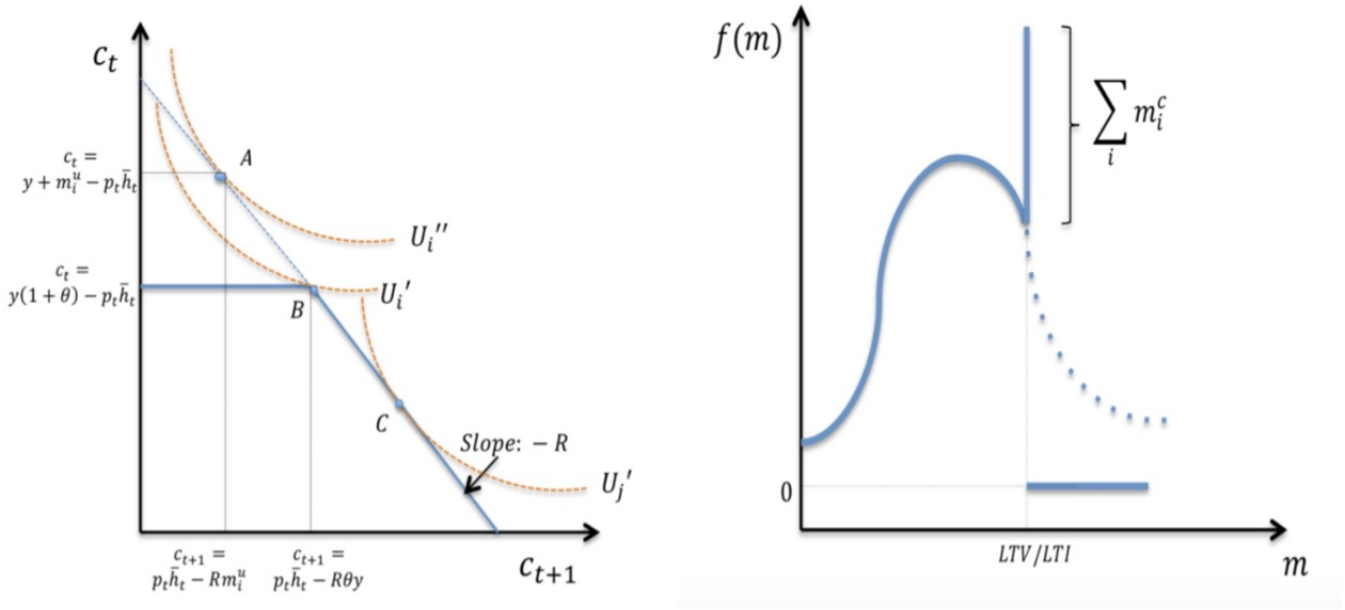
Empirical analysis: a Bunching approach

Implication from a model of borrowing:

(Brueckner (1994) JhE ; Defusco and Paciorek (2017) AEJ: EP ; Stein (1995) QJE ; Piazzesi Schneider (2016) NBER)

- 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:

