Homeownership rates of young households in Germany

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Disclaimer

The author's views do not necessarily reflect those of the Deutsche Bundesbank or its staff.

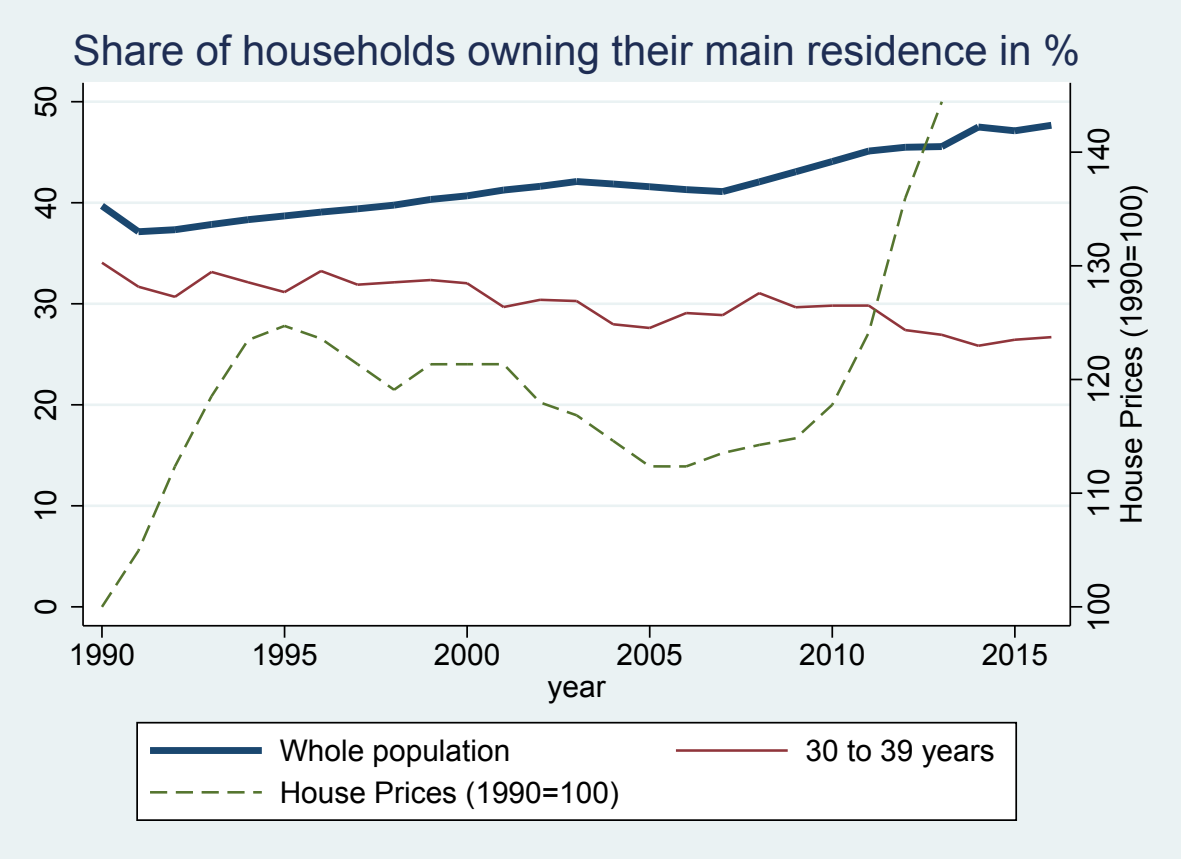
Motivation

Stylized Facts about homeownership in Germany

- Homeownership rate in Germany the lowest in the Euro Area (HFCS - Wave 2 - 2014)
  - In Germany 44% of households own their main residence
  - Euro Area average: 60%
- On average households main residence account for 60% of the value of real assets (HFCS)
- Low ownership rate one of the reason behind the relatively low median net wealth in Germany
- Since reunification homeownership rate increased from 38% to 47% in 2015 (GSOEP)

Motivation

Stylized Facts about homeownership in Germany



Own calculation based on GSOEP v32 and Jorda-Schularick-Taylor Database

Mortgagers vs. Outright Owners

Motivation

Potential reasons explaining declining homeownership rate of young housheolds

- Individuals enter the labor market increasingly with higher age
- Increasing uncertainty for young professionals See here
- Credit constraint due to a delayed start of capital accumulation
- Strong price increases for real estate since 2010 (e.g. in +25% in Germany between 2010 and 2015)
- Peaks in urban areas (e.g. in +65% in A-Cites between 2010 and 2015)
  - Young people increasingly live in urban regions See here

Affordability Analysis

Affordability Model

Assumpiton: Price may not exceed a household's maximum affordability

$$A_{i,c,t} = 1 \text{ if } MA_{i,t} \geq P_{i,c,t}$$
$$= 0 \text{ otherwise} \quad (1)$$

