The Impact of Minimum Energy Efficiency Standards on the Private Rental Market

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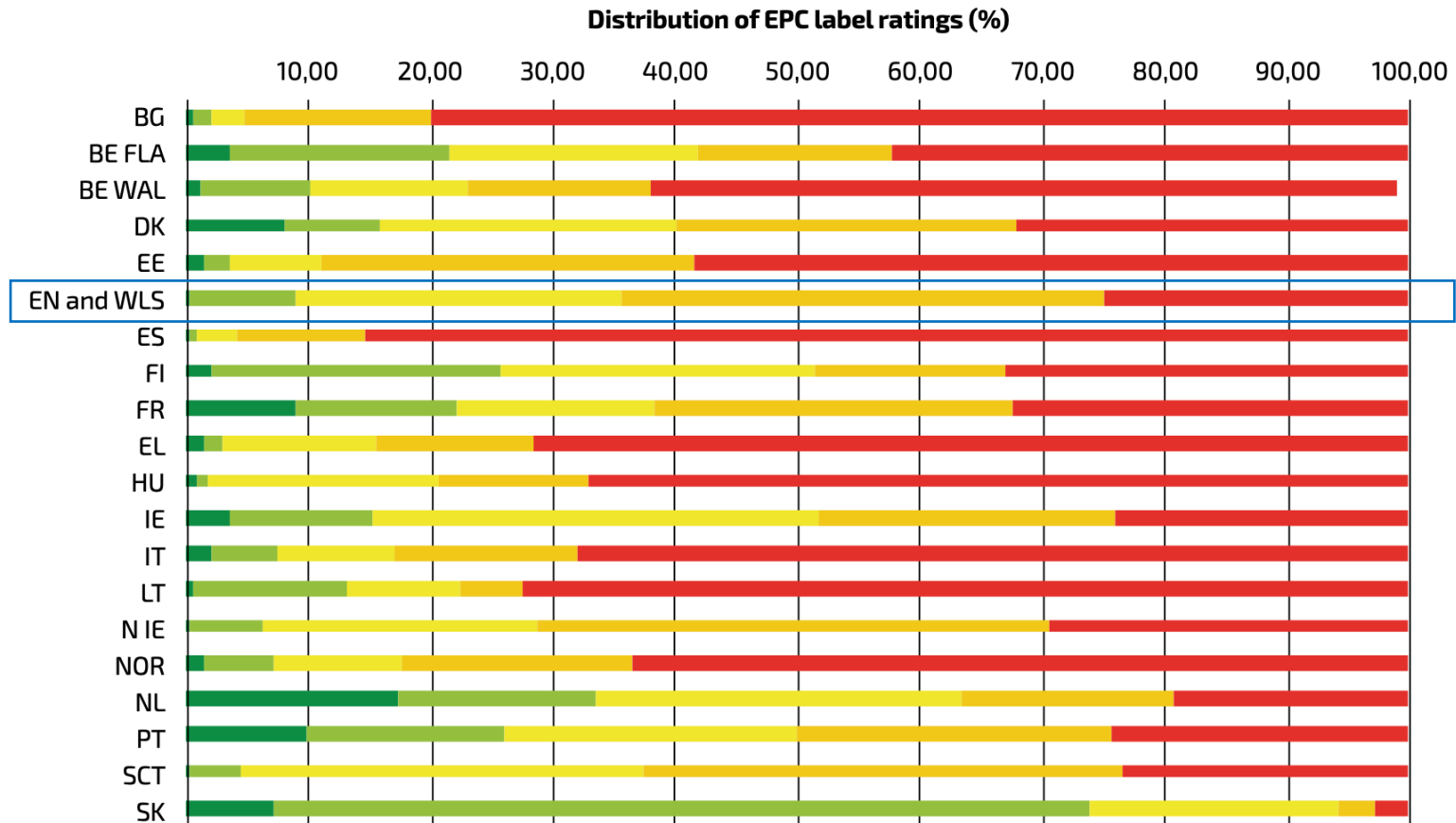
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Research Questions

- To what extent does energy efficiency affect rents in the private rental sector and how has this relationship changed due to the Minimum Energy Efficiency Standard (MEES)?

- Has MEES reached its aim of raising the energy efficiency (EE) levels of the bottom EE performers?