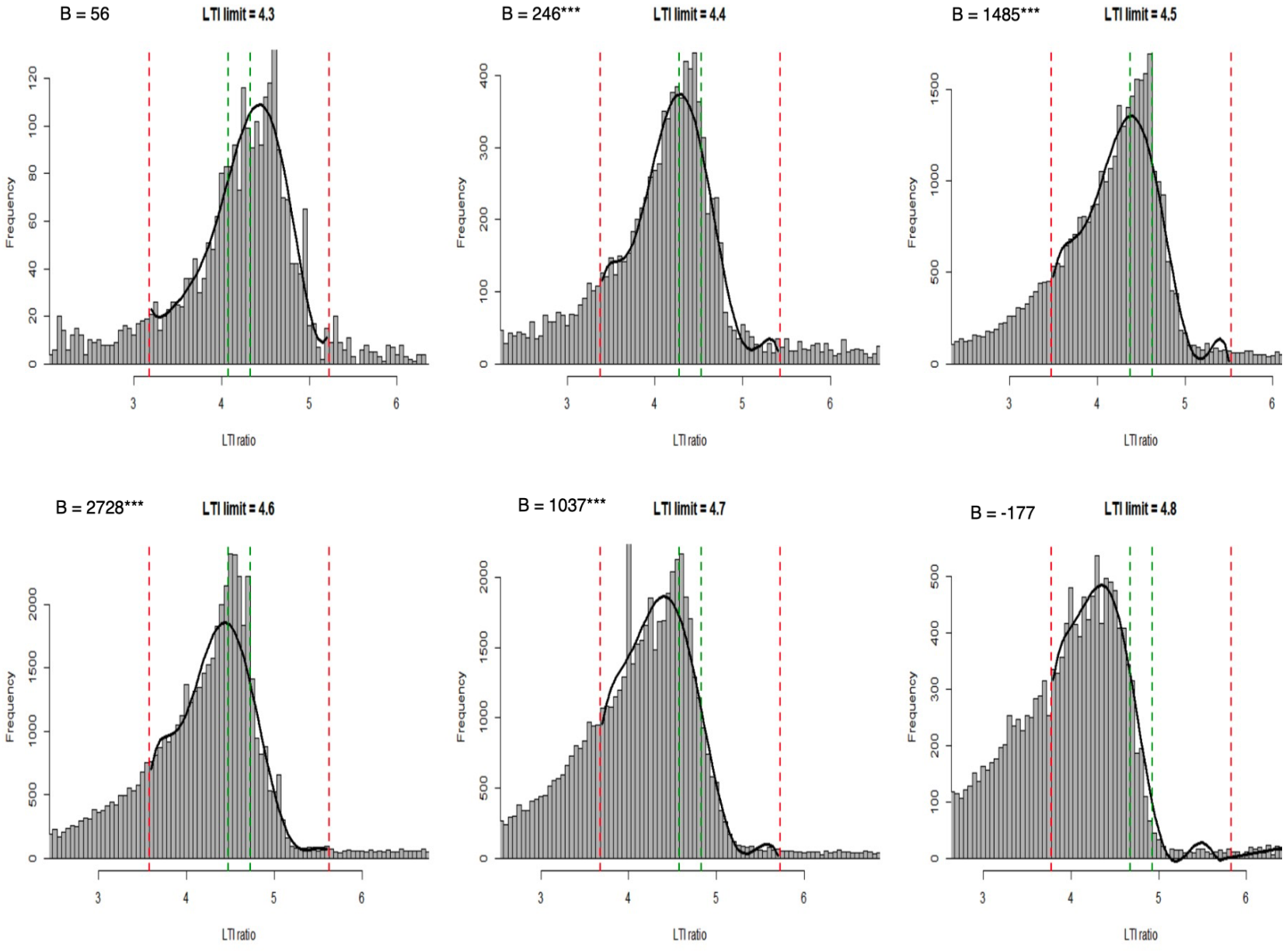
$$n_j = \sum_{i=1}^{p} \beta_i (z_j)^i + \sum_{s=-k}^{+k} \delta_s \mathbf{1}\left[z_j = z_{c+s}\right] + \epsilon_j \tag{1}$$

