The Price of Leverage: Learning from the Effect of LTV Constraints on Job Search and Wages

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The views expressed here are those of the authors, and not necessarily those of the Norges Bank.

Background

- **Household leverage** is crucial for the economy
  → With **benefits**

The New York Times

IN THE NATION

IN THE NATION; Why Owning a Home Is the American Dream

By Anthony Depalma

OCT 12, 09:55

UN chief calls for easier credit to offset rising inequality

William Langley in Hong Kong

The UN secretary-general has called on global institutions to ease the flow of credit to poorer countries to offset rising inequality caused by the coronavirus pandemic.

António Guterres told the IMF that the pandemic had forced 100m people into poverty at a time when 4bn had little to no income support, healthcare or social benefits.

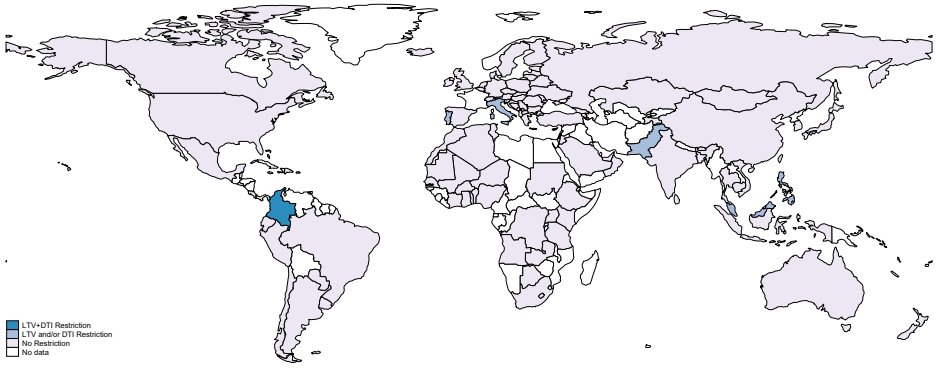
He called on international institutions to expand liquidity in poorer countries by reallocating unused special drawing rights, expand and extend a World Bank scheme to suspend debt servicing costs for low-income countries, and roll out an international framework for public and private debt relief.

Guterres said that access to liquidity was preventing some countries from bouncing back, noting that advanced economies were investing 28 per cent of their gross domestic product in economic recovery, while least developed countries were investing

Background

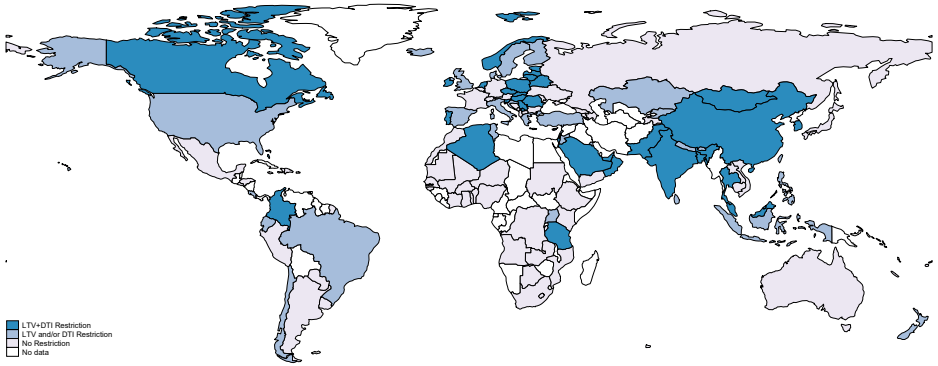
- **Household leverage** is crucial for the economy
  → With **benefits** and **costs**

Countries with macroprudential policies for household leverage until 2000



Only few countries had macroprudential policies for household leverage in 2000

Countries with macroprudential policies for household leverage until 2018



Many advanced and emerging countries have implemented macroprudential policies recently

Research Question

Question: Does **household leverage** affect **wages** through its influence on **job search**?

→ New insights into effects of household leverage

→ Useful for developing better tools to cope with consequences of high household leverage

This paper

To investigate how household leverage influences job search and wages, this paper uses

→ **Data:** Individual level **labor market** and **balance sheet** data from Norway

→ **Shock:** **LTV ratio restriction**

→ **Sample:** **Displaced workers** who recently bought a house

Results

- We find that a **decrease in household leverage improves wages**
  $\rightarrow$ 25% decline in debt-to-income ratio improves wages by 3.3 pp
- Leverage forces displaced workers to accept job offers sooner $\rightarrow$ **Lower leverage enables workers to stay unemployed longer**
- Displaced workers with lower leverage are more likely to do a **different occupation** with their new employer and switch to a **different industry**
- Displaced workers with lower leverage find jobs at **better paying firms**
- Effect is stronger for **young**, **more educated**, and displaced workers with **shorter tenure** with their previous employer