Maximum Affordability, $MA_{i,t}$

- Financial assets, $FA_{i,t}$
- Max. credit volume, $K_{i,t}^{max}$

$$\Rightarrow MA_{i,t} = FA_{i,t} + K_{i,t}^{max}$$

Purchase price, $P_{i,c,t}$

- Av. price per m^2, $p_{c,t}$
- Size of the residence $S_{i,t}$
- Transaction costs, $\theta_{c,t}$

$$\Rightarrow P_{i,c,t} = p_{c,t} * S_{i,t} * (1 + \theta_{c,t})$$

Affordability Model

Maximum credit volume is subject to an *income constraint* and a *wealth constraint* (e.g. Albacete & Lindner, 2017)

Wealth constraint

- Financial assets, $FA_{i,t}$
- Max. loan-to-value, LTV

$$\Rightarrow K_{i,t}^{max} = \frac{FA_{i,t}}{1-LTV} * LTV$$

Income constraint

- Disposable income, $I_{i,t}$
- Debt service-income ratio, κ
- Mortgage interest rate, r
- Time to repay the mortgage, $\eta_{i,t} = 65 - age_{i,t}$

$$\Rightarrow K_{i,t}^{max} = \kappa I_{i,t} \frac{1-(1+r)^{-\eta_{i,t}}}{r}$$

The lower value is binding

$$K_{i,t}^{max} = min\{\frac{FA_{i,t}}{1-LTV} * LTV; \kappa I_{i,t} \frac{1-(1+r)^{-\eta_{i,t}}}{r}\} \quad (2)$$

Affordability Model

$$p_{c,t} \leq \frac{FA_{i,t} + min\{\frac{FA_{i,t}}{1-LTV} LTV; \kappa I_{i,t} \frac{1-(1+r)^{-n_{i,t}}}{r}\}}{S_{i,c} * (1+\theta_{c,t})} \tag{3}$$

Options to react to a price increase affecting affordability

- Adjustment of credit conditions, κ, LTV, r, or η
- Reduction of size of dwelling, $S_{i,t}$
- Postpone decision to buy a house

Affordability Model

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Empirical evidence based on GSOEP

- Purchase decision affected by prices, financial endowment, marital status and number of children Cox Regression
- Size of dwelling influenced by price development, and financial situation OLS Regression

Application of affordability model with a focus on LTV

Affordability analysis using PHF waves 1 and 2

Share of tenant households with reference person aged 30-39 able to afford a 90-m^2 dwelling in the region of residence.

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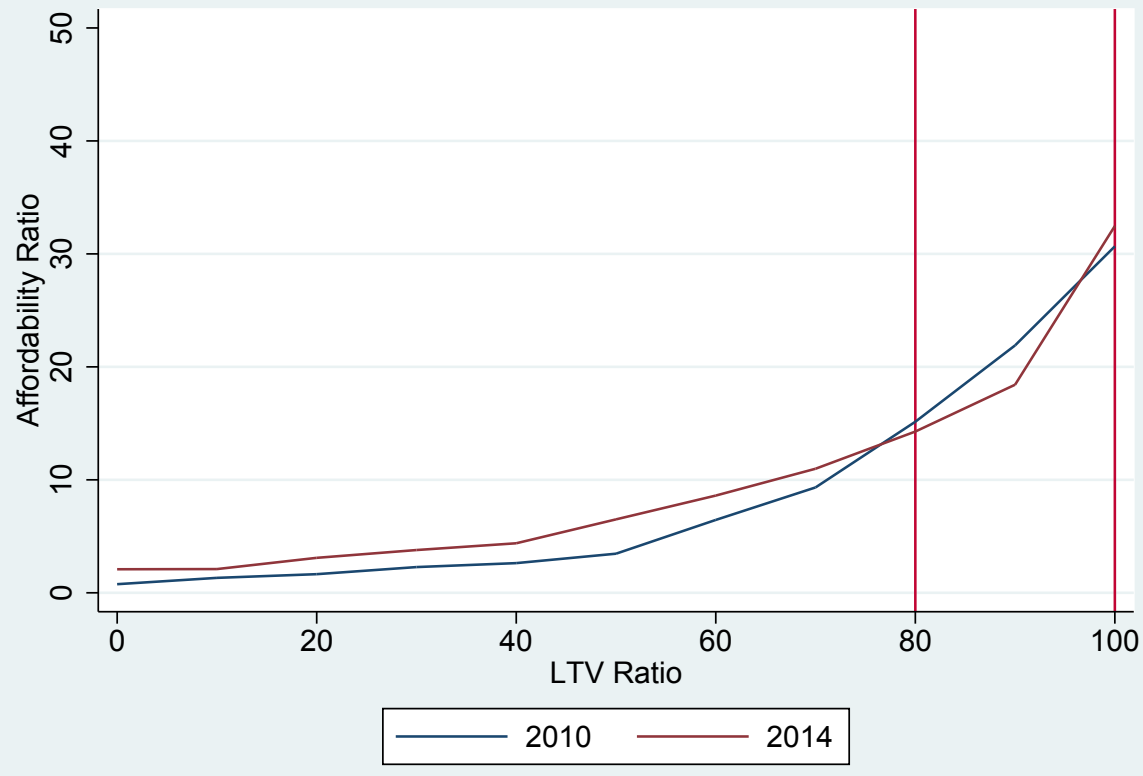


