Online Appendix
The Simpler the Better?
Threshold Effects of Energy Labels on Property Prices and Energy-Efficiency Investments

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Appendix A: Energy Performance Certificates Legislation

The EPC-audit rules are defined in the *Energy Performance of Buildings (Certificates and Inspections) (England and Wales) 2007* legislation (HMG, 2007) and came into force in 2007 as part of the UK government's strategy to reduce greenhouse gas emissions to be in line with the European Union (EU) directive on the energy performance of buildings – EU 2002/91/EC (HMG, 2004). The *Energy Performance of Buildings (Certificates and Inspections) (England and Wales) (Amendment) Regulations 2011* (HMG, 2011) came into force in April 2012 and made it mandatory to include the energy performance rating in all marketing publications, including printed material and online listings (to be in line with the recast of the EU directive – HMG, 2016). The *Energy Performance of Buildings (England and Wales) Regulations 2012* (HMG, 2012) came into force in January 2013 and made the requirement to include the energy-efficiency rating in marketing materials more explicit.

The energy performance audit for residential properties (i.e., dwellings) is performed by following the UK Government's Standard Assessment Procedure (SAP) methodology. The SAP was developed in 1993 by the Building Research Estab-

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lishment (BRE), then a UK government-funded research laboratory, and is revised and updated regularly by the now independent BRE.[A1] The current edition was last revised in 2014 (BRE, 2014). The aim of the SAP is to provide uniform energy-consumption estimates of the energy required to deliver a defined level of comfort and service provision based on standard occupancy and behavior patterns. The SAP audit generates a set of energy-performance indicators that are presented in the EPC, including the total expected energy cost and the energy-cost rating (SAP score). These indicators are calculated using a range of property factors that affect energy efficiency (e.g., property type, building materials, the efficiency of heating systems, etc.), environmental information (e.g., climatic data), and predefined fuel prices, which are calculated as averages of the previous three years across all regions (BRE, 2014). This means that, for the purposes of the SAP calculations, energy prices are uniform across the UK and across months. The energy cost of various energy requirement categories (e.g., space heating, electricity for lighting, etc.) is calculated by multiplying their energy demand in kWh/year by the standardized fuel cost. The total energy cost for a property is simply the sum of all category costs.

The formula for the SAP score accounts for the total floor area of the property (to make it comparable across different property sizes) and applies a cost deflator to provide comparability across years and audit-methodology revisions. The SAP score is presented on a scale from 1 to 100, where higher values represent lower energy running costs and, thus, higher energy efficiency. While the formula is not linear and slightly penalizes high-energy cost properties (BRE, 2014), the non-linearity kink occurs at SAP score 51, which does not coincide with a rating-band threshold and therefore does not represent a concern for our analysis. The formula for calculating the SAP score (BRE, 2014) involves the calculation of an energy cost factor (ECF):

$$\text{ECF} = \frac{\text{Deflator} \cdot \text{Total Cost}}{(\text{Total Floor Area} + 45)}$$

[A1] The BRE was privatized in 1997 and is now owned by the registered charity BRE Trust.

$$\text{if ECF} \geq 3.5 \Rightarrow \text{SAP} = 117 - 121 \cdot \log(\text{ECF})$$
$$\text{if ECF} < 3.5 \Rightarrow \text{SAP} = 100 - 13.95 \cdot \text{ECF}$$

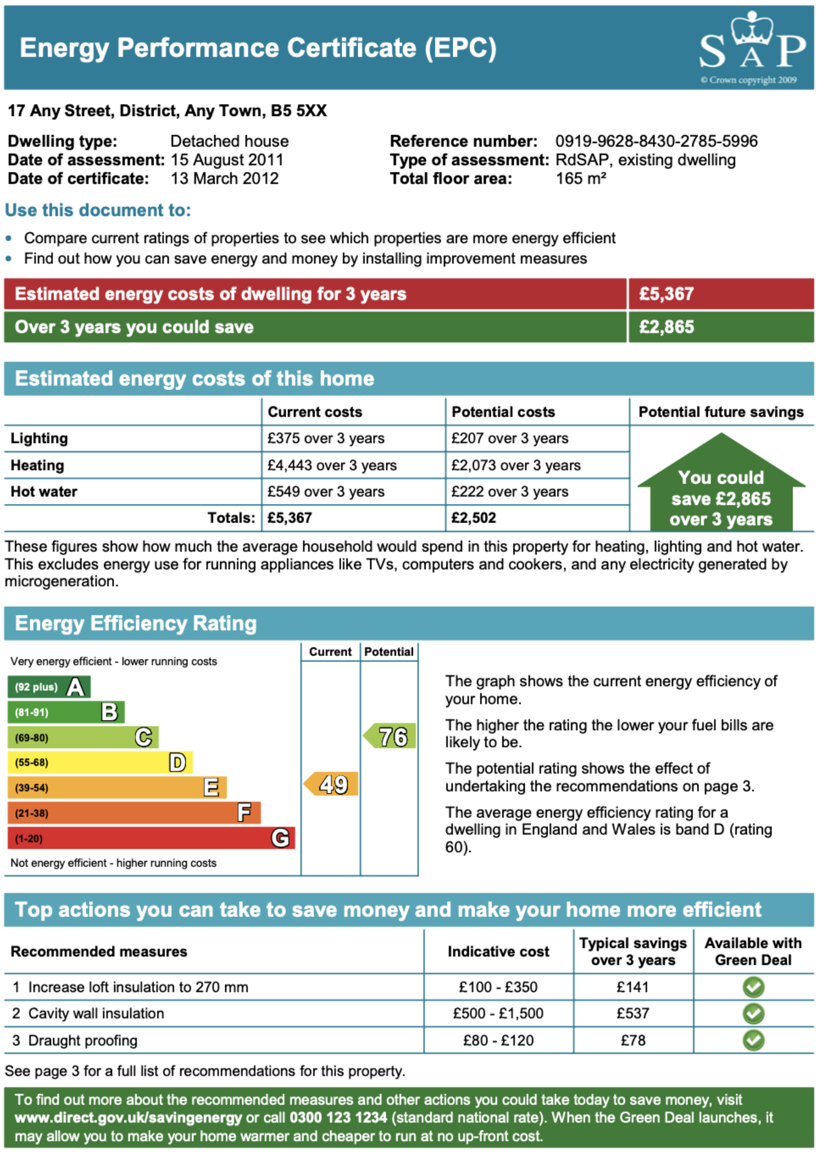
Note that when the ECF is at the kink (3.5), both formulas will result in an SAP score of 51.

The total energy cost, the SAP score, and the rating band are included on the first page of the EPC, an example of which is shown in Figure A1. In its present format,[A2] the total energy cost is proxied by the estimated costs for three years. The SAP score and the rating band are shown in a graph following the visual format specified in the EU Energy Labelling Framework Directive (EU 92/75/EEC), where energy efficiency is presented as a discrete, color-coded grade from green A to red G that overlaps the continuous SAP score (EUCO: Council of the European Union, 1992).

While UK legislation generally does not reference specific EE rating bands, there are two exceptions: First, *The Energy Efficiency (Private Rented Property) (England and Wales) Regulations 2015* (HMG, 2015) requires properties offered for rent on or after April 2018 (and tenancy renewals on or after April 2020) to have a rating band E or better. This means that owners of properties with rating bands G and F will have to make EE investments if they want to offer them for rent after this date. Second, since August 2022, vulnerable households in receipt of means-tested benefits are eligible for subsidies to improve the EE of their home if it has an energy rating in band D or worse (*Energy Company Obligation (ECO4)* – HMG, 2022). Note that while the 2018 policy should increase the willingness to pay for an already modernized property, the opposite is the case for the 2022 policy, as it ties financial benefits to owning an energy-*in*efficient home. Lastly, while falling short of being implemented as actual legislation or policy, the UK government published the *Energy Performance Certificates for Buildings Action Plan*, a non-binding policy brief in September 2020, in which it

[A2] The format of the EPC changed slightly as part of the regulation amendments of 2012, but the unchanged rating graph was maintained as the main source of information.

articulated the "aspiration for as many homes as possible to be EPC band C by the year 2035" (DBEIS, 2020). This policy brief proposed (but did not enact) raising the minimum EE requirement for rental properties to rating band C by the year 2028.



Energy Performance Certificate (EPC)

SAP © Crown copyright 2009

17 Any Street, District, Any Town, B5 5XX

Dwelling type:	Detached house	**Reference number:**	0919-9628-8430-2785-5996
Date of assessment:	15 August 2011	**Type of assessment:**	RdSAP, existing dwelling
Date of certificate:	13 March 2012	**Total floor area:**	165 m²

Use this document to:

- Compare current ratings of properties to see which properties are more energy efficient
- Find out how you can save energy and money by installing improvement measures

Estimated energy costs of dwelling for 3 years	**£5,367**
Over 3 years you could save	**£2,865**

Estimated energy costs of this home

	Current costs	Potential costs	Potential future savings
Lighting	£375 over 3 years	£207 over 3 years	You could save £2,865 over 3 years
Heating	£4,443 over 3 years	£2,073 over 3 years	
Hot water	£549 over 3 years	£222 over 3 years	
Totals:	**£5,367**	**£2,502**	

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers, and any electricity generated by microgeneration.

Energy Efficiency Rating

The graph shows the current energy efficiency of your home.

The higher the rating the lower your fuel bills are likely to be.

The potential rating shows the effect of undertaking the recommendations on page 3.

The average energy efficiency rating for a dwelling in England and Wales is band D (rating 60).

Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
1 Increase loft insulation to 270 mm	£100 - £350	£141	✓
2 Cavity wall insulation	£500 - £1,500	£537	✓
3 Draught proofing	£80 - £120	£78	✓

See page 3 for a full list of recommendations for this property.

To find out more about the recommended measures and other actions you could take today to save money, visit **www.direct.gov.uk/savingenergy** or call **0300 123 1234** (standard national rate). When the Green Deal launches, it may allow you to make your home warmer and cheaper to run at no up-front cost.

Figure A1. First Page of a Sample Energy Performance Certificate

Appendix B: Further Robustness Analysis

To further gauge the reliability of our findings, we conduct a number of additional robustness tests, which are briefly summarised in Section VI.C and which we describe in more detail below. For the sake of brevity, we present all relevant tables and figures at the end of this Appendix B.

