Lenders and Landlords in the Mortgage Market*

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*The views expressed in this paper are those of the authors, and not necessarily those of the Bank of England or its committees.

Motivation

- Important links between real estate markets, the banking sector, and the wider economy
  - → Higher interest rates improves banks' net operating margins, but trigger deleveraging
  - → Loan underwriting as a mechanism to managing credit flows

- **Our paper: novel channel of the effects of higher interest rates on loan underwriting.**
  - → Context: residential real estate investor market and the loans granted to individual landlords.
  - → In the UK, investors own 20% of all residential properties —mostly individuals.
  - → Buy-to-let (BTL) properties often financed with debt: £41.3 billion of loans originated in 2022, stock £243.3 billion of outstanding debt in Q4/2022.
  - → Significant debt use by landlords → banking sector exposure to real estate markets

How do real estate investors and the lenders providing the loans respond to higher interest rates? Explore heterogeneity in borrower size and lender specialization.

This Paper

- Exploit a large and unexpected credit tightening event, the mini-budget announcement of September 23, 2022 ("the event")
- Use a difference-in-differences framework and an administrative dataset on the universe of BTL mortgage originations to study the effects of higher interest rates on:
  1. Asset values and rental yields achieved by landlords of different sizes (as measured by the # of rental properties they own)—Cashflow vs. discount rate channel
  2. Financing: Study pass-through of interest rate shocks to different borrowers by lender type—Specialists vs. Non-specialists (as measured by their exposure to the BTL sector)
     - Study effects on interest rates, loan fees, stress test rate, LTVs, Interest Coverage Ratios
- Supply side: Daily data on the universe of BTL loans on offer:
  - → Contractual features: Interest rates, loans fees, fixation period
  - → Lender risk management: Maximum advance, maximum number of properties

Preview of Main Results

1. **Assets**
   - → Rental yields: Prior to the event, rents and property values moved in tandem generating stable yields. After the event, rents kept increasing but property values stabilized (and even declined slightly), leading to an increase in yields
   - → Property: Large landlords invest in lower-priced local housing markets, achieving higher rental yields
2. **Financing**
   - → Loan interest rates:
     a. Large increase led to significant deleveraging with originations concentrated among specialist lenders
     b. This increase is relatively less for large than small landlords, particularly among specialist lenders, but also when considering variation within lender type
   - → Loan fees:
     a. Specialist lenders increase loan fees more than non-specialist ones, particularly for large landlords
     b. Substitution helps to sustain lender profitability and credit flows by improving ICRs
   - → Stress tested rates: Stress test rates increase relatively less for large borrowers, particularly among specialist lenders
   - → Effects visible in the origination data and in the loans on offer → high frequency

Related Literature

1. Literature on fees in consumer credit, mortgage markets, and corporate credit.
   → Stango and Zinman 2014; Ru and Schoar 2016; Brueckner 1994; Stanton and Wallace 1998; Buchak and Jørring 2025; Berg, Saunders, and Steffen 2016; Benetton, Gavazza, and Surico 2024
2. Role of Lenders in the underwriting process and regulatory arbitrage in mortgage markets
   → Demyanyk and Loutskina 2016; Gete and Reher 2021; Ganduri 2023; Buchak, Matvos, et al. 2018; Mian and Sufi 2009; Keys et al. 2010; Adelino, Schoar, and Severino 2016.
3. Literature on real estate investors
   → Gurun et al. 2023; Francke et al. 2023; Gargano and Giacoletti 2022; LaPoint 2022; Austin 2022; Ganduri and Maturana 2022; Levy 2021; Favilukis and Van Nieuwerburgh 2021; Garriga, Gete, and Tsouderou 2020
4. Literature on mortgages and mortgage markets
   → For example, Greenwald and Guren 2021; Garriga, Kydland, and Sustek 2017; Mian and Sufi 2011; Koijen, Van Hemert, and Van Nieuwerburgh 2009; Campbell and Cocco 2003; Greenwald and Guren 2021.

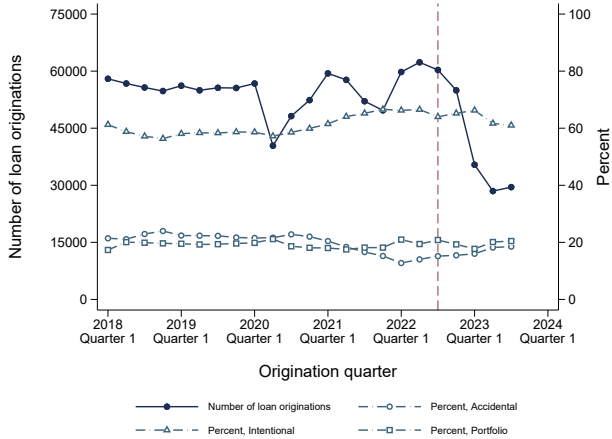
THE DATA & UNDERWRITING CRITERIA

Data

Datasets of Buy-to-let (BTL) loan originations and BTL loans on offer

- Loan originations reported by lenders to the Bank of England
  - → Phase I (2017Q3) followed by Phase II (2018Q1)
  - → All loans granted to individuals but not property companies
  - → Our sample: 2018Q1 to 2023Q3 —1.2 million loan originations
- Origination information on
  - → Borrowers: Date of birth, income, marginal tax rate, regulatory framework, number of properties owned with a mortgage
  - → Properties: property value (or purchase price), postcode, rental income, property type, number of bedrooms
  - → Loans: lender name, origination date, loan type, amount, interest rate, interest rate type, lender fee, mortgage term, stress test rate, repayment method
- BTL loans on offer on each day from Moneyfacts:
  - → Lender name, loan type, fixation period, interest rate, maximum LTV, stress testing, etc.

Number of Loan Originations



Loan Amount

Summary statistics

Origination data

Variable	Mean	Sd	P10	P25	Median	P75	P90
				Panel A: Property			
Rental income (monthly, £)	1054	771	525	650	850	1300	1750
Property value (£)	269,874	243,193	95000	135,000	210,000	335,596	500,000
Rental yield (annual, percent)	5.30	1.51	3.80	4.33	5.00	6.00	7.20
				Panel B: Loan			
Loan amount (£)	154,848	121,732	53313	80565	124,000	198,006	288,000
Loan-to-value (percent)	60.89	16.90	36.74	52.80	65.76	75.00	75.70
Interest rate (basis points)	262.82	102.29	173.00	199.00	234.00	294.00	389.00
Initial loan fee (% of loan amount)	0.88	1.20	0.00	0.04	0.68	1.21	1.96
Fixation term (years)	4.09	2.43	1.95	2.08	4.90	5.06	5.18
Mortgage term (months)	255.58	80.15	144.00	192.00	264.00	300.00	360.00
				Panel C: Borrower			
Age (years)	47.1	11.3	33	38	46	55	63
Annual income (£)	65503	231,633	15000	27005	42561	70145	120,000
Marginal tax rate (percent)	28.1	11.8	20	20	20	40	40
Distance (kilometers)	35.50	80.27	0.29	1.5	5.44	21.10	113.72
Number of buy-to-let properties	3.09	6.13	1.00	1.00	2.00	3.00	6.00