Empirical Strategy

Empirical strategy

To estimate the causal effect of the borrowing restriction on job search and wages, we need

1. Job search behavior not triggered by individual characteristics
2. Implementation of a borrowing restriction

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To estimate the causal effect of the borrowing restriction on job search and wages, we need

1. Job search behavior not triggered by individual characteristics
2. Implementation of a borrowing restriction

Use the introduction of an **LTV ratio restriction** with a sample of **displaced workers** who had bought a home before losing their jobs

Displaced workers

- **Displaced workers**
  → A worker is displaced if she lost her job due to a mass layoff
  → Mass layoff is a case where firm loses at least 30% of its employees in a year, or stops existing
- Displaced workers' job search is not triggered by individual characteristics
- **Unobserved individual characteristics** can trigger a job switch
  → LTV restriction can interact with individual characteristics
  → Selection bias

LTV ratio restriction

- Due to strong growth in house prices and household debt levels, LTV ratio restriction is introduced in 2011
- **LTV restriction** puts a cap on mortgage amounts relative to home value
  $\rightarrow$ **85%**
  $\rightarrow$ Covers all loans to the same property
- Some workers have **smaller mortgages** due to this restriction

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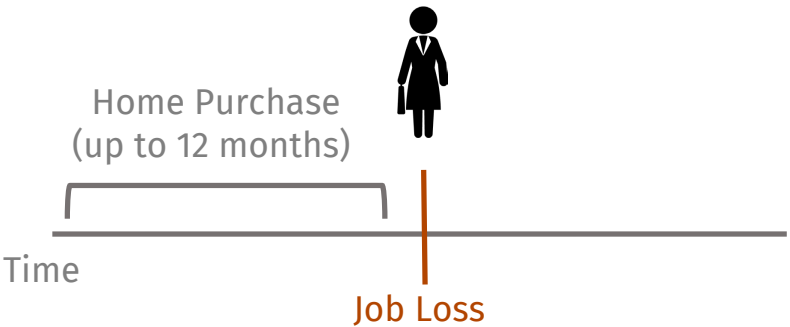
Displaced workers + **LTV restriction** $\Rightarrow$ **Two challenges**

Recent homebuyers

LTV ratio restriction has to be important for displaced workers

→ Restrict displaced workers with the ones who bought a home before losing their jobs



Recent homebuyers

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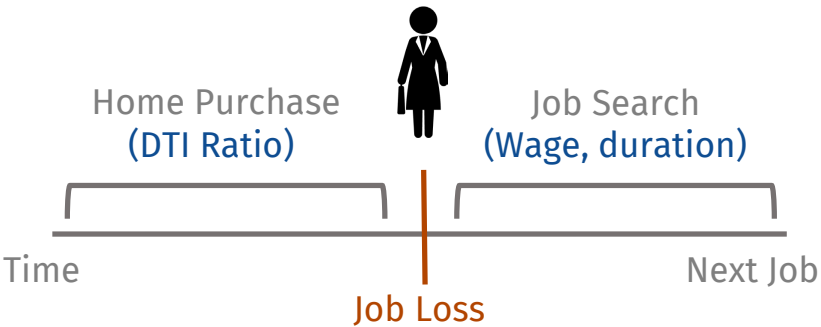
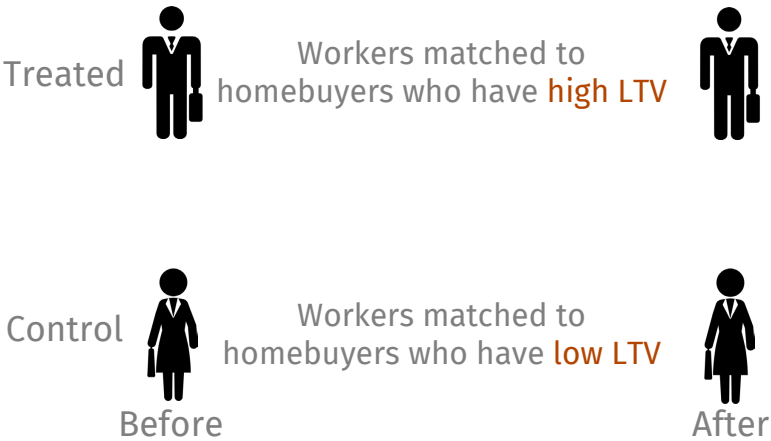