B.1. Covariate Balance

Probing the identifying assumption that properties on either side of a threshold are comparable in terms of observable characteristics, Section VI.B formally tests for covariate balance with a stacked-regression approach and visually inspects covariate-balance plots for property characteristics, which our models flag as being suspect of balance failure. We now complement this analysis by (a) providing equivalent covariate-balance plots for area characteristics and (b) reporting results for the individual regressions underlying the stacked-regression test.

Beginning with (a), covariate-balance graphs for all area characteristics are depicted in Figure B1. Each graph plots the proportion of homes that share the respective characteristic (such as being a property located in the North East of England). Closely mirroring the pattern for property characteristics presented in Figure 8, the plots show nonlinear relationships between observables and SAP scores. However, once again, the relationship is generally smooth, and there are no obvious discontinuities at rating-band thresholds that are suspected of being spurious drivers of our results. Yet, under the proverbial microscope, we are able to detect a slight regional imbalance at the E–D threshold, with the proportion of homes sold in the West Midlands ticking down (Panel (e) of Figure B1), which is (mechanically) offset by concurrent upticks in the proportions of properties in London (Panel (g) of Figure B1), the South West of England (Panel (i) of Figure B1) and Wales (Panel (j) of Figure B1).

Moving on to (b), Figure B2 presents confidence intervals for estimates of discontinuities in covariate proportions, where statistically significant non-zero values would indicate failure of balance. These estimates come from running 108 separate local linear RDD regressions (18 covariates times six thresholds) using the same MSE-optimal bandwidth selection procedure as in our main analysis while replacing the dependent variable in Specification 1 with each covariate.[A3] Recall that this approach is conservative for two reasons. First, with 108 individual tests, our models are bound to detect some spurious discontinuities by random chance (see, for example, Lee and Lemieux, 2010). Second, in our case, this problem is exacerbated by the fact that most of our covariates are mutually exclusive, categorical variables, which introduces a high degree of mechanical co-dependence and increases the risk of false positives.[A4]

With that in mind, results in Figure B2 confirm the isolated imbalances that were detectable when visually inspecting the population plots in Figures 8 and B1.[A5] Note that the formal balance tests pick up a few additional cases for which covariate imbalance cannot be statistically rejected. However, a close inspection of Figures 8 and B1 reveals that these do not represent genuine discontinuous shifts. Instead, they appear to be an artifact of overly restrictive functional-form assumptions of our local linear model. Noisy data patterns are the likely source for false positives at thresholds G–F (transactions in the South East and North East of England as well as semi-detached houses) and B–A (transactions in the East Midlands), whereas curvature changes in the neighborhood of cutoffs appear to be the driver for thresholds D–C (London) and C–B (properties in the North East of England, detached and semi-detached houses, flats, leasehold properties,

[A3]For our categorical variables listed in Table 2, we create binary variables for every individual category (e.g., detached houses) and use these as dependent variables. As a result, our models test for discontinuities in the relative frequencies of each category.

[A4]For example, property type is represented by four binary indicators for detached houses, semi-detached houses, terraced houses, and flats, whose respective shares must sum up to one. If a positive discontinuity were detected for, say, the proportion of detached houses, the proportions of the other three property types would have to be lower by virtue of simple mechanics, which biases our models towards picking up negative discontinuities for these variables.

[A5]Note that while some of these imbalances may appear sizeable due to the way they are displayed, they are, in fact, relatively small when put into perspective. For example, the positive discontinuities detected for the number of rooms at thresholds E–D and D–C merely measure roughly 0.025 rooms and are barely noticeable in the data plots.

and the number of rooms). Finally, our formal tests pick up three additional nonzero discontinuities for properties in urban areas that do not exist in the population depicted in Figure B1: two negative ones for thresholds F–E and E–D and a positive one for threshold D–C.

All in all, we believe this analysis to draw an innocuous picture. Covariate balance appears to be generally satisfied, and the few exceptions are very small in magnitude and appear unsystematic. Moreover, our main results are robust to the inclusion of covariates, which – while falling short of solving any identification issues outright – provides evidence that our findings are unlikely to be driven by systematic differences in observable characteristics.

B.2. Alternative Definitions of the Dependent Variable

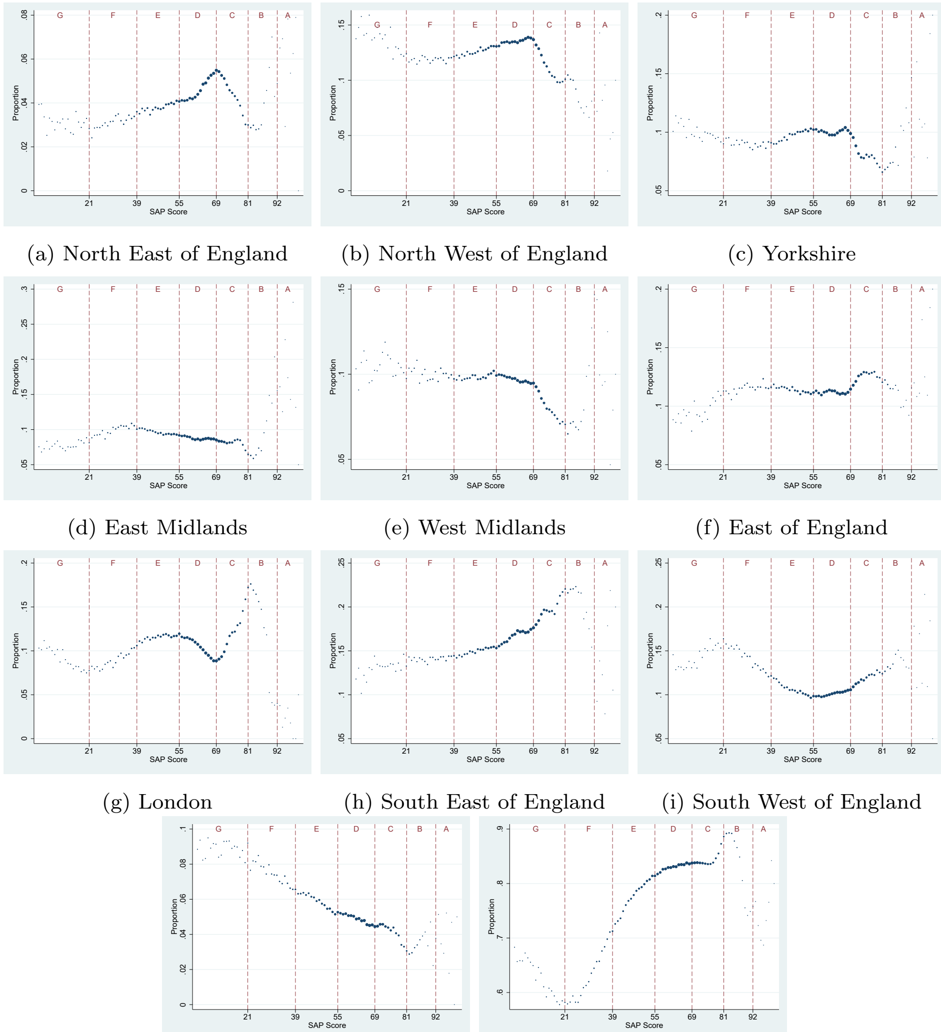
Table B1 tests whether the price discontinuities reported in Table 3 of our main analysis are artifacts of the way we define the dependent variable. In our main specification, we use the log of price per square meter. We consider this to be the most meaningful specification because it accounts for both variation in property size and the right skew in selling prices. Table B1 replicates the analysis in Table 3 using different specifications of the price variable. Columns (1) and (2) report results using price per square meter without the log transformation. Because the distribution of price per square meter is heavily right-skewed, we exclude properties with a price per square meter of over £25,000 to avoid outliers from affecting the results. Columns (3) to (6) present results using the log of price as the dependent variable and only vary with respect to the control vector. Results in Column (3) come from a model without any controls. Column (4) displays estimates from a model that controls for the same covariates and fixed effects as in our main analysis. Finally, to further test the sensitivity of our analysis to differences in property size, Columns (5) and (6) provide estimates with floor area included on its own and together with the set of other covariates and fixed effects, respectively. In all specifications, Table B1 robustly confirms the presence of price discontinuities at the four lowest thresholds.

B.3. Alternative Modes of Inference

Our main price and investment analyses in Sections IV and V already document that our results are robust to alternative bandwidth-selection procedures (MSE optimal versus two-MSE optimal). This section further probes the stability of our results to varying modes of inference. We first test whether our results are an artifact of our choice of kernel. Our main analysis uses triangular kernels, which assign greater weight to observations that are closer to the threshold. An alternative approach is to use uniform kernels, which give equal weight to all observations within the specified bandwidth. Table B2 shows that all the price discontinuities reported in Table 3 and all the investment effects reported in Table 4 continue to be observed when we replace triangular with uniform kernels. The only notable difference is that the investment-probability discontinuities at threshold E–D are less precisely estimated (RBC p-values of 0.083 and 0.091, respectively) when uniform kernels are used. In the next robustness test, we probe the reliability of our results by performing the MSE-optimal bandwidth-selection procedure using the full range of SAP scores for each threshold instead of merely the observations in the previous and current rating bands. Results are presented in Table B3 and confirm the findings of our main analysis. We continue by re-estimating our models with arbitrary bandwidths of 3, 4, and 5 instead of data-driven bandwidths to demonstrate that our results are insensitive to bandwidth misspecification. Estimates are reported in Table B4 for the price analysis and Table B5 for the investment analysis and confirm our main findings across the board. In a final robustness check, we vary our approach to controlling for area fixed effects. In our main analysis, we use ten UK regions and an indicator for urban classification to capture geographic differences. To further validate our findings, we repeat both our price and investment analyses using 105 postcode-area fixed effects, which are much smaller geographical units. Despite a considerably smaller number of comparable properties within each postcode and a loss of precision for the price discontinuity at threshold G–F (p-values of 0.189 and 0.064), our main findings are confirmed by results presented in Table B6.

