

Credit Constraints and the Composition of Home Sales. Farewell to First-time Buyers?

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Job Market Talk

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The Housing Downturn in England and Wales

- ▶ Between late 2007 and mid 2009 home prices fell by 17% and trading volumes by 60%.
 - ▶ Time series co-movement between prices and sales.
- ▶ But what happens in the cross section?

New Question

- ▶ How did sale volumes and prices change **for different segments** of the market?

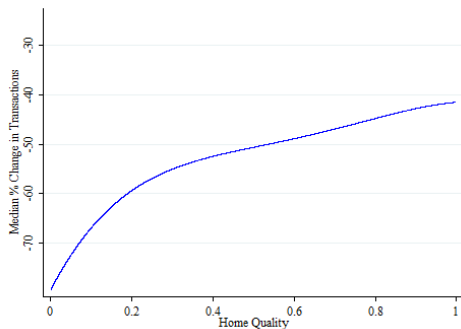
New Fact

- ▶ Drop in prices between 2007 and 2009 was similar across qualities. Transactions fell much more for low quality homes.

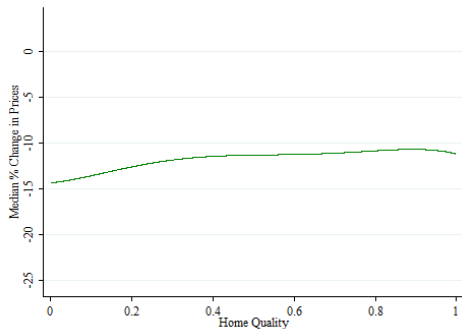
Change in Transactions and Prices by Quality

2007-2009

Transactions
(Correlation=0.2)



Prices
(Correlation=0.04)



► No available models to explain the graph on the left!

This Paper

1) New Fact: Changing Composition of Sales

- ▶ Transactions fell more for low quality homes
 - Change in composition of sales.
- ▶ Composition of sales had been stable between 2000-2007 and changed abruptly in 2008.

2) Explanation: Tighter Credit and First-time Buyers

3) Testable Implications

This Paper

1) New Fact: Changing Composition of Sales

2) Explanation: Tighter Credit and First-time Buyers

- ▶ Survey evidence suggests changing mortgage market conditions after 2008 affected young prospective buyers (NatGen (2011), LSL (2014)).
- ▶ **Hypothesis:** Tightening of credit conditions affected composition of sales.
- ▶ Mechanism formalized in a model of the housing ladder.
- **Intuition:** Young agents priced out of home ownership by older agents who keep their starter homes when moving to a better dwelling.

3) Testable Implications

This Paper

1) New Fact: Changing Composition of Sales

2) Explanation: Tighter Credit and First-time Buyers

3) Testable Implications

- ▶ Additional implications from the model used to provide evidence on the mechanism.
- ▶ Predictions regarding the rental market and the number of transactions for different age groups.

Contribution

Evolution of Housing Market Segments

- ▶ Literature studying price dynamics across segments within cities (e.g.: Landvoigt et al. (2014), Guerrieri et al. (2013), Smith and Tesarek (1991)).
 - Incorporate transactions.
 - Focus on a bust period.

Credit Constraints and Housing Market

- ▶ Theoretical literature credit constraints and housing markets (e.g.: Ortalo-Magné and Rady (2006), Stein (1995)).
 - Model relating credit, renting and the composition of sales.
 - Emphasis on 'Accidental landlords' and First-time Buyers.

Policy Relevance

- ▶ FTBs at the center of current UK housing policy debate.

Stylized Fact

The Housing Downturn by Quality Levels

Objective: Study changes in the transactions and prices across home qualities within metropolitan areas.

Data: Housing transaction records for England and Wales between 1995-2013 from **Land Registry's Price Paid Data**

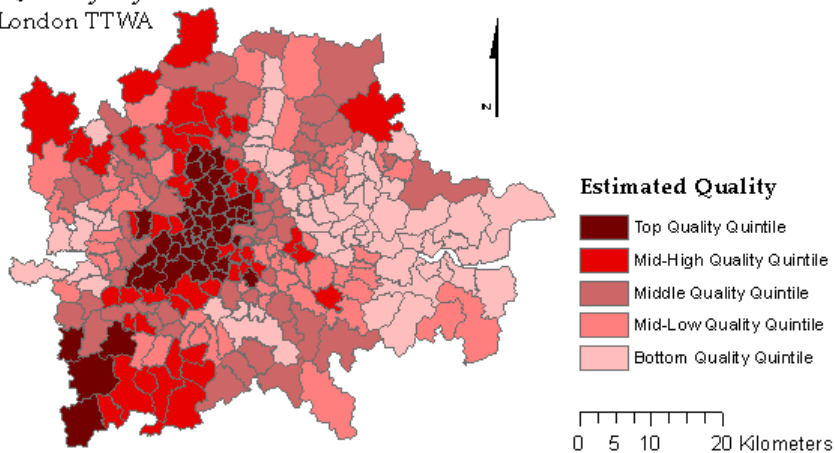
Definition of Home Quality

- ▶ $p_{it} = \delta_t^{city} + \alpha_j + \xi_{it}$.
- ▶ *Quality* is α_j (unobservable) and will be estimated.
- ▶ I am interested in exploiting **within-city** variation: Within city quality **rank** used.

