# Supplemental Appendices
# Mortgage Pricing and Monetary Policy

Matteo Benetton[¶] Alessandro Gavazza[§] Paolo Surico[‡]

October 2024

The appendices are structured as follows. Appendix A explains our procedure for constructing the estimation dataset. Appendix B provides institutional background on the Funding for Lending Scheme program. Appendix C reports additional descriptive analyses. Appendix D details the formulas of the demand elasticities and consumer surplus. Appendix E reports additional estimation results.

## A Dataset Construction

In this Appendix, we describe our procedure for constructing the dataset used in the estimation, which requires merging the PSD and the Moneyfacts dataset.

First, we construct a product-type definition based on variables that are common to both Moneyfacts and the PSD. The product-type definition is based on the following characteristics: interest-rate type (fixed or variable); length of the fixation period (e.g., 2 years, 5 years); LTV band (e.g., 70-75, 75-80); and lender identifier in the PSD. Moneyfacts reports more detailed information on the brand associated with the mortgage product, but the PSD only reports the more aggregated banking entity, which is the one we use for matching purposes. For example, HSBC and First Direct are both retail divisions of HSBC Bank Plc, and their mortgages are reported as being issued by HSBC in the PSD.

Second, for each product type, quarter, interest rate, and origination fee, we drop all repeated observations in Moneyfacts. Given our product-type definition, the quarterly interval, and the rate-fee pair, we can obtain multiple observations because of: (1) different

[¶]Haas School of Business, University of California, Berkeley. Email: benetton@berkeley.edu.
[§]London School of Economics. Email: a.gavazza@lse.ac.uk.
[‡]London Business School and CEPR. Email: psurico@london.edu.

brands under the same lender; and (2) different observations across months within the same quarter. We keep the product with the highest fee if we observe multiple fees for a given product type, quarter, and interest rate (this can happen if the lender changes the fee in a month within the quarter without changing the interest rate). This second step provides us with a product list for each quarter in Moneyfacts we can merge with PSD using product type, quarter, and interest rate as matching variables (we remind the readers that the PSD does not report origination fees).

Third, we impute missing product characteristics in the PSD other than the fee. We identify three categories of observations: (1) those with no missing characteristics (30 percent of all PSD observations); (2) those with missing initial fixation period only (30 percent); and (3) those with more than one missing variable (40 percent). These categories are often associated with specific lenders, because the reporting of some variables was optional before 2015 and thus some lenders (almost) always reported them, while others (almost) never did. For observations in category (2), we impute the length of the initial fixation period by recovering it from Moneyfacts based on the lender, interest-rate type, LTV band, and the interest rate. For category (3) we impute all missing variables using the predicted values from regression models based on the mortgage characteristics and borrowers demographics of mortgages with no missing values. This procedure allows us to retain more than 90 percent of the observations in the PSD.

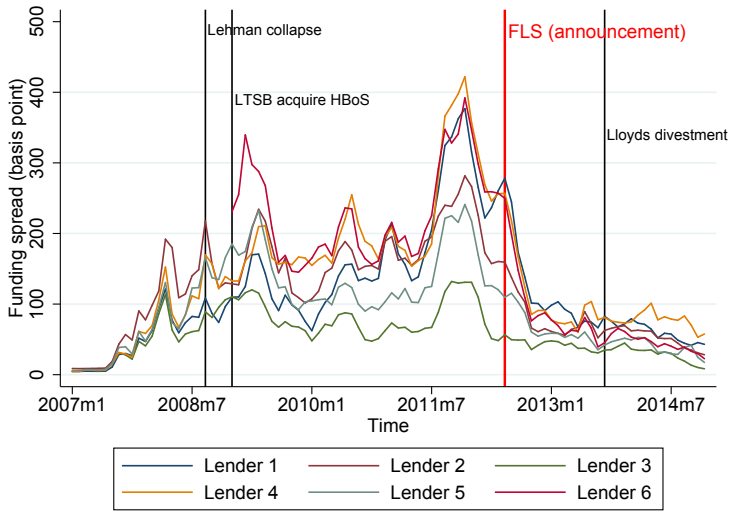
Fourth, based on our definition of a product type—a combination of three non-price characteristics: (1) lender; (2) interest-rate type with fixation period; and (3) maximum LTV ratio—and its interest rate observed in the PSD, we recover the corresponding origination fee from the Moneyfacts dataset.

Finally, the resulting dataset still features many product types with minimal market shares. We combine all products with a market share below 0.1 percent into a representative "outside" product, whose characteristics equal the (weighted) average characteristics of the underlying mortgages. As a result, our final dataset contains 245 product types (124 for first-time buyers, 121 for home movers) and 374 products (186 for first-time buyers, 188 for home movers).

# B The Funding For Lending Scheme

On June 14, 2012, the Governor of the Bank of England, Mervyn King, announced the introduction of the Bank of England and HM Treasury FLS program, which officially started

Figure B1: Funding Costs




*Notes*—This figure displays the funding spreads of the six largest UK lenders.

on July 13, 2012. The scheme was part of the larger monetary stimulus package that the Bank of England had pursued since the onset of the financial crisis, along the lines of similar programs of other central banks (Borio and Zabai, 2016).[1]

The timing of the FLS followed an intensification of the European Sovereign Debt Crisis and an increase in banks' funding costs for major UK lenders, which in turn led to an increase in loan rates. Figure B1 displays funding spreads for the six (anonymized) largest UK lenders.[2] Black vertical lines denote key banking events, and the red vertical line marks the announcement of the FLS. The time series of these funding costs display two large increases: one during the Great Recession in 2007–09 and one during the intensification of the European Sovereign Debt Crisis in 2011–2012. After the FLS announcement, lenders' funding spreads decreased considerably; by the second half of 2013, the level and dispersion of the funding spreads were close to those prevailing before the financial crisis.

The FLS program provides direct funding to banks and building societies for an extended period at lower rates than those prevailing on the market, with the stated goal of promoting lending to households and firms. The scheme's incentives operate through both quantities and prices. As for quantities, the amount of funding available varies with the amount banks

[1]The Bank of England cut the interest rate to 0.5 percent in March 2009, and from September 2009 to July 2012 purchased a total of £375 billion in assets—mainly UK government securities, but also smaller quantities of high-quality corporate bonds.

[2]More formally, Figure B1 reports the constant maturity secondary market spreads to mid-swaps for the largest UK lenders' 5-year euro-denominated senior unsecured bonds (or a suitable proxy when unavailable) as constructed in the Bank of England Credit Conditions Review 2017Q3 (Chapter 1, Chart 1.2).

lend out, as follows. First, each lender can borrow from the Bank of England up to 5 percent of its existing stock of loans to households and to firms in June 2012. Second, banks can borrow beyond this 5 percent limit as long as the additional borrowing leads to a net expansion (i.e., net of repayments) of their lending to households and firms over the period July 2012–December 2013. In other words, banks can finance each pound of new lending with a pound from the FLS, with no constraint on the additional amount they can borrow for this purpose. As for the scheme's incentive for prices, the cost depends on the amount banks lend out. Banks that maintain or expand lending pay an annual fee of 25 bps for the amount they borrow from FLS facilities. Banks that reduce net lending pay an additional fee of 25 bps for each percentage point of decline in net lending. This fee increases linearly up to a maximum of 150 bps for banks that reduce net lending by more than 5 percent.

By the end of 2014, the FLS had recorded aggregate outstanding drawings of more than £4.4 billions, with an associated increase in aggregate lending of about 2.5 percent. All large lenders, with the notable exception of HSBC, participated in the FLS. The scope of the scheme narrowed over time, and since February 2014, excluded household loans such as mortgages amid rising property values. Churm, Radia, Leake, Srinivasan, and Whisker (2012) provide a more detailed description of the FLS, as well as some evidence on the short-term effects of the scheme on the interest rates lenders charged to firms and households. The FLS closed at the end of Feb 2018.

# C Data: Additional Descriptive Analyses

The goal of this Appendix is to provide additional descriptive patterns in our data.

## C.1 More Facts about Mortgage Pricing

We now provide additional details on mortgage pricing using the Moneyfacts data.

**Rate Decomposition.** Table C1 presents the coefficient estimates of several regressions that aim to decompose the variation in interest rates across mortgage products. The dependent variable is the interest rate $r_{jkt}$ of product $j$, product type $k$ in month $t$. We gradually enrich the product attributes included among the explanatory variables. The specification of column (1) includes time fixed effects only, and the $R^2$ indicates that they account for 20.7 percent of the sample rate variation. Specification (2) further includes indicator variables for the maximum LTV of the mortgage product. The $R^2$ increases substantially—from 20.7

Table C1: Interest Rate Decomposition

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| $60 < \text{LTV} \leq 70$ | | -0.057*** | -0.076*** | 0.159*** | 0.163*** |
| | | (0.008) | (0.007) | (0.007) | (0.007) |
| $70 < \text{LTV} \leq 75$ | | 0.279*** | 0.248*** | 0.384*** | 0.359*** |
| | | (0.007) | (0.006) | (0.006) | (0.006) |
| $75 < \text{LTV} \leq 80$ | | 0.734*** | 0.713*** | 0.821*** | 0.807*** |
| | | (0.008) | (0.007) | (0.007) | (0.006) |
| $80 < \text{LTV} \leq 85$ | | 1.197*** | 1.117*** | 1.283*** | 1.259*** |
| | | (0.008) | (0.007) | (0.006) | (0.006) |
| $85 < \text{LTV} \leq 90$ | | 1.969*** | 1.827*** | 2.016*** | 1.991*** |
| | | (0.008) | (0.007) | (0.007) | (0.006) |
| $90 < \text{LTV} \leq 95$ | | 2.349*** | 2.158*** | 2.250*** | 2.167*** |
| | | (0.014) | (0.012) | (0.011) | (0.011) |
| Home movers | | | 0.006* | 0.002 | 0.010*** |
| | | | (0.004) | (0.003) | (0.003) |
| Fix 3 years | | | 0.297*** | 0.327*** | 0.322*** |
| | | | (0.005) | (0.005) | (0.005) |
| Fix 5 years | | | 0.701*** | 0.759*** | 0.748*** |
| | | | (0.005) | (0.004) | (0.004) |
| Discounted | | | -0.020** | 0.126*** | 0.124*** |
| | | | (0.008) | (0.008) | (0.007) |
| Discounted 2 years | | | -0.296*** | -0.314*** | -0.302*** |
| | | | (0.005) | (0.005) | (0.005) |
| Fees (£1,000) | | | | | -0.229*** |
| | | | | | (0.003) |
| Time f.e. | Yes | Yes | Yes | Yes | Yes |
| Lender f.e. | No | No | No | Yes | Yes |
| $R^2$ | 0.207 | 0.635 | 0.734 | 0.781 | 0.792 |
| Observations | 101,185 | 101,185 | 101,185 | 101,185 | 101,185 |

*Notes*—This table presents the coefficient estimates of several regressions in which the dependent variable is the interest rate $r_{jkt}$ of product $j$, product type $k$ in month $t$.

percent in column (1) to 63.5 percent in column (2)—thereby indicating that the variation across LTV bands is the major cross-sectional driver of UK mortgage rates.