B.4. Placebo Tests

To further rule out that our results are driven by specification issues, we perform a number of falsification tests that check for price and EE-investment discontinuities at placebo thresholds. In total, we test for discontinuities at 45 pseudo thresholds: the three SAP scores before and after each real cutoff, and – in a nod to the literature documenting left-digit bias – SAP scores that end on zero (10, 20, 30, etc.). Results are collected in Tables B7 and B8. Given the discrete nature of our running variable and the complex curvatures documented in Figures 4 and 7, it is only natural that our models will spuriously pick up some false-positive effects but, as a whole, the documented pattern suggests the absence of systematic discontinuities at our arbitrary placebo thresholds. For prices, 34 of the 45 scrutinized cutoffs return null results. Of the 11 statistically significant results, 7 have a negative, and 4 have a positive sign. The latter are exclusively detected at the two highest rating bands and are therefore likely driven by the volatile functional form in that area, already discussed in our main analysis. Results are similar for EE investments with 29 null results, 11 cases with a ("wrong") positive sign, and 5 cases with a negative sign.



(a) North East of England (b) North West of England (c) Yorkshire

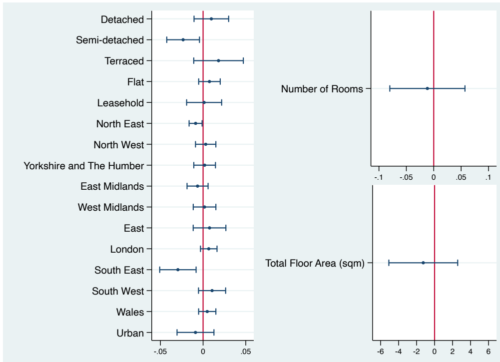
(d) East Midlands (e) West Midlands (f) East of England

(g) London (h) South East of England (i) South West of England

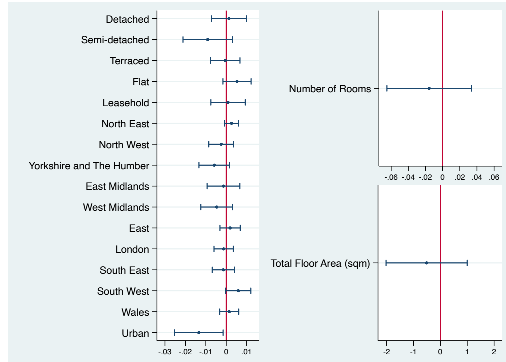
(j) Wales (k) Urban classification

FIGURE B1. COVARIATE BALANCE PLOTS: AREA CHARACTERISTICS

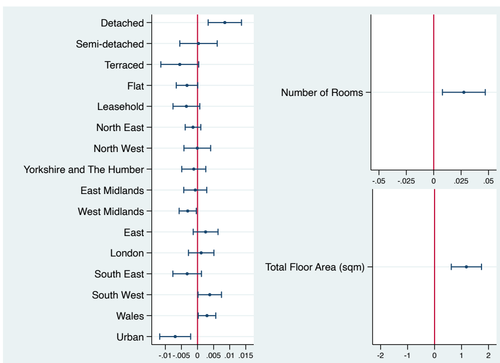
Notes: These figures plot covariate-balance graphs for all area characteristics by SAP score. Each graph plots the proportion of homes that share the respective characteristic.



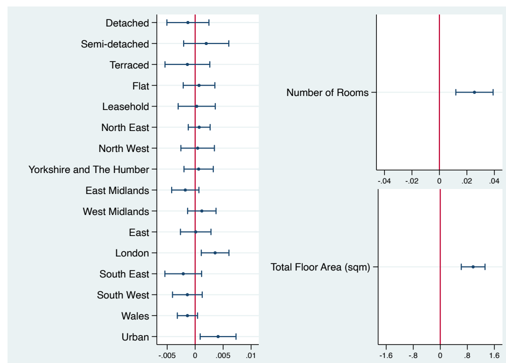
(a) G–F threshold



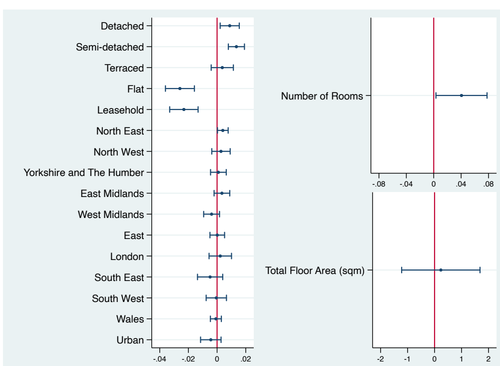
(b) F–E threshold



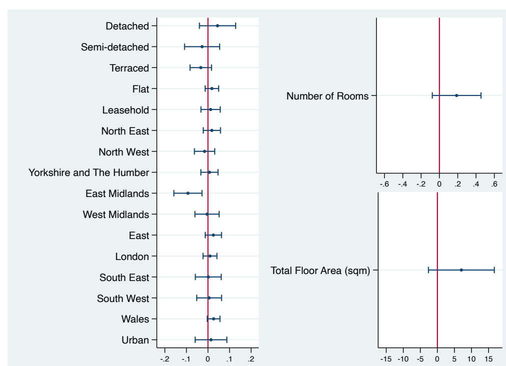
(c) E–D threshold



(d) D–C threshold



(e) C–B threshold



(f) B–A threshold

Figure B2. Covariate Balance Tests: Property and Area Characteristics

Notes: These figures plot results for separate local linear RDD regressions at each rating-band threshold where the dependent variable in Specification 1 is replaced with each covariate. Reported are 95% confidence intervals based on standard errors adjusted for clustering at the running variable (the SAP score). The estimated discontinuities for binary variables are shown on the left-hand side of each plot, while the numerical variables are shown on the right-hand side.

Table B1—Robustness: Alternative Dependent Variables

	DV = Price per square meter		DV = log(price)		DV = log(price)	
	(1)	(2)	(3)	(4)	(5)	(6)
[G–F]						
τ	46.671	45.409	0.018	0.018	0.025	0.022
Robust standard error	(13.132)	(23.624)	(0.003)	(0.006)	(0.003)	(0.006)
Robust, bias-corrected 95% CI	[15.488,84.010]	[8.510,102.219]	[0.010,0.032]	[0.012,0.032]	[0.018,0.035]	[0.016,0.036]
Robust, bias-corrected p-value	[0.004]	[0.021]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	4.154|4.154	4.773|4.773	4.009|4.009	3.734|3.734	3.762|3.762	4.114|4.114
BW bias	7.743|7.743	7.552|7.552	5.449|5.449	5.256|5.256	6.263|6.263	5.691|5.691
Observations	64,856|298,980	64,820|298,762	64,856|298,980	64,820|298,762	64,856|298,980	64,820|298,762
Effective observations	21,489|41,354	21,478|41,327	21,489|41,354	16,554|31,523	16,561|31,544	21,478|41,327
[F–E]						
τ	89.896	25.257	0.022	0.002	0.028	0.004
Robust standard error	(11.279)	(5.706)	(0.005)	(0.001)	(0.004)	(0.001)
Robust, bias-corrected 95% CI	[71.346,131.624]	[17.748,54.129]	[0.019,0.038]	[0.001,0.005]	[0.021,0.041]	[0.004,0.008]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]
BW estimate	3.955|3.955	3.654|3.654	4.396|4.396	5.716|5.716	4.036|4.036	4.482|4.482
BW bias	6.316|6.316	6.099|6.099	6.235|6.235	8.014|8.014	6.463|6.463	7.292|7.292
Observations	298,980|1,324,545	298,762|1,323,559	298,980|1,324,545	298,762|1,323,559	298,980|1,324,545	298,762|1,323,559
Effective observations	88,806|187,217	88,750|187,078	113,464|245,067	36,238|307,373	113,464|245,067	1 113,392|244,879
[E–D]						
τ	55.284	34.567	0.028	0.013	0.020	0.012
Robust standard error	(7.182)	(4.067)	(0.003)	(0.001)	(0.002)	(0.001)
Robust, bias-corrected 95% CI	[47.182,76.374]	[38.075,49.650]	[0.026,0.037]	[0.014,0.019]	[0.017,0.027]	[0.013,0.016]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.719|3.719	3.478|3.478	3.471|3.471	3.538|3.538	3.641|3.641	3.485|3.485
BW bias	5.256|5.256	5.363|5.363	5.068|5.068	5.791|5.791	5.430|5.430	5.598|5.598
Observations	1,324,545|3,411,187	1,323,559|3,408,989	1,324,545|3,411,187	1,323,559|3,408,989	1,324,545|3,411,187	1,323,559|3,408,989
Effective observations	404,441|740,197	404,176|739,721	404,441|740,197	404,176|739,721	404,441|740,197	404,176|739,721
[D–C]						
τ	23.656	6.489	0.016	0.006	0.009	0.004
Robust standard error	(4.838)	(3.090)	(0.001)	(0.000)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[10.627,41.801]	[-0.333,17.447]	[0.015,0.021]	[0.006,0.010]	[0.008,0.014]	[0.004,0.009]
Robust, bias-corrected p-value	[0.001]	[0.059]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.556|3.556	4.067|4.067	3.476|3.476	4.330|4.330	3.710|3.710	3.500|3.500
BW bias	5.757|5.757	7.311|7.311	5.486|5.486	5.418|5.418	5.707|5.707	5.069|5.069
Observations	3,411,187|1,727,916	3,408,989|1,722,293	3,411,187|1,727,916	3,408,989|1,722,293	3,411,187|1,727,916	3,408,989|1,722,293
Effective observations	886,173|963,656	1,172,757|1,123,375	886,173|963,656	1,172,757|1,123,375	886,173|963,656	885,556|962,752
[C–B]						
τ	-13.589	5.406	-0.006	0.003	0.004	0.006
Robust standard error	(7.982)	(6.578)	(0.007)	(0.002)	(0.002)	(0.001)
Robust, bias-corrected 95% CI	[-68.804,-16.814]	[-12.671,21.028]	[0.005,0.018]	[0.002,0.006]	[0.008,0.014]	[0.005,0.011]
Robust, bias-corrected p-value	[0.001]	[0.627]	[0.000]	[0.000]	[0.218]	[0.000]
BW estimate	3.666|3.666	4.344|4.344	4.454|4.454	5.427|5.427	4.973|4.973	3.984|3.984
BW bias	6.202|6.202	6.746|6.746	6.680|6.680	6.270|6.270	6.343|6.343	6.367|6.367
Observations	1,727,916|128,795	1,722,293|120,498	1,727,916|128,795	1,722,293|120,498	1,727,916|128,795	1,722,293|120,498
Effective observations	183,053|103,708	263,306|107,378	266,682|114,352	358,618|113,292	266,682|114,352	180,236|97,713
[B–A]						
τ	28.128	50.648	0.095	0.052	0.028	0.047
Robust standard error	(1.685)	(12.238)	(0.009)	(0.006)	(0.004)	(0.002)
Robust, bias-corrected 95% CI	[-97.265,1.294]	[-71.728,132.386]	[0.118,0.163]	[0.042,0.077]	[0.010,0.070]	[0.044,0.057]
Robust, bias-corrected p-value	[0.056]	[0.560]	[0.000]	[0.000]	[0.008]	[0.000]
BW estimate	2.945|2.945	3.331|3.331	2.768|2.768	3.315|3.315	2.886|2.886	3.258|3.258
BW bias	5.226|5.226	6.120|6.120	5.315|5.315	6.421|6.421	5.210|5.210	6.119|6.119
Observations	128,795|1,437	120,498|1,365	128,795|1,437	120,498|1,365	128,795|1,437	120,498|1,365
Effective observations	1,457|973	2,367|1,085	1,457|973	2,367|1,085	1,457|973	2,367|1,085
BW selection	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal
Property size					Yes	Yes
Property characteristics		Yes		Yes		Yes
Area FE		Yes		Yes		Yes
Date FE		Yes		Yes		Yes