- ▶ Two methods to estimate quality:
 - ▶ Location - Type Groups.
 - ▶ Postcode Districts (maps).
 - ▶ Postcode sector - Dwelling type pairs.
 - ▶ Repeat-Sales.

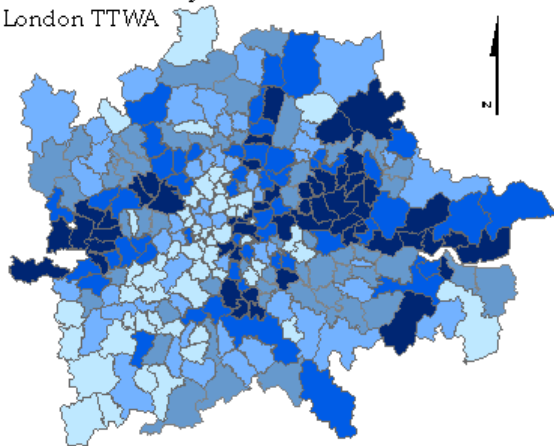
Quality by Postcode District

London TTWA



Fall in Sales by Postcode District

London TTWA



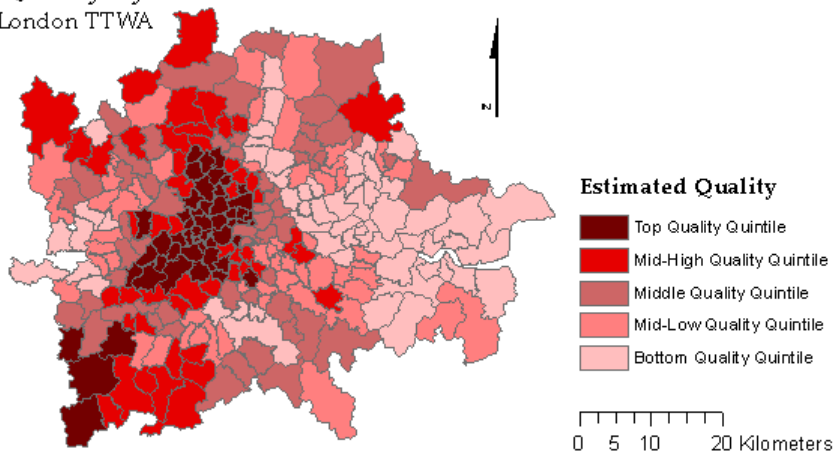
Estimated Quality

- Top Fall in Sales Quintile
- Mid-High Fall in Sales Quintile
- Middle Fall in Sales Quintile
- Mid-Low Fall in Sales Quintile
- Bottom Fall in Sales Quintile