Quelle: PHF und Bulwiengesa

LTV and Mortgage Rates

Positive correlation between LTV and mortgage rate

- Banks bear higher risks with higher LTV ratios (see e.g. Qi & Yang, 2009)
- Maximum observed LTV raises the probability of a real estate boom by capturing relaxed lending standards (Cerutti et al., 2017)
- European bank survey provides evidence that an increase of a LTV ratio from 50% to 95% leads to a higher mortgage rate of up to 60 basis points (Drudi et al, 2009)

LTV and Mortgage Rates in Germany - Sample Design

Data: PHF 2014

- Sample consists of household serving a mortgage for HMR
- Sample restricted to mortgages with LTV ratio of 50%-120%
- HMR purchased up to 15 years prior survey
- Investigation at the household level as well as for single credits
- Only mortgages with main purpose to purchase HMR
- Household level: Mortgage rate calculated as weighted average of mortgage rates with respect to credits' original value
- Credit level: Only credits accounting for at least 30% of original credit volume
- Sample Size: 260 households and 326 credits
- Regressions and variance estimation based on five imputations and 1,000 replicate weights

LTV and Mortgage Rates in Germany - Estimation

$$i_{hh,t} = \sum_{c=1}^{C} w_{c,0} * i_{c,t} = \alpha + \beta * LTV + \gamma * X + \epsilon_{hh,t}$$

Measurement of LTV: PHF 2014

LTV: Sum of the original values of the issued mortgages is divided by the purchasing price

1. Linear term of LTV
2. Two categories with a LTV ratio of 80% as threshold
3. Four categories with 60%, 80%, and 100% as thresholds

Covariates

- Fixed interest rate
- Credit volume (log values)
- Individual characteristics (age, gender, education)
- Year of purchase/credit origination

LTV and Mortgage Rates in Germany - Results PHF 2014

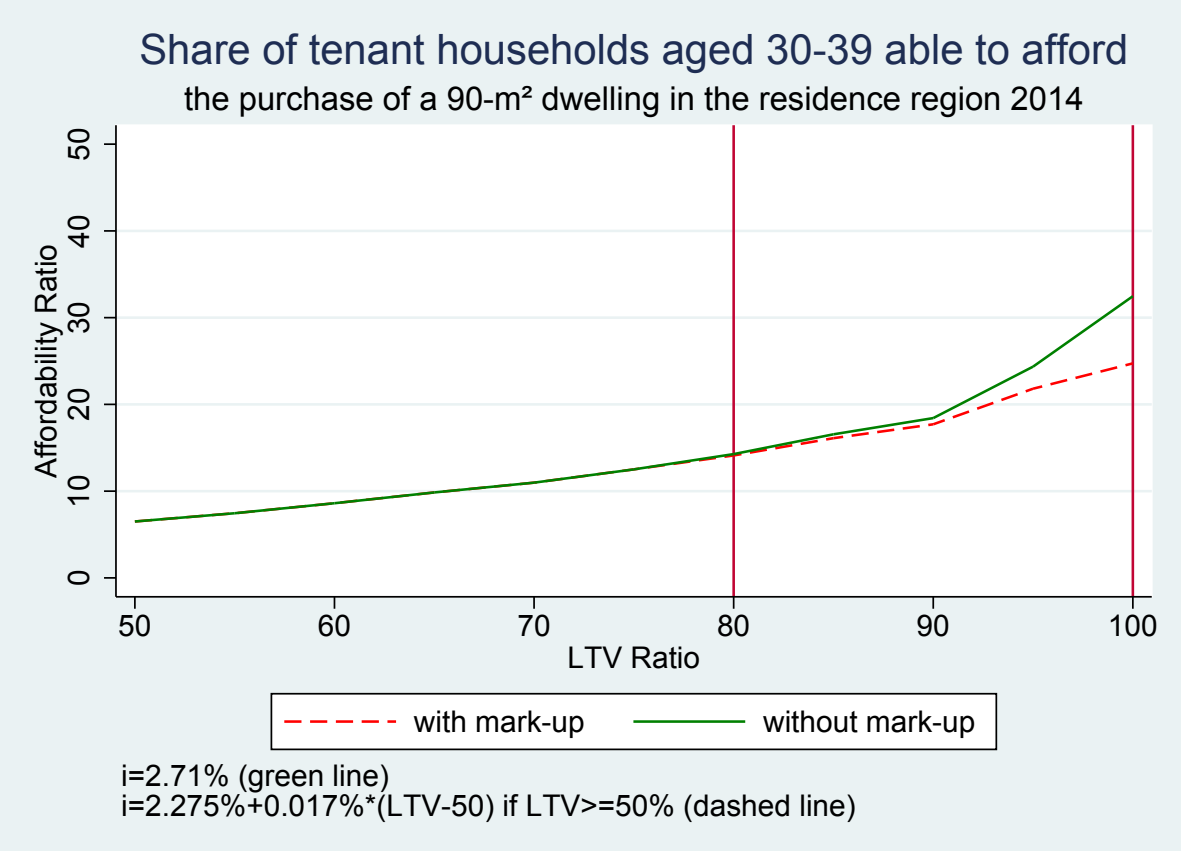
Dependent Variable:						
Mortgage Rate	Household			Credit		
LTV (linear)	0.017*			0.017**		
LTV: [60%-80%)		0.030			-0.053	
LTV: [80%-100%)		0.613**			0.474**	
LTV: 100% plus		0.815			0.770*	
LTV: 80% plus			0.669**			0.616***
fixed interest rates	0.691**	0.609*	0.598*	0.967***	0.888***	0.877***
ln(credit volume)	-0.243	-0.219	-0.220	0.159	0.185	0.180
Observations	259	259	259	326	326	326