Notes: This table reports results for our local linear RDD analysis of price discontinuities when using alternative definitions of the dependent variable. Each panel contains point and confidence-interval estimates of the parameter τ, which captures the price discontinuity associated with being above the respective rating-band threshold. Standard errors, adjusted for clustering at the running variable (the SAP score), are in parentheses. Bias-corrected p-values are reported in brackets. Columns (1) and (2) present results using price per square meter as the dependent variable. The distribution of price per square meter is heavily right-skewed. To avoid outliers from affecting the results, we exclude properties with a price per square meter of over £25,000. Columns (3) to (6) present results using the log of price as the dependent variable. Property characteristics include property type, number of rooms, and tenure; area fixed effects (FE) include regions and urban classification; date FE include sale year and sale quarter.

Table B2—Robustness: Uniform Kernels

	Price analysis		Investment analysis	
	(1)	(2)	(3)	(4)
[G–F]				
τ	0.020	0.017	-0.003	-0.004
Robust standard error	(0.004)	(0.008)	(0.007)	(0.008)
Robust, bias-corrected 95% CI	[0.013,0.039]	[0.007,0.040]	[-0.022,0.013]	[-0.023,0.013]
Robust, bias-corrected p-value	[0.000]	[0.004]	[0.635]	[0.592]
BW estimate	3.625|3.625	4.068|4.068	3.595|3.595	3.591|3.591
BW bias	6.028|6.028	6.285|6.285	6.783|6.783	6.639|6.639
Observations	65,293|299,568	65,257|299,350	43,674|203,983	43,642|203,813
Effective observations	16,631|31,631	21,576|41,439	10,837|20,832	10,830|20,821
[F–E]				
τ	0.028	0.010	-0.008	-0.008
Robust standard error	(0.005)	(0.000)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[0.020,0.041]	[0.004,0.018]	[-0.011,-0.006]	[-0.012,-0.007]
Robust, bias-corrected p-value	[0.000]	[0.002]	[0.000]	[0.000]
BW estimate	3.079|3.079	2.858|2.858	4.886|4.886	4.312|4.312
BW bias	5.565|5.565	5.555|5.555	7.198|7.198	8.003|8.003
Observations	299,568|1,325,863	299,350|1,324,875	203,983|822,298	203,813|821,621
Effective observations	88,939|187,435	61,819|134,350	79,049|156,927	78,993|156,792
[E–D]				
τ	0.022	0.010	-0.003	-0.003
Robust standard error	(0.002)	(0.002)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[0.020,0.028]	[0.009,0.015]	[-0.004,0.000]	[-0.004,0.000]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.083]	[0.091]
BW estimate	2.745|2.745	3.321|3.321	3.234|3.234	3.262|3.262
BW bias	5.176|5.176	6.358|6.358	5.618|5.618	5.620|5.620
Observations	1,325,863|3,413,478	1,324,875|3,411,279	822,298|1,876,936	821,621|1,875,494
Effective observations	279,932|536,018	404,572|740,328	243,573|434,275	243,379|433,957
[D–C]				
τ	0.009	0.004	-0.001	-0.001
Robust standard error	(0.001)	(0.000)	(0.000)	(0.000)
Robust, bias-corrected 95% CI	[0.008,0.015]	[0.004,0.008]	[-0.002,-0.001]	[-0.002,-0.001]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.968|3.968	3.130|3.130	5.382|5.382	4.362|4.362
BW bias	6.206|6.206	5.214|5.214	5.290|5.290	5.416|5.416
Observations	3,413,478|1,728,658	3,411,279|1,723,033	1,876,936|896,682	1,875,494|893,505
Effective observations	886,646|964,063	886,028|963,158	762,739|649,329	612,133|580,506
[C–B]				
τ	0.005	0.007	-0.001	-0.001
Robust standard error	(0.003)	(0.003)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[-0.008,0.004]	[0.002,0.013]	[-0.002,0.001]	[-0.002,0.001]
Robust, bias-corrected p-value	[0.559]	[0.014]	[0.458]	[0.510]
BW estimate	3.278|3.278	3.213|3.213	4.121|4.121	4.110|4.110
BW bias	6.188|6.188	5.279|5.279	6.704|6.704	6.541|6.541
Observations	1,728,658|128,830	1,723,033|120,531	896,682|78,817	893,505|75,117
Effective observations	183,120|103,735	180,302|97,740	140,177|70,564	138,359|67,320
[B–A]				
τ	0.006	0.026	-0.018	-0.013
Robust standard error	(0.001)	(0.009)	(0.002)	(0.002)
Robust, bias-corrected 95% CI	[-0.060,0.062]	[-0.025,0.081]	[-0.023,-0.008]	[-0.018,-0.005]
Robust, bias-corrected p-value	[0.979]	[0.306]	[0.000]	[0.000]
BW estimate	2.794|2.794	2.836|2.836	3.147|3.147	3.226|3.226
BW bias	5.617|5.617	6.177|6.177	5.356|5.356	5.231|5.231
Observations	128,830|1,437	120,531|1,365	78,817|599	75,117|569
Effective observations	1,457|973	1,358|919	1,077|476	1,007|449
BW selection	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal
Property characteristics		Yes		Yes
Area FE		Yes		Yes
Date FE		Yes		Yes

Notes: This table reports results for our local linear RDD analyses of price and EE-investment discontinuities when using uniform kernel weights instead of triangular kernel weights. Each panel contains point and confidence-interval estimates of the parameter τ, which captures the discontinuity associated with being above the respective rating-band threshold. Standard errors, adjusted for clustering at the running variable (the SAP score), are in parentheses. Bias-corrected p-values are reported in brackets. Columns (1) and (2) present results for the price analysis using Specifications 1 and 2, respectively. Columns (3) and (4) present results for the EE-investment analysis using Specifications 3 and 4, respectively. Property characteristics include property type, number of rooms, and tenure; area fixed effects (FE) include regions and urban classification; date FE include sale year and sale quarter.

Table B3—Robustness: Optimal Bandwidths Using All Transactions

	Price analysis		Investment analysis	
	(1)	(2)	(2)	(2)
[G–F]				
τ	0.022	0.020	-0.018	-0.018
Robust standard error	(0.003)	(0.007)	(0.000)	(0.001)
Robust, bias-corrected 95% CI	[0.018,0.033]	[0.012,0.039]	[-0.020,-0.016]	[-0.020,-0.016]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	4.422|4.422	4.700|4.700	3.909|3.909	3.701|3.701
BW bias	7.563|7.563	7.129|7.129	5.671|5.671	5.955|5.955
Observations	65,293|6,897,834	65,257|6,880,433	65,293|6,897,834	65,257|6,880,433
Effective observations	21,587|41,466	21,576|41,439	16,631|31,631	16,624|31,610
[F–E]				
τ	0.026	0.004	-0.022	-0.022
Robust standard error	(0.004)	(0.002)	(0.000)	(0.000)
Robust, bias-corrected 95% CI	[0.020,0.036]	[-0.000,0.009]	[-0.023,-0.021]	[-0.023,-0.021]
Robust, bias-corrected p-value	[0.000]	[0.056]	[0.000]	[0.000]
BW estimate	6.852|6.852	7.214|7.214	4.479|4.479	4.450|4.450
BW bias	11.090|11.090	11.428|11.428	8.556|8.556	8.561|8.561
Observations	364,861|6,598,266	364,607|6,581,083	364,861|6,598,266	364,607|6,581,083
Effective observations	157,304|376,576	176,252|450,619	113,639|245,331	113,567|245,143
[E–D]				
τ	0.017	0.011	-0.034	-0.035
Robust standard error	(0.003)	(0.001)	(0.000)	(0.000)
Robust, bias-corrected 95% CI	[0.014,0.024]	[0.012,0.015]	[-0.035,-0.033]	[-0.036,-0.034]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	5.344|5.344	3.673|3.673	5.097|5.097	3.146|3.146
BW bias	8.634|8.634	6.150|6.150	8.052|8.052	5.659|5.659
Observations	1,690,724|5,272,403	1,689,482|5,256,208	1,690,724|5,272,403	1,689,482|5,256,208
Effective observations	615,716|1,192,279	404,572|740,328	615,716|1,192,279	404,572|740,328
[D–C]				
τ	0.008	0.003	-0.047	-0.047
Robust standard error	(0.001)	(0.001)	(0.000)	(0.000)
Robust, bias-corrected 95% CI	[0.008,0.013]	[0.003,0.006]	[-0.048,-0.045]	[-0.048,-0.045]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	4.707|4.707	4.579|4.579	4.248|4.248	4.382|4.382
BW bias	7.650|7.650	8.512|8.512	5.303|5.303	5.334|5.334
Observations	5,104,202|1,858,925	5,100,761|1,844,929	5,104,202|1,858,925	5,100,761|1,844,929
Effective observations	1,174,194|1,125,003	1,173,389|1,123,849	1,174,194|1,125,003	1,173,389|1,123,849
[C–B]				
τ	0.003	0.006	-0.050	-0.051
Robust standard error	(0.002)	(0.002)	(0.000)	(0.000)
Robust, bias-corrected 95% CI	[-0.007,0.000]	[0.003,0.012]	[-0.054,-0.051]	[-0.056,-0.052]
Robust, bias-corrected p-value	[0.079]	[0.002]	[0.000]	[0.000]
BW estimate	3.795|3.795	4.666|4.666	2.705|2.705	2.694|2.694
BW bias	6.555|6.555	8.038|8.038	5.765|5.765	5.507|5.507
Observations	6,832,860|130,267	6,823,794|121,896	6,832,860|130,267	6,823,794|121,896
Effective observations	183,120|103,735	263,422|107,408	109,435|87,896	107,351|83,515
[B–A]				
τ	0.023	0.037	-0.074	-0.075
Robust standard error	(0.010)	(0.005)	(0.002)	(0.001)
Robust, bias-corrected 95% CI	[-0.023,0.036]	[0.017,0.056]	[-0.079,-0.067]	[-0.082,-0.064]
Robust, bias-corrected p-value	[0.655]	[0.000]	[0.000]	[0.000]
BW estimate	3.231|3.231	3.997|3.997	4.091|4.091	3.733|3.733
BW bias	5.581|5.581	6.499|6.499	6.402|6.402	6.325|6.325
Observations	6,961,690|1,437	6,944,325|1,365	6,961,690|1,437	6,944,325|1,365
Effective observations	2,561|1,144	2,367|1,085	4,422|1,259	2,367|1,085
BW selection	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal
Property characteristics		Yes		Yes
Area FE		Yes		Yes
Date FE		Yes		Yes