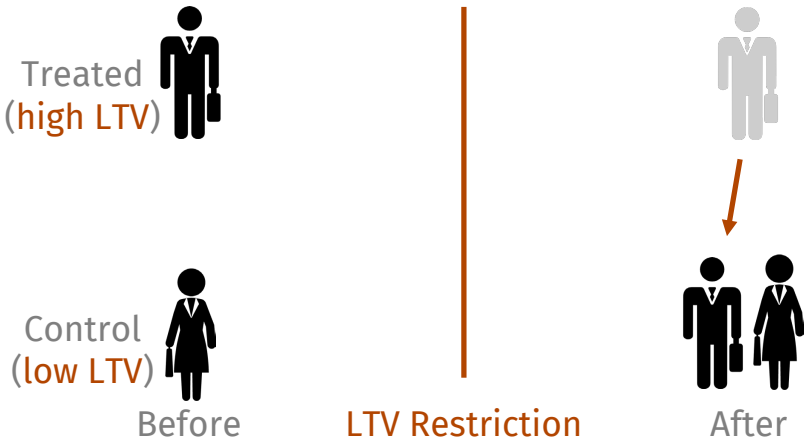
Matching

- LTV ratio restriction is applied to **all new homebuyers**
  $\rightarrow$ We do not have a variable that tells which workers are affected by this restriction
  $\rightarrow$ Before the restriction, 1/3 of the sample has LTV ratios below the threshold
- How can we **distinguish affected workers from unaffected ones**?
- **Homebuyers before the restriction** provides useful information to tell which workers would have obtained a higher LTV ratio if restriction were not implemented
- **Match workers** in the regression sample to homebuyers before the restriction using individual characteristics
- Use **Random Forest** for this matching

Matching


Treated
Workers matched to homebuyers who have high LTV
Control
Workers matched to homebuyers who have low LTV
Before
After

Matching


Treated
(high LTV)
Control
(low LTV)
Before
LTV Restriction
After

Empirical strategy

- Estimate a **Difference-in-Differences** model

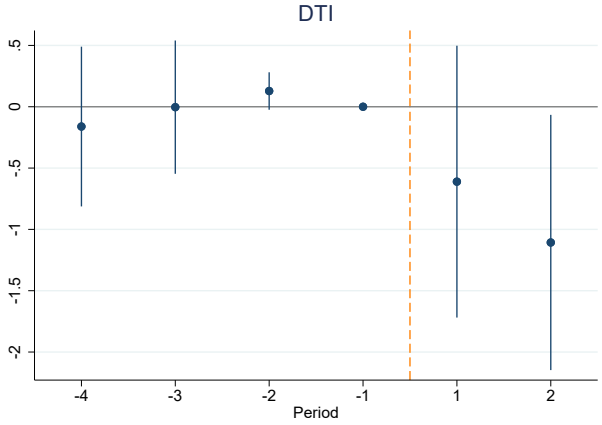
  $y_{it} = \beta \; d(\widehat{LTV} > 0.85)_i \times Post_t + \gamma \; d(\widehat{LTV} > 0.85)_i + controls + \epsilon_{it}$

  $\rightarrow$ Debt-to-income ratio at household level

  $\rightarrow$ Wage growth between job that worker is displaced from and next job she finds

Main Results

Debt-to-Income ratio



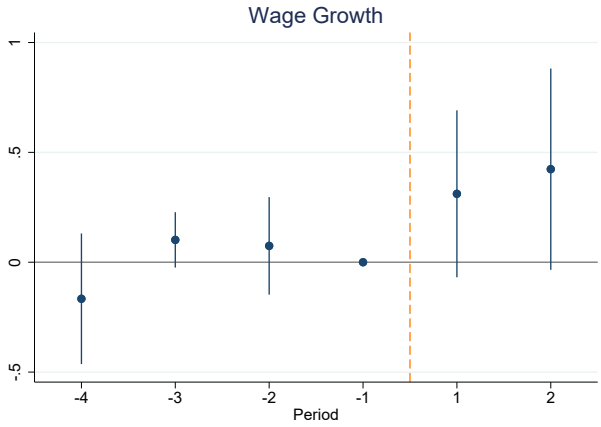
LTV restriction reduces household leverage of affected displaced workers

Debt-to-Income ratio

	$\frac{Debt}{Income}$					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	-1.094***	-1.058***	-1.138***	-1.108***	-1.148***	-1.017**
	(0.372)	(0.348)	(0.394)	(0.358)	(0.353)	(0.401)
d($\widehat{LTV}$>0.85)	0.895***	0.858***	1.192***	1.206***	1.188***	1.193***
	(0.284)	(0.256)	(0.304)	(0.268)	(0.234)	(0.250)
Fixed Effects:						
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	1,876	1,876	1,833	1,833	1,833	1,833
R^2	0.023	0.029	0.163	0.187	0.211	0.265
Mean($\frac{Debt}{Income}$)	4.241					

