharing, receipt lotteries
  - large-scale deduction possibilities: health, education, nutrition, housing and clothing

- wage earners: firm reported tax declarations
  - tax declarations directly submitted by employer
  - employees report projected value of deductions to employer
  - employer computes wage retention
  - deductions above reporting threshold: employee submits annex
Data

- universe of individual income tax return data from 2006 - 2015
- firm-reported tax forms
- socio-demographic data on workers and firms
- only look at private sector wage earners
Gross Income Distribution

Figure: Pooled gross income of wage earners in Ecuador 2006-2015
Figure: Pooled taxable income of wage earners in Ecuador 2006-2015
Tax avoidance over time

Figure: Number of individuals with income above first kink
Tax avoidance over time

Figure: Number of individuals with income above first kink
Bunching Estimates - Taxable Income

Figure: Bunching estimate taxable income of wage earners 2006-2015

Excess Mass (b): 4.131
Standard Error: .236
## Bunching over Time

**Table:** Bunching estimates over time

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Albrecht Bohne (U Mannheim)

Learning Dynamics in Ecuador

July 2017
Cohort Analysis

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Note: Bunching estimates for taxable income by year conditioned on the cohort of entry into the formal economy.
Bunching Estimates - No Experience

Figure: No income above first kink in previous 2 years
Bunching Estimates - Experienced

Figure: At least one year of income above first kink in previous 2 years

Excess Mass (b): 6.171
Standard Error: .2142
## Controls

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Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Job Switchers

How do job switchers adjust to firm-level bunching?

- compare workers who move into high-bunching vs. low-bunching environment
- consider (first) switch of main employer among all job-to-job transitions in 2010-2014
- only consider switches where we observe at least two consecutive years at both origin and target firm
- assign old and new firms to quintiles based on the share of co-workers who are bunching
restrict sample to job switchers starting in mid quintile and moving to quintile $\in \{low, high\}$

$$Y_{it} = \beta_0 + \sum_{k=-2}^{k=2} \gamma_k D_{it}^k + \delta post_{it} \times quintile_i + \theta X_{it} + \lambda_t + \alpha_i + \epsilon_{it} \quad (1)$$

- $Y_{it}$: Indicator for buncher (taxable income 1000$ below kink)
- $quintile_i$: Indicator for moving to high or low quintile
- $post_{it}$: Indicator for after job switch
- $D_{it}^k$: Indicator for year relative to job switch
## Job Switchers - Results I

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<th>Mid to Low (2)</th>
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* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Identification II - Anticipatory and post treatment

\[ Y_{it} = \beta_0 + \sum_{k=-2}^{k=2} \gamma_k D_{it}^k + \sum_{k=-2}^{k=2} \delta_k D_{it}^k \times \text{quintile}_i + \theta X_{it} + \lambda_t + \alpha_i + \epsilon_{it} \]  

\( \delta_k \): identifies anticipatory and post treatment effects
## Job Switchers - Results II

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Standard errors in parentheses, clustered at firm level
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Job Switchers - Summary

- strong and persistent firm level effects: moving to high quintile increases bunching by 2-5 %
- moving to low quintile does not have significant effect
- → asymmetric response
- → learning and memory (confirming Chetty et al. (2013); Paetzold and Winner (2014))
What determines firm-level bunching?

- Focus on *firm cohorts*
- Group firms into cohorts by year of entry into the formal sector
- Condition on firms always employing potential bunchers after entering formal sector
- Calculate share of firms within cohort with 1 or more bunchers
## Firm Cohorts

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Note: Share of firms in given cohort with at least 1 buncher. Cohorts conditioned on year of entry into formal sector and having potential bunchers in all subsequent years.
Firm-cohort summary

- Increasing experience at the firm level leads to higher bunching shares
- Cohorts entering later start at higher bunching levels
- Within a given year, firms from older cohorts more likely to bunch
Do workers learn from new co-workers who are bunching?

- compare firms that receive potential bunchers who
  - bunch ("treatment group")
  - do not bunch ("control group")
- consider firms with one incoming event in 2010 - 2014
- examine average level of bunching in firms before and after the event leaving out the incoming worker
Co-worker Learning - Small Firms

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Co-worker Learning - Summary

- no significant effect of incoming bunchers on co-worker bunching level
- even in subsamples where influence seems easier
  → firms drive decision whether individuals bunch using deductions
  → however, serious power issues in this analysis
Conclusion

- clear evidence for tax bunching driven by reporting behavior
- experience with filing taxes increases bunching probability
- strong impact of firm-level bunching on individual bunching
- evidence for asymmetric adjustments: learning and memory
- evidence for firm-level learning
- incumbent workers seem not to learn from new co-workers
THANK YOU

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Bibliography


Labor Supply Model

Figure: Neoclassical Labor Supply Model
Bunching Mechanism

- consider the introduction of a kink at $z^*$
- pre-reform incomes between $z^*$ and $z^* + dz^*$ bunch at $z^*$ after reform

Figure: Bunching at the kink
Bunching Mechanism

- consider the introduction of a kink at $z^*$
- pre-reform incomes between $z^*$ and $z^* + dz^*$ bunch at $z^*$ after reform

Figure: Bunching at the kink