Notes: This table reports results for our local linear RDD analyses of price and EE-investment discontinuities when using transactions over the entire range of SAP scores to compute optimal bandwidths at each threshold. Each panel contains point and confidence-interval estimates of the parameter τ, which captures the discontinuity associated with being above the respective rating-band threshold. Standard errors, adjusted for clustering at the running variable (the SAP score), are in parentheses. Bias-corrected p-values are reported in brackets. Columns (1) and (2) present results for the price analysis using Specifications 1 and 2, respectively. Columns (3) and (4) present results for the EE-investment analysis using Specifications 3 and 4, respectively. Property characteristics include property type, number of rooms, and tenure; area fixed effects (FE) include regions and urban classification; date FE include sale year and sale quarter.

Table B4—Robustness: Alternative Bandwidths (Price Analysis)

	(1)	(2)	(3)	(4)	(5)	(6)
[G–F]						
τ	0.025	0.028	0.022	0.022	0.022	0.020
Robust standard error	(0.002)	(0.005)	(0.003)	(0.007)	(0.003)	(0.007)
Robust, bias-corrected 95% CI	[0.030,0.030]	[0.044,0.047]	[0.026,0.030]	[0.031,0.048]	[0.021,0.030]	[0.020,0.043]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	65,293|299,568	65,257|299,350	65,293|299,568	65,257|299,350	65,293|299,568	65,257|299,350
Effective observations	16,631|31,631	16,624|31,610	21,587|41,466	21,576|41,439	26,133|52,102	26,121|52,070
[F–E]						
τ	0.036	0.009	0.030	0.007	0.027	0.006
Robust standard error	(0.003)	(0.001)	(0.004)	(0.001)	(0.004)	(0.002)
Robust, bias-corrected 95% CI	[0.054,0.055]	[0.016,0.016]	[0.039,0.057]	[0.012,0.017]	[0.029,0.050]	[0.008,0.015]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	299,568|1,325,863	299,350|1,324,875	299,568|1,325,863	299,350|1,324,875	299,568|1,325,863	299,350|1,324,875
Effective observations	88,939|187,435	88,883|187,296	113,639|245,331	113,567|245,143	136,548|307,926	136,455|307,699
[E–D]						
τ	0.021	0.012	0.019	0.011	0.018	0.009
Robust standard error	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)
Robust, bias-corrected 95% CI	[0.029,0.030]	[0.015,0.016]	[0.019,0.031]	[0.013,0.016]	[0.017,0.027]	[0.012,0.015]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	1,325,863|3,413,478	1,324,875|3,411,279	1,325,863|3,413,478	1,324,875|3,411,279	1,325,863|3,413,478	1,324,875|3,411,279
Effective observations	404,837|740,804	404,572|740,328	514,875|959,199	514,523|958,591	615,716|1,192,279	615,286|1,191,503
[D–C]						
τ	0.009	0.004	0.009	0.004	0.008	0.003
Robust standard error	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.001)
Robust, bias-corrected 95% CI	[0.008,0.008]	[0.004,0.004]	[0.007,0.012]	[0.004,0.007]	[0.009,0.014]	[0.004,0.007]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	3,413,478|1,728,658	3,411,279|1,723,033	3,413,478|1,728,658	3,411,279|1,723,033	3,413,478|1,728,658	3,411,279|1,723,033
Effective observations	886,646|964,063	886,028|963,158	1,174,194|1,125,003	1,173,389|1,123,849	1,453,473|1,256,011	1,452,506|1,254,555
[C–B]						
τ	0.001	0.004	0.004	0.006	0.008	0.006
Robust standard error	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)	(0.002)
Robust, bias-corrected 95% CI	[-0.003,-0.003]	[-0.005,-0.005]	[-0.007,-0.002]	[-0.006,0.006]	[-0.007,-0.002]	[-0.002,0.009]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.952]	[0.000]	[0.164]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	1,728,658|128,830	1,723,033|120,531	1,728,658|128,830	1,723,033|120,531	1,728,658|128,830	1,723,033|120,531
Effective observations	183,120|103,735	180,302|97,740	266,799|114,383	263,422|107,408	362,544|120,878	358,777|113,323
[B–A]						
τ	0.017	0.030	0.038	0.039	0.056	0.044
Robust standard error	(0.010)	(0.006)	(0.014)	(0.005)	(0.019)	(0.006)
Robust, bias-corrected 95% CI	[-0.033,-0.032]	[0.012,0.019]	[-0.034,-0.004]	[0.012,0.034]	[-0.021,0.032]	[0.014,0.040]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.011]	[0.000]	[0.668]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	128,830|1,437	120,531|1,365	128,830|1,437	120,531|1,365	128,830|1,437	120,531|1,365
Effective observations	2,561|1,144	2,367|1,085	4,422|1,259	4,017|1,194	7,952|1,315	7,208|1,248
BW selection	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal
Property characteristics		Yes		Yes		Yes
Area FE		Yes		Yes		Yes
Date FE		Yes		Yes		Yes

Notes: This table reports results for our local linear RDD analysis of price discontinuities when using alternative bandwidths instead of a data-driven bandwidth. Each panel contains point and confidence-interval estimates of the parameter τ, which captures the price discontinuity associated with being above the respective rating-band threshold. Standard errors, adjusted for clustering at the running variable (the SAP score), are in parentheses. Bias-corrected p-values are reported in brackets. Columns (1) and (2) present results for models with a bandwidth of 3. Columns (3) and (4) present results for models with a bandwidth of 4. Columns (5) and (6) present results from models with a bandwidth of 5. Property characteristics include property type, number of rooms, and tenure; area fixed effects (FE) include regions and urban classification; date FE include sale year and sale quarter.

Table B5—Robustness: Alternative Bandwidths (Investment Analysis)

	(1)	(2)	(3)	(4)	(5)	(6)
[G–F]						
τ	0.010	0.010	0.002	0.002	-0.001	-0.001
Robust standard error	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Robust, bias-corrected 95% CI	[0.035,0.036]	[0.036,0.037]	[0.008,0.039]	[0.006,0.041]	[-0.004,0.027]	[-0.006,0.027]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.004]	[0.009]	[0.138]	[0.208]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	43,674|203,983	43,642|203,813	43,674|203,983	43,642|203,813	43,674|203,983	43,642|203,813
Effective observations	10,837|20,832	10,830|20,821	14,089|27,329	14,078|27,313	17,116|34,378	17,104|34,358
[F–E]						
τ	-0.009	-0.009	-0.008	-0.008	-0.008	-0.008
Robust standard error	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[-0.014,-0.013]	[-0.014,-0.014]	[-0.015,-0.008]	[-0.015,-0.008]	[-0.012,-0.006]	[-0.012,-0.005]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	203,983|822,298	203,813|821,621	203,983|822,298	203,813|821,621	203,983|822,298	203,813|821,621
Effective observations	62,125|119,906	62,081|119,802	79,049|156,927	78,993|156,792	94,844|196,784	94,769|196,623
[E–D]						
τ	-0.004	-0.004	-0.003	-0.003	-0.003	-0.003
Robust standard error	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[-0.007,-0.007]	[-0.007,-0.007]	[-0.008,-0.004]	[-0.008,-0.004]	[-0.006,-0.002]	[-0.006,-0.002]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	822,298|1,876,936	821,621|1,875,494	822,298|1,876,936	821,621|1,875,494	822,298|1,876,936	821,621|1,875,494
Effective observations	243,573|434,275	243,379|433,957	310,795|559,013	310,546|558,606	372,948|690,799	372,650|690,286
[D–C]						
τ	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
Robust standard error	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Robust, bias-corrected 95% CI	[-0.001,-0.001]	[-0.001,-0.001]	[-0.001,-0.001]	[-0.001,-0.001]	[-0.001,-0.001]	[-0.001,-0.001]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	1,876,936|896,682	1,875,494|893,505	1,876,936|896,682	1,875,494|893,505	1,876,936|896,682	1,875,494|893,505
Effective observations	460,628|498,867	460,224|498,277	612,668|581,242	612,133|580,506	762,739|649,329	762,101|648,402
[C–B]						
τ	0.000	0.000	-0.001	-0.001	-0.001	-0.001
Robust standard error	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[0.003,0.003]	[0.003,0.003]	[0.000,0.004]	[-0.000,0.003]	[-0.001,0.002]	[-0.001,0.002]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.040]	[0.076]	[0.444]	[0.571]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	896,682|78,817	893,505|75,117	896,682|78,817	893,505|75,117	896,682|78,817	893,505|75,117
Effective observations	97,048|63,693	95,533|60,797	140,177|70,564	138,359|67,320	190,092|74,661	188,048|71,236
[B–A]						
τ	-0.018	-0.016	-0.017	-0.013	-0.016	-0.011
Robust standard error	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Robust, bias-corrected 95% CI	[-0.024,-0.023]	[-0.026,-0.025]	[-0.024,-0.020]	[-0.022,-0.015]	[-0.022,-0.014]	[-0.019,-0.011]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
BW bias	3.100|3.100	3.100|3.100	4.100|4.100	4.100|4.100	5.100|5.100	5.100|5.100
Observations	78,817|599	75,117|569	78,817|599	75,117|569	78,817|599	75,117|569
Effective observations	1,077|476	1,007|449	2,059|523	1,917|495	4,156|544	3,881|516
BW selection	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal
Property characteristics		Yes		Yes		Yes
Area FE		Yes		Yes		Yes
Date FE		Yes		Yes		Yes