Institutional Background

Regulatory Framework

- Regulations
  - → Consumer buy-to-let mortgages are regulated by the FCA —1/5 loans
  - → Supervision of the Prudential Regulation Authority (PRA) —4/5 loans

- Landlord classification
  1. Accidental
     - Rental property previously occupied by (i) borrower, or (ii) by a member of their family, or (iii) inherited, and
     - Not purchased with the intention of renting it out
     - Rental income from the property is not intended to be the main source of borrower income
  2. Intentional
     - Bought with the intent of renting and those who own more than one rental property
     - Main distinction between accidental and Intentional landlords is intent
  3. Portfolio
     - Borrowers who own four or more mortgaged rental properties (across all lenders)
     - Essentially, large landlords who finance their property investments with debt

Institutional Background

Underwriting Criteria and Affordability Assessment

1. Accidental landlords
   - → Mortgage brokers involved in the consumer buy-to-let market are regulated by the FCA
   - → Personal income (other than rental income) may be taken into consideration in the underwriting process (similar to a residential mortgage)
2. Intentional landlords
   - → Supervisory Statement SS13/16 of September 2016 sets minimum underwriting standards for BTL mortgages that are not classified as consumer buy-to-let
   - → Minimum ICR threshold: 125% (20% tax rate) and 145% (40% tax rate)
   - → Minimum stress tested interest rate of 5.5% (unless interest rate is fixed or capped for ≥ 5 years)
3. Portfolio landlords
   - → Subject to additional underwriting tests
   - → Lenders should have (i) adequate risk management and controls for lending to portfolio landlords, (ii) actively manage maximum LTV and minimum ICR, (iii) portfolio concentration and (iv) exposure to high-risk segments

Summary Statistics by Landlord Type

Variable	Type	Mean	Std. dev	P10	P25	Median	P75	P90
Rental Yield (percent)	Accidental	4.87	1.14	3.65	4.13	4.71	5.40	6.25
	Intentional	5.33	1.52	3.82	4.36	5.05	6.00	7.20
	Portfolio	5.62	1.68	3.96	4.52	5.28	6.36	7.76
Loan-to-Value (percent)	Accidental	57.53	17.99	30.45	48.17	61.23	73.00	75.40
	Intentional	61.48	16.59	37.82	53.50	66.67	75.00	75.69
	Portfolio	62.38	16.30	40.76	55.80	67.00	75.00	76.12
Interest rate (basis points)	Accidental	253.26	99.93	169.00	194.00	224.00	274.00	377.00
	Intentional	260.22	103.15	172.00	199.00	229.00	285.00	385.00
	Portfolio	280.53	99.81	179.00	209.00	255.00	329.00	404.00
Interest Coverage Ratio (Origination)	Accidental	470.68	651.56	204.85	278.06	354.67	470.18	684.19
	Intentional	436.55	674.98	207.66	276.35	351.85	455.47	612.24
	Portfolio	439.82	993.21	190.09	256.29	335.29	437.43	593.67
Interest Coverage Ratio (Stress)	Accidental	218.12	344.18	123.90	134.07	152.00	191.41	290.55
	Intentional	213.78	458.12	125.00	138.94	157.23	194.38	263.32
	Portfolio	252.65	814.14	138.60	145.08	165.50	206.13	279.37
Fee over loan amount	Accidental	0.74	1.07	0.00	0.02	0.57	0.97	1.63
	Intentional	0.88	1.21	0.00	0.04	0.69	1.21	1.96
	Portfolio	1.03	1.27	0.00	0.05	0.82	1.51	2.20

Summary Statistics By Landlord Type

Variable	Type	Mean	Std. dev	P10	P25	Median	P75	P90
Tax rate (percent)	Accidental	27.4	11.6	20.0	20.0	20.0	40.0	40.0
	Intentional	27.6	11.8	20.0	20.0	20.0	40.0	40.0
	Portfolio	31.9	11.7	20.0	20.0	40.0	40.0	45.0
Interest-only loans (fraction)	Accidental	0.74	0.44	0	0	1	1	1
	Intentional	0.79	0.41	0	1	1	1	1
	Portfolio	0.89	0.31	0	1	1	1	1
House purchases (fraction)	Accidental	0.01	0.09	0	0	0	0	0
	Intentional	0.33	0.47	0	0	0	1	1
	Portfolio	0.24	0.43	0	0	0	0	1
Rental income (monthly, £)	Accidental	1,145	694	550	700	975	1400	1842
	Intentional	1,035	758	525	625	850	1250	1700
	Portfolio	1,023	815	500	600	795	1200	1750
Number of buy-to-let properties	Accidental	1.42	1.19	1.00	1.00	1.00	2.00	2.00
	Intentional	1.73	0.77	1.00	1.00	2.00	2.00	3.00
	Portfolio	8.50	11.81	4.00	4.00	6.00	8.00	13.00

In the analysis, we explore the heterogeneity in landlord size.

Underwriting criteria

- Loan to value: typical maximum LTV of 75%

$$\text{LTV} = \frac{\text{Loan amount}}{\text{Property value}}. \tag{1}$$

- Interest coverage ratio (ICR): typical minimum 125 (or 145 for high rate tax payer)

$$\text{ICR} = \frac{\text{Annual rental income}}{\text{Interest rate} \times \text{Loan amount}}. \tag{2}$$

- Stress testing of ICRs: Less stringent if loan interest rate fixed for 5-years or more.

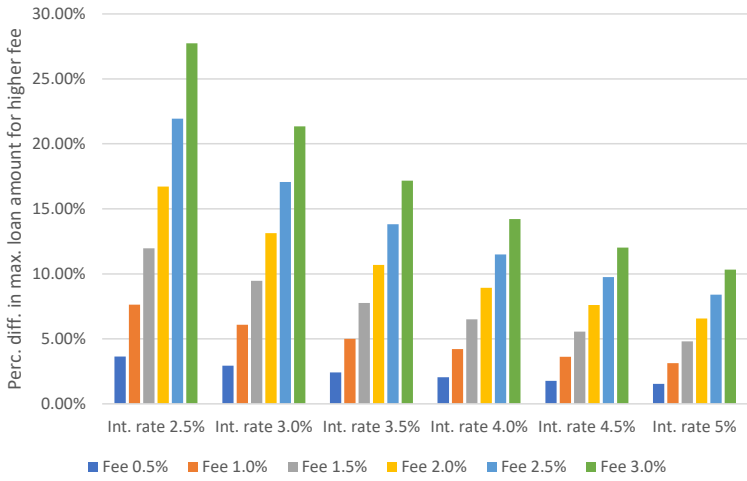
The role of interest rate and fees in ICRs

Hiking fees to keep interest rates lower and credit flowing

- Lenders are compensated through the loan interest rate premium and loan fees with both, ceteris paribus, contributing positively to lender profitability.
- Example: Property that generates 1 of rental income. Interest-only loan with an initial period of discounted rates of 5-years, refinanced at this point. Minimum ICR of 1.25.
  1. Loan with an interest rate of 2.5% and an initial fee of 0. Assuming that the LTV constraint is not binding, the maximum loan amount is 32, as determined by the ICR constraint, and calculated from $1/(1.25 \times 2.5\%)$.
  2. Alternative loan with initial fees of 1%, but with interest rate of 2.3% (20 basis points lower, or 1% divided by the 5). Initial fee is added to the loan amount. The maximum loan amount determined by the ICR constraint is 34.438, calculated from $1/(1.25 \times 2.3\% \times 1.01)$.