25 percent reduction in household leverage

Wage growth between two jobs



LTV restriction improves the starting wages of affected displaced workers

Wage growth between two jobs

	Wage Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	0.335**	0.343**	0.482***	0.495***	0.449**	0.390*
	(0.154)	(0.153)	(0.161)	(0.158)	(0.160)	(0.187)
d($\widehat{LTV}$>0.85)	-0.102***	-0.109***	-0.129***	-0.125***	-0.123***	-0.120***
	(0.010)	(0.027)	(0.033)	(0.036)	(0.031)	(0.028)
Fixed Effects:						
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	1,876	1,876	1,833	1,833	1,833	1,833
R^2	0.008	0.014	0.091	0.107	0.121	0.183
Mean(Wage Growth)	-0.074					

3.3 percentage points lower decline in wages

Selection Concerns

- LTV ratio restriction can create a problem due to **endogenous selection** to housing market
  → Some of the workers may not be able to afford down payment
  → **Characteristics of the treatment group can change** due to the restriction
- The restriction does not affect the transition into being a homeowner
  → Norway has one of the highest homeownership ratios among advanced countries
- LTV restriction **does not change characteristics** of the treatment group
- **Remove workers who cannot afford down payment** from the prerestriction period
  → All workers are able to afford down payment ⇒ No selection bias
  → Results do not change

Robustness Checks

- External validity: Does the **negative relationship between HH leverage and wages** hold in larger samples?
  $\rightarrow$ **Yes!** Full population, all unemployed...
  $\rightarrow$Caveat: HH leverage is endogenous.
- **Alternative treatment classifications**: The results are robust to using deposits, a linear probability model, and bunching in the LTV distribution.

Additional robustness checks

1. Displaced workers are younger than other workers. Once age is controlled for, they have similar characteristics.
2. Different starting years
3. Remove workers who receive inheritance
4. Remove workers who ever earn business income
5. Control for macroeconomic conditions
6. Placebo test
7. Remove low LTV ratio observations far from LTV threshold

Mechanism

Through what mechanism does leverage affect wages?

- **Job search duration**
  → Higher leverage can force displaced workers to accept job offers sooner
- **Access to credit during unemployment**
  → A reduction in leverage can increase displaced workers' access to credit during unemployment spell
  → Household leverage can affect labor market outcomes through its influence on access to credit
- **Characteristics of new employers**
  → Thanks to relaxation on constraints, displaced workers can find jobs at better-paying firms
  → Firm wage premium (Abowd et al (ECTA-1999))

Through what mechanism does leverage affect wages?

	ln(Unemp. Spell)		Δ ln(Ex-Post Debt)		Δ ln(Firm Wage Pre.)	
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	0.608***	0.567*	-0.067	-0.114	0.004	0.058**
	(0.205)	(0.281)	(0.244)	(0.313)	(0.023)	(0.027)
d($\widehat{LTV}$>0.85)	0.019	0.017	-0.023	-0.063	0.029***	0.009
	(0.091)	(0.110)	(0.024)	(0.057)	(0.007)	(0.008)
Fixed Effects:						
Year FE		✓		✓		✓
Education FE		✓		✓		✓
Location FE		✓		✓		✓
Industry FE		✓		✓		✓
Obs.	1,876	1,833	1,876	1,833	1,672	1,637
R^2	0.006	0.160	0.000	0.096	0.002	0.386
Mean(Dependent Var.)	2.270		0.085		-0.286	

Longer spell, higher paying new employers, no change in debt during spell

Job search broadness

- Decrease in financial risk can allow workers to take **higher risks in job search**
  $\rightarrow$ They may be more willing to broaden their job search
- A reduction in HH leverage can **reduce consumption commitments**, lowering risk-aversion (Chetty & Szeidl (2007))

Job search broadness

	Diff. Occupation		Diff. Industry		Diff. Job Location	
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	0.202**	0.293***	0.155*	0.233**	0.066	0.024
	(0.088)	(0.097)	(0.082)	(0.105)	(0.132)	(0.157)
d($\widehat{LTV}$>0.85)	0.032	0.012	0.038	0.020	0.067	0.065
	(0.025)	(0.025)	(0.024)	(0.023)	(0.043)	(0.044)
Fixed Effects:						
Year FE		✓		✓		✓
Education FE		✓		✓		✓
Location FE		✓		✓		✓
Industry FE		✓		✓		✓
Obs.	1,876	1,833	1,876	1,833	1,876	1,833
R^2	0.009	0.183	0.005	0.222	0.005	0.142
Mean(Different Job)	0.764		0.650		0.448	

More likely to switch to other industries & occupations. No effect on labor mobility