Notes: This table reports results for our local linear RDD analysis of discontinuities in EE-investment probabilities when using alternative bandwidths instead of a data-driven bandwidth. Each panel contains point and confidence-interval estimates of the parameter τ, which captures the EE-investment discontinuity associated with being above the respective rating-band threshold. Standard errors, adjusted for clustering at the running variable (the SAP score), are in parentheses. Bias-corrected p-values are reported in brackets. Columns (1) and (2) present results for models with a bandwidth of 3. Columns (3) and (4) present results for models with a bandwidth of 4. Columns (5) and (6) present results from models with a bandwidth of 5. Property characteristics include property type, number of rooms, and tenure; area fixed effects (FE) include regions and urban classification; date FE include sale year and sale quarter.

Table B6—Robustness: Postcode Area Fixed Effects

	Price analysis		Investment analysis	
	(1)	(2)	(3)	(4)
[G–F]				
τ	0.010	0.011	-0.003	-0.003
Robust standard error	(0.006)	(0.005)	(0.006)	(0.006)
Robust, bias-corrected 95% CI	[-0.005,0.024]	[-0.001,0.022]	[-0.016,0.009]	[-0.015,0.009]
Robust, bias-corrected p-value	[0.189]	[0.064]	[0.613]	[0.624]
BW estimate	6.242|6.242	6.009|6.009	5.708|5.708	5.939|5.939
BW bias	8.381|8.381	8.772|8.772	8.281|8.281	8.907|8.907
Observations	65,293|299,568	65,257|299,350	43,674|203,983	43,642|203,813
Effective observations	30,369|63,716	30,353|63,676	17,116|34,378	17,104|34,358
[F–E]				
τ	0.025	0.006	-0.008	-0.008
Robust standard error	(0.003)	(0.002)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[0.022,0.034]	[0.003,0.014]	[-0.011,-0.005]	[-0.011,-0.005]
Robust, bias-corrected p-value	[0.000]	[0.004]	[0.000]	[0.000]
BW estimate	4.500|4.500	4.267|4.267	3.900|3.900	3.996|3.996
BW bias	7.643|7.643	7.060|7.060	6.192|6.192	6.268|6.268
Observations	299,568|1,325,863	299,350|1,324,875	203,983|822,298	203,813|821,621
Effective observations	113,639|245,331	113,567|245,143	62,125|119,906	62,081|119,802
[E–D]				
τ	0.016	0.011	-0.003	-0.003
Robust standard error	(0.001)	(0.001)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[0.016,0.021]	[0.010,0.014]	[-0.005,-0.001]	[-0.005,-0.001]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.001]	[0.001]
BW estimate	4.018|4.018	3.757|3.757	4.155|4.155	4.222|4.222
BW bias	6.344|6.344	6.179|6.179	6.636|6.636	6.716|6.716
Observations	1,325,863|3,413,478	1,324,875|3,411,279	822,298|1,876,936	821,621|1,875,494
Effective observations	514,875|959,199	404,572|740,328	310,795|559,013	310,546|558,606
[D–C]				
τ	0.006	0.004	-0.001	-0.001
Robust standard error	(0.001)	(0.000)	(0.000)	(0.000)
Robust, bias-corrected 95% CI	[0.009,0.011]	[0.005,0.008]	[-0.002,-0.001]	[-0.002,-0.001]
Robust, bias-corrected p-value	[0.000]	[0.000]	[0.000]	[0.000]
BW estimate	3.835|3.835	3.443|3.443	6.563|6.563	5.624|5.624
BW bias	5.583|5.583	4.928|4.928	5.983|5.983	5.789|5.789
Observations	3,413,478|1,728,658	3,411,279|1,723,033	1,876,936|896,682	1,875,494|893,505
Effective observations	886,646|964,063	886,028|963,158	908,484|706,590	762,101|648,402
[C–B]				
τ	0.007	0.006	-0.001	-0.001
Robust standard error	(0.001)	(0.001)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[0.005,0.014]	[0.003,0.011]	[-0.002,0.001]	[-0.002,0.001]
Robust, bias-corrected p-value	[0.000]	[0.001]	[0.650]	[0.566]
BW estimate	3.932|3.932	3.997|3.997	4.493|4.493	4.650|4.650
BW bias	6.499|6.499	6.190|6.190	6.987|6.987	6.902|6.902
Observations	1,728,658|128,830	1,723,033|120,531	896,682|78,817	893,505|75,117
Effective observations	183,120|103,735	180,302|97,740	140,177|70,564	138,359|67,320
[B–A]				
τ	0.021	0.037	-0.019	-0.021
Robust standard error	(0.008)	(0.007)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[0.002,0.057]	[0.008,0.052]	[-0.023,-0.013]	[-0.027,-0.015]
Robust, bias-corrected p-value	[0.033]	[0.006]	[0.000]	[0.000]
BW estimate	3.408|3.408	4.504|4.504	4.867|4.867	3.871|3.871
BW bias	6.103|6.103	6.350|6.350	6.074|6.074	5.618|5.618
Observations	128,830|1,437	120,531|1,365	78,817|599	75,117|569
Effective observations	2,561|1,144	4,017|1,194	2,059|523	1,007|449
BW selection	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal
Property characteristics		Yes		Yes
Area FE	Yes	Yes	Yes	Yes
Date FE		Yes		Yes

Notes: This table reports results for our local linear RDD analyses of price and EE-investment discontinuities when using postcode-area fixed effects (FE) rather than region FE. Each panel contains point and confidence-interval estimates of the parameter τ, which captures the discontinuity associated with being above the respective rating-band threshold. Standard errors, adjusted for clustering at the running variable (the SAP score), are in parentheses. Bias-corrected p-values are reported in brackets. Column (1) presents results for the price analysis when controlling for urban and postcode area fixed effects alone, whereas Column (2) presents results for the price analysis, including the full set of controls. Column (3) presents results for for the EE-investment analysis when controlling for urban and postcode area fixed effects alone, whereas Column (2) presents results for the EE-investment analysis, including the full set of controls. Property characteristics include property type, number of rooms, and tenure; area fixed effects (FE) include postcode areas and urban classification; date FE include sale year and sale quarter.