Specification (3) further includes fixed effects for the combination of interest rate type (e.g., fixed vs. variable) and the duration of the deal (e.g., 2 vs. 3 years).[3] Lenders price these mortgage products differently because the resulting loans carry different interest-rate risks. The $R^2$ of the regression increases to 73.4 percent.

Specification (4) further includes lender fixed effects, which increase the $R^2$ to 78.1 percent. Specification (5) further includes fees. The $R^2$ reaches 79.2 percent.

[3]Some lenders offer mortgage products with variable rates with a spread over a benchmark rate lower for, say, the first two years, and higher thereafter. Hence, these mortgage products are 2-year variable rates.

**Rate-fee Correlation.** We now provide additional details on the relationship between rates and fees in the Moneyfacts data. To this goal, we estimate the following regressions:

$$r_{jkt} = \chi^r_{kt} + \upsilon^r_{jkt}, \tag{C1}$$

$$f_{jkt} = \chi^f_{kt} + \upsilon^f_{jkt}, \tag{C2}$$

where $r_{jkt}$ and $f_{jkt}$ are the interest rate and the fee, respectively, of product $j$, product type $k$, in month $t$; $\chi^r_{kt}$ and $\chi^f_{kt}$ are product type-month fixed effects; and $\upsilon^r_{jkt}$ and $\upsilon^f_{jkt}$ are unobservables. The inclusion of product type-month fixed effects implies that we exploit exclusively mortgage products with multiple rate-fee combinations, as in the regressions of columns (2)–(7) of Table 2.

Figure C1 displays several binned scatterplots of the estimated residuals of equation (C1) on the vertical axis and of equation (C2) on the horizontal axis for several groups of mortgage products: products with a maximum LTV equal or below 80 percent (top-left); products with a maximum LTV above 80 percent (top-right); product offered to first-time buyers (second row-left) and home movers (second row-right); products offered by the largest 6 lenders (third row-left); products offered by smaller lenders (third row-right); products offered with a fixed interest rate (fourth row-left); products offered with a variable interest rate (fourth row-right); products offered before the FLS, until July 2012 (bottom-left); and products offered after the FLS, from August 2012 (bottom-right).

All these plots show a negative relation between residual fees and residual rates. The magnitudes are also quite similar across plots: On average, a £1,000-higher fee is associated with an approximately 25-bps-lower interest rate.

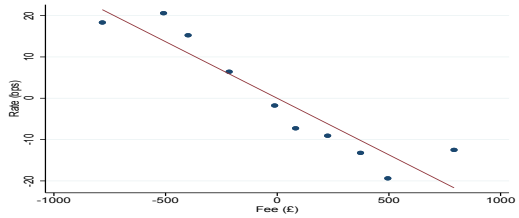
We further explore the rate-fee schedule by estimating the following flexible specification:

$$r_{jkt} = \sum_b \eta_b \mathbb{1}\{fee_{jkt} \in b\} + \chi_{kt} + \upsilon_{jkt}, \tag{C3}$$

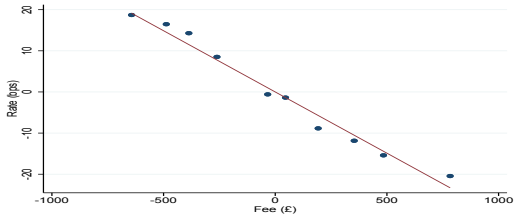
where $\mathbb{1}\{fee_{jkt} \in b\}$ are indicator variables equal to one if the fees of product $j$, product type $k$, in month $t$ belong to the following bands: (1) fees between £1 and £450; (2) fees between £451 and £950; and (3) fees between £951 and £1,250. Products with zero fees are the excluded category. $\chi_{kt}$ are product type-month fixed effects, and $\upsilon_{jkt}$ are unobservables.

Figure C2 displays the estimated $\eta_b$ of equation (C3) for different groups of products. Relative to zero-fee mortgages, on average mortgages with fees between £1 and £450 feature 10-basis-point-lower interest rates for products with LTV equal or below 80 percent, offered

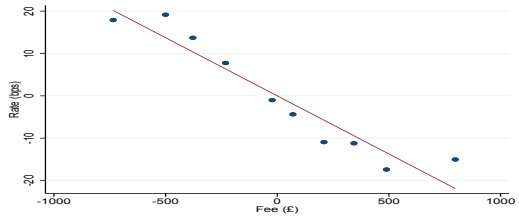
Figure C1: Correlation between Residual Rates and Fees Across Products



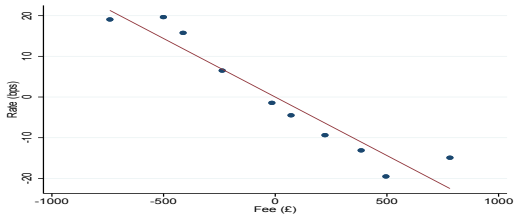

(a) LTV $\leq$ 80



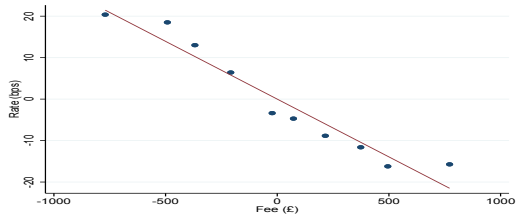

(b) LTV $>$ 80



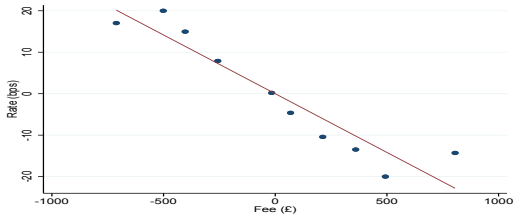

(c) First-time Buyers



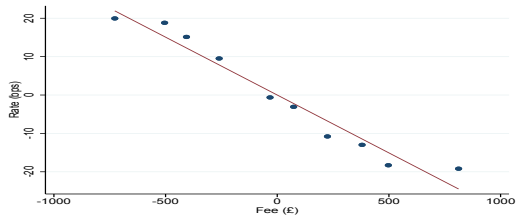

(d) Home Movers



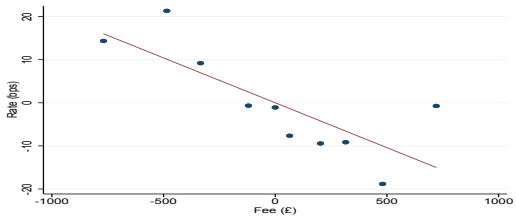

(e) Big 6



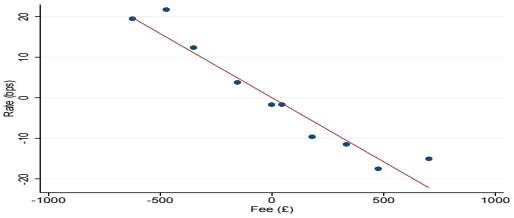

(f) Small Lenders



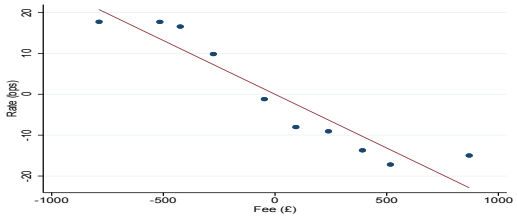

(g) Fixed Rate




(h) Variable Rate




(i) Pre-FLS




(j) Post-FLS

*Notes*—The Figure reports the binned scatterplots of the estimated residuals ($\hat{v}^r_{jkt}, \hat{v}^f_{jkt}$) of equations (C1) and (C2) for several groups of mortgage products: products with a maximum LTV equal or below 80 percent (top-left); products with a maximum LTV above 80 percent (top-right); product offered to first-time buyers (second row-left) and home movers (second row-right); products offered by the largest 6 lenders (third row-left); products offered by smaller lenders (third row-right); products offered with a fixed interest rate (fourth row-left); products offered with a variable interest rate (fourth row-right); products offered before the FLS, until July 2012 (bottom-left); and products offered after the FLS, from August 2012 (bottom-right).