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Dummies for individual characteristics (age, gender, education) and year of purchase included.

Findings

- Increased risk for bank (high LTV) is reflected in higher mortgage rates
- LTV ratio ↗ 10 percentage pts ⇒ mortgage rate ↗ 17 basis pts
- Mortgages with a LTV ratio above 80% ⇒ mortgage rate ↗ 60 basis pts
- Fixed rates coincide with higher mortgage rates

Affordability analysis - PHF 2014 including estimation results



If borrowers account for increased risks via mark-ups, LTV cap becomes less efficient

Summary & Outlook

Summary and Outlook

Major Finding

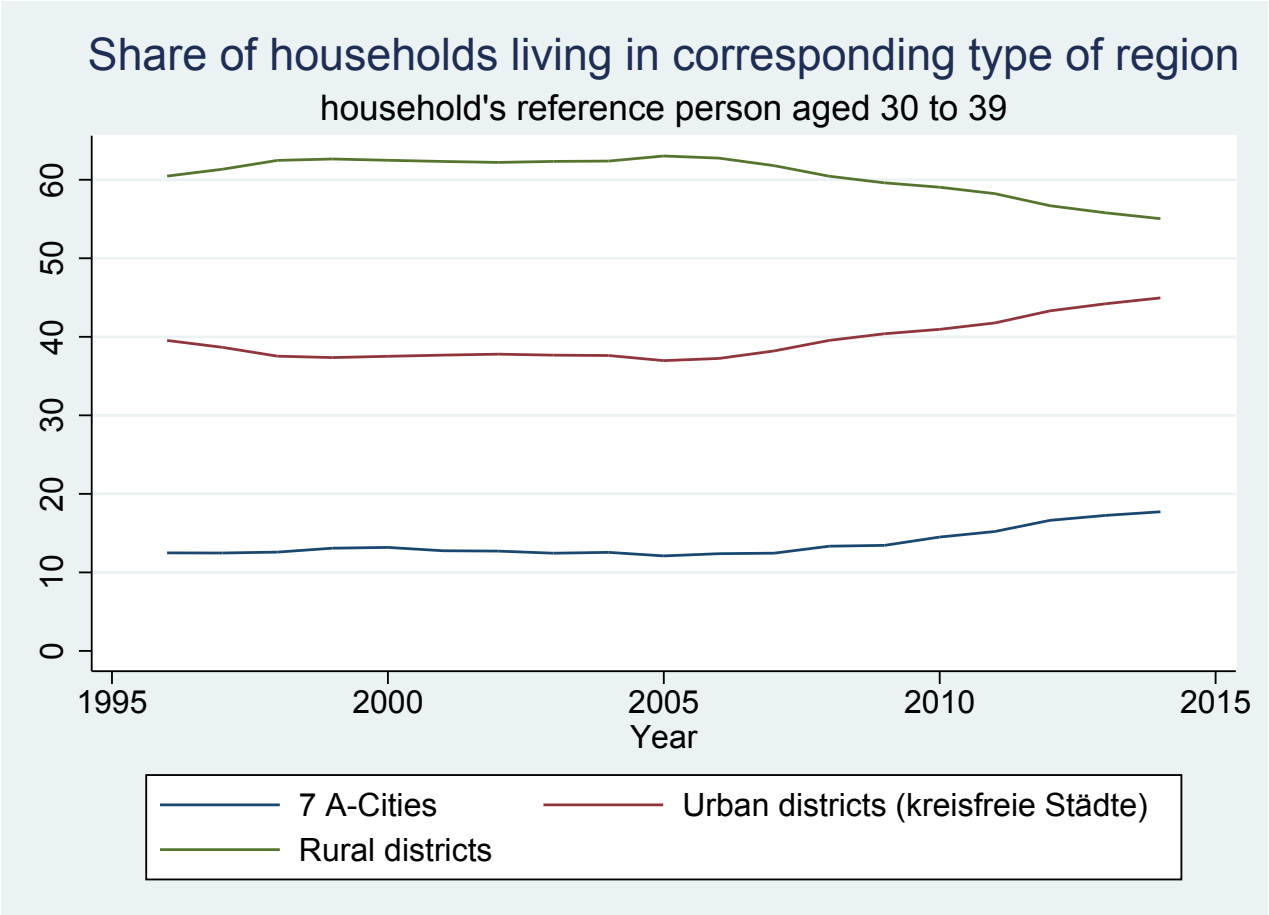
- Several reasons for declining homeownership/delayed purchase decision of young households
- Many young households are credit constraint
- Improved borrowing conditions offset by increased real estate prices
- Introduction of LTV cap could affect affordability of young tenant households
- Macroprudential instrument would be efficient under relaxed lending behavior