Heterogeneity tests

- Reduction in household leverage **relaxes the constraints** that leverage puts on job search
- Effect should be larger in subsamples in which workers are more likely to exploit this opportunity
- Split the sample into two with respect to **age**, **education** and **job tenure** in the previous employer
  $\rightarrow$ For young and highly educated workers, it is easier to adjust their skills
  $\rightarrow$ Skills of workers who have longer tenures in a job can be too firm-specific

Heterogeneity tests

Wage Growth	Age		Tenure		Education	
	(1) Low	(2) High	(3) Low	(4) High	(5) Low	(6) High
d($\widehat{LTV}$>0.85) × Post	0.700***	0.126	0.609**	0.433	0.101	0.402**
	(0.210)	(0.277)	(0.227)	(0.423)	(0.260)	(0.173)
d($\widehat{LTV}$>0.85)	-0.195**	-0.024	-0.160**	-0.054	-0.161***	-0.026
	(0.069)	(0.049)	(0.072)	(0.040)	(0.036)	(0.030)
Fixed Effects:						
Year FE	✓	✓	✓	✓	✓	✓
Education FE	✓	✓	✓	✓		
Location FE	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓
Obs.	1,044	789	866	967	419	882
R^2	0.170	0.219	0.159	0.195	0.096	0.062
Mean(Wage Growth)	-0.074					

Effect is stronger for young, highly educated workers with lower tenure

Conclusion

- A **mortgage restriction** affects labor market outcomes through its influence on job search
  $\rightarrow$ It **improves wages** of displaced workers
- Workers with lower leverage have longer unemployment spells, find jobs in better-paying firms, and broaden their job search
- **Macroprudential policies** that limit household leverage can have **positive side effects** to the **labor market**
- Results help us to **understand the nature of an economy** that enters into a recession with **high household leverage**

Thank You!

Institutional settings

- Housing market
  → Above **80%** home ownership ratio
  → Due to tax advantages

- Labor market
  → In case of mass layoff, firm gives a notice of dismissal within a 30-day period and without grounds related to the individual employees
  → **Unemployment insurance covers 62.4% of previous income** (OECD average is 60%)
  → **No change in unemployment insurance** in our sample period

Comparison of treated and control workers

	d($\widehat{LTV}$<0.85)	d($\widehat{LTV}$ ≥0.85)	Difference	t-stat
Income$_{t-1}$	1120.76	710.29	410.47	8.67
Wage$_{t-1}$	1065.95	687.38	378.57	8.31
Debt-to-Income$_{t-1}$	2.58	1.54	1.04	4.20
Deposits$_{t-1}$	869.19	156.09	713.10	28.61
Business Inc.$_{t-1}$	54.81	22.91	31.90	2.05
Parents' Debt$_{t-1}$	1898.84	1987.59	-88.75	-0.46
Parents' Dep.$_{t-1}$	1458.99	600.92	858.06	10.18
Parents' Wealth$_{t-1}$	1508.78	529.30	979.48	4.82
Age	36.09	32.39	3.70	5.58
Immigrant	0.18	0.20	-0.02	-0.90
Immigrant^{Mot}	0.21	0.24	-0.03	-0.94
Immigrant^{Fat}	0.29	0.30	-0.01	-0.27
College	0.73	0.39	0.34	10.68
College^{Mot}	0.26	0.17	0.09	3.63
College^{Fat}	0.33	0.18	0.15	5.66
Observations	1880			

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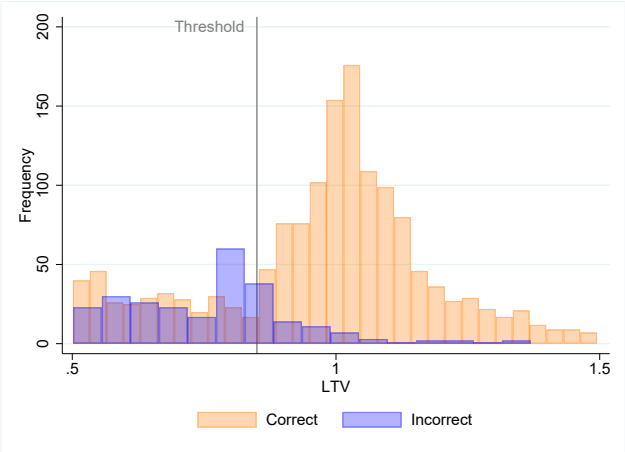
Distribution of Misclassified Households