Table C2: Number of Quotes and Loan Amounts within LTV Bands

| | Number of quotes | | | | Loan amount | | | |
|---|---|---|---|---|---|---|---|---|
| | FTB | | HM | | FTB | | HM | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| LTV $\leq$ 70 | 2.78 | 2.33 | 2.80 | 2.34 | 133.92 | 91.99 | 141.45 | 111.40 |
| 70 $<$ LTV $\leq$ 75 | 3.29 | 2.78 | 3.29 | 2.72 | 130.84 | 69.63 | 178.24 | 113.01 |
| 75 $<$ LTV $\leq$ 80 | 2.41 | 1.58 | 2.40 | 1.61 | 146.74 | 89.41 | 180.99 | 115.61 |
| 80 $<$ LTV $\leq$ 85 | 2.99 | 3.10 | 2.84 | 2.62 | 136.26 | 82.34 | 184.90 | 103.57 |
| 85 $<$ LTV $\leq$ 90 | 2.89 | 3.09 | 2.57 | 2.63 | 129.88 | 62.67 | 165.40 | 78.49 |
| 90 $<$ LTV $\leq$ 95 | 2.17 | 2.77 | 2.21 | 2.69 | 134.44 | 47.21 | | |

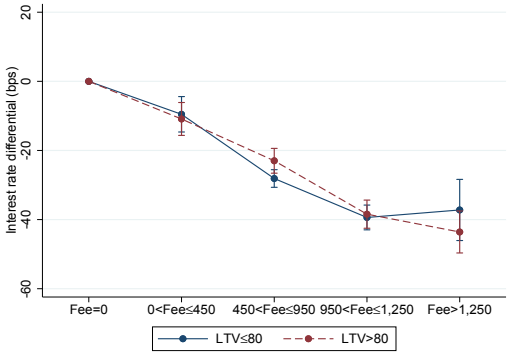
*Notes*—Summary statistics for the number of quotes in Moneyfacts and loan amounts (in £,000) in PSD 001 within LTV bands in each market segment. The number of mortgage loans in PSD 001 with LTVs above 90 in the home mover segment does not satisfy the restrictions described in Appendix A and thus the cells are empty.

by the largest six lenders, in both market segments (first-time buyers and home movers), and with either a fixed or an adjustable rate. The point estimate of the decrease in rates is slightly lower for mortgage products offered by smaller lenders, but the magnitudes are not statistically different. The increase in the fees from £1–450 to £451–950 is associated with an average decrease in interest rates by 15–20 bps, corresponding to a 25–30 bps discount relative to a zero-fee mortgage. Increasing the fees from £451–950 to £951–1,250 yields a similar rate decrease by 15–20bps. Finally, increasing fees further above £1,250 does not seem to lead to additional reductions in interest rates, although there are only a few products with fees greater than £1,250 and thus the estimates are not precise.

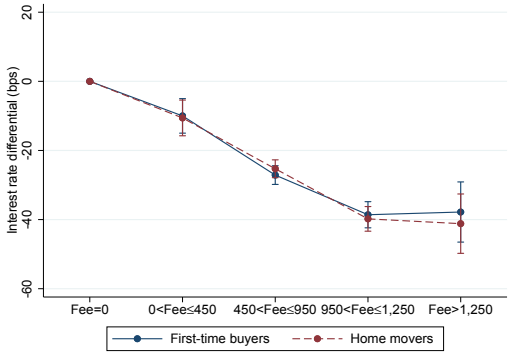
**Two-part pricing and default risk.** We now report additional details on some empirical patterns mentioned in Section 3 that suggest that lenders do not construct menus of two-part tariffs to screen borrowers for their default risk.

Specifically, if lenders construct menus composed of different rate-fee quotes to screen borrowers ex-ante based on their default risk, we might expect the number of quotes to be higher at higher LTV bands, that is the segment of the market with higher default rates. Table C2 reports the number of products by type/month for different LTV bands in each market segment. The number of products by type/month does not display a clear pattern across LTV bands. Critically, we do not observe a larger number of rate-fee quotes and thus finer screening through two-part pricing at higher LTV products—probably, the opposite.

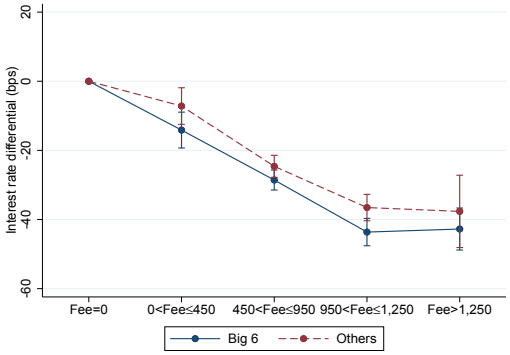
Figure C2: Rate-Fee Schedules Across Products



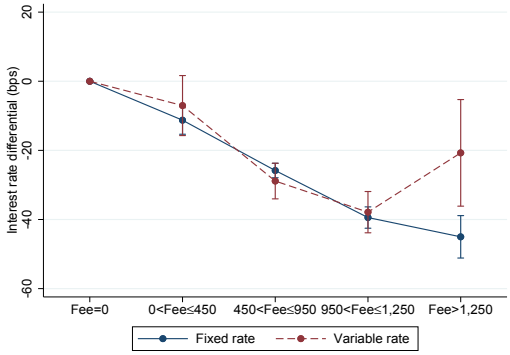

(a) LTV



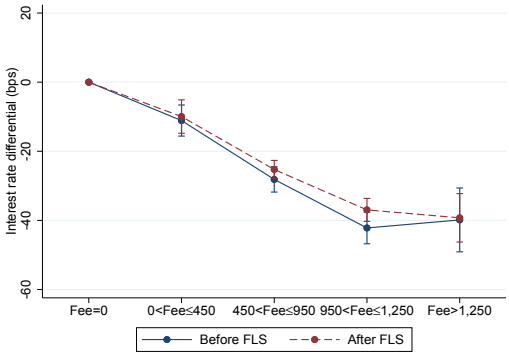

(b) Borrower Type




(c) Lenders




(d) Rate Type




(e) Pre/Post FLS

*Notes*—The Figure reports the estimated $\eta_b$ of equation (C3) for several different groups of products.

Moreover, we investigate whether lenders screen borrowers at high LTVs using a different rate-fee trade-off than at low LTVs. For example, riskier borrowers may be more likely to choose zero-fee products than safer borrowers. This is because, in anticipation of their future default, risky borrowers should be less willing to pay upfront fees to reduce their future interest payments than safer borrowers. Because lenders' incentives to screen borrowers are higher on high-LTV (riskier) mortgages than at low-LTV (safer) mortgages, lenders should charge a larger interest rate differential between zero-fee products and positive-fee products on high-LTV mortgages than on low-LTV mortgages.

The comparison between panels (a) and (b) of Figure C1 above does not seem to show evidence for such a differential rate-fee relationship between riskier, high-LTV and safer, low-LTV mortgages. In addition, we investigate more formally the rate-fee relationship across LTVs by estimating the following regression:

$$r_{jkt} = \sum_{d} \eta_d f_{jkt} \mathbb{1}\{LTV_{jkt} \in d\} + \chi_{kt} + \upsilon_{jkt}, \tag{C4}$$

where $r_{jkt}$ is the interest rate of product $j$, product type $k$, in month $t$; $f_{jkt}$ is the corresponding fee; $\mathbb{1}\{LTV_{jkt} \in d\}$ are indicator variables equal to one if the maximum LTV of product $j$, product type $k$, in month $t$ equals: 75, 80, 85, 90, and 95, respectively; $\chi_{kt}$ are product type-month fixed effects and $\upsilon_{jkt}$ are unobservables. The coefficients of interest are the $\eta_d$, which measure the rate of substitution between initial interest rates and origination fees within a product type-time pair across different LTV bands. Following the estimation of equation (1), we estimate two specifications: the first one with fees in level as a continuous variable; the second with an indicator variable equal to one for products with no fees, and zero otherwise.

Table C3 reports the coefficient estimates. The first column reports that a £1,000-higher origination fee corresponds to a 22-bps-lower interest rate within the same product type-month pair. Critically, we do not find any monotonic pattern in the rate-fee relationship across LTV bans. Similarly, the estimates in the second column show that lenders offer products with zero fees at an interest rate that is on average 31 bps higher than a product with identical non-price characteristics but with a positive fee. Again, although the magnitude of the pricing schedule varies somewhat across LTV bands, we do not find any clear monotonic pattern.

**No-Fee Product Choice.** To further understand borrowers' choices of no-fee products, Table C4 reports the coefficient estimates of several linear probability model regressions in

Table C3: Rate-Fee Relationship across LTV Bands

| | (1) | (2) |
|---|---|---|
| Fees (£1,000) | -0.222*** | |
| | (0.024) | |
| No Fee | | 0.308*** |
| | | (0.028) |
| Interacted with: | | |
| $70 < \text{LTV} \leq 75$ | -0.118*** | 0.051 |
| | (0.030) | (0.032) |
| $75 < \text{LTV} \leq 80$ | -0.047 | 0.062** |
| | (0.037) | (0.031) |
| $80 < \text{LTV} \leq 85$ | -0.079** | 0.071** |
| | (0.031) | (0.033) |
| $85 < \text{LTV} \leq 90$ | -0.056* | -0.029 |
| | (0.030) | (0.035) |
| $90 < \text{LTV} \leq 95$ | -0.149** | -0.045 |
| | (0.066) | (0.061) |
| Product-Time | Yes | Yes |
| $R^2$ | 0.936 | 0.931 |
| Observations | 90,305 | 90,305 |

*Notes*—Column (1) reports the estimates of equation (C4) using fees as a continuous explanatory variable. Column (2) reports the estimates of equation (C4) using an indicator variable equal to one if fees are zero, and zero otherwise, as the explanatory variable. Standard errors clustered at the product and time level in parenthesis.

which the outcome variable equals one if the household chooses a no-fee mortgage product, and zero otherwise.

These regressions confirm that the loan size is negatively correlated with the choice of a no-fee product. Interestingly, this choice is uncorrelated with the demographic characteristics available, such as age and income, once we control for loan size.