0 5 10 20 Kilometers

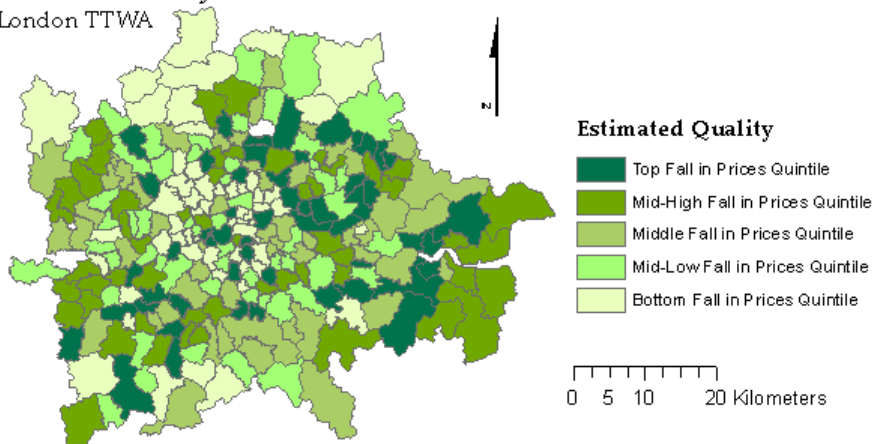
Quality by Postcode District

London TTWA



Fall in Prices by Postcode District

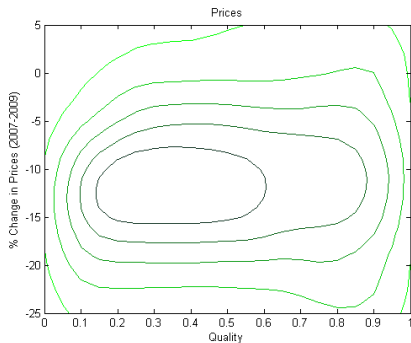
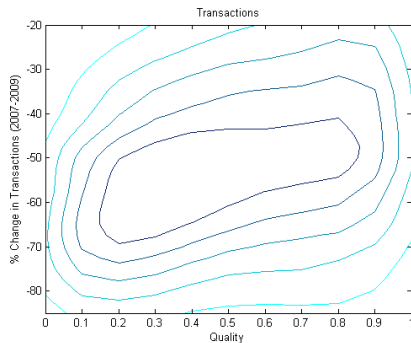
London TTWA



Location-Dwelling Type Pairs

Kernel Density Estimate

Δ Transactions and Prices Vs. Quality Rank

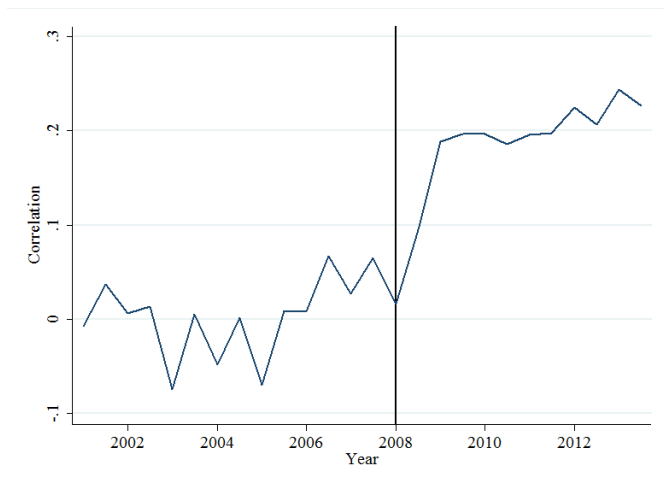


Right: Change in yearly transactions between 2007 and 2009.

Left: Change in prices between 2007 and 2009.

[Details](#)

Correlation: Quality and Transactions



- ▶ Cross sectional correlation of quality and transactions. Estimated for each semester.
- ▶ Abrupt change in 2008.

Robustness

- ▶ Location-type estimates for quality have stable ranks.
 - ▶ Estimate qualities for the 1998-2002, 2003-2007 and 2008-2012 periods and obtain rank correlation plots.

▶ Rank Correlations

- ▶ Repeat-Sales: Alternative method to estimate α_j using homes sold at least twice.
 - ▶ Results analogous to those presented above.

▶ Repeat-Sales

- ▶ Alternative definition of quality based on dwelling types (Detached Vs. Terraced) also confirms the results.

▶ Detached vs. Terraced

- ▶ Robust to including newbuilds and leaseholds or excluding transactions in rural areas.

Credit Constraints and the Composition of Sales

Credit Constraints and the Composition of Sales

“The housing market has now stabilized and has begun a slow recovery. But many first-time buyers, particularly those without large deposits, still find it hard to get a mortgage.” - **Alistair Darling, Chancellor of the Exchequer (2010)**

- ▶ I propose a model relating changing composition of sales to tightening of credit conditions.
- ▶ **Housing ladder model** - Young agents typically buy or rent a small (low type) home and some trade up to a large (high type) home when they are older.
- ▶ **Key:** Increase in the mass of old agents who retain their starter home when moving to a better dwelling.

Model Setup

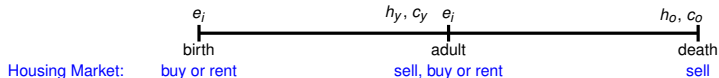
- ▶ Households live for two periods and receive fixed endowment $e_j \sim G(e)$ both periods.
- ▶ Fixed stock of housing units $\bar{S} = S_L + S_H < 2$.
- ▶ Household have preferences over housing and consumption:

$$u(c, h) = (c_y + \beta c_o)h_y h_o$$

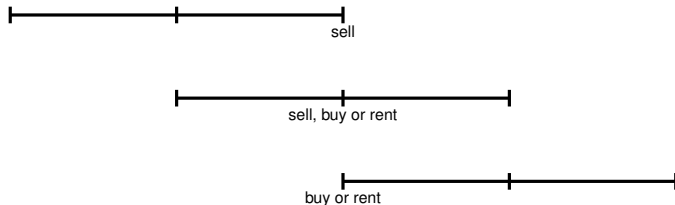
- ▶ h_o and h_y correspond to home services.
- ▶ Take values $\{\phi, 1, \psi\}$ if agents stay with the parents, reside in an L home, reside in an H home $\phi < 1 < \psi$.
- ▶ Households can buy one home in the property market per period by paying P_L or P_H or rent paying R
- ▶ Credit: Borrow up to γ as a mortgage at an interest rate r .
- ▶ Only low homes can be rented. Rent supply comes from people owning two homes.