  $\Rightarrow$ A significant 7.62% increase in maximum loan amount.

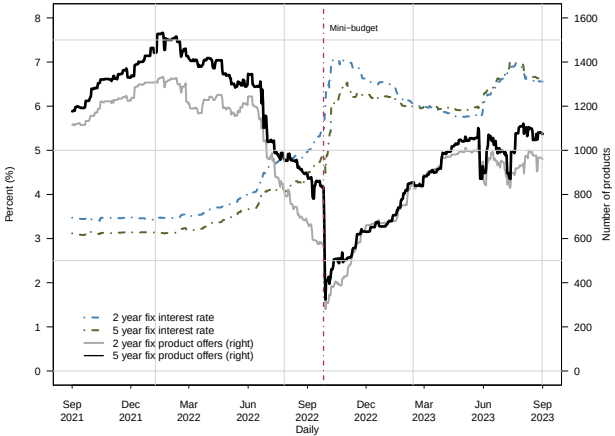
Impact on Loan Amount



Tighter credit, asset values and yields

Credit tightening

The "Mini" Budget event



- "Mini" Budget contained £45bn of unfunded tax cuts —the biggest tax cuts for 50 years.
- Sparked a strong U.K. gilt market reaction, and quickly and dramatically increased U.K. mortgage borrowing costs in a matter of days.
- Large reduction on the number of products on offer, which subsequently increased as lenders repriced their loans
- Unanticipated and large (persistent) increase in interest rates, even though several of the policies proposed were subsequently reversed

Google Trends | Uncertainty | Macro

Empirical Specifications

Difference-in-Differences

1. Reduced Form:

$$\text{Yield}_{ilt} = \alpha + \beta^{\text{Intentional}}\text{Intentional}_{il} + \beta^{\text{Portfolio}}\text{Portfolio}_{il} + \gamma \boldsymbol{X}_{ilt} + \omega_{lt} + \epsilon_{ilt} \tag{3}$$

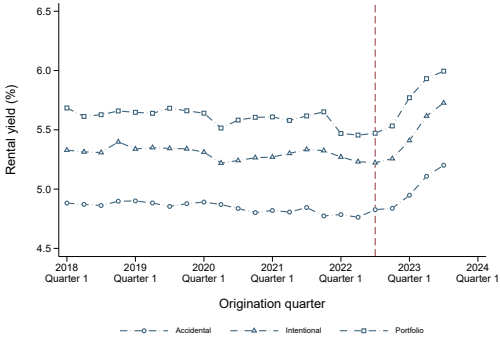
2. Event Study:

$$\text{Yield}_{ilt} = \sum_{k \in \{2018Q1, 2023Q3\}} \beta_k^{\text{Intentional}} \boldsymbol{D}_k \cdot \text{Intentional}_{il} + \sum_{k \in \{2018Q1, 2023Q3\}} \beta_k^{\text{Portfolio}} \boldsymbol{D}_k \cdot \text{Portfolio}_{il} + \gamma \boldsymbol{X}_{ilt} + \omega_{lt} + \epsilon_{ilt} \tag{4}$$

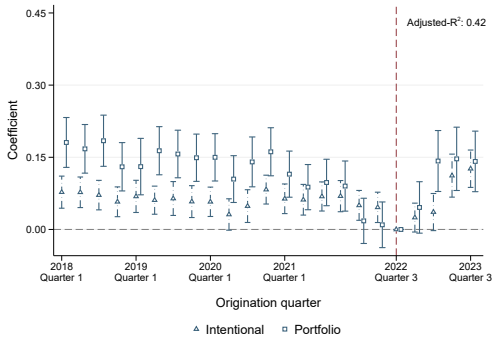
- where $\boldsymbol{i}$ is the property used for collateral, $\boldsymbol{l}$ local area, $\boldsymbol{t}$ origination quarter
- $\boldsymbol{X}_{ilt}$ is a vector of other explanatory variables that includes property characteristics and in some of the regressions LTV dummies and
- ϵ_{ilt} is the error term

Rental Yields Over Time and in the Cross Section

Landlord Type



(a) Rental Yield (Annual)



(b) Rental yield (event study)

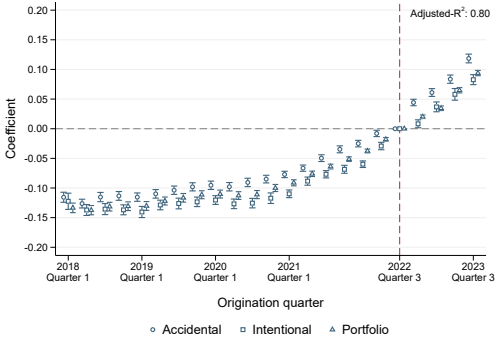
Rental Yields

Landlord Type

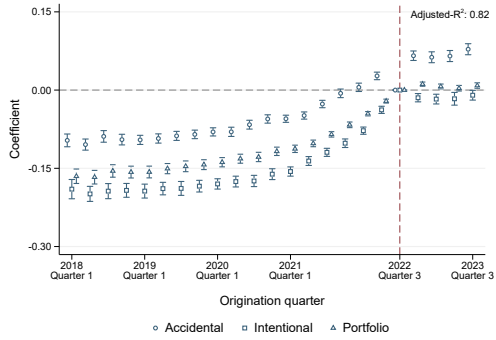
Dependent variable:	Rental yield (p.p)					
	(1)	(2)	(3)	(4)	(5)	(6)
Portfolio	0.760***	0.714***	0.402***	0.715***	0.408***	0.381***
	(0.034)	(0.031)	(0.017)	(0.031)	(0.018)	(0.018)
Intentional	0.464***	0.444***	0.261***	0.448***	0.269***	0.260***
	(0.021)	(0.019)	(0.013)	(0.020)	(0.014)	(0.014)
Constant	4.868***	5.002***				
	(0.043)	(0.081)				
Property characteristics		Yes	Yes	Yes	Yes	Yes
Fixed effects:						
Local-area			Yes			
Origination quarter				Yes		
Local-area × quarter					Yes	Yes
Lender						Yes
Adjusted-R^2	0.03	0.06	0.40	0.06	0.41	0.43
Observations	1,176,967	1,154,844	1,154,844	1,154,844	1,154,799	1,154,799

Rental Yields

Rental Income versus Property Values



(a) Rental Income, regression coefficients



(b) Property Value, regression coefficients

The increase in interest rates that operates through a discount rate channel more than offsets the positive valuation effects of higher rents.