## C.2 Additional Market Trends

**House Prices and Mortgage Arrears.** The left panel of Figure C3 displays the UK House Price Monthly Index calculated by the Office of National Statistics for the period 2010–2014 (Office for National Statistics, 2015). It shows that house prices were broadly flat in 2010–2012, and started to increase rapidly from 2013.

The right panel of Figure C3 displays the time series of mortgage arrears as a share of total loan balances, from subtable 11 of Bank of England Prudential Regulation Authority and Financial Conduct Authority (2022). Our PSD origination data cover 2010–2014, but we display mortgage arrears until 2017, because most arrears occur in the first few years after originations. The right panel shows that the level of mortgage arrears was low and

Table C4: No-Fee Product Choice

| | (1) | (2) | (3) | (4) | (5) | (6) FTB | (7) HM |
|---|---|---|---|---|---|---|---|
| Age | 0.061 | 0.049 | 0.033 | -0.027 | -0.004 | 0.051* | -0.019 |
| | (0.135) | (0.134) | (0.137) | (0.076) | (0.019) | (0.028) | (0.017) |
| Income | -0.004 | 0.011 | 0.012 | 0.001 | -0.001 | -0.015 | 0.001 |
| | (0.009) | (0.014) | (0.014) | (0.003) | (0.001) | (0.009) | (0.001) |
| Loan amount (log) | | -0.042*** | -0.047*** | -0.051*** | -0.038*** | -0.044*** | -0.034*** |
| | | (0.014) | (0.014) | (0.009) | (0.006) | (0.014) | (0.007) |
| Time f.e. | No | No | Yes | Yes | Yes | Yes | Yes |
| Lender f.e. | No | No | No | Yes | No | No | No |
| Product f.e. | No | No | No | No | Yes | Yes | Yes |
| $R^2$ | 0.000 | 0.005 | 0.019 | 0.211 | 0.391 | 0.343 | 0.446 |
| Observations | 193,860 | 193,860 | 193,860 | 193,860 | 193,860 | 85,346 | 108,514 |

*Notes*—This table reports the coefficient estimates of linear probability model regressions in which the outcome variable equals one if the household chooses a no-fee product, and zero otherwise.

declined during 2010–2017. Because mortgage arrears are a stock variable, the declining series suggest that new flows—and thus, recent mortgages—have fewer arrears than the stock of older mortgages.

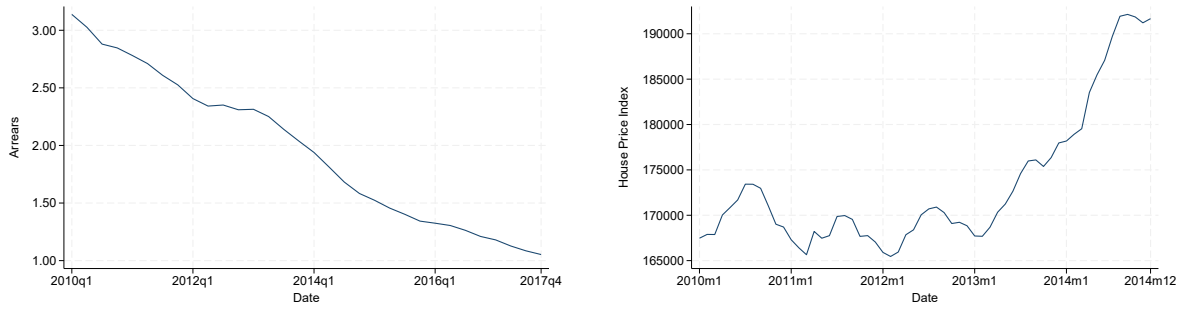
**Mortgage Products.** Figure C4 documents the number of product offerings in 2011Q3 and in 2013Q3 by LTV band in the first-time buyer (left panel) and home mover (right panel) segments. Lenders expanded their offerings of high-LTV products in the first-time buyer segment, thereby allowing borrowers to obtain larger mortgages amid rising house prices. This expansion of high-LTV products is smaller in the home mover segment, presumably because home movers are simultaneously buyers and sellers in the housing market, and thus their LTVs are less affected by the increase in house prices than those of first-time buyers. Nevertheless, trading volume is correlated with house prices (Stein, 1995), and thus lenders may want to expand their product offerings when turnover in the housing market is high.

# D Model: Additional Results

In this Appendix, we provide the formulas of the demand elasticities.

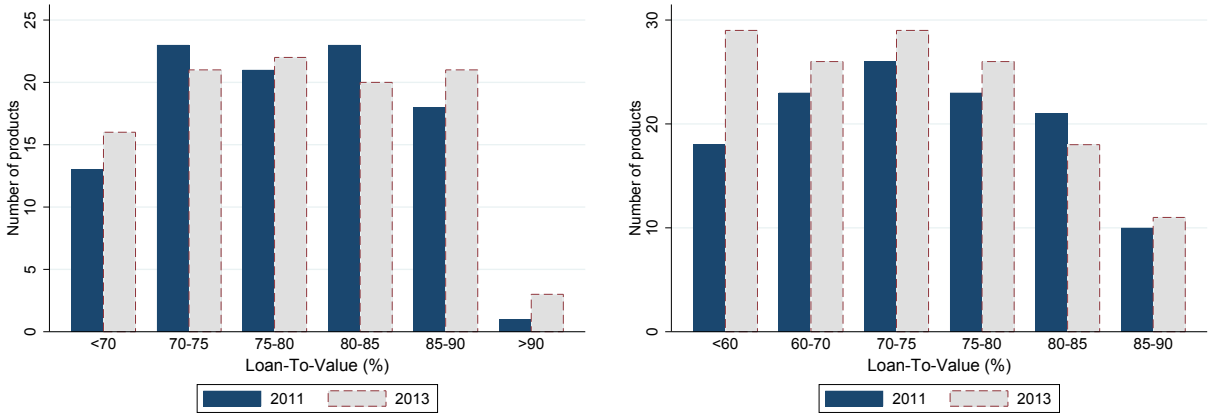
The derivatives of the individual loan demand with respect to the interest rate and the

Figure C3: House Prices and Mortgage Arrears




*Notes*—Left panel: UK House Price Monthly Index calculated by Office for National Statistics (2015). Right panel: Quarterly balances of mortgages in arrears as a share of total loan balances, from subtable 11 of Bank of England Prudential Regulation Authority and Financial Conduct Authority (2022).

Figure C4: Product Offerings




*Notes*—The figure displays the number of product offerings in 2011Q3 and in 2013Q3 by LTV band in the first-time buyer (left panel) and home mover (right panel) segments.

fee, respectively, equal

$$\frac{\partial q_{ijmt}}{\partial r_{jt}} = -(1+\alpha_m)\frac{q_{ijmt}}{r_{jt}}, \tag{D1}$$

$$\frac{\partial q_{ijmt}}{\partial f_{jt}} = -\frac{\psi_m}{Y_i - f_{jt}} q_{ijmt}. \tag{D2}$$

The derivatives of the product demand equal

$$\frac{\partial s_{ijmt}}{\partial r_{jt}} = -\alpha_m \exp\left(\delta_{jmt} + \zeta_i\right) \left( \frac{1 - s_{ijmt|j\in J_i}}{\rho_m} + s_{ijmt|j\in J_i} s_{i0mt} \right) \frac{s_{ijmt}}{r_{jt}}, \tag{D3}$$

$$\frac{\partial s_{ijmt}}{\partial f_{jt}} = -\frac{\gamma_m}{\left(Y_i - f_{jt}\right)^{\psi_m}} \left( \frac{1 - s_{ijmt|j\in J_i}}{\rho_m} + s_{ijmt|j\in J_i} s_{i0mt} \right) s_{ijmt}. \tag{D4}$$

Individual elasticities follow from equations (D1)–(D4). We then compute the elasticities at the product-market-quarter level by averaging across households in each market $m$ and quarter $t$.

# E Estimation: Additional Results

**Demand Parameters.** Figure E1 presents the point estimates and 95 percent confidence intervals of the demand parameters of each group. Groups are ordered as in Tables E5 and E6, e.g., group 1 comprises young, low-income, first-time buyers in the London region. We display first-time buyer groups in blue and home mover groups in red.

**Model Fit.** Figure E2 displays several plots that illustrate how the model fits the data. Overall, the fit is good, although the model slightly underpredicts that many products have a small market share (left panel) and loan size (middle panel), whereas it slightly overpredicts LTVs (right panel).

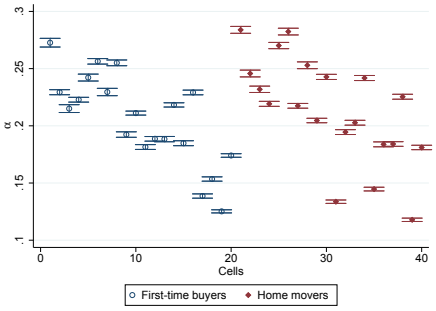
**Estimated Fee-Rate Trade-off.** Based on the estimated demand parameters, we consider borrowers' (approximate) annualized borrowing costs $\frac{f_{jt}}{\tau_{jt}} + r_{jt} q_{ijmt}$ and calculate the change in interest rate $dr_{jt}$ that keeps borrowers' borrowing costs constant, given an increase in annualized fees $d\left(\frac{f_{jt}}{\tau_{jt}}\right)$:

$$dr_{jt} = -\frac{\left(1 + r_{jt} \frac{\partial q_{ijmt}}{\partial\left(\frac{f_{jt}}{\tau_{jt}}\right)}\right)}{\left(q_{ijmt} + r_{jt} \frac{\partial q_{ijmt}}{\partial r_{jt}}\right)} d\left(\frac{f_{jt}}{\tau_{jt}}\right), \tag{E1}$$

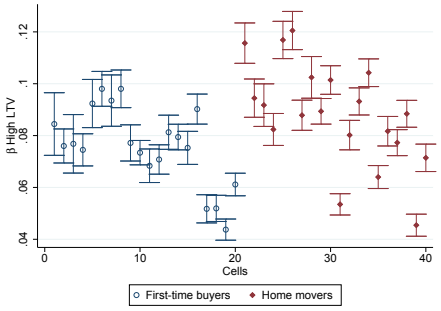
where the derivatives, whose formulas are in Appendix D, draw on borrowers' heterogeneity in their loan demand (22), as the elasticities displayed in Panel B of Table 5.