Misclassified observations are clustered around the threshold

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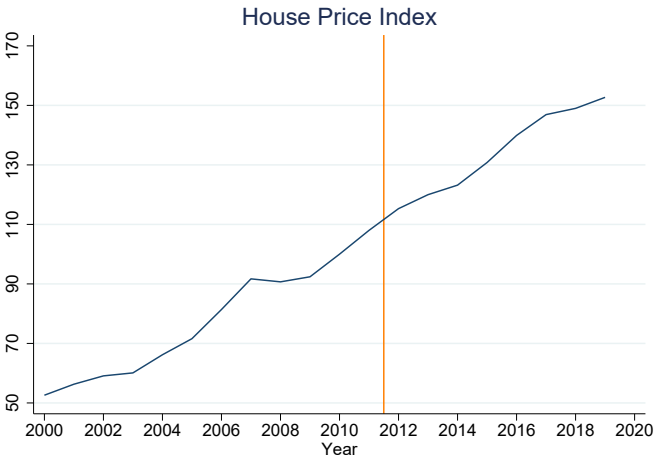
National House Prices



Aggregate house price index is not affected

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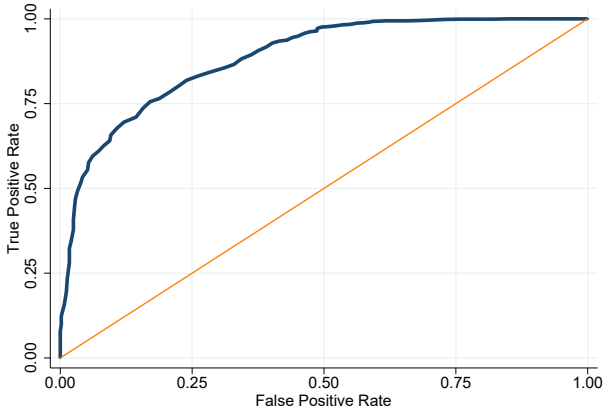
Random Forest performance



Area under ROC curve is 0.89

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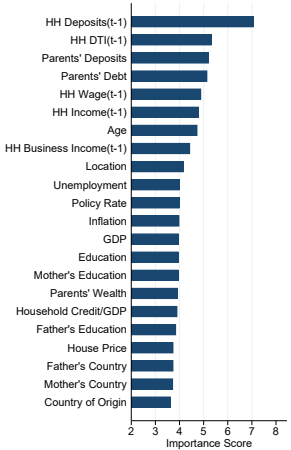
Variable importance



No single variable dominates the model

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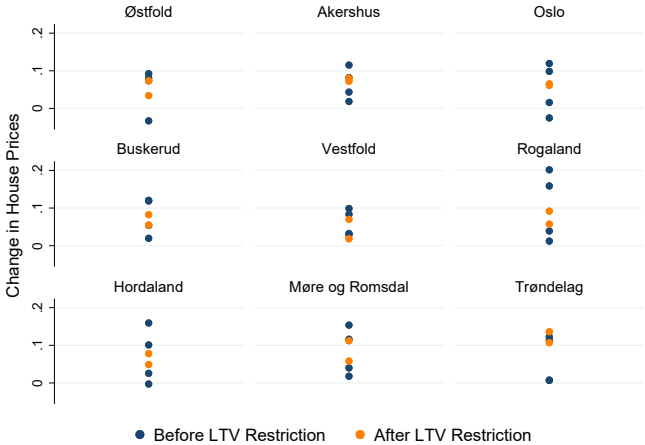
Regional House Prices



House prices after restriction are in the support of prices before the restriction

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Loan-to-Value Ratio

	LTV					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	-0.235***	-0.234***	-0.229***	-0.225***	-0.226***	-0.218***
	(0.021)	(0.021)	(0.021)	(0.017)	(0.018)	(0.030)
d($\widehat{LTV}$>0.85)	0.234***	0.233***	0.221***	0.216***	0.216***	0.212***
	(0.014)	(0.014)	(0.015)	(0.015)	(0.014)	(0.019)
Fixed Effects:						
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	1,876	1,876	1,833	1,833	1,833	1,833
R^2	0.211	0.213	0.278	0.290	0.291	0.343
Mean(LTV)	0.924					

22 percent reduction in LTV ratio

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Other Balance Sheet Items

	Mortgage		House Price		Deposits	
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	-603.153***	-667.540***	-436.306**	-503.119***	-69.821	-109.932
	(114.309)	(126.417)	(156.551)	(150.137)	(81.675)	(137.884)
d($\widehat{LTV}$>0.85)	-119.832*	90.282	-486.696***	-229.524**	-198.473***	-176.430***
	(65.223)	(61.379)	(93.149)	(81.908)	(12.966)	(45.433)
Fixed Effects:						
Year FE		✓		✓		✓
Education FE		✓		✓		✓
Location FE		✓		✓		✓
Industry FE		✓		✓		✓
Location × Industry FE						✓
Obs.	1,876	1,833	1,876	1,833	1,876	1,833
R^2	0.034	0.256	0.114	0.323	0.096	0.247
Mean(Dependent Var.)	1721.468		1956.405		222.015	