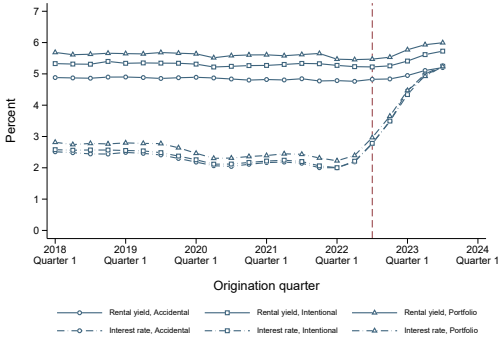
Summary of findings

- Rental yields over time
  1. Prior to the event, rents and property values moved in tandem generating stable yields. After the event, rents kept increasing but property values stabilized (and even declined slightly).
  2. Higher rental income improves the ability of borrowers to service debt
- Rental yields in the cross-section
  1. Larger landlords achieve higher yields
  2. Similar rental income, but lower priced properties
  3. Patterns similar pre- and post credit tightening event

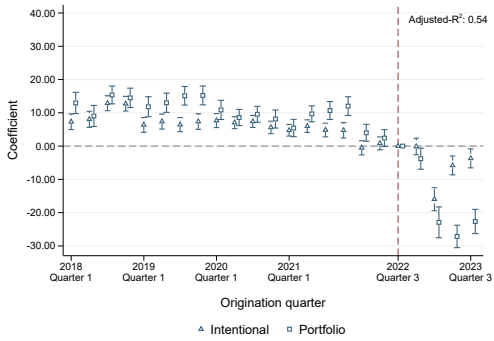
FINANCING

Rental Yields versus Interest Rate

Spread narrows for all landlord types



(a) Rental yields and interest rates



(b) Interest rate, regression coefficients

Increase in interest rates smaller for larger landlords.

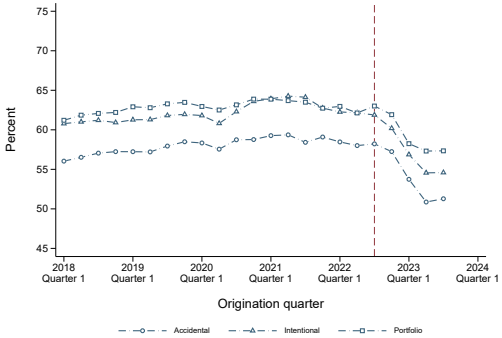
Interest Rate

Landlord Type

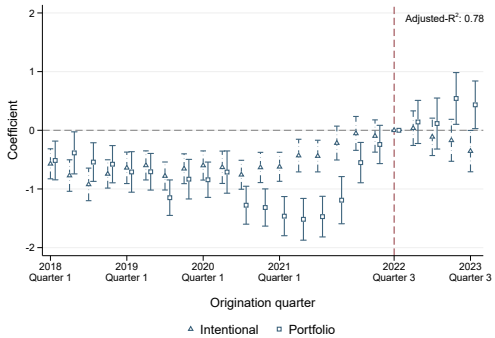
Dependent variable:	Interest rate (basis points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Portfolio	28.552***	26.919***	22.861***	21.530***	18.779***	2.861***
	(0.787)	(0.679)	(0.581)	(0.440)	(0.394)	(0.250)
Intentional	7.236***	7.802***	5.663***	4.031***	2.532***	0.064
	(0.511)	(0.469)	(0.396)	(0.324)	(0.290)	(0.185)
Constant	252.226***	246.408***				
	(0.578)	(1.039)				
Property characteristics		Yes	Yes	Yes	Yes	Yes
LTV dummies	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects:						
Local-area			Yes			
Origination quarter				Yes		
Local-area × quarter					Yes	Yes
Lender						Yes
Adjusted-R^2	0.01	0.02	0.04	0.55	0.56	0.80
Observations	1,176,967	1,154,844	1,154,844	1,154,844	1,154,799	1,154,799

Loan-to-Value

Significant deleveraging across landlord types



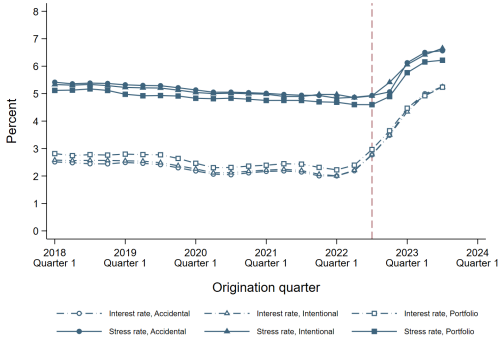
(a) Loan-to-value



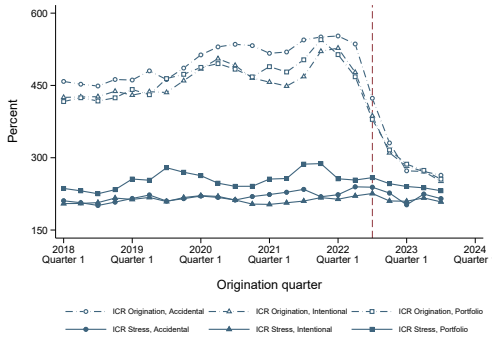
(b) Loan-to-value, regression coefficients

Interest coverage ratios

Significant declines in origination ICRs



(a) Initial and stress test interest rate

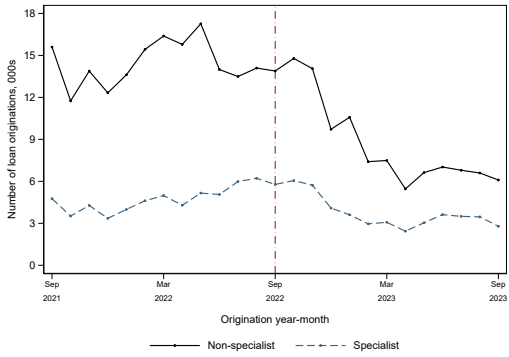


(b) Interest coverage ratios

But relatively stable stress tested ICRs.

Loan Originations by Lender Type

Concentrated among specialist lenders after the event



Specialist lenders are those in 2018 and 2019 with an above median share of BTL loan volume as a proportion of the total residential mortgage loans (including BTL and owner-occupied sectors). The median is share is 28.14%.