Figure E3 displays the bps change in the interest rate calculated as in equation (E1) given a £1,000 increase in annualized fees $\frac{f_{jt}}{\tau_{jt}}$ for different bins of loan amounts, using the

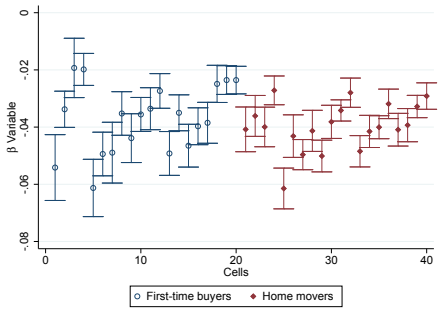
Figure E1: Demand Estimates



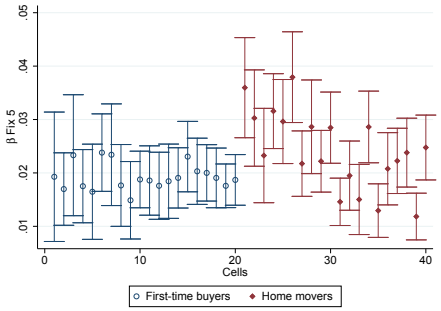

(a) Interest Rate: $\alpha_m$



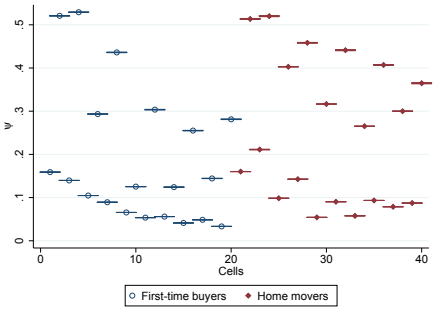

(b) High LTV: $\beta_m^{High\ LTV}$



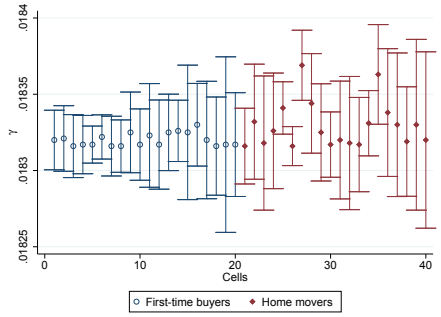

(c) Two-year Fixed: $\beta_m^{Fixed\,2}$



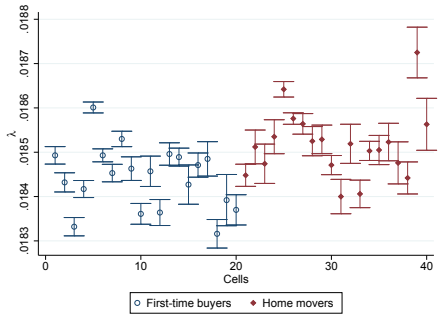

(d) Five-year Fixed: $\beta_m^{Fixed\,5}$



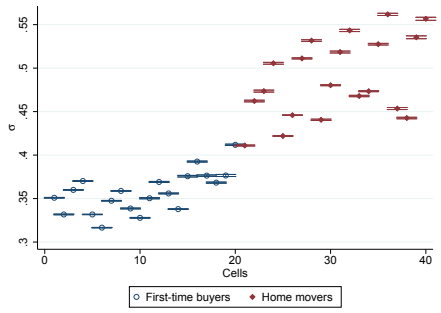

(e) Concavity in Income: $\psi_m$




(f) Income and Fees: $\gamma_m$



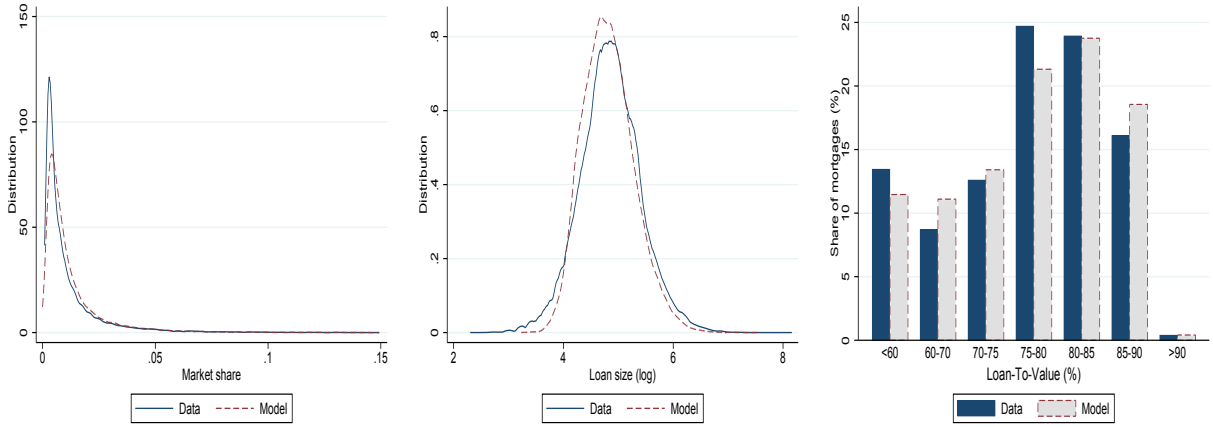

(g) Bank Branches: $\lambda_m$




(h) Standard Deviation of $\zeta$: $\sigma_m$

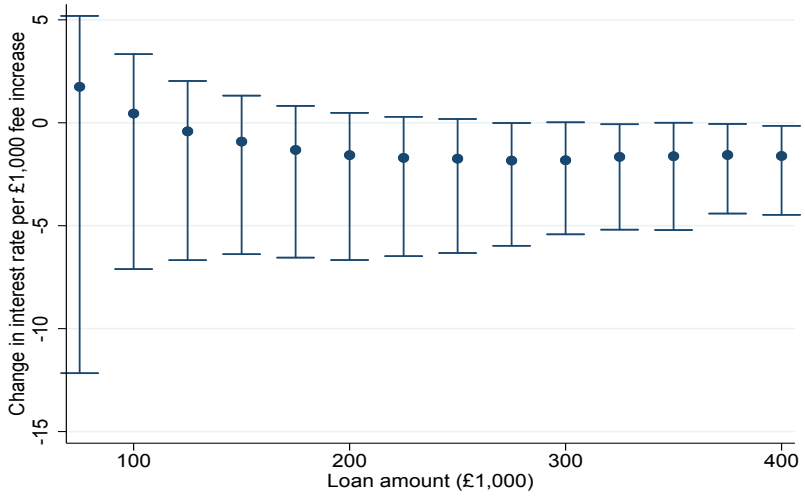
*Notes*—The charts show the estimates of the structural demand parameters in different cells given by region, age, income, and borrower type. First-time buyer groups in blue and home mover groups in red.

Figure E2: Model Fit




*Notes*—The left panel displays the distribution of market shares in the data (solid line) and the model (dashed line); the middle panel displays the distribution of the log of the loan size in the data (solid line) and the model (dashed line); the right panel displays the histogram of LTV in the data (solid bars) and the model (shaded bars).

Figure E3: Change in Interest Rates




*Notes*—This figure displays the basis-point change in interest rate calculated as in equation (E1) given a £1,000-increase in annualized fees $\frac{f_{jt}}{\tau_{jt}}$ for different bins of loan amounts. The range of each bin equals £25,000, the dot marker is the median within each bin and the vertical whiskers correspond to the range of the 10th–90th percentiles within each bin.

Table E1: Cross-Price Elasticities, First-time Buyers

| | LTV Band | Dealtype | Lender | Product | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | 80<LTV<=85 | 2-year fixed | 1 | -12.94 | 1.50 | 0.36 | 1.21 | 1.48 | 0.00 | 1.83 | 1.48 | 1.19 | 1.39 |
| 2 | 85<LTV<=90 | 2-year fixed | 1 | 1.53 | -10.36 | 0.00 | 0.85 | 1.55 | 0.00 | 1.51 | 1.55 | 0.83 | 1.48 |
| 3 | 70<LTV<=75 | 2-year fixed | 1 | 0.40 | 0.00 | -8.47 | 0.89 | 0.00 | 0.91 | 0.39 | 0.00 | 0.88 | 0.00 |
| 4 | 75<LTV<=80 | 2-year fixed | 1 | 0.86 | 0.61 | 0.57 | -13.25 | 0.60 | 0.31 | 0.84 | 0.60 | 1.14 | 0.53 |
| 5 | 85<LTV<=90 | 2-year fixed | 9 | 0.96 | 0.98 | 0.00 | 0.52 | -10.83 | 0.00 | 0.94 | 0.97 | 0.51 | 0.87 |
| 6 | 60<LTV<=70 | 2-year fixed | 1 | 0.00 | 0.00 | 0.99 | 0.54 | 0.00 | -5.76 | 0.00 | 0.00 | 0.53 | 0.00 |
| 7 | 80<LTV<=85 | 2-year fixed | 9 | 1.00 | 0.81 | 0.19 | 0.65 | 0.80 | 0.00 | -13.60 | 0.80 | 0.65 | 0.73 |
| 8 | 85<LTV<=90 | 2-year fixed | 6 | 0.91 | 0.93 | 0.00 | 0.48 | 0.92 | 0.00 | 0.90 | -10.86 | 0.47 | 0.89 |
| 9 | 75<LTV<=80 | 2-year fixed | 9 | 0.47 | 0.33 | 0.32 | 0.64 | 0.32 | 0.18 | 0.46 | 0.32 | -13.58 | 0.28 |
| 10 | 85<LTV<=90 | 2-year fixed | 1 | 0.59 | 0.60 | 0.00 | 0.31 | 0.59 | 0.00 | 0.58 | 0.59 | 0.30 | -10.07 |