Timing

Lifetime Decisions



Overlapping Generations



Household Problem

$$\text{Max}_{c_y, c_o, h_y, h_o} u(c, h) \quad \text{s.t.}$$

$$\begin{array}{l} \text{Intertemp.} \\ \text{Budget} \end{array} : (1+r)c_y + \frac{c_o}{1+r} = \begin{array}{l} \text{Lifetime Net} \\ \text{Income} \end{array} (e_i) \quad (1)$$

$$\text{Credit Constraint (young)} \quad (2)$$

$$\text{Credit Constraint (old)} \quad (3)$$

- ▶ Solving the household problem identifies thresholds in income (e_i) which determine the housing market allocations.
- ▶ The thresholds θ depend on (endogenous) prices and determine housing demand.

Equilibrium

- ▶ Demands are given by the mass between thresholds.
- ▶ Example: $D_y^R = G(\theta_L^y) - G(\theta_R^y)$

Equilibrium Conditions

Low type homes:

$$D_y^L(P_L, P_H, R) + D_o^L + S^R = S_L$$

High type homes:

$$D_y^H + D_o^H = S_H$$

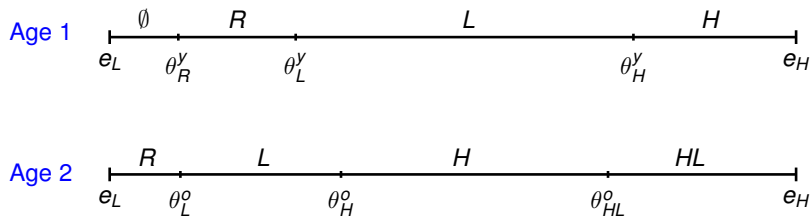
Rental market:

$$D_y^R + D_o^R = S^R$$

- ▶ I use equilibrium conditions to study how the composition of sales is affected by γ .

Equilibrium Configuration

Steady State



• Sales of Low type bottles

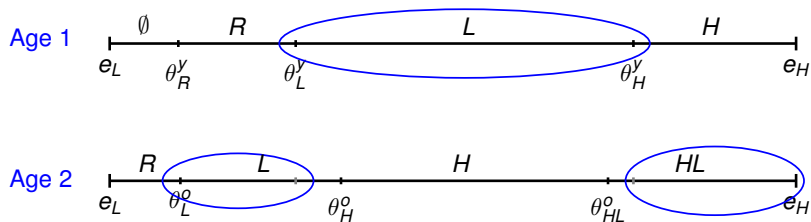
• Purchase by young first-time buyers

• Purchase by old first-time buyers

• Purchases for treatment purposes

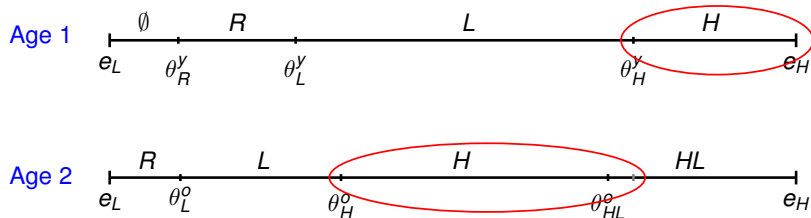
▶ Alternative Configuration

Transactions



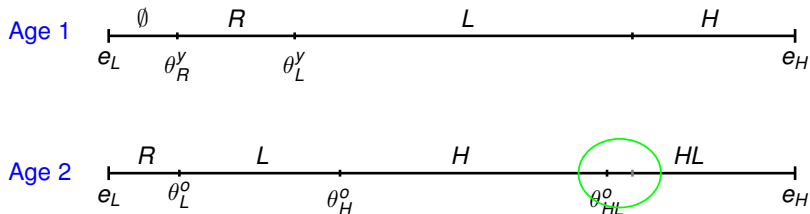
- ▶ Sales of Low type homes:
 - ▶ Purchase by young first-time buyers.
 - ▶ Purchase by old first-time buyers.
 - ▶ Purchases for investment purposes.