Outlook

- Quantifying the effects of declining homeownership/delayed purchase decision of young households in Germany
- Assessing long-run consequences on financial stability

Appendix

Regional Distribution of households since 1991



Own calculation based on GSOEP v32

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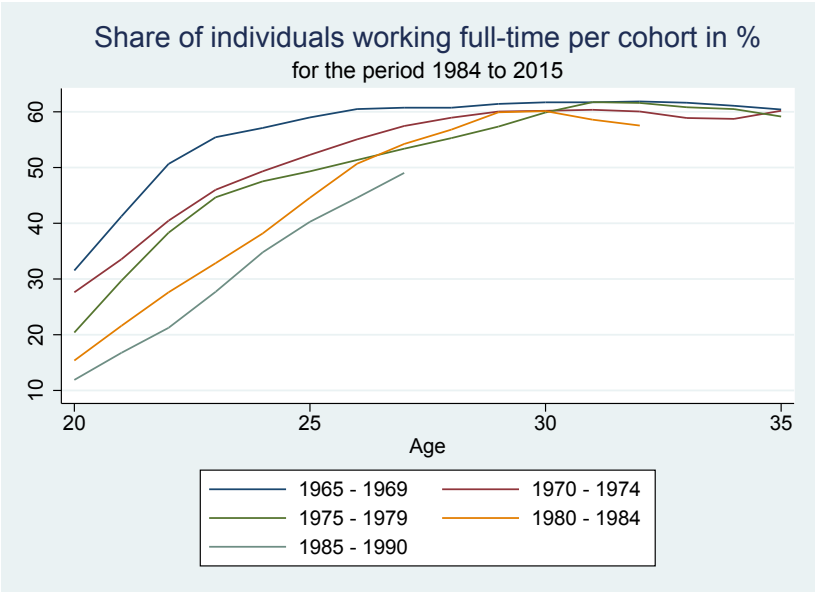
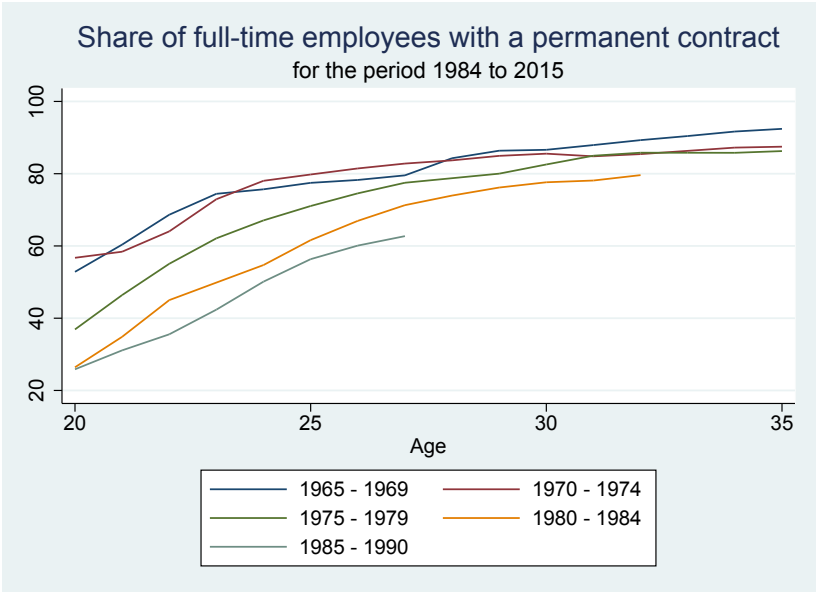
Labor Market in Germany