- Has MEES inadvertently contributed to a supply shortage of rental properties?

- Has MEES inadvertently created rent inflation in the private rental sector (PRS), particularly in the more affordable market segment?

Pervasive Lack of Energy Efficiency in EU Housing Markets

Distribution of EPC label ratings (%)

Chart showing distribution of EPC label ratings (%) for: BG, BE FLA, BE WAL, DK, EE, EN and WLS, ES, FI, FR, EL, HU, IE, IT, LT, N IE, NOR, NL, PT, SCT, SK

Legend:
- Share of dwellings with label A
- Share of dwellings with label B
- Share of dwellings with label C
- Share of dwellings with label D
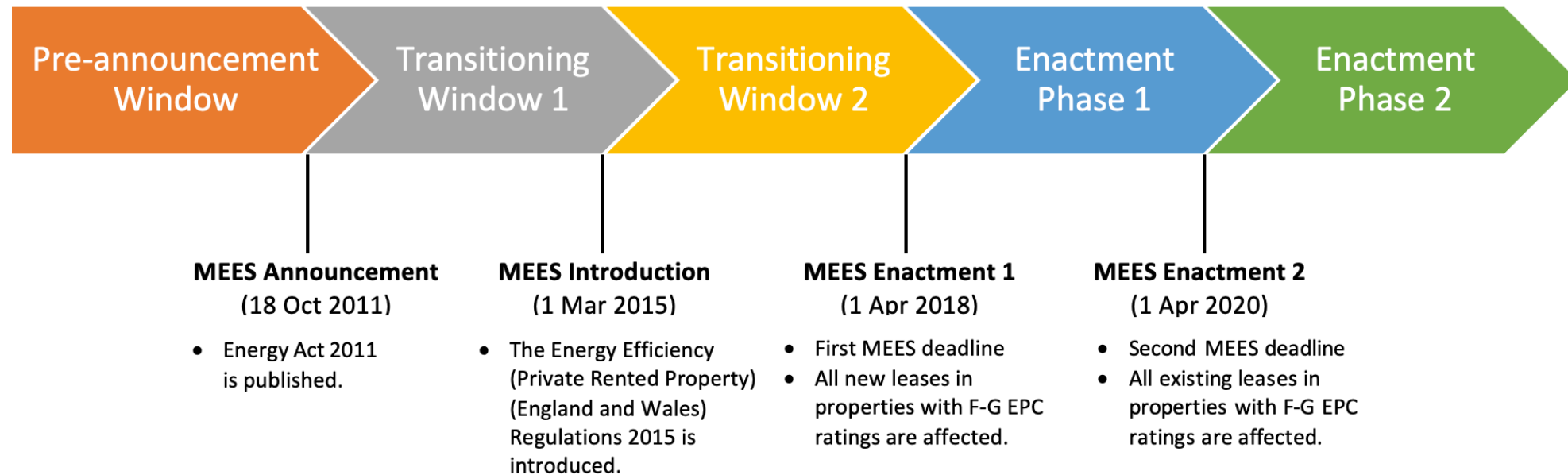- Share of dwellings with label >D

- Based on current Energy Performance Certificate (EPC) data.
- 97% of residential buildings built before 2010 in EU need retrofitting to comply with carbon emission reduction goals.
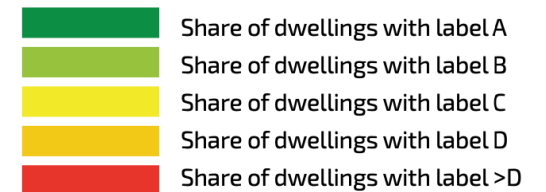
Note: Definitions of EPC bands vary across countries due to national differences in implementing the EPBD

Source: BPIE, 2020

Timeline of MEES for domestic dwellings in England and Wales

Pre-announcement Window	Transitioning Window 1	Transitioning Window 2	Enactment Phase 1	Enactment Phase 2

MEES Announcement
(18 Oct 2011)

- Energy Act 2011 is published.

MEES Introduction
(1 Mar 2015)

- The Energy Efficiency (Private Rented Property) (England and Wales) Regulations 2015 is introduced.

MEES Enactment 1
(1 Apr 2018)

- First MEES deadline
- All new leases in properties with F-G EPC ratings are affected.