*Notes*—This table displays the matrix of cross-price elasticities of the 10 products with the largest market share in the first-time buyer segment in 2011Q3.

estimated parameters and the variables $q_{ijmt}, r_{jt}, f_{jt}, \tau_{jt}$ of borrowers' chosen mortgages.[4] The figure shows that the large heterogeneity across borrowers is at odds with pure cost-minimization arguments for two main reasons. First, the median change in interest rates (the dot marker) is almost flat across the different bins of loan amounts. However, cost-minimization arguments imply that the change in the interest rate should be monotonically increasing, because borrowers should require a smaller decrease in interest rates given a fixed increase in fees as their loan amounts increase. Second, and perhaps more striking, the figure shows that the ranges of the 10th–90th percentiles (the vertical whiskers) overlap across bins, and that these large ranges shrink for the bins with large loans only. However, cost minimization implies that the range of the 10th–90th percentiles should not overlap, because borrowers should require a different range of interest rate decreases given a fixed increase in the fee as their loan amounts increase, and that the range of the 10th–90th percentiles should shrink as loan sizes increase, because each £25,000 increase in loan amount accounts for a smaller share of the total loan amount, and thus of total borrowing costs.

**Demand Cross-Product Elasticities.** Tables E1 and E1 display the cross-price elasticities among the 10 products with the largest market share in the first-time buyer and home mover segments, respectively.

Three main patterns emerge from these tables. First, the product with the largest cross-price elasticity with respect to the price of product 1 in the first-time buyer segment of Table E1 is product 7, which has the same key attributes as product 1, that is the same

[4]Changes in annualized fees and interest rates as in equation (E1) would likely lead borrowers to choose a different mortgage product. Hence, Figure E3 focuses exclusively on the changes due to the loan demand (22).

Table E2: Cross-Price Elasticities, Home Movers

| | LTV Band | Dealtype | Lender | Product | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | LTV<=60 | 2-year fixed | 1 | -2.11 | 0.37 | 0.38 | 0.08 | 0.37 | 0.00 | 0.08 | 0.00 | 0.36 | 0.00 |
| 2 | LTV<=60 | 5-year fixed | 3 | 0.28 | -2.19 | 0.28 | 0.07 | 0.27 | 0.00 | 0.07 | 0.00 | 0.27 | 0.00 |
| 3 | LTV<=60 | 2-year fixed | 7 | 0.23 | 0.23 | -2.24 | 0.05 | 0.23 | 0.00 | 0.05 | 0.00 | 0.22 | 0.00 |
| 4 | 70<LTV<=75 | 2-year fixed | 1 | 0.03 | 0.03 | 0.03 | -3.03 | 0.07 | 0.11 | 0.18 | 0.16 | 0.03 | 0.16 |
| 5 | 60<LTV<=70 | 2-year fixed | 1 | 0.11 | 0.11 | 0.11 | 0.07 | -2.93 | 0.00 | 0.07 | 0.04 | 0.10 | 0.04 |
| 6 | 85<LTV<=90 | 2-year fixed | 1 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | -2.89 | 0.03 | 0.11 | 0.00 | 0.11 |
| 7 | 70<LTV<=75 | 2-year fixed | 9 | 0.02 | 0.02 | 0.02 | 0.15 | 0.06 | 0.09 | -3.05 | 0.12 | 0.02 | 0.12 |
| 8 | 75<LTV<=80 | 2-year fixed | 9 | 0.00 | 0.00 | 0.00 | 0.11 | 0.03 | 0.10 | 0.11 | -3.13 | 0.00 | 0.13 |
| 9 | LTV<=60 | 2-year fixed | 9 | 0.11 | 0.11 | 0.11 | 0.02 | 0.11 | 0.00 | 0.02 | 0.00 | -2.27 | 0.00 |
| 10 | 75<LTV<=80 | 2-year fixed | 1 | 0.00 | 0.00 | 0.00 | 0.10 | 0.03 | 0.09 | 0.10 | 0.12 | 0.00 | -3.12 |

*Notes*—This table displays the matrix of cross-price elasticities of the 10 products with the largest market share in the home mover segment in 2011Q3.

LTV band and the same fixation period, but it is offered by a different lender. This type of substitution is pervasive: products 2, 4, 5, 8, 9, and 10 in the first-time buyer segment, and products 1, 3, 4, 7, 8, 9, and 10 in the home mover segment display the highest cross-price elasticities with products with the same attributes but offered by a different lender. Second, for products that do not display the aforementioned feature, the highest cross-price elasticities tend to be with the price of a product offered by the same lender but in an adjacent LTV band. It is easier to discern this pattern in Table E1 about the first-time buyer segment than in Table E2 about the home mover segment, because the most popular products are more heterogeneous in the home mover segment and thus some cross-price elasticities are not reported. Third, the lowest cross-price elasticities are consistently those with respect to prices of products with very different LTV bands.

**Supply.** Table E3 reports the coefficient estimates of the cost equation (25) in which $\mathbb{1}\{Q_{lt}^F > 0\}$ depends on the net positive drawing stock on FLS funds in quarter $t$. Interestingly, the first-stage regressions are stronger than those reported in Table 6, likely because our instruments may work better in the cross-section of banks and the drawing stock exhibit less time variation the drawing flow. The point estimates of the second-stage regression coefficients confirm that FLS funds lowered lenders' funding costs.

Table E4 reports the coefficient estimates of a regression equation similar to (24) using the estimated underwriting cost $a_{ij}$ as the dependent variable instead. We do not find any evidence that the FLS program affected underwriting costs, which provides a useful placebo test of our main analysis, because changes in lenders' funding costs due to the FLS should not affect their costs of processing mortgage applications.

Table E3: The FLS and Lenders' Costs, Alternative Definition

| | FLS Flow | | | | | |
|---|---|---|---|---|---|---|
| | (1) OLS | (2) FS | (3) IV | (4) OLS | (5) FS | (6) IV |
| FLS | | | | | | |
| Drawing stock > 0 | -0.212*** | | -0.236*** | -0.108** | | -0.172* |
| | (0.049) | | (0.091) | (0.050) | | (0.093) |
| Excluded Instruments | | | | | | |
| FLS Allowance (£) | | 0.052*** | | | 0.051*** | |
| | | (0.005) | | | (0.005) | |
| Lender Characteristics | | | | | | |
| Sight deposits | -0.432 | 0.304 | -0.360 | -0.935 | 0.658 | -0.729 |
| | (0.815) | (0.418) | (0.781) | (0.704) | (0.440) | (0.690) |
| Time deposits | -1.158 | -5.365*** | -1.116 | -1.520* | -4.796*** | -1.388* |
| | (0.823) | (0.775) | (0.771) | (0.791) | (0.796) | (0.736) |
| Capital ratio | -0.214 | -2.762*** | -0.316 | -2.432* | -0.664 | -2.560* |
| | (1.318) | (0.702) | (1.388) | (1.281) | (0.669) | (1.316) |
| Repos | 6.671*** | -2.568*** | 6.674*** | 4.455*** | -0.851** | 4.586*** |
| | (1.130) | (0.417) | (1.121) | (1.078) | (0.397) | (1.082) |
| Assets (£T) | -0.590 | -0.365** | -0.634 | -0.550 | -0.178 | -0.655* |
| | (0.369) | (0.170) | (0.399) | (0.354) | (0.153) | (0.383) |
| Product-level Costs | | | | | | |
| Risk weights | 5.373*** | 0.616*** | 5.391*** | 0.247 | 4.726*** | 0.599 |
| | (0.528) | (0.097) | (0.528) | (0.964) | (0.483) | (1.040) |
| Swap rates | 0.426*** | -0.113*** | 0.422*** | 0.554*** | -0.119*** | 0.544*** |
| | (0.073) | (0.035) | (0.075) | (0.057) | (0.040) | (0.061) |
| High LTV | 0.684*** | -0.046*** | 0.683*** | | | |
| | (0.057) | (0.008) | (0.057) | | | |
| Home movers | -0.316*** | -0.010 | -0.316*** | | | |
| | (0.046) | (0.009) | (0.046) | | | |
| Variable rate | -0.224*** | -0.008 | -0.224*** | | | |
| | (0.039) | (0.006) | (0.038) | | | |
| Fix 5 years | 0.134** | 0.063*** | 0.136** | | | |
| | (0.058) | (0.020) | (0.058) | | | |
| Selection | | | | | | |
| Age | -0.012 | 0.003 | -0.012 | -0.006 | 0.001 | -0.006 |
| | (0.009) | (0.003) | (0.009) | (0.007) | (0.003) | (0.007) |
| Income | 0.626 | 0.105 | 0.628 | 0.433 | 0.125 | 0.440 |
| | (0.468) | (0.165) | (0.465) | (0.377) | (0.179) | (0.382) |
| Age × Income | -0.010 | -0.003 | -0.010 | -0.006 | -0.003 | -0.006 |
| | (0.012) | (0.004) | (0.012) | (0.010) | (0.004) | (0.010) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Time f.e. | Yes | Yes | Yes | Yes | Yes | Yes |
| Lender f.e. | Yes | Yes | Yes | No | No | No |
| Product f.e. | No | No | No | Yes | Yes | Yes |
| Marginal cost (mean) | 3.17 | 0.43 | 3.17 | 3.16 | 0.43 | 3.17 |
| F statistic | | | 113.97 | | | 101.85 |
| Adjusted $R^2$ | 0.78 | 0.89 | 0.78 | 0.86 | 0.90 | 0.86 |
| Observations | 2,796 | 2,796 | 2,796 | 2,791 | 2,791 | 2,796 |

*Notes*—The dependent variable is the cost $\widetilde{c}_{jt}$ of each mortgage product $j$ in quarter $t$. Standard errors are clustered at the product level.