Transactions



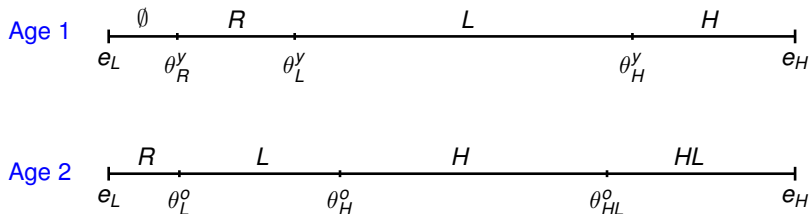
- ▶ Sales of High type homes:
 - ▶ Purchase by young first-time buyers.
 - ▶ Purchase by old trade up buyers.

Equilibrium Configuration



- ▶ Agents retaining their low type home when trading up.

Equilibrium Configuration

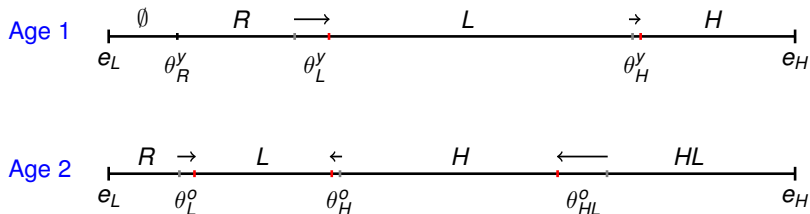


→ Increase in the number of dual owners (landlords) arising from an increase in the mass of agents moving to a high type home and keeping their low type home.

→ Change in the composition of sales.

→ Increase in the number of people living as renters.

Credit Tightening (Fall in γ)

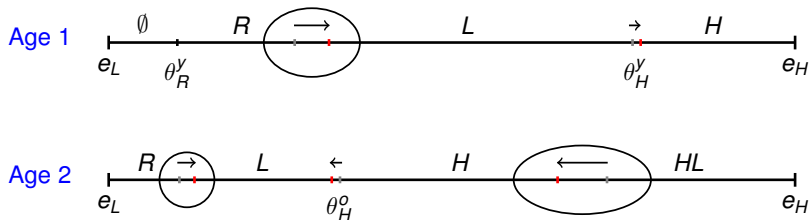


→ increase in the number of dual owners (landlords) arising from an increase in the mass of agents moving to a high-type home and keeping their low-type home.

→ Change in the composition of sales.

→ increase in the number of people living as renters.

Credit Tightening (Fall in γ)



- ▶ Increase in the number of dual owners (landlords) arising from an increase in the mass of agents moving to a high type home and keeping their low type home.
 - ▶ Change in the composition of sales.
- ▶ Increase in the number of people living as renters.

Testable Implications

Testable Implications

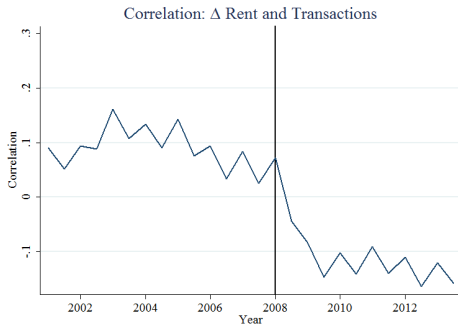
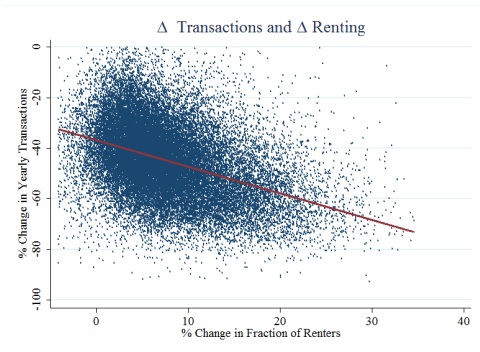
Transactions and the Increase in Renting

- ▶ Tighter credit: Negative cross sectional correlation between the change in renting and in transactions.
- ▶ Intuition: Extra rental supply coming from unsold homes.
- ▶ Test using dis-aggregated census data on housing tenure distributions and transactions.

Purchases by the young

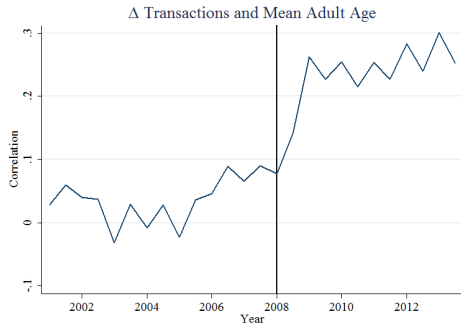
- ▶ Tighter credit: Less purchases by the young.
- ▶ Data on population structure indicates young households tend to move to *young* places.
- ▶ Test: Use census data on population structure and transactions.