MEES Enactment 2
(1 Apr 2020)

- Second MEES deadline
- All existing leases in properties with F-G EPC ratings are affected.

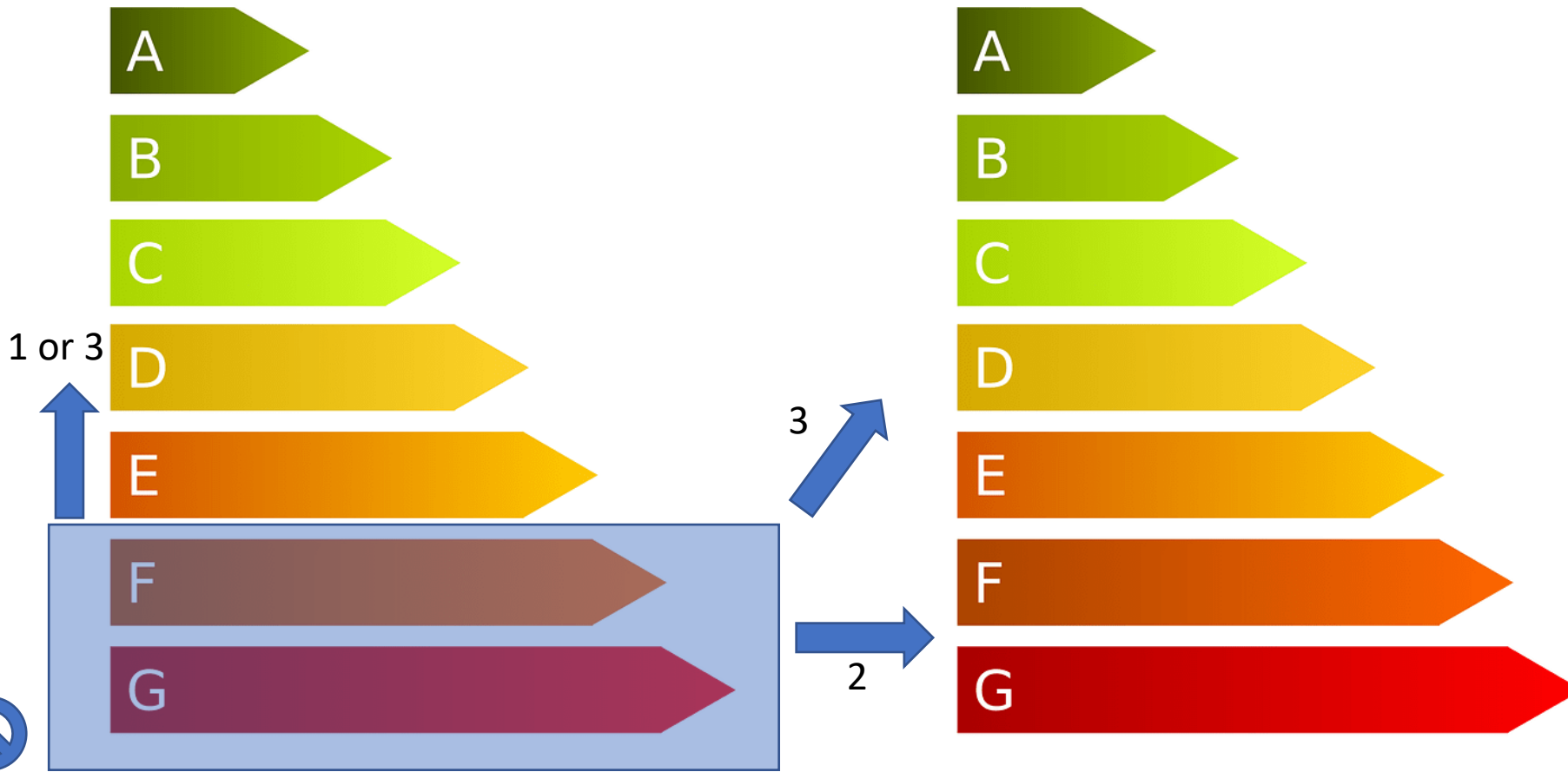# Possible Landlord Reactions to MEES Regulations