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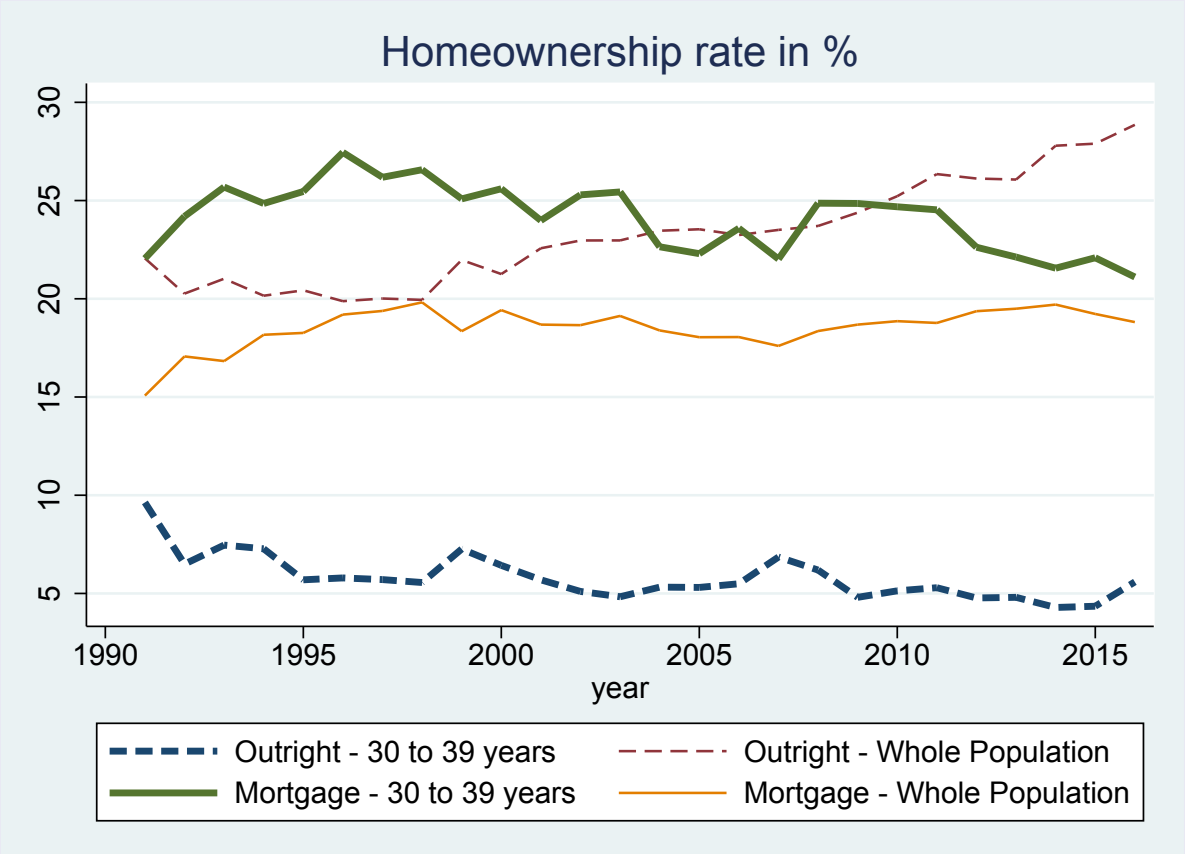

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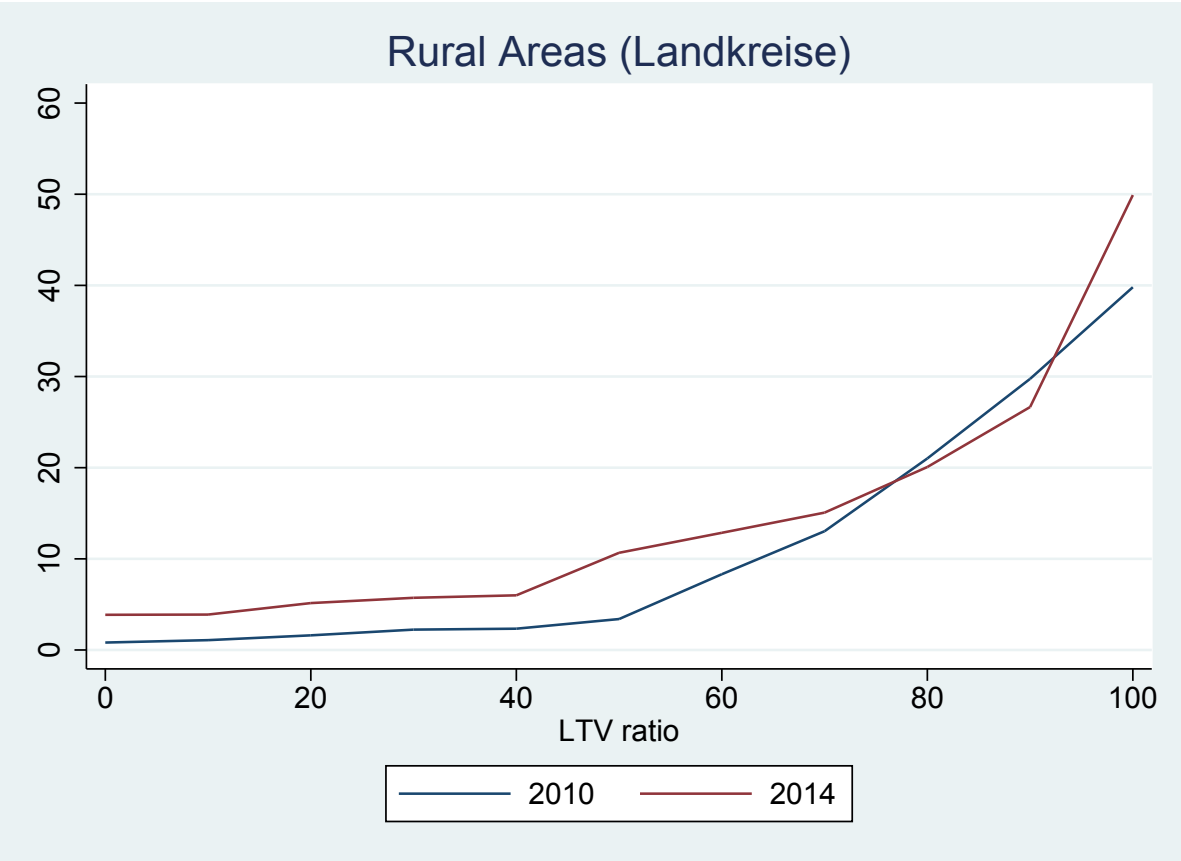