Transactions and the Increase in Renting



- ▶ **Left:** Change in transactions between benchmark and crisis Vs. change in renting (2001-2011).
- ▶ **Right:** Cross sectional correlations between change in renting (2001-2011) and transactions.

Transactions and Neighbourhood Age



- ▶ **Left:** Change in transactions between benchmark and crisis Vs. mean adult population.
- ▶ **Right:** Cross sectional correlations between mean adult age and transactions.

Conclusions

- ▶ Fall in transactions was not homogeneous across qualities.
- ▶ **New stylized fact:** Trades of cheaper homes fell more and the composition of transactions changed.
- ▶ Emphasize a **new mechanism** for this change in composition:
 - ▶ More households keeping their previous home when trading up the ladder.
 - ▶ Key role of 'Accidental Landlords' and First-time Buyers.

Policy Implications

- ▶ I show how credit constraints can affect housing tenure. Provide a clear mechanism through which policies such as *Help-to-Buy* can influence home-ownership.

thank you

Alternative Explanations

Lower Internal Migration

- ▶ Geographical mobility decreased during the recession.
- ▶ Test: use internal migration data.

▶ Evidence

Loss Aversion and Negative Equity

- ▶ Seller loss aversion (Genesove and Mayer (2001)) and negative equity could affect home sales differently.
- ▶ Test: Exclude the period of high prices (2004-2007).

Income Uncertainty

- ▶ Income uncertainty increased abruptly during 2008. Mentioned as one of the barriers to home-ownership.
- ▶ Test: Data on unemployment at the TTWA level provide evidence in favour of this hypothesis.

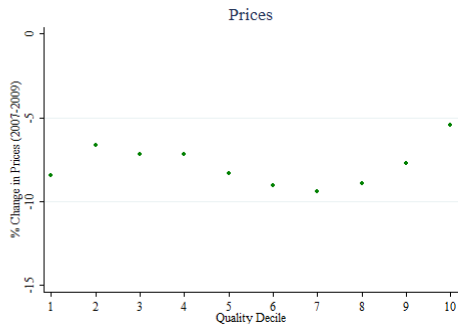
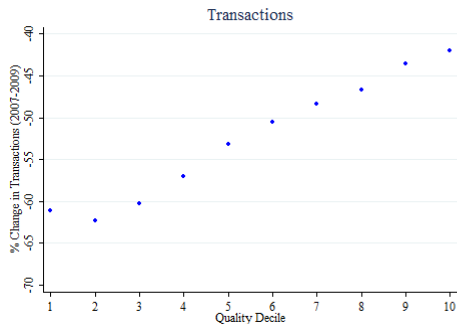
Location-Dwelling Type Groups as a Proxy for Quality

- ▶ I proxy α_j using location-dwelling type pairs.
- ▶ Estimate $p_{it} = \delta_t^{city} + \mu_j + \epsilon_{it}$
 - ▶ p_{it} - log of transaction price.
 - ▶ μ_j - 36,085 PS-DT pair groups.
 - ▶ δ_t - city specific time dummies (TTWA).
- ▶ Transactions: Calculate the change in transactions between 2007 and 2009.
- ▶ Prices: Compute change in mean prices between 2007 and 2009.
- ▶ 27,814 of these groups had at least one sale in 2007.

▶ back

Repeat-Sales

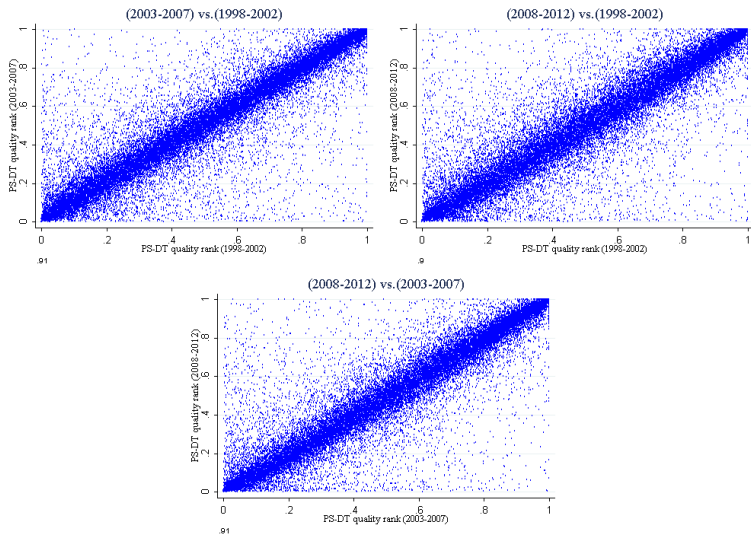
Fall in Transactions and Prices Vs. Quality Rank