Lender type: summary statistics

Landlord type	Number loans	Interest rate (%)	Stress rate (%)	LTV (%)	Fix. term (yrs)	Loan fees (%)	ICR (%)	ICR stress (%)
			Panel A.1: Specialist lenders, pre-period					
Accidental	7,398	2.60	4.82	57.4	4.5	1.25	466.0	232.2
Intentional	29,979	2.83	4.81	60.0	5.1	1.35	458.5	248.5
Portfolio	19,845	2.80	4.63	63.8	4.7	1.46	412.7	240.1
			Panel A.2: Non-specialist lenders, pre-period					
Accidental	25,582	2.16	4.91	58.7	4.1	0.69	526.6	230.7
Intentional	120,605	2.11	4.97	62.7	4.2	0.74	485.1	212.3
Portfolio	25,707	2.23	4.67	61.7	4.4	0.89	519.7	280.4
			Panel B.1: Specialist lenders, post-period					
Accidental	6,749	4.68	5.85	53.6	4.2	1.50	255.3	201.1
Intentional	23,545	4.78	5.74	57.1	5.0	1.67	271.0	218.4
Portfolio	14,053	4.55	5.51	60.8	4.7	1.95	284.8	227.6
			Panel B.2: Non-specialist lenders, post-period					
Accidental	17,932	4.30	5.99	53.9	3.8	0.86	302.7	222.4
Intentional	70,488	4.14	6.11	57.3	4.0	0.84	290.3	207.5
Portfolio	14,212	4.28	5.75	57.6	4.1	1.14	293.7	252.3
			Panel C.1: Specialist lenders, Δ post-period					
Accidental	-0.09%	2.08	1.03	-3.8	-0.3	0.25	-210.7	-31.1
Intentional	-0.21%	1.94	0.94	-2.9	-0.1	0.31	-187.5	-30.1
Portfolio	-0.29%	1.75	0.89	-3.0	0.0	0.49	-127.8	-12.5
			Panel C.2: Non-specialist lenders, Δ post-period					
Accidental	-0.30%	2.14	1.08	-4.7	-0.3	0.17	-223.9	-8.3
Intentional	-0.42%	2.02	1.13	-5.4	-0.2	0.10	-194.7	-4.7
Portfolio	-0.45%	2.04	1.08	-4.2	-0.3	0.25	-226.0	-28.2

Lender and borrower type variation, empirical specification

- Regression specification

$$
\begin{aligned}
y_{ilt} = \beta_0 + \beta_1 \text{Specialist}_{ilt} + \beta_2 \text{Portfolio}_{ilt} + \beta_3 \text{Intentional}_{ilt} + \beta_4 (\text{Portfolio}_{ilt} \cdot \text{Specialist}_{ilt}) \\
+ \beta_5 (\text{Intentional}_{ilt} \cdot \text{Specialist}_{ilt}) + \beta_6 (\text{Post}_{ilt} \cdot \text{Specialist}_{ilt}) + \beta_7 (\text{Post}_{ilt} \cdot \text{Portfolio}_{ilt}) + \\
\beta_8 (\text{Post}_{ilt} \cdot \text{Intentional}_{ilt}) + \beta_9 (\text{Post}_{ilt} \cdot \text{Portfolio}_{ilt} \cdot \text{Specialist}_{ilt}) + \\
\beta_{10} (\text{Post}_{ilt} \cdot \text{Intentional}_{ilt} \cdot \text{Specialist}_{ilt}) + \gamma \boldsymbol{X}_{ilt} + \omega_l + \omega_t + \epsilon_{ilt},
\end{aligned}
\tag{5}
$$

→ where i is the property used for collateral, l is the local-area where the property is located, t origination quarter, $\boldsymbol{X}_{ilt}$ is a vector of other explanatory variables that include property characteristics and LTV dummies, ϵ_{ilt} is the residual

→ Post is an indicator taking the value of one for all mortgages originating after 2022/Q3

→ Specialist is an indicator taking the value of one for all mortgages originated by specialist lenders

→ Control for local area (ω_l) and origination-quarter (ω_t) fixed effects

→ The base groups in the above specification are accidental landlords and non-specialist lenders

Lender and borrower type variation, regression results

Dependent variable:	Interest rate	Stress Rate	Fix Term	Fee Loan Amt
	(1)	(2)	(3)	(4)
Specialist	37.115***	-4.254***	1.027***	0.321***
	(1.274)	(0.653)	(0.022)	(0.010)
Portfolio	9.566***	-33.073***	0.484***	0.206***
	(0.332)	(0.528)	(0.012)	(0.005)
Intentional	-0.455**	-4.919***	0.269***	0.114***
	(0.195)	(0.580)	(0.007)	(0.003)
Portfolio × Specialist	16.579***	12.050***	-0.311***	-0.093***
	(0.963)	(1.333)	(0.024)	(0.010)
Intentional × Specialist	14.657***	-3.035***	-0.025	0.042***
	(0.833)	(0.602)	(0.028)	(0.009)
Post × Specialist	-12.243***	-22.894***	-0.516***	0.310***
	(1.509)	(1.781)	(0.032)	(0.028)
Post × Portfolio	-21.960***	1.539	-0.162***	0.060***
	(1.127)	(1.552)	(0.025)	(0.018)
Post × Intentional	-14.011***	20.358***	-0.071***	-0.114***
	(0.742)	(1.163)	(0.016)	(0.011)
Post × Portfolio × Specialist	-9.384***	-4.243	0.397***	0.305***
	(1.885)	(2.644)	(0.044)	(0.039)
Post × Intentional × Specialist	13.904***	-17.356***	0.445***	0.118***
	(1.590)	(2.275)	(0.039)	(0.034)
Property characteristics	Yes	Yes	Yes	Yes
LTV dummies	Yes	Yes	Yes	Yes
Fixed effects:				
Local-area	Yes	Yes	Yes	Yes
Origination quarter	Yes	Yes	Yes	Yes
Adjusted-R^2	0.59	0.22	0.05	0.08
Observations	1,141,654	1,141,654	1,141,654	1,141,654

Interest rate, within lender type

Dependent variable:	Interest rate (basis points)					
Lender type:	Non-specialist			Specialist		
	(1)	(2)	(3)	(4)	(5)	(6)
Portfolio	3.117***	5.292***	4.776***	3.464***	8.001***	5.468***
	(0.333)	(0.360)	(0.328)	(0.317)	(0.317)	(0.291)
Intentional	-0.276	1.057***	0.857***	1.083***	2.758***	2.123***
	(0.207)	(0.193)	(0.177)	(0.294)	(0.308)	(0.282)
Post × Portfolio		-20.913***	-13.059***		-32.869***	-11.678***
		(1.103)	(1.113)		(1.425)	(1.216)
Post × Intentional		-12.750***	-10.547***		-13.494***	-6.681***
		(0.736)	(0.781)		(1.096)	(1.022)
Property characteristics	Yes	Yes	Yes	Yes	Yes	Yes
LTV dummies	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects:						
Local-area × quarter	Yes	Yes	Yes	Yes	Yes	Yes
Lender	Yes	Yes		Yes	Yes	
Lender × quarter			Yes			Yes
Adjusted-R^2	0.74	0.74	0.75	0.83	0.83	0.86
Observations	825,870	825,870	825,869	315,650	315,650	315,642

Loan fees, within lender type

Lender type:	Non-specialist			Specialist		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Loan fees as a fraction of loan amount					
Portfolio	0.084***	0.075***	0.088***	0.259***	0.213***	0.077***
	(0.005)	(0.005)	(0.005)	(0.009)	(0.008)	(0.008)
Intentional	0.074***	0.076***	0.073***	0.074***	0.073***	0.074***
	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.006)
Post × Portfolio		0.088***	-0.016		0.314***	0.257***
		(0.017)	(0.016)		(0.034)	(0.035)
Post × Intentional		-0.014	-0.010		0.009	0.122***
		(0.011)	(0.011)		(0.029)	(0.028)
Adjusted-R^2	0.16	0.16	0.18	0.35	0.35	0.43
Property characteristics	Yes	Yes	Yes	Yes	Yes	Yes
LTV dummies	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects:						
Local-area × quarter	Yes	Yes	Yes	Yes	Yes	Yes
Lender	Yes	Yes		Yes	Yes	
Lender × quarter			Yes			Yes
Observations	825,870	825,870	825,869	315,650	315,650	315,642