Rental Market

Owner Occupier Market
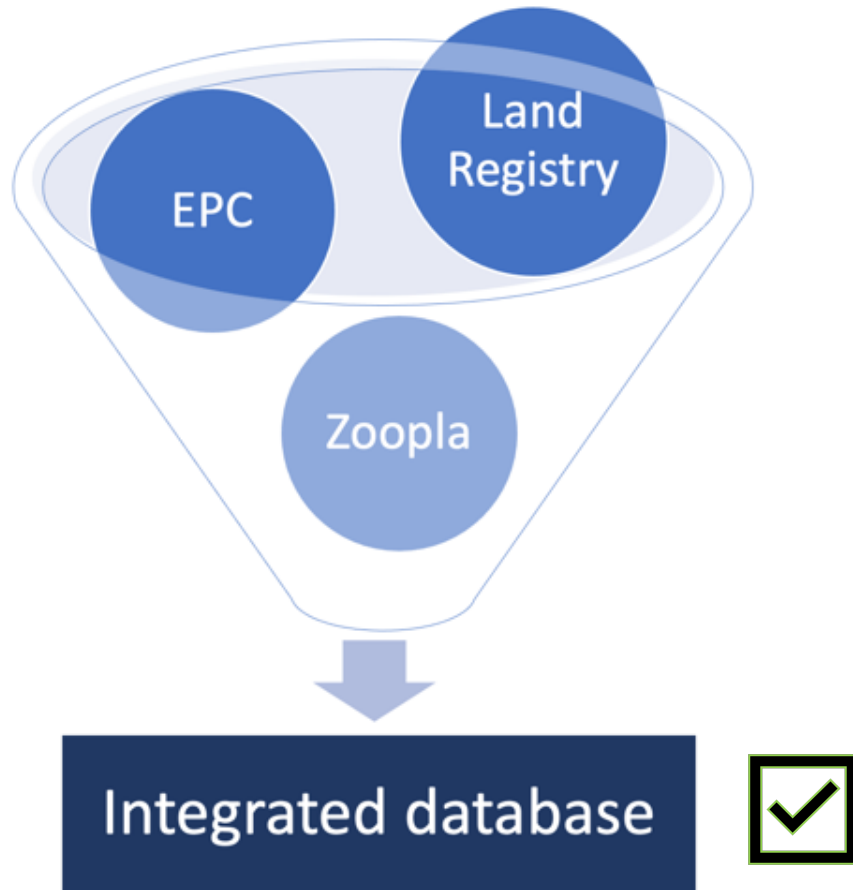
Option 1: Upgrade and continue leasing