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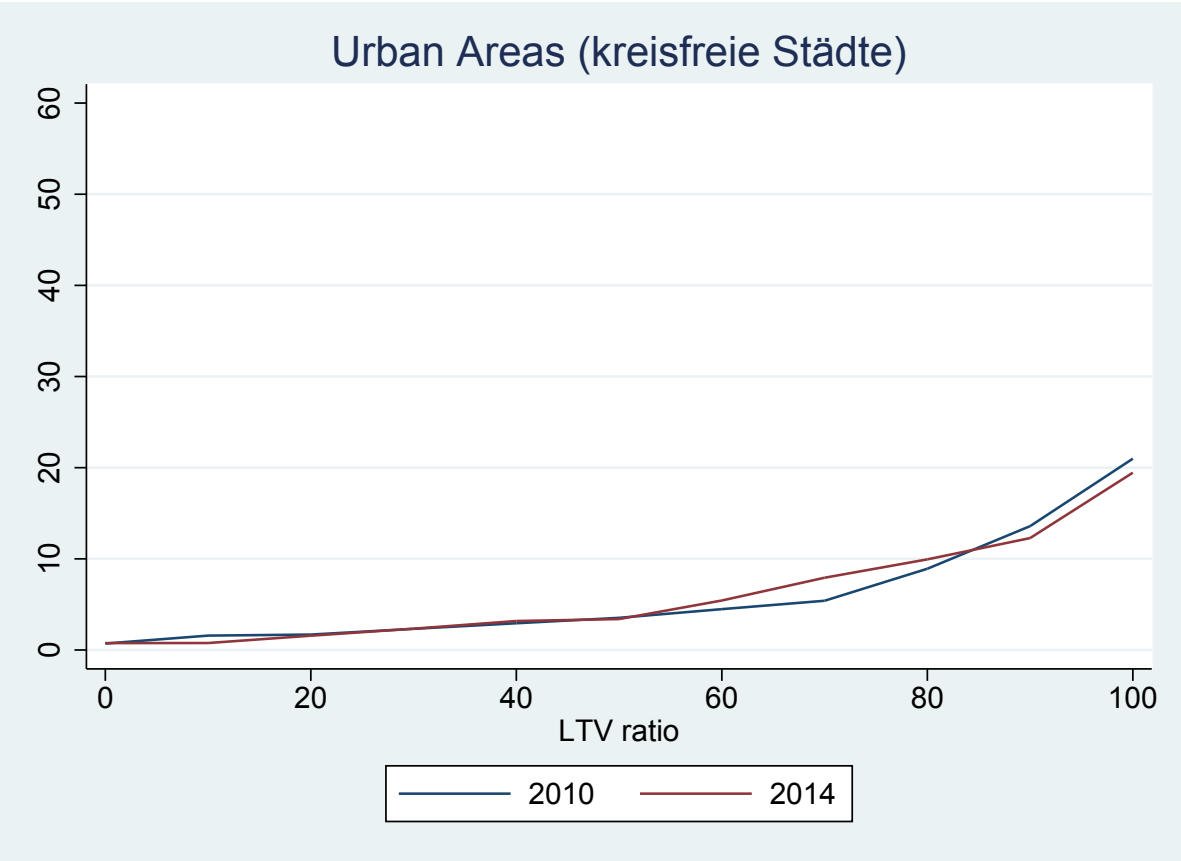