Stress test interest rate and fixation term, within lender type

Lender type:	Non-specialist			Specialist		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Stress test interest rate (basis points)					
Portfolio	-11.090***	-11.106***	-8.927***	-11.935***	-11.505***	-12.346***
	(0.324)	(0.300)	(0.310)	(0.681)	(0.728)	(0.732)
Intentional	-4.647***	-5.455***	-2.299***	-5.856***	-5.682***	-6.125***
	(0.195)	(0.173)	(0.140)	(0.734)	(0.784)	(0.746)
Post × Portfolio		0.183	-3.786***		-3.133*	-7.583***
		(1.402)	(1.355)		(1.785)	(1.614)
Post × Intentional		7.343***	-5.258***		-1.398	-2.460*
		(1.046)	(0.889)		(1.447)	(1.318)
Adjusted-R^2	0.50	0.50	0.60	0.48	0.48	0.53
Dependent variable:	Fixation term (years)					
Portfolio	0.244***	0.262***	0.230***	0.286***	0.250***	0.249***
	(0.009)	(0.009)	(0.009)	(0.017)	(0.019)	(0.019)
Intentional	0.154***	0.164***	0.146***	0.114***	0.117***	0.136***
	(0.006)	(0.006)	(0.006)	(0.014)	(0.015)	(0.014)
Post × Portfolio		-0.173***	0.036		0.249***	0.063*
		(0.024)	(0.027)		(0.037)	(0.033)
Post × Intentional		-0.098***	-0.069***		-0.018	0.070**
		(0.016)	(0.016)		(0.035)	(0.030)
Adjusted-R^2	0.07	0.07	0.17	0.30	0.30	0.33
Property characteristics	Yes	Yes	Yes	Yes	Yes	Yes
LTV dummies	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects:						
Local-area × quarter	Yes	Yes	Yes	Yes	Yes	Yes
Lender	Yes	Yes		Yes	Yes	
Lender × quarter			Yes			Yes
Observations	825,870	825,870	825,869	315,650	315,650	315,642

Summary of findings

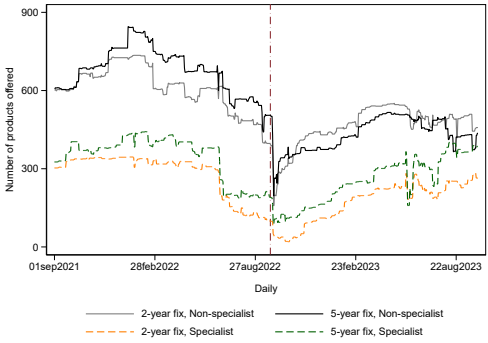
- Loan originations become concentrated among specialist lenders
- Interest rates increase relatively less for large landlords while loan fees increase relatively more, especially among specialist lenders.
- Specialist lenders facilitate credit access to larger borrowers:
  - → Hiking loan fees to keep interest rates lower and credit flowing
  - → Loans with interest rates fixed for longer, for which less stringent stress testing is required

Loans on Offer

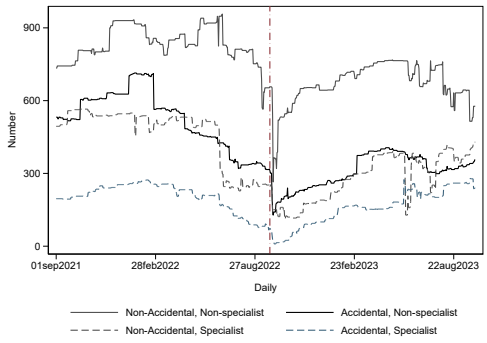
Loans on offer

- The previous analysis focused on loan originations (equilibrium outcomes)
- In general, it is difficult to separate supply and demand
- Use daily information on the products on offer to shed additional light on the channels (Moneyfacts data)
- High frequency, distinguish between products offered by specialist and non-specialist lenders

Number of loans on offer

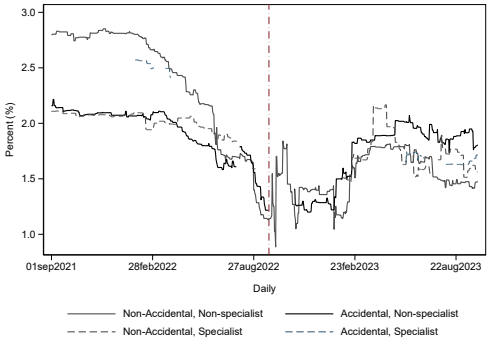


(a) Lender type and fixation period

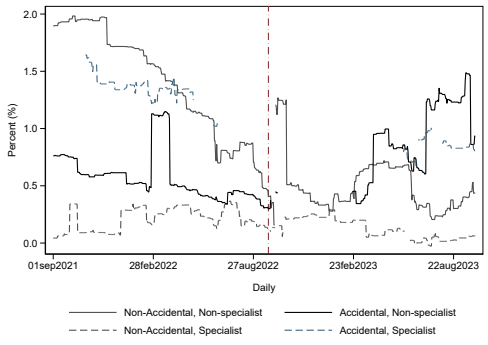


(b) Landlord and lender type

Interest rate premium used for the ICR stress test



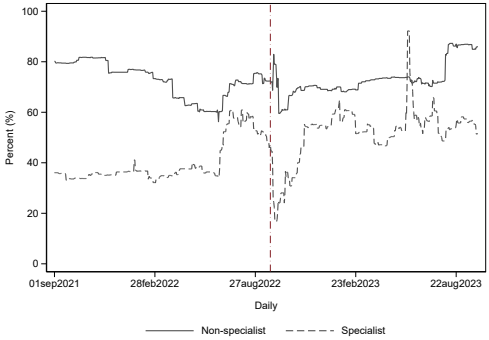
(a) 2-year fixed interest rate



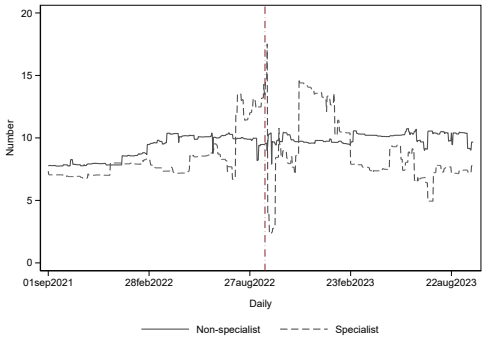
(b) 5-year fixed interest rate

Lender risk management

Maximum number of properties



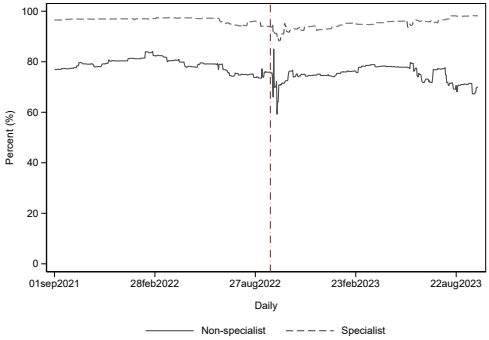
(a) Restriction on maximum number



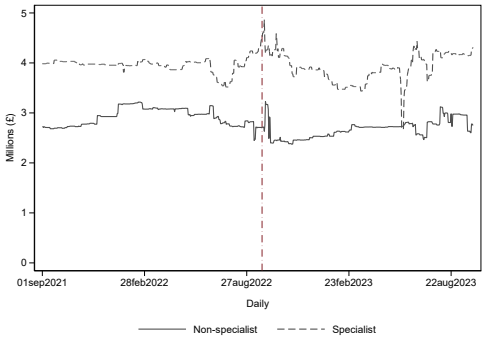
(b) Maximum number, conditional on restriction