▶ back

Quality Rank Correlations

Quality Rank Correlations

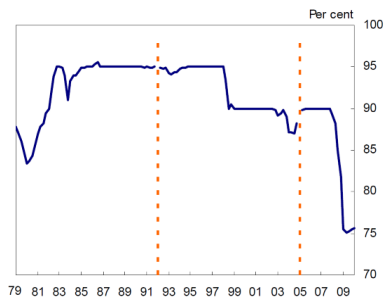


Mortgage Markets

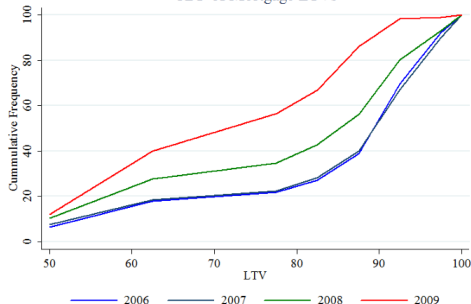
Loan To Value Ratios

- ▶ *Loan-to-Value Ratios (LTV)* - ratio of mortgage amount to home value.
- ▶ $\text{Deposit} = (1 - \text{LTV}) \times \text{Value}$.

Median LTV Ratios for FTBs

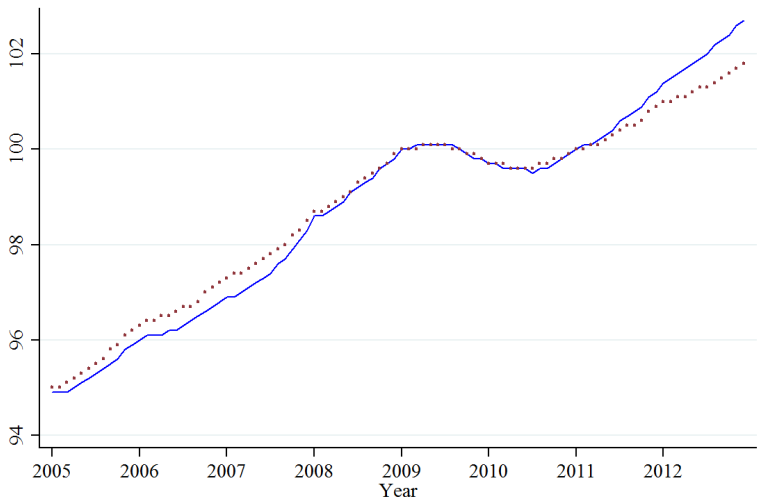


CDF of Mortgage LTVs



Left: Median LTV ratios for FTBs (source: Kuvshinov (2011)).

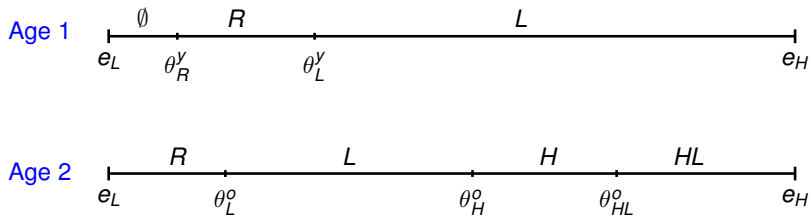
Right: Mortgage lending by LTV.



Index of Private Housing Rental Prices (IPHRP) for England.
Dotted line corresponds to the index excluding London.

Alternative Configuration

Steady State



▶ back

Household Problem

$$\text{Max}_{c_y, c_o, h_y, h_o} u(c, h) \quad \text{s.t.}$$

$$\text{Intertemp. Budget} : (1+r)c_y + \frac{c_o}{1+r} = \text{Lifetime Net Income} \quad (4)$$

$$\text{Credit Constraint (young)} \quad (5)$$

$$\text{Credit Constraint (old)} \quad (6)$$

$$\text{Lifetime Net Income} = \left\{ \begin{array}{ll} (2+r)e_i - R & (\emptyset R) \\ (2+r)(e_i - R) & (R R) \\ (2+r)e_i - (1+r)R - (r/1+r)P_L & (R L) \\ (2+r)e_i - (r(2+r)/1+r)P_L & (L L) \\ (2+r)e_i - rP_L - (r/1+r)P_H & (L H) \\ (2+r)e_i + R - (r(2+r)/1+r)P_L - (r/1+r)P_H & (L HL) \\ (2+r)e_i - rP_L - (r/1+r)P_H & (H H) \\ (2+r)e_i + R - (r/1+r)P_L - (r(2+r)/1+r)P_H & (H HL) \end{array} \right.$$