Table E4: The FLS and Underwriting Costs

| | FLS Flow | | | FLS Stock | | |
|---|---|---|---|---|---|---|
| | (1) OLS | (2) FS | (3) IV | (4) OLS | (5) FS | (6) IV |
| FLS | | | | | | |
| Drawing flow > 0 | 0.360** | | 0.355 | | | |
| | (0.159) | | (0.595) | | | |
| Drawing stock > 0 | | | | 0.087 | | 0.205 |
| | | | | (0.236) | | (0.347) |
| Excluded Instruments | | | | | | |
| FLS Allowance (£) | | 0.026*** | | | 0.046*** | |
| | | (0.005) | | | (0.007) | |
| Product-level Costs | | | | | | |
| Risk weights | 3.809 | -0.004 | 3.809* | 3.770 | 0.482*** | 3.709 |
| | (2.359) | (0.133) | (2.310) | (2.350) | (0.130) | (2.306) |
| High LTV | -0.056 | 0.008 | -0.056 | -0.049 | -0.049*** | -0.043 |
| | (0.283) | (0.009) | (0.278) | (0.282) | (0.010) | (0.275) |
| Home movers | 0.926*** | -0.022 | 0.926*** | 0.918*** | 0.005 | 0.917*** |
| | (0.212) | (0.024) | (0.205) | (0.212) | (0.015) | (0.207) |
| Lender Characteristics | | | | | | |
| Sight deposits | -6.043** | 1.767*** | -6.026** | -5.142** | 0.241 | -5.448** |
| | (2.706) | (0.593) | (2.644) | (2.590) | (0.552) | (2.453) |
| Time deposits | -2.468 | -2.431*** | -2.461 | -2.133 | -4.837*** | -2.332 |
| | (2.520) | (0.870) | (2.499) | (2.652) | (0.982) | (2.464) |
| Capital ratio | 6.400 | -4.713*** | 6.369 | 4.731 | -2.744*** | 5.259 |
| | (6.680) | (1.127) | (7.391) | (6.279) | (0.908) | (6.651) |
| Repos | -5.380 | 1.568* | -5.362 | -4.249 | -2.204*** | -4.353 |
| | (3.509) | (0.892) | (3.601) | (3.339) | (0.736) | (3.341) |
| Assets (£T) | 4.244** | 0.799* | 4.244** | 4.379** | -0.180 | 4.564** |
| | (1.692) | (0.462) | (1.657) | (1.756) | (0.266) | (1.941) |
| Selection | | | | | | |
| Age | -0.064* | -0.003 | -0.064* | -0.065* | 0.002 | -0.066* |
| | (0.037) | (0.006) | (0.036) | (0.037) | (0.005) | (0.036) |
| Income | -2.088 | -0.170 | -2.089 | -2.152 | 0.248 | -2.200 |
| | (1.806) | (0.299) | (1.773) | (1.815) | (0.258) | (1.759) |
| Age × Income | 0.054 | 0.008 | 0.054 | 0.057 | -0.006 | 0.058 |
| | (0.046) | (0.008) | (0.045) | (0.046) | (0.007) | (0.045) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Time f.e. | Yes | Yes | Yes | Yes | Yes | Yes |
| Lender f.e. | Yes | Yes | Yes | Yes | Yes | Yes |
| F-statistic | | | 31.66 | | | 47.71 |
| Adjusted $R^2$ | 0.16 | 0.59 | 0.16 | 0.15 | 0.87 | 0.15 |
| Observations | 1,028 | 1,028 | 1,028 | 1,028 | 1,028 | 1,028 |

*Notes*—The dependent variable is the underwriting cost. Standard errors are clustered at the product level.

**Counterfactuals.** Tables E5 and E6 report the counterfactual analyses of Section 7 across different borrower groups in the first-time buyer and home mover segments, respectively.

Columns (1)–(4) report the average interest rate and average origination fee paid by each borrower group, as well as their average loan amount and the number of mortgages originated in the 2011Q3 baseline market before the introduction of FLS facilities, respectively. Columns (5)–(8) report the corresponding outcomes in the counterfactual market in which the marginal costs of lenders with positive FLS drawings are 40 bps lower, as in column (4) of Table 7. Columns (9)–(12) Tables E5 and E6 report on the heterogeneity of the effect of banning fees across borrower groups in the first-time buyer and home mover segments, respectively.

## Table E5: Effects of the FLS on First-time Buyer Groups

| Region | Age | Income | Pre-FLS (2011Q3) | | | | FLS model | | | | FLS no fee model | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Rate | Fee | Loan Amount | Number of Mortgages | Rate | Fee | Loan Amount | Number of Mortgages | Rate | Fee | Loan Amount | Number of Mortgages |
| | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Aggregate | | | 431 | 913 | 103,577 | 7159 | 374 | 1,016 | 126,321 | 7272 | 438 | 0 | 117,578 | 7142 |
| | | | (56) | (126) | (58,826) | | (57) | (186) | (77,077) | | (60) | (0) | (65,128) | |
| London | Young | Low | 401 | 868 | 119,009 | 430 | 343 | 872 | 152,975 | 442 | 410 | 0 | 148,322 | 429 |
| | | | (51) | (145) | (52,485) | | (52) | (226) | (74,275) | | (64) | (0) | (60,226) | |
| London | Young | High | 412 | 860 | 200,210 | 284 | 357 | 904 | 247,296 | 289 | 426 | 0 | 221,766 | 282 |
| | | | (47) | (83) | (93,493) | | (41) | (123) | (125,685) | | (46) | (0) | (94,979) | |
| London | Old | Low | 394 | 801 | 139,786 | 257 | 338 | 848 | 172,111 | 262 | 390 | 0 | 166,980 | 257 |
| | | | (42) | (160) | (64,105) | | (43) | (185) | (82,246) | | (52) | (0) | (73,212) | |
| London | Old | High | 398 | 862 | 253,334 | 294 | 342 | 870 | 318,930 | 297 | 415 | 0 | 272,549 | 292 |
| | | | (57) | (133) | (144,284) | | (54) | (165) | (192,156) | | (55) | (0) | (140,850) | |
| Southern England | Young | Low | 429 | 930 | 101,460 | 654 | 371 | 1,062 | 121,851 | 670 | 432 | 0 | 120,971 | 653 |
| | | | (56) | (117) | (39,597) | | (57) | (154) | (49,725) | | (62) | (0) | (46,284) | |
| Southern England | Young | High | 433 | 973 | 155,219 | 384 | 376 | 965 | 195,631 | 392 | 435 | 0 | 173,191 | 383 |
| | | | (51) | (100) | (59,351) | | (52) | (91) | (81,181) | | (54) | (0) | (64,804) | |
| Southern England | Old | Low | 397 | 846 | 111,640 | 370 | 338 | 852 | 140,189 | 378 | 394 | 0 | 132,434 | 370 |
| | | | (49) | (168) | (43,291) | | (50) | (220) | (58,382) | | (62) | (0) | (53,104) | |
| Southern England | Old | High | 404 | 981 | 185,945 | 473 | 356 | 908 | 233,504 | 478 | 421 | 0 | 206,164 | 472 |
| | | | (50) | (204) | (92,245) | | (54) | (184) | (124,159) | | (47) | (0) | (92,716) | |
| Central England | Young | Low | 445 | 904 | 79,703 | 414 | 386 | 1,095 | 94,705 | 421 | 448 | 0 | 91,155 | 413 |
| | | | (57) | (140) | (30,768) | | (58) | (161) | (38,549) | | (56) | (0) | (35,340) | |
| Central England | Young | High | 437 | 940 | 113,469 | 274 | 384 | 989 | 137,607 | 279 | 449 | 0 | 118,587 | 273 |
| | | | (51) | (117) | (45,902) | | (50) | (135) | (58,657) | | (52) | (0) | (46,613) | |
| Central England | Old | Low | 414 | 953 | 83,400 | 237 | 358 | 997 | 100,814 | 240 | 421 | 0 | 92,099 | 237 |
| | | | (50) | (90) | (32,179) | | (49) | (176) | (40,618) | | (53) | (0) | (35,929) | |
| Central England | Old | High | 413 | 899 | 139,150 | 344 | 363 | 983 | 165,420 | 345 | 424 | 0 | 154,944 | 344 |
| | | | (48) | (124) | (66,182) | | (46) | (152) | (84,437) | | (57) | (0) | (72,711) | |
| Northern England | Young | Low | 464 | 952 | 69,445 | 527 | 409 | 1,136 | 81,058 | 536 | 473 | 0 | 77,065 | 526 |
| | | | (56) | (94) | (27,132) | | (58) | (168) | (33,064) | | (53) | (0) | (30,125) | |
| Northern England | Young | High | 454 | 965 | 101,544 | 392 | 401 | 1,038 | 121,980 | 399 | 463 | 0 | 107,722 | 391 |
| | | | (46) | (83) | (38,899) | | (48) | (121) | (49,053) | | (53) | (0) | (41,077) | |
| Northern England | Old | Low | 419 | 842 | 75,534 | 389 | 360 | 987 | 91,295 | 394 | 429 | 0 | 80,891 | 388 |
| | | | (54) | (137) | (30,402) | | (54) | (169) | (38,413) | | (58) | (0) | (33,110) | |
| Northern England | Old | High | 418 | 919 | 117,108 | 510 | 366 | 960 | 144,492 | 514 | 433 | 0 | 128,181 | 509 |
| | | | (56) | (95) | (55,040) | | (56) | (121) | (73,883) | | (51) | (0) | (56,259) | |
| Wales/Scotland | Young | Low | 443 | 901 | 70,223 | 264 | 385 | 1,069 | 83,151 | 269 | 453 | 0 | 75,503 | 264 |
| | | | (48) | (83) | (28,342) | | (49) | (152) | (34,918) | | (51) | (0) | (30,463) | |
| Wales/Scotland | Young | High | 437 | 833 | 108,597 | 215 | 380 | 938 | 131,652 | 218 | 453 | 0 | 110,470 | 214 |
| | | | (43) | (119) | (47,914) | | (46) | (158) | (62,186) | | (56) | (0) | (48,796) | |
| Wales/Scotland | Old | Low | 416 | 897 | 76,996 | 192 | 357 | 997 | 92,232 | 195 | 432 | 0 | 78,539 | 192 |
| | | | (45) | (90) | (30,627) | | (43) | (127) | (37,842) | | (46) | (0) | (32,101) | |
| Wales/Scotland | Old | High | 422 | 998 | 121,676 | 254 | 369 | 991 | 151,090 | 255 | 440 | 0 | 136,196 | 253 |
| | | | (47) | (129) | (53,539) | | (48) | (111) | (73,121) | | (52) | (0) | (58,457) | |