Lender risk management

Maximum advance



(a) Restriction on maximum advance



(b) Maximum advance, conditional on restriction

CONCLUSION

Conclusion

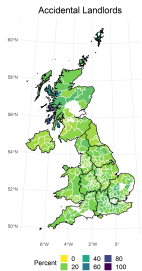
- We have studied asset and financing outcomes around a large and unanticipated credit tightening event, exploiting borrower and lender heterogeneity.
- Asset results:
  - → Prior to the event, rents and property values moved in tandem generating stable yields. After the event, the co-movement that characterized changes in property values and rents prior to the event broke down temporarily, as the higher discount rates offset the positive cash-flow effects of higher rents.
- Financing results:
  - → Significant declines in interest coverage ratios
  - → Interest rates increase relatively less for large borrowers, while loan fees increase relatively more, particularly on loans originated by specialist lenders
  - → Specialist lenders facilitate credit access to larger borrowers, on whom they depend more for their business activity
- Our results show significant segmentation across lender and borrower types. They also shed light on the incentives of heterogeneous lenders, and the margins along which they adjust loan contracts and underwriting, at times of interest rate rises, so as to mitigate the effects of the rises on their lending activity.

APPENDIX SLIDES

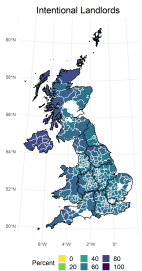
Origination by Location

Landlord type

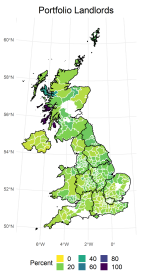
(a) Accidental



(b) Intentional



(c) Portfolio



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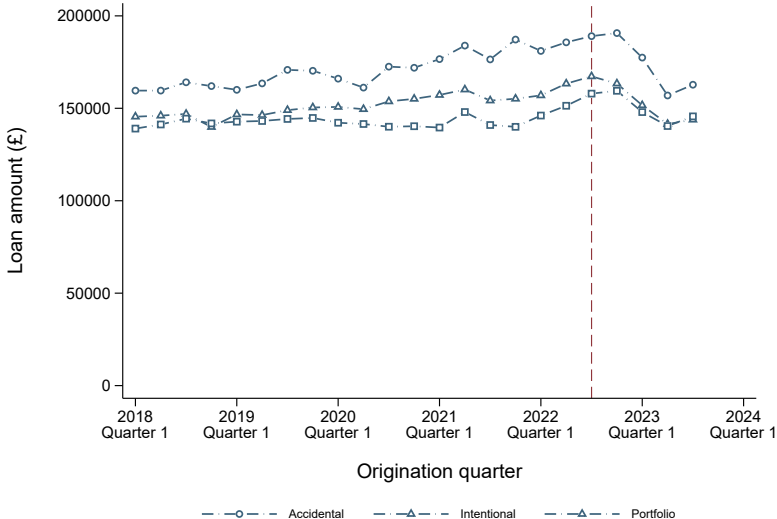
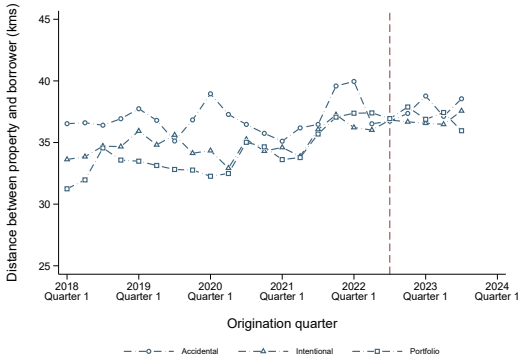
Loan Amount

Landlord Type



Location Choices

Landlord Type



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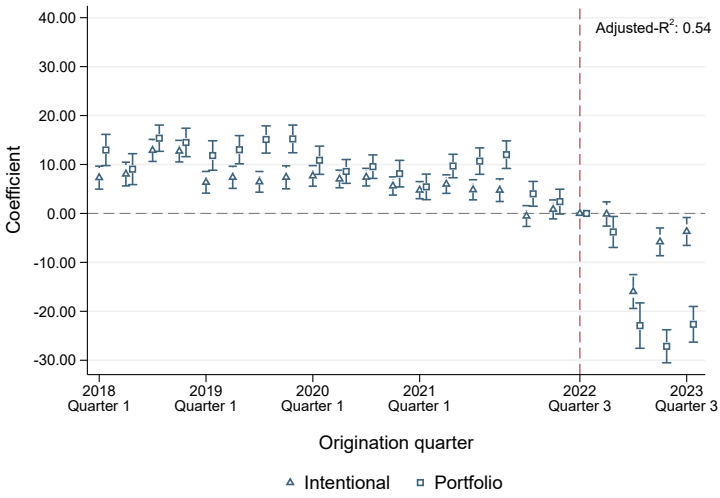
Interest Rate

Landlord Type



Summary Statistics

Landlord and Lender Type

Landlord type	N	Loan amount	Interest rate	Stress rate	LTV	Fixation term	Lender fees	ICR	ICR stress	Mortgage term
					Panel A: High-street lenders					
Accidental	139,186	169,881	2.37	5.20	57.48	3.51	0.006	502.81	228.91	262.28
Portfolio	112,582	124,655	2.51	4.88	62.31	4.01	0.009	454.53	257.00	260.92
Intentional	466,840	150,791	2.43	5.18	62.17	3.87	0.008	433.70	206.01	257.04
					Panel B: Non High-street lenders					
Accidental	95,104	172,558	2.75	5.28	57.51	4.23	0.009	425.81	202.40	260.05
Portfolio	121,271	163,775	3.07	5.02	62.36	4.71	0.012	427.19	247.69	247.10
Intentional	273,077	156,485	2.90	5.20	60.37	4.67	0.011	438.49	225.25	248.44

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Institutional Background

Significant Events in the Housing Markets

1. Tax Deductibility
   - → Before April 2017, residential landlords benefited from mortgage interest tax deductibility at their marginal tax rate
   - → Phased reduction in tax benefits over the following three years and from April 2020 residential landlords only benefit from mortgage interest tax deductibility at the basic tax rate of 20%