Table B7—Robustness: Placebo Thresholds I

	(Threshold = -3 SAP)		(Threshold = -2 SAP)		(Threshold = -1 SAP)		(Threshold = +1 SAP)		(Threshold = +2 SAP)		(Threshold = +3 SAP)	
	Price Analysis	Investment Analysis	Price Analysis	Investment Analysis	Price Analysis	Investment Analysis	Price Analysis	Investment Analysis	Price Analysis	Investment Analysis	Price Analysis	(Investment Analysis
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
[G–F]												
τ	-0.008	0.000	0.000	0.012	-0.002	-0.008	-0.010	-0.012	0.005	0.004	0.007	0.019
Robust standard error	(0.004)	(0.005)	(0.005)	(0.003)	(0.008)	(0.005)	(0.010)	(0.003)	(0.008)	(0.005)	(0.006)	(0.003)
Robust, bias-corrected 95% CI	[-0.017,0.003]	[-0.010,0.014]	[-0.013,0.014]	[0.008,0.023]	[-0.018,0.013]	[-0.022,0.000]	[-0.036,0.004]	[-0.023,-0.006]	[-0.011,0.024]	[-0.004,0.018]	[-0.012,0.028]	[0.014,0.029]
Robust, bias-corrected p-value	[0.167]	[0.777]	[0.897]	[0.000]	[0.727]	[0.058]	[0.123]	[0.001]	[0.475]	[0.193]	[0.442]	[0.000]
BW estimate	4.410|4.410	5.109|5.109	4.705|4.705	3.991|3.991	5.776|5.776	5.003|5.003	6.137|6.137	4.859|4.859	8.296|8.296	4.642|4.642	3.788|3.788	4.438|4.438
BW bias	7.726|7.726	8.423|8.423	7.149|7.149	7.230|7.230	7.680|7.680	7.627|7.627	9.372|9.372	8.872|8.872	11.313|11.313	6.897|6.897	7.358|7.358	8.598|8.598
Observations	48,633|315,974	32,812|214,643	53,861|310,746	36,232|211,223	59,373|305,234	39,831|207,624	72,315|292,292	48,312|199,143	79,811|284,796	53,280|194,175	88,066|276,541	58,756|188,699
Effective observations	17,773|31,178	14,148|25,944	18,957|34,205	9,694|17,048	24,469|47,323	16,067|31,124	33,179|69,391	15,500|29,688	44,907|108,544	17,048|32,489	22,809|40,867	18,925|35,628
[F–E]												
τ	-0.001	0.002	-0.000	-0.001	-0.002	-0.001	-0.002	0.001	-0.002	0.005	0.000	-0.002
Robust standard error	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Robust, bias-corrected 95% CI	[-0.006,0.003]	[-0.001,0.003]	[-0.005,0.004]	[-0.007,0.001]	[-0.007,0.003]	[-0.005,0.004]	[-0.008,0.002]	[-0.001,0.011]	[-0.008,0.002]	[0.001,0.012]	[-0.003,0.005]	[-0.008,-0.000]
Robust, bias-corrected p-value	[0.553]	[0.280]	[0.829]	[0.112]	[0.439]	[0.844]	[0.225]	[0.092]	[0.244]	[0.016]	[0.583]	[0.044]
BW estimate	5.020|5.020	5.056|5.056	5.118|5.118	5.922|5.922	5.317|5.317	5.289|5.289	5.606|5.606	3.558|3.558	4.205|4.205	3.692|3.692	4.125|4.125	2.913|2.913
BW bias	8.222|8.222	8.265|8.265	8.429|8.429	8.430|8.430	7.341|7.341	7.789|7.789	9.001|9.001	5.340|5.340	7.980|7.980	5.486|5.486	6.415|6.415	5.659|5.659
Observations	210,467|1,413,758	141,732|883,702	237,531|1,386,694	160,534|864,900	267,528|1,356,697	181,439|843,995	340,674|1,283,551	229,842|795,592	385,076|1,239,149	258,428|767,006	433,700|1,190,525	289,693|735,741
Effective observations	104,687|223,233	71,211|147,961	114,433|249,115	78,356|163,081	125,380|276,965	86,393|179,166	154,891|334,965	69,308|130,763	147,545|290,563	76,989|142,008	166,172|316,269	59,851|110,743
[E–D]												
τ	-0.001	-0.000	0.000	-0.002	-0.000	-0.000	-0.009	0.003	0.000	0.001	-0.002	0.000
Robust standard error	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.001)	(0.000)
Robust, bias-corrected 95% CI	[-0.005,0.002]	[-0.002,0.002]	[-0.008,0.001]	[-0.003,0.000]	[-0.006,0.005]	[-0.002,0.003]	[-0.022,-0.007]	[0.002,0.007]	[-0.010,0.011]	[-0.002,0.004]	[-0.005,0.003]	[-0.002,0.002]
Robust, bias-corrected p-value	[0.347]	[0.914]	[0.139]	[0.068]	[0.871]	[0.657]	[0.000]	[0.003]	[0.932]	[0.443]	[0.622]	[0.728]
BW estimate	5.140|5.140	4.533|4.533	4.083|4.083	5.174|5.174	4.886|4.886	4.794|4.794	3.420|3.420	3.705|3.705	3.346|3.346	4.627|4.627	3.076|3.076	2.675|2.675
BW bias	7.622|7.622	7.409|7.409	6.171|6.171	8.346|8.346	6.156|6.156	7.855|7.855	5.543|5.543	5.928|5.928	6.177|6.177	7.939|7.939	6.583|6.583	5.578|5.578
Observations	920,303|3,815,851	578,242|2,118,873	1,045,131|3,691,023	653,593|2,043,522	1,180,719|3,555,435	735,218|1,961,897	1,493,027|3,243,127	921,747|1,775,368	1,670,182|3,065,972	1,026,083|1,671,032	1,860,551|2,875,603	1,137,282|1,559,833
Effective observations	469,684|940,248	241,356|447,841	428,142|815,420	316,707|601,985	471,130|884,484	286,247|520,360	447,896|790,439	268,154|458,480	489,463|846,196	372,490|621,756	535,676|899,384	215,535|374,625
[D–C]												
τ	-0.000	-0.000	-0.002	0.000	-0.000	-0.000	-0.006	0.001	-0.000	0.002	-0.002	0.001
Robust standard error	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
Robust, bias-corrected 95% CI	[-0.003,0.003]	[-0.001,0.001]	[-0.005,-0.001]	[-0.000,0.002]	[-0.001,0.004]	[-0.001,0.001]	[-0.009,-0.004]	[0.001,0.002]	[-0.004,0.008]	[0.000,0.003]	[-0.002,0.005]	[-0.001,0.001]
Robust, bias-corrected p-value	[0.916]	[0.832]	[0.002]	[0.110]	[0.414]	[0.897]	[0.000]	[0.000]	[0.600]	[0.007]	[0.505]	[0.874]
BW estimate	3.925|3.925	4.222|4.222	4.965|4.965	3.720|3.720	5.321|5.321	4.775|4.775	3.499|3.499	3.635|3.635	3.088|3.088	3.930|3.930	3.550|3.550	4.201|4.201
BW bias	6.112|6.112	6.122|6.122	7.616|7.616	5.542|5.542	5.871|5.871	5.252|5.252	6.063|6.063	5.736|5.736	5.205|5.205	6.239|6.239	5.739|5.739	7.088|7.088
Observations	2,525,251|2,609,061	1,415,270|1,353,729	2,820,426|2,313,886	1,570,217|1,198,782	3,119,703|2,014,609	1,725,231|1,043,768	3,694,466|1,439,846	2,023,461|745,538	3,952,198|1,182,114	2,157,003|611,996	4,180,648|953,664	2,274,756|494,243
Effective observations	833,737|1,169,215	589,052|741,733	1,128,912|1,360,222	456,824|586,786	1,428,189|1,415,425	611,838|648,540	874,040|840,662	453,244|432,539	832,495|713,636	431,772|366,893	769,369|594,887	549,525|355,884
[C–B]												
τ	-0.002	-0.000	-0.005	0.001	0.004	-0.001	0.003	0.000	-0.008	-0.001	0.003	0.002
Robust standard error	(0.002)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)
Robust, bias-corrected 95% CI	[-0.004,0.002]	[-0.001,0.001]	[-0.007,-0.003]	[0.000,0.002]	[0.002,0.009]	[-0.002,-0.001]	[-0.003,0.005]	[-0.000,0.002]	[-0.013,-0.010]	[-0.002,0.001]	[-0.005,0.011]	[0.001,0.004]
Robust, bias-corrected p-value	[0.373]	[0.876]	[0.000]	[0.000]	[0.006]	[0.001]	[0.661]	[0.069]	[0.000]	[0.253]	[0.518]	[0.000]
BW estimate	3.954|3.954	3.995|3.995	3.892|3.892	3.295|3.295	4.144|4.144	3.932|3.932	3.806|3.806	4.049|4.049	3.126|3.126	4.810|4.810	3.879|3.879	3.836|3.836
BW bias	5.191|5.191	5.305|5.305	6.826|6.826	6.738|6.738	7.574|7.574	6.330|6.330	6.297|6.297	6.599|6.599	5.647|5.647	5.774|5.774	6.343|6.343	5.286|5.286
Observations	1,542,731|300,833	797,972|170,650	1,615,682|227,882	835,756|132,866	1,675,712|167,852	867,524|101,098	1,758,655|84,909	914,726|53,896	1,786,225|57,339	931,633|36,989	1,806,548|37,016	944,735|23,887
Effective observations	288,176|215,924	149,570|116,754	251,426|170,543	130,299|95,877	311,456|145,061	112,378|77,211	142,973|71,786	116,754|50,015	110,513|50,131	95,877|35,072	83,515|32,999	51,230|21,970
[B–A]												
τ	-0.006	-0.004	-0.003	0.002	0.010	0.003	-0.002	0.015	0.034	-0.005	-0.104	0.013
Robust standard error	(0.009)	(0.000)	(0.001)	(0.001)	(0.003)	(0.002)	(0.019)	(0.002)	(0.021)	(0.004)	(0.018)	(0.004)
Robust, bias-corrected 95% CI	[-0.026,0.017]	[-0.008,-0.004]	[-0.017,0.029]	[-0.004,0.006]	[0.003,0.024]	[0.001,0.005]	[-0.057,0.003]	[-0.001,0.041]	[-0.012,0.050]	[-0.014,0.010]	[-0.158,-0.091]	[0.005,0.028]
Robust, bias-corrected p-value	[0.676]	[0.000]	[0.585]	[0.682]	[0.010]	[0.004]	[0.080]	[0.057]	[0.224]	[0.739]	[0.000]	[0.003]
BW estimate	3.527|3.527	2.325|2.325	2.125|2.125	2.932|2.932	4.027|4.027	5.505|5.505	3.506|3.506	2.329|2.329	5.687|5.687	3.191|3.191	3.654|3.654	3.530|3.530
BW bias	5.748|5.748	4.890|4.890	4.939|4.939	4.937|4.937	6.642|6.642	6.369|6.369	5.739|5.739	5.125|5.125	6.349|6.349	6.174|6.174	6.621|6.621	6.748|6.748
Observations	118,164|3,732	74,110|1,576	119,173|2,723	74,556|1,130	119,945|1,951	74,882|804	120,957|939	75,300|386	121,235|661	75,409|277	121,450|446	75,498|188
Effective observations	10,756|2,793	2,874|1,007	2,659|1,784	1,356|744	6,622|1,671	7,562|730	1,784|768	418|266	3,071|641	527|224	919|389	381|156
BW selection	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal	MSE-Optimal
Property characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Area FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Date FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports results for our local linear RDD analysis of price and EE-investment discontinuities at the following placebo thresholds: the three SAP scores before and after each real cutoff. Even-numbered columns present results for the price analysis using Specification 2. Odd-numbered columns present results for the EE-investment analysis using Specification 4. Bias-corrected p-values are reported in brackets. Property characteristics include property type, number of rooms, and tenure; area fixed effects (FE) include regions and urban classification; date FE include sale year and sale quarter.

