Empirical analysis: a Bunching approach

Implication from a model of borrowing:

- Leverage constraints create a kink in borrowers’ intertemporal budget sets.
- The kink induces bunching at the leverage limit (LTI/LTV) in the distribution of mortgages.
- The bunching mass is informative on how binding leverage constraints are.

Figure 4: (Un)constrained optimal consumption and mortgage distribution.
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**Question:** How many households are LTI-constrained?

**Procedure:** Chetty, Olsen, Pistaferri (2011) QJE

- Discretize the LTI distributions in $J$ equally-spaced bins and run:

$$
n_j = \sum_{i=1}^{p} \beta_i(z_j)^i + \sum_{s=-k}^{+k} \delta_s 1[z_j = z_{c+s}] + \epsilon_j \tag{1}$$

- Assuming smoothness, obtain the estimated counterfactual $\hat{n}_j$ as the fitted value of (1) omitting the contribution of the dummies. Then, estimate bunching mass at the LTI limit as:

$$\hat{B} = n_j - \hat{n}_j = \sum_{s=-k}^{+k} \delta_s 1[z_j = z_{c+s}] \tag{2}$$

$$\hat{b} = \frac{\hat{B}}{\sum_{-k}^{k} \hat{n}_j/(2k + 1)} \tag{3}$$
Empirical analysis: bunching at low LTIs
Empirical analysis: bunching at high LTIs
Empirical analysis: a bunching approach

What about the LTV limit?

- Same for everybody, doesn’t explain the cross-section of debt.
- House price increase induces increase in borrowing capacity
  \[ B.C. = \rho h (1 - \delta) \]

Still, there may be distributional effects of the LTV rule.

- Traditional bunching approach not very well suited
- Use pre-treatment distribution as C group.

I estimate:

\[
\hat{B} = \sum_{j=-k}^{k} \left( \bar{n}_{c+j}^t - \bar{n}_{c+j}^0 \right) ; \quad \hat{M} = \sum_{j=k+1}^{J} \left( \bar{n}_{c+j}^t - \bar{n}_{c+j}^0 \right)
\]

Where \( \bar{n}_{c+j}^t \) is the density in bin \( c + j \) at time \( t \).
Empirical analysis: bunching at the LTV limit
Conclusion

LTI limits:
- Changes in the limits induce changes in debt take-on for low income households. High income households unaffected.
- Key role played by the (costly) "explain" option: avg. estimated cost 7 bp, low income households also more likely to explain.

LTV limit:
- Increasing house prices lead to increasing borrowing capacity, "by construction" ⇒ does not limit loan amounts at origination.
- Still, LTV limits affect financing choices: further LTV tightenings induce 2x more bunching at the limit.

House Prices:
- Additional binding factor: strong positive causal effect of house prices on household debt, comparable in size with that of the LTI limit.