Smaller mortgages, cheaper houses, insignificant decline in deposits

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Interest Rate Payments

	Interest Expense					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	-45.875***	-44.626***	-41.265***	-36.504**	-31.523**	-37.456**
	(10.390)	(9.821)	(13.315)	(14.011)	(13.681)	(16.988)
d($\widehat{LTV}$>0.85)	-7.803**	-8.570***	-4.688	-2.726	-2.684	-0.780
	(2.769)	(2.173)	(3.609)	(4.285)	(4.278)	(5.007)
Fixed Effects:						
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	1,876	1,876	1,833	1,833	1,833	1,833
R^2	0.014	0.106	0.224	0.249	0.267	0.316
Mean(Interest Expense)	91.489					

Reduction in interest expense

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Controlling for liquidity

	Wage Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	0.265*	0.274*	0.403**	0.397**	0.327*	0.193
	(0.142)	(0.135)	(0.160)	(0.164)	(0.183)	(0.219)
d($\widehat{LTV}$>0.85)	-0.033	-0.041	-0.030	-0.013	-0.013	0.033
	(0.053)	(0.052)	(0.048)	(0.050)	(0.047)	(0.062)
$ln(liq.)_{t-1}$	0.248	0.204	0.287*	0.278*	0.345**	0.124
	(0.163)	(0.161)	(0.158)	(0.151)	(0.152)	(0.144)
$ln(liq.)_{t-1} \times ln(liq.)_{t-1}$	-0.044	-0.037	-0.051*	-0.049*	-0.060**	-0.025
	(0.026)	(0.026)	(0.026)	(0.024)	(0.025)	(0.023)
$ln(liq.)_{t-1} \times ln(liq.)_{t-1} \times ln(liq.)_{t-1}$	0.002*	0.002	0.002**	0.002**	0.003**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Fixed Effects:						
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	941	941	927	927	927	927
R^2	0.018	0.032	0.147	0.165	0.187	0.298
Mean(Wage Growth)	-0.074					

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Robustness checks for starting wages

	Wage Growth						
	(1) 2005	(2) 2007	(3) No Transf.	(4) No Bus. Inc.	(5) Macro	(6) Education	(7) Placebo
d($\widehat{LTV}$>0.85) × Post	0.426**	0.449**	0.409**	0.430**	0.983***	0.423*	
	(0.183)	(0.186)	(0.180)	(0.183)	(0.329)	(0.205)	
d($\widehat{LTV}$>0.85) × Placebo							-0.039
							(0.131)
d($\widehat{LTV}$>0.85)	-0.108**	-0.096***	-0.088**	-0.126***	-5.076	0.703***	0.027
	(0.040)	(0.033)	(0.038)	(0.037)	(3.510)	(0.184)	(0.117)
Fixed Effects:							
Year FE	✓	✓	✓	✓	✓	✓	✓
Education FE	✓	✓	✓	✓	✓	✓	✓
Location FE	✓	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓	✓
Treated × Macro Var.					✓		
Treated × Education FE						✓	
Obs.	2,016	1,614	1,649	1,737	1,833	1,833	1,029
R^2	0.124	0.124	0.138	0.122	0.124	0.171	0.169
Mean(Wage Growth)	-0.074						

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Placebo test

	Wage Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Placebo	0.014	0.017	-0.015	-0.033	-0.039	-0.152
	(0.111)	(0.106)	(0.128)	(0.136)	(0.131)	(0.168)
Placebo	0.016	-0.000	0.041	0.034	0.027	0.045
	(0.072)	(0.067)	(0.077)	(0.092)	(0.117)	(0.137)
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	1,050	1,050	1,029	1,029	1,029	1,029
R^2	0.000	0.002	0.099	0.114	0.169	0.259
Mean(Wage Growth)	-0.074					

Evidence for parallel trends

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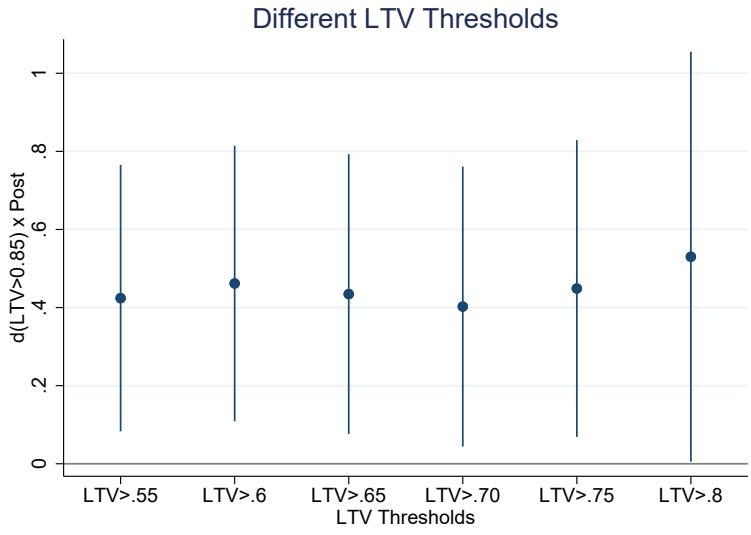
Narrow the sample from below