Table B8—Robustness: Placebo Thresholds II

<table>
<tr><th></th><th>(1)</th><th>(2)</th></tr>
<tr><td>[SAP=10]</td><td></td><td></td></tr>
<tr><td>τ</td><td>-0.002</td><td>-0.006</td></tr>
<tr><td>Robust standard error</td><td>(0.007)</td><td>(0.004)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[-0.013,0.022]</td><td>[-0.023,0.011]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.613]</td><td>[0.489]</td></tr>
<tr><td>BW estimate</td><td>3.657|3.657</td><td>3.661|3.661</td></tr>
<tr><td>BW bias</td><td>5.676|5.676</td><td>6.014|6.014</td></tr>
<tr><td>Observations</td><td>17,546|6,928,144</td><td>12,121|3,901,640</td></tr>
<tr><td>Effective observations</td><td>8,081|13,314</td><td>5,540|8,979</td></tr>
<tr><td>[SAP=20]</td><td></td><td></td></tr>
<tr><td>τ</td><td>-0.002</td><td>-0.007</td></tr>
<tr><td>Robust standard error</td><td>(0.008)</td><td>(0.006)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[-0.019,0.014]</td><td>[-0.021,0.002]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.746]</td><td>[0.117]</td></tr>
<tr><td>BW estimate</td><td>6.681|6.681</td><td>5.632|5.632</td></tr>
<tr><td>BW bias</td><td>9.231|9.231</td><td>8.314|8.314</td></tr>
<tr><td>Observations</td><td>59,373|6,886,317</td><td>39,831|3,873,930</td></tr>
<tr><td>Effective observations</td><td>28,513|57,954</td><td>16,067|31,124</td></tr>
<tr><td>[SAP=30]</td><td></td><td></td></tr>
<tr><td>τ</td><td>-0.000</td><td>-0.003</td></tr>
<tr><td>Robust standard error</td><td>(0.002)</td><td>(0.003)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[-0.004,0.006]</td><td>[-0.010,0.002]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.741]</td><td>[0.157]</td></tr>
<tr><td>BW estimate</td><td>8.328|8.328</td><td>6.493|6.493</td></tr>
<tr><td>BW bias</td><td>15.519|15.519</td><td>13.157|13.157</td></tr>
<tr><td>Observations</td><td>155,659|6,790,031</td><td>103,832|3,809,929</td></tr>
<tr><td>Effective observations</td><td>83,344|208,948</td><td>45,076|100,344</td></tr>
<tr><td>[SAP=40]</td><td></td><td></td></tr>
<tr><td>τ</td><td>-0.001</td><td>-0.003</td></tr>
<tr><td>Robust standard error</td><td>(0.002)</td><td>(0.003)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[-0.007,0.003]</td><td>[-0.007,0.005]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.510]</td><td>[0.708]</td></tr>
<tr><td>BW estimate</td><td>6.934|6.934</td><td>7.330|7.330</td></tr>
<tr><td>BW bias</td><td>10.365|10.365</td><td>10.756|10.756</td></tr>
<tr><td>Observations</td><td>405,931|6,539,759</td><td>273,484|3,640,277</td></tr>
<tr><td>Effective observations</td><td>177,779|409,295</td><td>134,796|310,857</td></tr>
<tr><td>[SAP=50]</td><td></td><td></td></tr>
<tr><td>τ</td><td>-0.001</td><td>-0.000</td></tr>
<tr><td>Robust standard error</td><td>(0.001)</td><td>(0.001)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[-0.004,0.002]</td><td>[-0.003,0.002]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.404]</td><td>[0.707]</td></tr>
<tr><td>BW estimate</td><td>5.177|5.177</td><td>8.147|8.147</td></tr>
<tr><td>BW bias</td><td>10.654|10.654</td><td>14.193|14.193</td></tr>
<tr><td>Observations</td><td>1,074,196|5,871,494</td><td>696,426|3,217,335</td></tr>
<tr><td>Effective observations</td><td>401,890|783,438</td><td>363,091|806,607</td></tr>
<tr><td>[SAP=60]</td><td></td><td></td></tr>
<tr><td>τ</td><td>0.003</td><td>-0.000</td></tr>
<tr><td>Robust standard error</td><td>(0.001)</td><td>(0.000)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[0.000,0.006]</td><td>[-0.001,0.000]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.038]</td><td>[0.108]</td></tr>
<tr><td>BW estimate</td><td>5.307|5.307</td><td>4.218|4.218</td></tr>
<tr><td>BW bias</td><td>8.670|8.670</td><td>7.252|7.252</td></tr>
<tr><td>Observations</td><td>2,648,073|4,297,617</td><td>1,627,682|2,286,079</td></tr>
<tr><td>Effective observations</td><td>958,591|1,566,660</td><td>458,480|704,755</td></tr>
<tr><td>[SAP=70]</td><td></td><td></td></tr>
<tr><td>τ</td><td>-0.004</td><td>0.001</td></tr>
<tr><td>Robust standard error</td><td>(0.001)</td><td>(0.000)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[-0.007,-0.000]</td><td>[0.001,0.002]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.025]</td><td>[0.000]</td></tr>
<tr><td>BW estimate</td><td>4.809|4.809</td><td>3.836|3.836</td></tr>
<tr><td>BW bias</td><td>8.293|8.293</td><td>6.035|6.035</td></tr>
<tr><td>Observations</td><td>5,383,948|1,561,742</td><td>3,092,537|821,224</td></tr>
<tr><td>Effective observations</td><td>1,169,215|971,368</td><td>453,244|432,539</td></tr>
<tr><td>[SAP=80]</td><td></td><td></td></tr>
<tr><td>τ</td><td>0.003</td><td>-0.001</td></tr>
<tr><td>Robust standard error</td><td>(0.001)</td><td>(0.000)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[0.001,0.009]</td><td>[-0.002,-0.000]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.025]</td><td>[0.004]</td></tr>
<tr><td>BW estimate</td><td>4.300|4.300</td><td>4.675|4.675</td></tr>
<tr><td>BW bias</td><td>8.165|8.165</td><td>7.070|7.070</td></tr>
<tr><td>Observations</td><td>6,776,473|169,217</td><td>3,812,094|101,667</td></tr>
<tr><td>Effective observations</td><td>311,456|145,061</td><td>162,067|86,778</td></tr>
<tr><td>[SAP=90]</td><td></td><td></td></tr>
<tr><td>τ</td><td>-0.009</td><td>0.002</td></tr>
<tr><td>Robust standard error</td><td>(0.003)</td><td>(0.001)</td></tr>
<tr><td>Robust, bias-corrected 95% CI</td><td>[-0.017,0.008]</td><td>[-0.005,0.007]</td></tr>
<tr><td>Robust, bias-corrected p-value</td><td>[0.457]</td><td>[0.735]</td></tr>
<tr><td>BW estimate</td><td>2.769|2.769</td><td>2.968|2.968</td></tr>
<tr><td>BW bias</td><td>5.909|5.909</td><td>5.793|5.793</td></tr>
<tr><td>Observations</td><td>6,942,967|2,723</td><td>3,912,631|1,130</td></tr>
<tr><td>Effective observations</td><td>2,659|1,784</td><td>1,356|744</td></tr>
<tr><td>Property characteristics</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Area FE</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Date FE</td><td>Yes</td><td>Yes</td></tr>
</table>

Notes: This table reports results for our local linear RDD analysis of price and EE-investment discontinuities at the following placebo thresholds: SAP scores that end on zero (10, 20, 30, etc.). Column (1) presents results for the price analysis using Specification 2. Column (2) presents results for the EE-investment analysis using Specification 4. Bias-corrected p-values are reported in brackets. Property characteristics include property type, number of rooms, and tenure; area fixed effects (FE) include regions and urban classification; date FE include sale year and sale quarter.

Appendix C: Costs and Benefits of EE investments

As part of our discussion of agent sophistication in Section VII.A, we explore the EE-investment behavior of sellers in more detail. To this end, Table 9 presents back-of-the-envelope estimates of the costs and benefits of retrofitting for vendors who invest before a sale. Recall that Table 9 is structured as follows: Column (1) reports the actual extent of retrofitting by measuring the average SAP-score increase within the subsample of transactions that saw investments. Columns (2) to (4) contain estimates of the *private* costs and benefits that come with the type of retrofitting documented in Column (1). Finally, Column (5) provides an estimate of the *social* benefits from the same EE improvements in the form of CO_2 emission savings. This appendix provides details on these calculations.

To keep our calculations tractable, we focus on the following subsamples: First, we restrict the analysis to the rating bands for which reliable price discontinuities can be detected: the four lowest thresholds G–F, F–E, E–D, and D–C. Second, instead of estimating costs and benefits over the entire domain of SAP scores, we zoom in on properties whose *initial* SAP score is just to the left of an energy-rating band (i.e., those with SAP scores of 20, 38, 54, and 68). In line with the spirit of our RDD analysis, this will reflect the marginal incentives that exist at the rating-band thresholds. For each of these transactions, we calculate the SAP increase due to retrofitting as the difference between the final and the initial SAP score. Threshold-specific sample means of these values are presented in Column (1) of Table 9 and form the basis of our cost-benefit analysis. The average gain in SAP scores decreases as we move to more energy-efficient properties. For example, properties with an initial SAP score of 20 (i.e., just to the left of the G–F threshold) experience an average increase of 29.2 SAP scores. Properties just to the left of the F–E threshold see their SAP score go up by only 16.8 on average, and so on. This relationship is also visualized in Figure 9.

Column (2) of Table 9 contains estimates of the cost necessary to improve a property's EE by the values reported in Column (1). For this, we consulted relevant websites typically used by homeowners contemplating EE upgrades. As a result, our cost estimates are representative of the information sellers would find online. Some websites, like the UK Green Building Council (ukgbc.org) and The Green Age (www.thegreenage.co.uk), also indicate the potential gain in SAP scores that would arise from specific installations. To give a few examples, replacing an inefficient electric boiler with a more efficient condensing boiler is estimated to cost between £4,000 and £5,000 and would result in an estimated gain of 30 to 40 SAP scores. Approximately 4 SAP points are gained when spending £250 per square meter of window area, and the quoted cost for installing double-glazed windows on an average home is about £4,000 in the UK. Adding insulation to lofts or wall cavities is cheaper and can, depending on the property's size, cost between £350 to £1,000, while triggering an improvement of 5 to 15 SAP scores. The most inexpensive modifications, such as draft-proofing existing doors and windows or replacing CFL with LED bulbs, cost around £50 to £100 and would translate into gains of 1 or 2 SAP scores.

To estimate the gross return of EE investments (reported in Column (3) of Table 9), we take the difference in average market prices between properties with the initial and the post-investment SAP scores. The estimated net return in Column (4) is the difference between Columns (3) and (2). Where this last step involves taking the difference between ranges, the resulting estimate is reported as a range itself, with the lower bound representing the minimum difference and the upper bound representing the maximum difference. Finally, Column (5) of Table 9 reports the estimated CO_2 emission savings that correspond to the gain in SAP scores reported in Column (1). This calculation is made possible by the fact that the estimated annual CO_2 emissions of a property are included in any EPC and, hence, observable to us. To estimate emission savings, we subtract the average CO_2 emissions of properties with the final SAP score from the average emissions of properties with the initial SAP score.