Option 2: Sell into OO market

Option 3: Upgrade and sell into PRS or OO markets

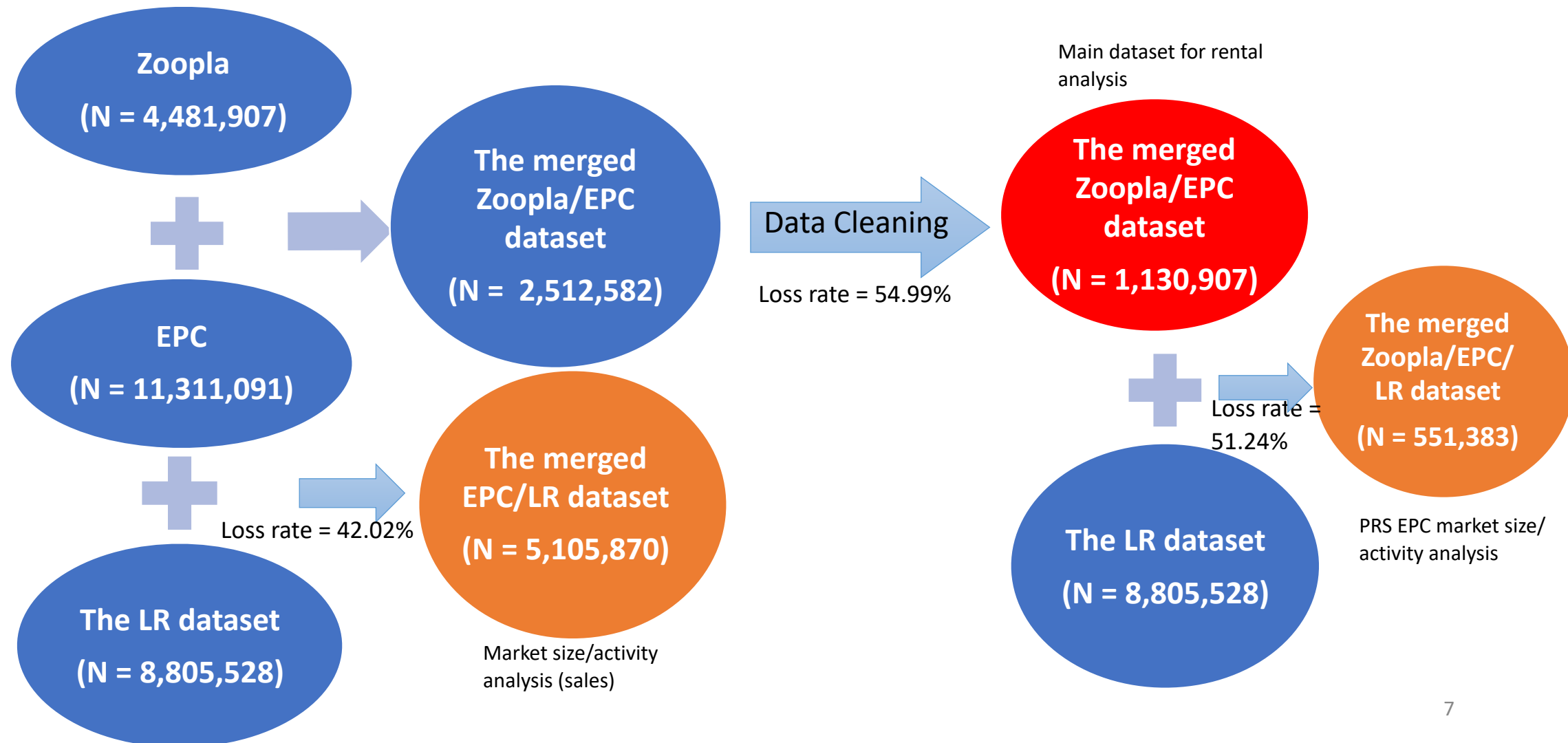*Option 4:* Apply for exemption (if applicable)

Updating Data and Matching Process 2023

- Zoopla: Zoopla/Whenfresh private rental sector data, rents and property attributes
- LR: Land Registry Price Paid database
- EPC: Register of EPC information including property characteristics (DCLG)

Sample Size of the Constituent Parts of the Database (Study period: 2014-2021)

Zoopla
(N = 4,481,907)

EPC
(N = 11,311,091)

The LR dataset
(N = 8,805,528)

The merged Zoopla/EPC dataset
(N = 2,512,582)

Data Cleaning

Loss rate = 54.99%

The merged EPC/LR dataset
(N = 5,105,870)

Loss rate = 42.02%

Market size/activity analysis (sales)

Main dataset for rental analysis

The merged Zoopla/EPC dataset
(N = 1,130,907)

The LR dataset
(N = 8,805,528)

Loss rate = 51.24%

The merged Zoopla/EPC/LR dataset
(N = 551,383)

PRS EPC market size/activity analysis

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Summary statistics of key variables in the Zoopla/EPC dataset
(N = 1,130,907)

Continuous variables	Mean	Std. Dev.	Min	Max
Rental price	318.6018	184.0912	91	1,385
Total floor area	73.4660	34.0607	10	1,961
Energy efficiency rating	63.8433	12.0377	1	131

Categorical variables	Categories	Frequency	% of total
Property type	Bungalow	22,694	1.99%
	Detached	60,028	5.26%
	Flat	654,792	57.42%
	Semidetached	126,894	11.13%
	Terraced	275,876	24.19%
Construction age bands	Before 1900	162,811	14.40%
	1900-1929	213,705	18.90%
	1930-1949	139,876	12.37%
	1950-1966	106,490	9.42%
	1967-1975	96,720	8.55%
	1976-1982	57,633	5.10%
	1983-1990	95,535	8.45%
	1991-1995	50,510	4.47%
	1996-2002	80,611	7.13%
	2003-2006	86,356	7.64%
	2007 onwards	40,660	3.60%
Number of habitable rooms	0	1	0%
	1	11,439	1.01%
	2	228,834	20.23%
	3	389,136	34.41%
	4	225,813	19.97%
	5	165,702	14.65%
	5+	109,982	9.73%
Energy Efficiency Band	A	102	0.01%
	B	56,132	4.96%
	C	380,045	33.61%
	D	481,794	42.60%
	E	178,750	15.81%
	F	27,264	2.41%
	G	6,820	0.60%