*Notes*—Columns (1)–(4) report market outcomes for different groups of first-time buyers in the estimated model in 2011Q3. Columns (5)–(8) report market outcomes in a counterfactual market in which we reduce the costs of lenders with positive FLS drawings by 40 bps. Columns (9)–(12) report market outcomes in a counterfactual market in which we reduce the costs of lenders with positive FLS drawings by 40 bps and we do not allow lenders to charge origination fees.

## Table E6: Effects of the FLS on Borrower Home Mover Groups

| Region | Age | Income | Pre-FLS (2011Q3) Rate | Fee | Loan Amount | Number of Mortgages | FLS model Rate | Fee | Loan Amount | Number of Mortgages | FLS no fee model Rate | Fee | Loan Amount | Number of Mortgages |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Aggregate | | | 369 | 1,067 | 130,224 | 9458 | 298 | 1,448 | 157,424 | 9742 | 385 | 0 | 145,329 | 9441 |
| | | | (55) | (243) | (95,546) | | (55) | (263) | (118,478) | | (50) | (0) | (99,133) | |
| London | Young | Low | 375 | 1,097 | 140,092 | 294 | 301 | 1,457 | 168,958 | 308 | 391 | 0 | 164,501 | 294 |
| | | | (56) | (274) | (72,389) | | (56) | (355) | (94,576) | | (48) | (0) | (75,447) | |
| London | Young | High | 373 | 1,100 | 214,060 | 287 | 307 | 1,541 | 249,951 | 298 | 390 | 0 | 241,220 | 287 |
| | | | (52) | (265) | (135,173) | | (50) | (185) | (162,928) | | (48) | (0) | (135,006) | |
| London | Old | Low | 337 | 885 | 123,288 | 272 | 266 | 1,322 | 138,128 | 284 | 357 | 0 | 144,981 | 271 |
| | | | (40) | (118) | (70,276) | | (34) | (168) | (80,154) | | (30) | (0) | (75,551) | |
| London | Old | High | 338 | 937 | 220,337 | 273 | 275 | 1,256 | 268,214 | 282 | 360 | 0 | 234,049 | 272 |
| | | | (43) | (163) | (147,370) | | (38) | (184) | (185,197) | | (36) | (0) | (142,521) | |
| Southern England | Young | Low | 377 | 1,145 | 117,518 | 769 | 299 | 1,573 | 145,834 | 799 | 386 | 0 | 134,635 | 769 |
| | | | (53) | (215) | (56,071) | | (55) | (227) | (73,908) | | (49) | (0) | (61,545) | |
| Southern England | Young | High | 380 | 1,238 | 188,228 | 841 | 312 | 1,623 | 230,860 | 869 | 394 | 0 | 216,817 | 839 |
| | | | (59) | (315) | (114,885) | | (59) | (198) | (145,830) | | (54) | (0) | (117,657) | |
| Southern England | Old | Low | 339 | 963 | 89,337 | 725 | 266 | 1,309 | 109,239 | 747 | 360 | 0 | 102,863 | 723 |
| | | | (34) | (144) | (52,458) | | (34) | (170) | (66,589) | | (30) | (0) | (58,186) | |
| Southern England | Old | High | 342 | 960 | 182,352 | 648 | 275 | 1,418 | 218,771 | 665 | 360 | 0 | 197,016 | 647 |
| | | | (51) | (201) | (129,361) | | (47) | (183) | (155,757) | | (46) | (0) | (127,289) | |
| Central England | Young | Low | 392 | 1,077 | 93,939 | 465 | 318 | 1,518 | 116,656 | 479 | 403 | 0 | 100,636 | 465 |
| | | | (57) | (236) | (47,155) | | (58) | (239) | (60,270) | | (52) | (0) | (49,190) | |
| Central England | Young | High | 381 | 1,131 | 135,138 | 440 | 314 | 1,528 | 160,481 | 454 | 402 | 0 | 150,209 | 439 |
| | | | (61) | (157) | (83,736) | | (62) | (171) | (109,221) | | (57) | (0) | (84,148) | |
| Central England | Old | Low | 354 | 931 | 77,633 | 453 | 278 | 1,298 | 95,655 | 463 | 371 | 0 | 85,207 | 452 |
| | | | (41) | (214) | (45,748) | | (42) | (250) | (58,226) | | (36) | (0) | (50,552) | |
| Central England | Old | High | 349 | 1,095 | 142,257 | 414 | 283 | 1,479 | 166,128 | 423 | 368 | 0 | 164,213 | 412 |
| | | | (51) | (220) | (106,067) | | (50) | (245) | (128,364) | | (44) | (0) | (109,492) | |
| Northern England | Young | Low | 389 | 1,076 | 89,321 | 582 | 317 | 1,451 | 111,491 | 599 | 403 | 0 | 95,214 | 582 |
| | | | (58) | (230) | (46,839) | | (60) | (324) | (61,333) | | (55) | (0) | (48,723) | |
| Northern England | Young | High | 377 | 1,162 | 136,492 | 585 | 311 | 1,534 | 161,737 | 605 | 393 | 0 | 152,447 | 584 |
| | | | (63) | (259) | (87,234) | | (62) | (255) | (109,666) | | (59) | (0) | (84,899) | |
| Northern England | Old | Low | 349 | 888 | 71,204 | 530 | 279 | 1,238 | 85,436 | 541 | 373 | 0 | 76,494 | 529 |
| | | | (42) | (128) | (42,114) | | (41) | (177) | (51,254) | | (35) | (0) | (45,314) | |
| Northern England | Old | High | 345 | 1,054 | 124,798 | 519 | 281 | 1,425 | 142,912 | 531 | 370 | 0 | 141,735 | 517 |
| | | | (45) | (270) | (93,134) | | (44) | (201) | (108,436) | | (43) | (0) | (94,785) | |
| Wales/Scotland | Young | Low | 388 | 1,028 | 86,928 | 331 | 314 | 1,431 | 105,712 | 340 | 396 | 0 | 94,208 | 331 |
| | | | (47) | (182) | (44,435) | | (48) | (254) | (56,099) | | (44) | (0) | (46,110) | |
| Wales/Scotland | Young | High | 389 | 1,197 | 145,923 | 368 | 319 | 1,457 | 183,468 | 379 | 404 | 0 | 160,261 | 368 |
| | | | (51) | (210) | (80,939) | | (54) | (285) | (111,763) | | (48) | (0) | (81,039) | |
| Wales/Scotland | Old | Low | 361 | 940 | 65,659 | 342 | 283 | 1,222 | 82,568 | 349 | 374 | 0 | 70,847 | 342 |
| | | | (37) | (130) | (38,746) | | (39) | (247) | (49,235) | | (32) | (0) | (41,139) | |
| Wales/Scotland | Old | High | 355 | 1,064 | 141,656 | 320 | 285 | 1,336 | 178,634 | 327 | 372 | 0 | 157,047 | 319 |
| | | | (40) | (282) | (91,878) | | (42) | (267) | (119,236) | | (38) | (0) | (97,968) | |

*Notes*–Columns (1)–(4) report market outcomes for different groups of home movers in the estimated model in 2011Q3. Columns (5)–(8) report market outcomes in a counterfactual market in which we reduce the costs of lenders with positive FLS drawings by 40 bps. Columns (9)–(12) report market outcomes in a counterfactual market in which we reduce the costs of lenders with positive FLS drawings by 40 bps and we do not allow lenders to charge origination fees.

# References


Bank of England Prudential Regulation Authority and Financial Conduct Authority (2022): "Mortgage Lenders and Administrators Statistics," retrieved from https://www.bankofengland.co.uk/statistics/mortgage-lenders-and-administrators/2022/2022-q3 on December 23rd, 2022.

Borio, C., and A. Zabai (2016): "Unconventional Monetary Policies: a Re-appraisal," Discussion paper, Bank of International Settlement.

Churm, R., A. Radia, J. Leake, S. Srinivasan, and R. Whisker (2012): "The Funding for Lending Scheme," *Bank of England Quarterly Bullettin*, Q4, 306–320.

Office for National Statistics (2015): "UK House Price Index," Statistical Bulletins.

Stein, J. C. (1995): "Prices and Trading Volume in the Housing Market: A Model with Down-Payment Effects," *The Quarterly Journal of Economics*, 110(2), 379–406.