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Interactions with Macro variables

	Wage Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	0.744***	0.744***	1.030***	1.053***	0.983***	1.025*
	(0.154)	(0.154)	(0.325)	(0.284)	(0.329)	(0.555)
d($\widehat{LTV}$>0.85) × Inflation	-0.300**	-0.300**	-0.462	-0.476*	-0.478*	-0.589
	(0.142)	(0.142)	(0.272)	(0.249)	(0.269)	(0.522)
d($\widehat{LTV}$>0.85) × Unemployment	0.833	0.833	1.421	1.419	1.429	1.808
	(0.541)	(0.541)	(1.032)	(0.931)	(1.018)	(1.975)
d($\widehat{LTV}$>0.85) × GDP	-0.185**	-0.185**	-0.278*	-0.287*	-0.280*	-0.343
	(0.081)	(0.081)	(0.159)	(0.144)	(0.160)	(0.294)
d($\widehat{LTV}$>0.85) × Policy Rate	0.395*	0.395*	0.611	0.616*	0.610	0.754
	(0.193)	(0.193)	(0.378)	(0.335)	(0.372)	(0.692)
d($\widehat{LTV}$>0.85)	-3.074	-3.074	-5.102	-5.073	-5.076	-6.370
	(1.855)	(1.855)	(3.560)	(3.182)	(3.510)	(6.698)
Fixed Effects:						
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	1,876	1,876	1,833	1,833	1,833	1,833
R^2	0.017	0.017	0.095	0.111	0.124	0.186
Mean(Wage Growth)	-0.074					

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Wages 4 Years After

	Wage Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	0.257***	0.259***	0.246**	0.220*	0.182**	0.201*
	(0.061)	(0.066)	(0.113)	(0.116)	(0.080)	(0.106)
d($\widehat{LTV}$>0.85)	0.003	0.002	-0.005	-0.008	-0.006	-0.012
	(0.036)	(0.037)	(0.036)	(0.043)	(0.031)	(0.033)
Fixed Effects:						
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	1,856	1,856	1,815	1,815	1,815	1,815
R^2	0.010	0.012	0.092	0.104	0.115	0.189
Mean(Wage Growth)	0.182					

Wage is still higher 4 years after the restriction

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Wage Volatility

	Wage Volatility					
	(1)	(2)	(3)	(4)	(5)	(6)
d($\widehat{LTV}$>0.85) × Post	-26.274***	-26.846***	-32.215**	-28.707*	-24.719*	-30.496**
	(5.917)	(7.609)	(15.242)	(15.901)	(12.988)	(13.655)
d($\widehat{LTV}$>0.85)	1.033	1.294	4.282	5.332	5.183*	4.138
	(3.270)	(3.301)	(3.211)	(3.697)	(2.635)	(2.951)
Fixed Effects:						
Year FE		✓	✓	✓	✓	✓
Education FE			✓	✓	✓	✓
Location FE				✓	✓	
Industry FE					✓	
Location × Industry FE						✓
Obs.	1,869	1,869	1,828	1,828	1,828	1,828
R^2	0.008	0.009	0.154	0.165	0.178	0.222
Mean(Wage Volatility)	82.757					

Wage volatility is lower

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Income and Gender

Wage Growth	Income			Gender	
	(1) Low	(2) Medium	(3) High	(4) Male	(5) Female
d($\widehat{LTV}$>0.85) × Post	0.833*	0.268	0.193	0.233	0.735*
	(0.475)	(0.264)	(0.244)	(0.152)	(0.384)
d($\widehat{LTV}$>0.85)	-0.209***	-0.102*	-0.044	-0.119*	-0.122*
	(0.061)	(0.052)	(0.058)	(0.059)	(0.064)
Fixed Effects:					
Year FE	✓	✓	✓	✓	✓
Education FE	✓	✓	✓	✓	✓
Location FE	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓
Obs.	432	911	490	1,022	811
R^2	0.312	0.176	0.261	0.156	0.228
Mean(Wage Growth)	-0.074				

Effect is stronger for low income workers and females

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