Difference-in-Difference Model Specification

$$\text{Log } Rent_{i,g,t} = \gamma_g + \beta X_i + c L_{i,t} + \lambda Phase_t + \delta D_{g,t} + \boxed{?} Phase_{g,t} * D_{g,t} + \varepsilon_{i,g,t}, \tag{1}$$

Log $Rent_{i,g,t}$ is the achieved rent associated with property i in group g (either the treatment or control group) for a lease signed at time t

γ_g represents the combined effects of time-invariant characteristics

$X_{i,}$ is a vector of building-level hedonic characteristics such as age, total floor area and location

$L_{i,t}$ is is a vector of lease/unit-level characteristics such as size of the rental unit and transaction dates.

$Phase_{g,t}$ represents indicator variables that indicate the time period in which the rental transaction occurs.

$D_{g,t}$ is an indicator that takes the value of zero for the control group and the value of one for the treatment group, and the parameter δ is the difference in rents between these groups.

$Phase_{g,t} * D_{g,t}$ is an interaction term that accounts for different growth rates in rent between the control group and treatment group.
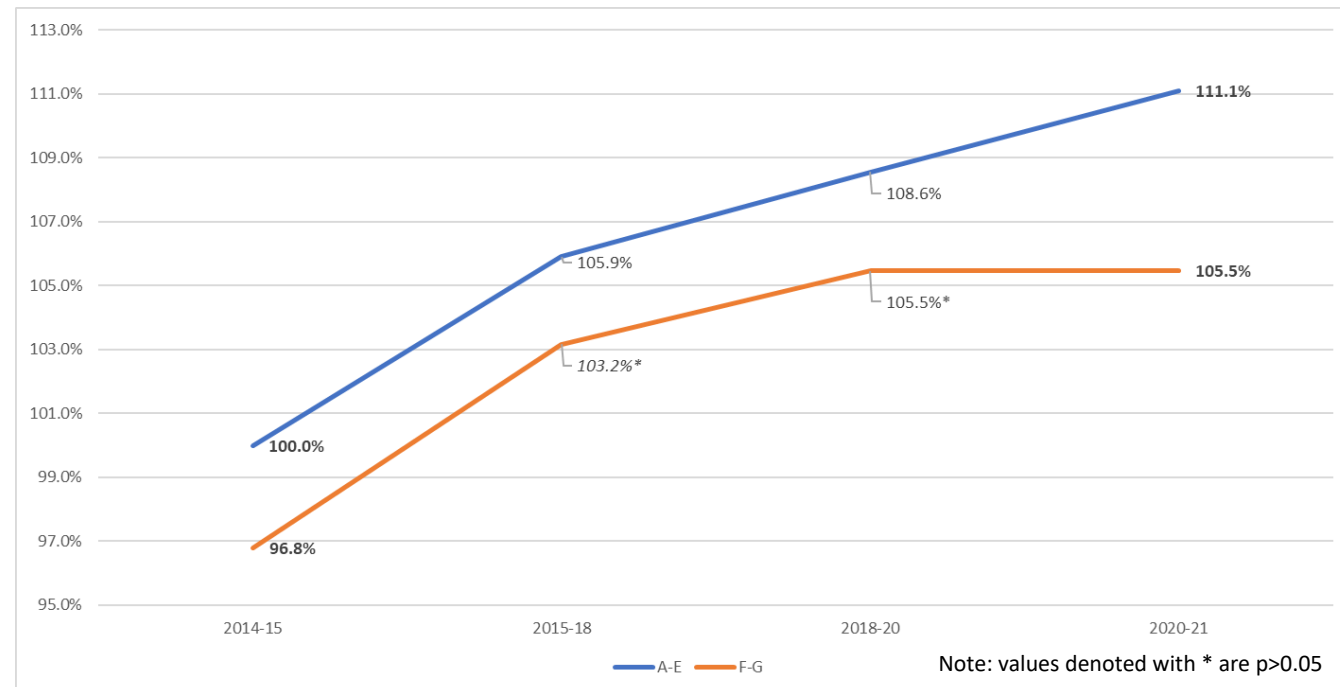
Impact of MEES on the PRS