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

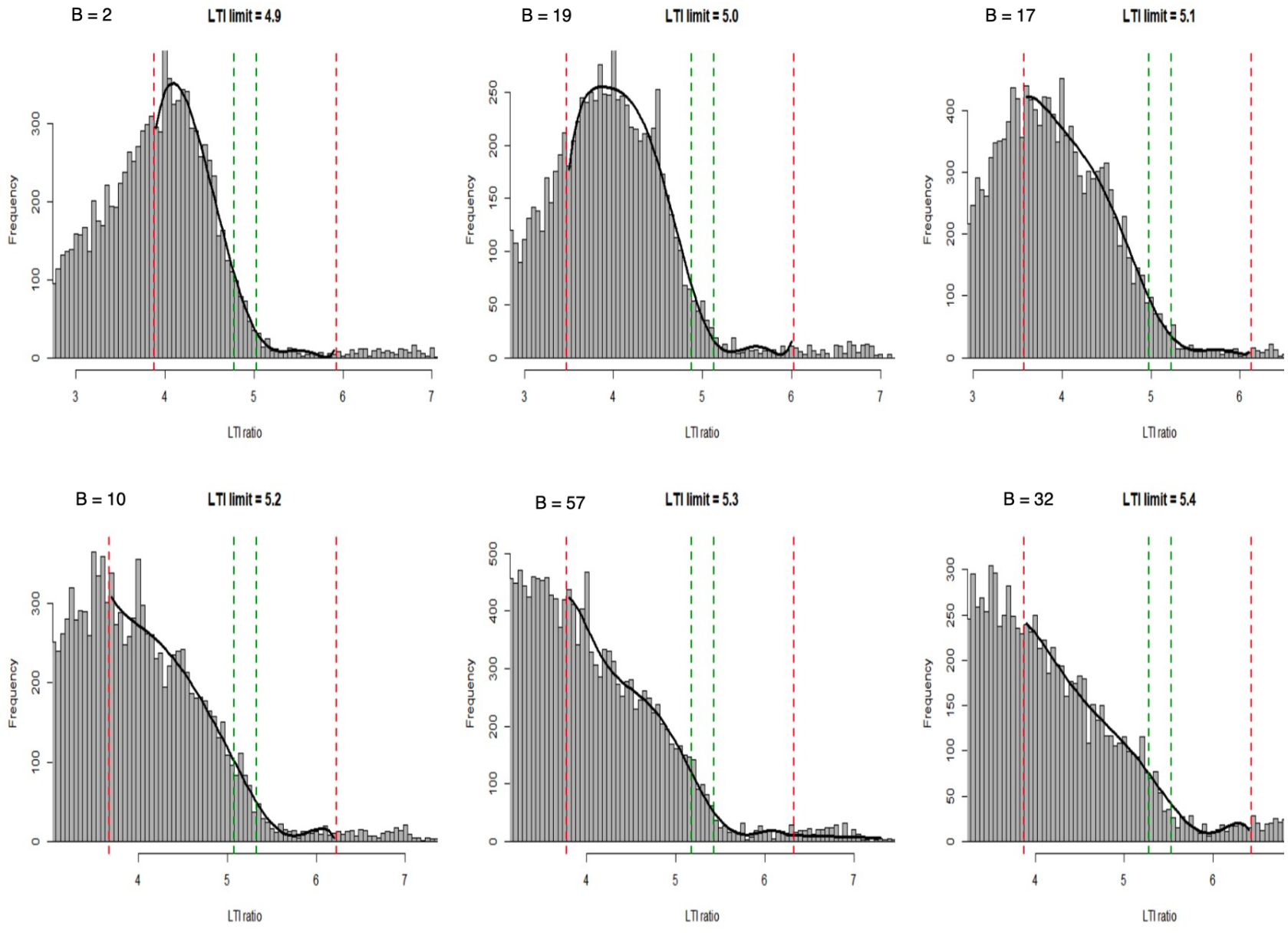
$$\widehat{B} = n_j - \widehat{n_j} = \sum_{s=-k}^{+k} \delta_s \mathbf{1}\left[z_j = z_{c+s}\right] \tag{2}$$

$$\widehat{b} = \frac{\widehat{B}}{\sum_{-k}^{k} \widehat{n_j}/(2k+1)} \tag{3}$$

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 $B.C. = p\bar{h}(1-\delta)$