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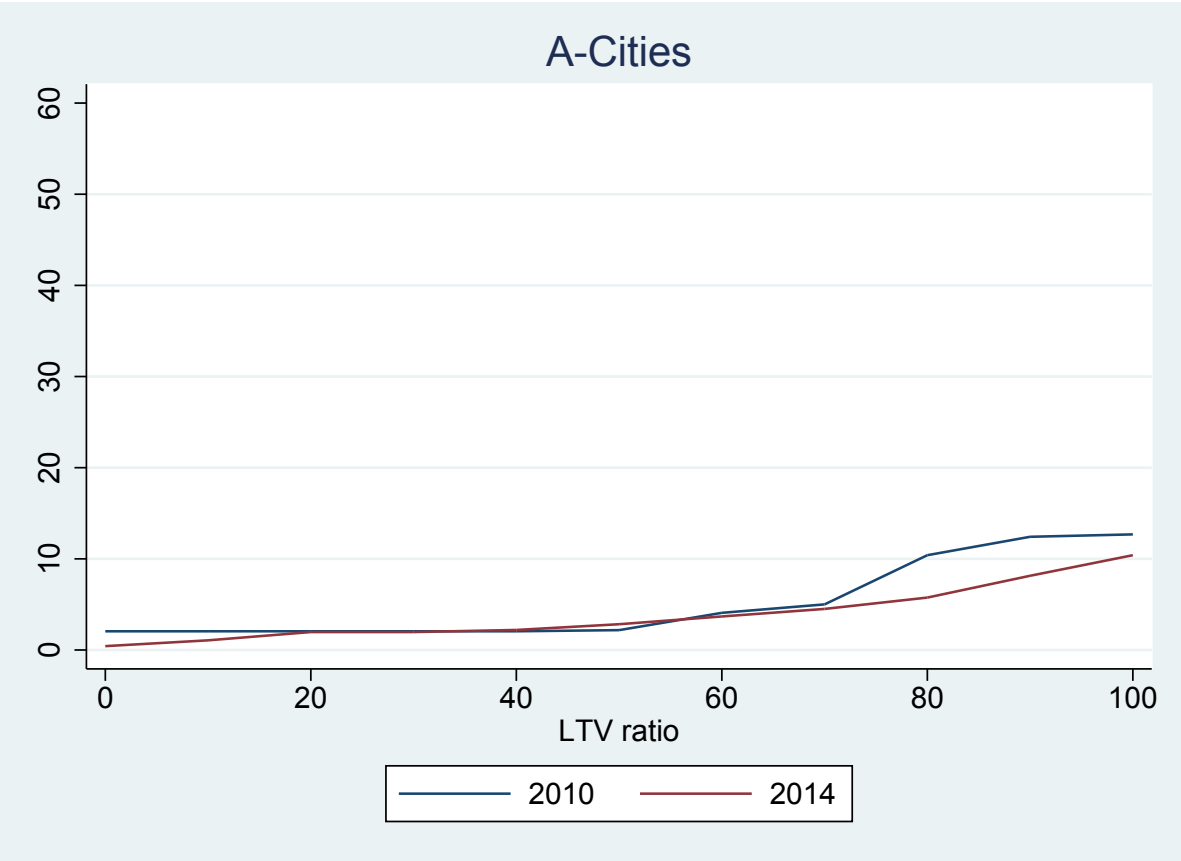

Cox-Regression estimating the hazard rate of house purchase

Birth cohorts	1970-90	1970-79	1980-90	1970-90	1970-79	1980-90
Price-Income-Ratio	-0.170***	-0.210***	-0.101***			
	(0.023)	(0.029)	(0.039)			
log(sqm-price$_{c,t}$)				-1.399***	-1.611***	-0.930***
				(0.189)	(0.224)	(0.352)
log(income)	1.154***	1.237***	1.007***	1.164***	1.242***	1.011***
	(0.104)	(0.126)	(0.192)	(0.104)	(0.126)	(0.191)
log(Fin.Assets)	0.065***	0.056***	0.081***	0.066***	0.057***	0.081***
	(0.015)	(0.017)	(0.029)	(0.015)	(0.017)	(0.029)
Observations	15,028	9,533	5,495	15,028	9,533	5,495
Log-Likelihood	-3,629.8	-2,595.3	-812.1	-3,631.5	-2,598.7	-812.1

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OLS Regressions on Size of purchased real estate

Dependent Variable	log(m^2 p.c.)	log(m^2)	m^2	log(m^2 p.c.)	log(m^2)	m^2
log(sqm-price$_{c,t}$)	-0.170***	-0.171***	-25.89***			
	(0.063)	(0.063)	(7.978)			
Price-Income-Ratio				-0.021***	-0.021***	-3.018***
				(0.007)	(0.007)	(0.930)
Equivailized HH-Size		0.513***	81.25***		0.524***	83.08***
		(0.193)	(24.24)		(0.192)	(24.23)
log(income)	0.319***	0.314***	36.033***	0.318***	0.313***	35.853***
	(0.036)	(0.036)	(4.523)	(0.036)	(0.036)	(4.520)
log(Fin.Assets)	0.010**	0.010***	1.026*	0.010**	0.010**	1.037*
	(0.005)	(0.004)	(0.567)	(0.004)	(0.005)	(0.567)
Observations	649	649	649	649	649	649
R^2	0.307	0.307	0.268	0.309	0.308	0.268

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