2. Minimum Energy Efficiency Standards
   - → Landlords in private residential properties can only grant a new tenancy if their property satisfies a minimum energy efficiency standard (E rating)
   - → First approved by the UK Parliament in April 2015, and came into force on 1 April 2018 (Clara et al. 2022)

3. COVID-19
   - → 1st lockdown on 23 March 2020 and most legal restrictions ending by March 2022

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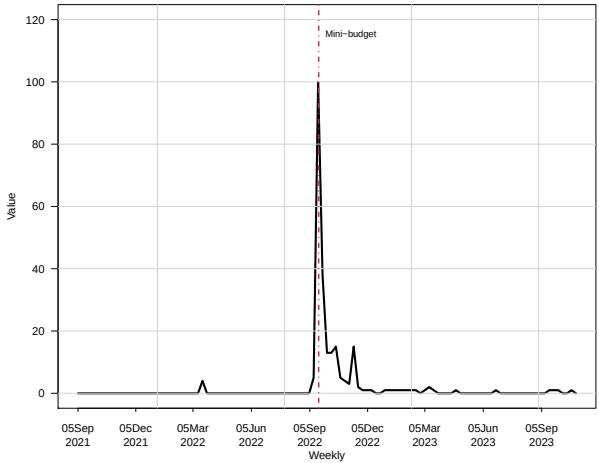
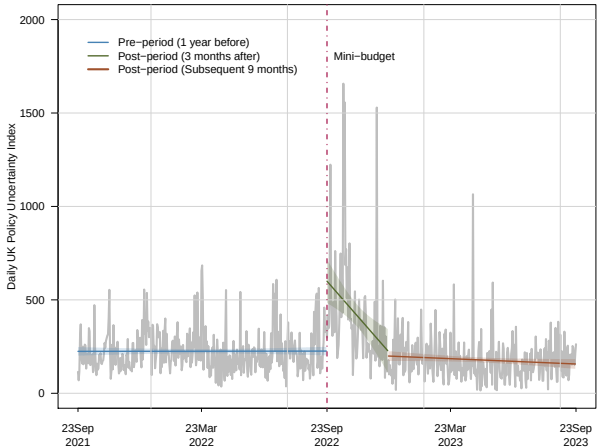
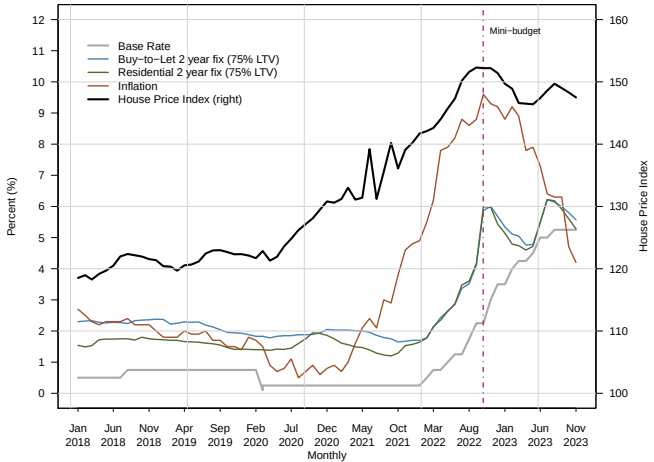
Google Trends



UK Daily Policy Uncertainty Index



Macroeconomic conditions



Interest Rate

Dependent variable:	Interest rate (basis points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Intentional	7.236***	7.802***	5.663***	4.031***	2.532***	0.064
	(0.511)	(0.469)	(0.396)	(0.324)	(0.290)	(0.185)
Portfolio	28.552***	26.919***	22.861***	21.530***	18.779***	2.861***
	(0.787)	(0.679)	(0.581)	(0.440)	(0.394)	(0.250)
Constant	252.226***	246.408***				
	(0.578)	(1.039)				
Property characteristics		Yes	Yes	Yes	Yes	Yes
LTV dummies	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects:						
Local-area			Yes			
Origination quarter				Yes		
Local-area × quarter					Yes	Yes
Lender						Yes
Adjusted-R^2	0.01	0.02	0.04	0.55	0.56	0.80
Observations	1,176,967	1,154,844	1,154,844	1,154,844	1,154,799	1,154,799

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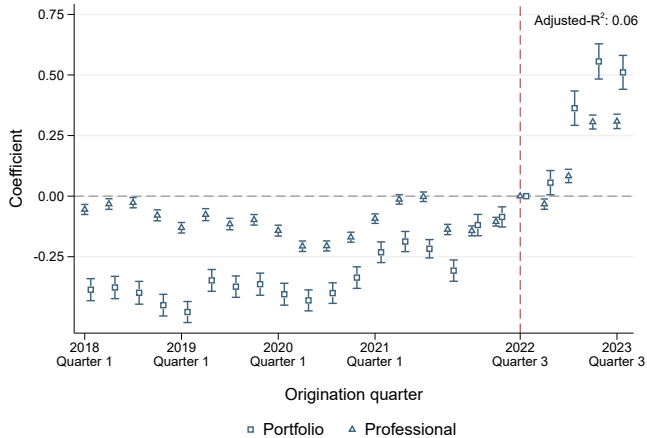
Stress Tested Interest Rate

Landlord Type



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Stress Tested Interest Rate

Dependent variable:	Stress tested interest rate (basis points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Intentional	-2.764***	-2.439***	-4.333***	-2.541***	-4.226***	-5.131***
	(0.586)	(0.587)	(0.605)	(0.586)	(0.618)	(0.268)
Portfolio	-24.480***	-25.588***	-28.832***	-26.808***	-29.487***	-12.165***
	(0.837)	(0.785)	(0.780)	(0.759)	(0.775)	(0.332)
Constant	503.316***	504.268***				
	(1.054)	(1.034)				
Property characteristics		Yes	Yes	Yes	Yes	Yes
LTV dummies	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects:						
Local-area			Yes			
Origination quarter				Yes		
Local-area × quarter					Yes	Yes
Lender						Yes
Adjusted-R^2	0.02	0.02	0.04	0.19	0.21	0.47
Observations	1,176,967	1,154,844	1,154,844	1,154,844	1,154,799	1,154,799

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Regulatory Arbitrage

Loan Fees by Landlord Type

Dependent variable:	Lender fees as a fraction of loan amount					
	(1)	(2)	(3)	(4)	(5)	(6)
Intentional	0.129***	0.121***	0.125***	0.107***	0.111***	0.071***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)
Portfolio	0.271***	0.264***	0.265***	0.248***	0.250***	0.148***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
Constant	1.175***	1.237***				
	(0.016)	(0.018)				
Property characteristics		Yes	Yes	Yes	Yes	Yes
LTV dummies	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects:						
Local-area			Yes			
Origination quarter				Yes		
Local-area × quarter					Yes	Yes
Lender						Yes
Adjusted-R^2	0.04	0.04	0.04	0.05	0.06	0.27
Observations	1,176,967	1,154,844	1,154,844	1,154,844	1,154,799	1,154,799

On average, loan fees is higher for portfolio landlords

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