Household Problem

$$\text{Max}_{c_y, c_o, h_y, h_o} u(c, h) \quad \text{s.t.}$$

$$\text{Intertemp. Budget} : (1+r)c_y + \frac{c_o}{1+r} = \text{Lifetime Net Income} \quad (1)$$

$$\text{Credit Constraint (young)} \quad (2)$$

$$\text{Credit Constraint (old)} \quad (3)$$

$$\text{Credit Constr. (young)} : s \geq -\gamma$$

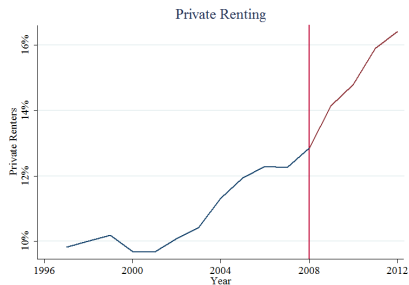
$$\text{Credit Constr. (old)} : \begin{cases} (2+r)e_i - (1+r)(R+c_y) - (P_L - \gamma) \geq 0 & \text{(L R)} \\ (2+r)e_i - (1+r)(P_L + c_y) + \gamma \geq 0 & \text{(L L)} \\ (2+r)e_i - rP_L - (1+r)c_y - (P_H - \gamma) \geq 0 & \text{(L H)} \\ (2+r)e_i - (1+r)(P_L + c_y) + \gamma + R - P_H \geq 0 & \text{(L HL)} \\ (2+r)e_i - (1+r)P_H + \gamma - (1+r)c_y \geq 0 & \text{(H H)} \\ (2+r)e_i - (1+r)(P_H + c_y) + \gamma + R - P_L \geq 0 & \text{(H HL)} \end{cases}$$

Transactions and the Increase in Renting

Table: Change in Renting and Transactions

| | (1) | (2) | (3) | (4) |
|--------------------|------------------------|------------------------|------------------------|------------------------|
| | $\Delta trans_{jt}$ | $\Delta trans_{jt}$ | $\Delta trans_{jt}$ | $\Delta trans_{jt}$ |
| Δ Renters | -0.336*** [0.00607] | -0.263*** [0.00587] | -0.267*** [0.00629] | -0.204*** [0.00683] |
| <i>Quality</i> | | 0.342*** [0.00590] | 0.348*** [0.00597] | 0.425*** [0.00779] |
| Δ Claimants | | | 0.0104 [0.00665] | 0.000744 [0.00699] |
| Δ Seekers | | | 0.0328*** [0.00533] | 0.0420*** [0.00576] |
| TTWA Effects | N | N | N | Y |
| R^2 | 0.134 | 0.263 | 0.265 | 0.326 |
| Obs. | 33003 | 33003 | 33003 | 33003 |

Buy-to-Let



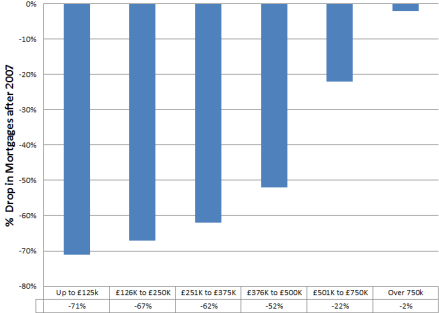
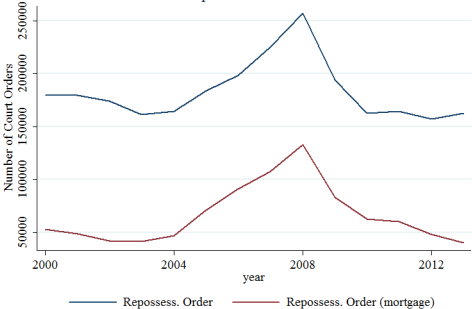
▶ back

Internal Migration

| | (1) | (2) | (3) | (4) |
|--------------------------|----------------------|----------------------|----------------------|----------------------|
| | mov_{ot}^d | mov_{ot}^d | mov_{ot}^d | mov_{ot}^d |
| $rank_o rank_d Crisis_t$ | -2.707** [1.124] | -2.707** [1.124] | -23.37*** [8.431] | 0.372 [0.269] |
| $rank_o Crisis_t$ | 1.510** [0.673] | 1.510** [0.673] | 12.76** [5.034] | -0.200 [0.147] |
| $rank_d Crisis_t$ | 1.207* [0.702] | 1.207* [0.702] | 11.27** [5.214] | -0.327* [0.181] |
| $Crisis_t$ | -1.839*** [0.485] | | | |
| Constant | 22.79*** [0.0499] | 22.68*** [0.0586] | 98.91*** [0.423] | 11.34*** [0.0237] |
| Obs. | 850208 | 850208 | 110096 | 740112 |

Repossessions

Repossession Orders



▶ back