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

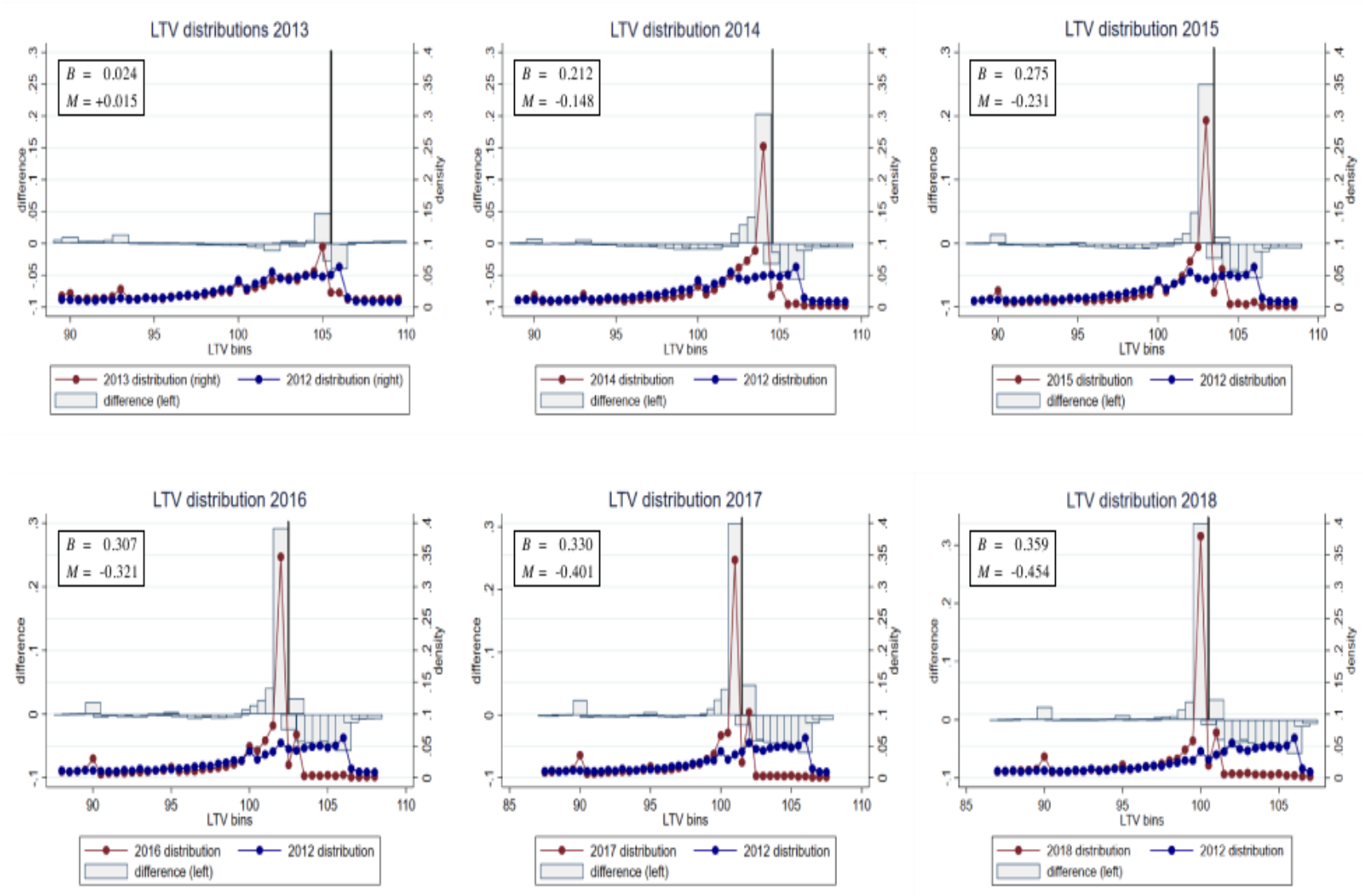
- Traditional bunching approach not very well suited
- Use pre-treatment distribution as C group.

I estimate:

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

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" $\Rightarrow$ 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.