The aggregate and distributional implications of credit shocks on housing and rental markets

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Motivation: the 2015 Irish Macro-Pru Reform

- In February 2015, the Central Bank of Ireland officially announced and directly implemented a LTV limit of 80% and LTI limit of 3.5.

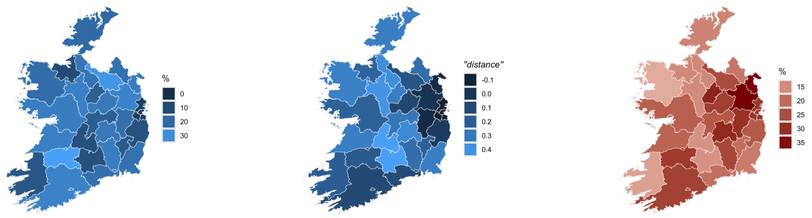


Figure 1. Counties, lending limits, house & rental price growth

- In low distance areas (mid plot), and hence more likely for the policy to bind, house price growth decelerated (left plot), while rental price growth accelerated (right plot).

Parametric approach: Acharya et al.'s (2020) strategy

- We estimate the following two regressions:

$$\Delta HP_i = \beta_0 + \beta_1 \texttt{Distance}_i + \epsilon_i \quad (1)$$
$$\Delta HR_i = \gamma_0 + \gamma_1 \texttt{Distance}_i + \nu_i \quad (2)$$

where i is county, Δ is change between 2014Q3 and 2016Q4.

- Results confirm that the reform lead to the intended reduction in house prices, but also increased rental price growth:

	Δ House prices	Δ Rents
Distance	0.289	-0.171
	(0.068)	(0.039)
Obs.	52	52
R^2	0.34	0.31

- A one standard deviation reduction in the county level distance measure is associated with 4.2% lower house prices and 2.5% higher rental rates.

The Model Economy

Household Problem

$$V(a, \underbrace{\{h, \tilde{h}\}}_{=s}, y, j) = \max_{c,a',s'} \left\{ \frac{(c\, f\,(\tilde{h}))^{1-\gamma}}{1-\gamma} + \sigma_\varepsilon \varepsilon(s) + \beta \mathbb{E} V\,(a', s', y', j+1) \right\}$$

s.t.

$$c + a' + p(\tilde{h}')h' + \mathbb{I}_{sell}\tau^h p(\tilde{h})h + \mathbb{I}_{buy}\tau^h p(\tilde{h}')h' + \delta^h p(\tilde{h})h \leq y + (1 + r\,(1 + \mathbb{I}_{a'<0}\kappa))\,a + p(\tilde{h})h + p_r(h-1)$$

$$a' \geq \begin{cases} \max\left\{-\lambda_{LTV}\, p(\tilde{h}')\, h', -\lambda_{LTI}\, y\right\} & \text{if } h' > h \\ a(1 + r(1+\kappa) - m(j)) & \text{if } h > 0 \text{ and } a < 0 \\ 0 & \text{otherwise} \end{cases}$$

$\varepsilon(s) \sim F$, extreme value type I dtb

$$m(j) = \frac{r(1+\kappa)(1+r(1+\kappa))^{J-j}}{(1+r(1+\kappa))^{J-j} - 1}$$

Production

- *Final good producer*
  - Linear technology: $Y_c = A_c N$
  - Profit max.: wage $= A_c$
- *Housing good producer*
  - Cobb-Douglas technology: $Y_h = A_h \bar{L}^{\alpha_L} S^{1-\alpha_L}$
  - Profit max.: $Y_h = A_h^{1/\alpha_L} \left((1-\alpha_L)\, p_h\right)^{(1-\alpha_L)/\alpha_L} \bar{L}$

Equilibirium

- *Housing market*
  - houses bought = houses produced + houses sold - depreciation
- *Rental market*
  - Competitive: renters meet landlords
  - p_r is determined using household's equilibrium distribution, $\mathcal{D}(a, s, y, j)$

A supply & demand illustration

- Rental supply is upward slopping
- Tighter limits force some households to **delay or cancel housing buying decisions**, which increases rental demand
- **Landlords** are only affected slightly as they are richer and hence **less constrained**
- Rent / price ratio increases and homeownership rate falls

Pre- & post-reform economies

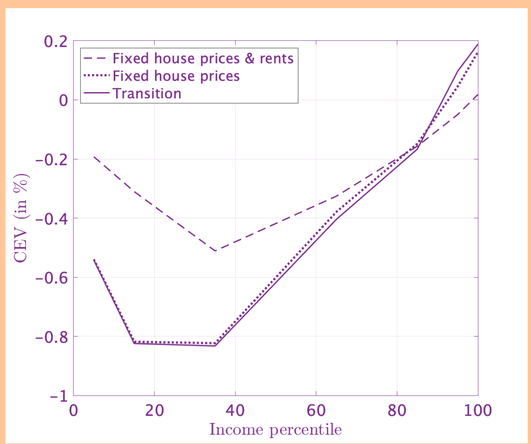
Steady state comparison

	Pre-Reform	Post-Reform	Percentage
	LTV = 100%, LTI = 6	LTV = 80%, LTI = 3.5	Change
Rent-to-Price	3.98 %	4.09 %	2.82 %
Average house price to income	4.930	4.925	-0.01%
Rent to Income	0.196	0.201	**2.73%**
Homeownership rate	79.42 %	77.59 %	**1.83 p.p.**
Share of HHs living in big house	50.41 %	50.03 %	0.38 p.p.
Share of households with 3 properties	4.29 %	4.51 %	0.22 p.p.

Transition dynamics

- Rental prices jump upon impact and continue to grow for several years until they reach their peak after 4 years (3.61%).
- House prices fall upon impact but don't overshoot, while homeownership adjusts gradually to its steady state level within the first 5-7 years.

Welfare: Consumption Equivalent Variation



Another credit shock: a permanent rise in the interest rate

Steady state decomposition

- Qualitative similar effects: increase in rents, fall in house prices and reduction of the homeownership rate.
- Quantitatively, there is a sharper rise in rents (12.7%) because they need to rise to compensate landlords for the higher return on liquid savings.

	Low Int. Rate	Decomposition	High Int. Rate
	$r^s = 0.02, r^b = 0.04$	$r^s = 0.03, r^b = 0.04$	$r^s = 0.03, r^b = 0.05$
Rent-to-Price	4.09 %	4.58 %	4.69 %
Average house price to income	4.925	4.899	4.846
Rent to Income	0.201	0.224	0.227
Homeownership rate	77.59 %	76.99 %	76.67 %
Share of HHs living in big houses	50.03 %	47.74 %	43.02 %

Welfare

- The increase in the real interest rate leads to **winners** (above mid income) and **losers** (below mid income).
- Poorer households suffer from higher rental prices.
- Richer households are net savers and benefit from higher returns on their savings and their BTL investments.

Policy Implications

1. Macro-prudential policies have **unintended consequences** on households through their impact on the **rental market.** These affect different households in distinct ways. Hence, policymakers could consider compensating households negatively affected.
2. Our real interest rate experiment suggests that **tightening cycles of monetary policy** that raise the real interest rate may benefit some households through reductions in asset prices (housing), but may make it **harder for low-income households to afford increasing rents.**