Ln (Rent in GBP)	(1) F-G rated and A-E rated properties	(2) E rated and A-D rated properties	(3) D-E rated and A-C rated properties
Treatment group	**-0.0322***	**-0.0195***	**-0.0169***
Phase 1 (Jan 2014 – Feb 2015)	Reference	Reference	Reference
Phase 2 (Mar 2015 – Mar 2018)	0.0591***	0.0585***	0.0555***
Phase 3 (Apr 2018 – Mar 2020)	0.0856***	0.0851***	0.0814***
Phase 4 (Apr 2020 – Dec 2021)	0.111***	0.109***	0.0986***
Treatment group* Phase 1	**Reference**	**Reference**	**Reference**
Treatment group* Phase 2	**0.00476**	**0.00308***	**0.00599***
Treatment group* Phase 3	**0.00126**	**0.000667**	**0.00673***
Treatment group* Phase 4	**-0.0242***	**0.0105***	**0.0211***
Ln (total floor area)	0.369***	0.373***	0.373***
Number of habitable rooms	0.0273***	0.0293***	0.0293***
Bungalow	Reference	Reference	Reference
Detached	0.0155***	0.00953***	0.00941***
Flat	-0.231***	-0.229***	-0.229***
Semidetached	-0.0518***	-0.0552***	-0.0554***
Terraced	-0.102***	-0.105***	-0.105***
Built 1900-1929	Reference	Reference	Reference
Built 1930-1949	0.00241***	0.000267	0.000608
Built 1950-1966	-0.00525***	-0.00805***	-0.00745***
Built 1967-1975	-0.00381***	-0.00700***	-0.00636***
Built 1976-1982	0.00399***	0.00141	0.00198*
Built 1983-1990	0.0155***	0.0136***	0.0141***
Built 1991-1995	0.0292***	0.0265***	0.0270***
Built 1996-2002	0.0667***	0.0627***	0.0619***
Built 2003-2006	0.0867***	0.0819***	0.0804***
Built 2007 onwards	0.0957***	0.0911***	0.0898***
Built before 1900	0.00952***	0.0111***	0.0108***
Constant	4.084***	4.065***	4.074***
Location (Postcode district) Control	Yes	Yes	Yes
Observations	1,130,907	1,096,823	1,096,823
R-squared	0.835	0.836	0.836

Data: Zoopla/Whenfresh, CDRC, 2022

1. The rental prices for F/G rated properties experienced a significant decrease in Phase 4 (2020-21)

2. Above-threshold properties in the EPC E band and/or D show a moderate increase above market average in rental price growth rate in response to MEES.

3. It is uncertain if the excess rental growth rate of D/E is indeed due to MEES through supply constraints, upgrading of properties or other factors

Model (1): rental index for treatment and control groups

Note: values denoted with * are p>0.05

Impact of MEES on the Affordable PRS Market Segment

Ln (Rent in GBP)	(1) F-G rated and A-E rated properties	(2) E rated and A-D rated properties	(3) D-E rated and A-C rated properties
Treatment group	**-0.0207***	**-0.0135***	**-0.00588***
Phase 1 (Jan 2014 – Feb 2015)	Reference	Reference	Reference
Phase 2 (Mar 2015 – Mar 2018)	0.0477***	0.0481***	0.0496***
Phase 3 (Apr 2018 – Mar 2020)	0.0811***	0.0811***	0.0816***
Phase 4 (Apr 2020 – Dec 2021)	0.125***	0.124***	0.127***
Treatment group* Phase 1	**Reference**	**Reference**	**Reference**
Treatment group* Phase 2	**-0.00563****	**-0.00226**	**-0.00307****
Treatment group* Phase 3	**0.00118**	**-0.000789**	**-0.00101**
Treatment group* Phase 4	**0.000128**	**-0.000859**	**-0.00329****
Ln (total floor area)	0.157***	0.159***	0.158***
Number of habitable rooms	0.00655***	0.00723***	0.00726***
Bungalow	Reference	Reference	Reference
Detached	-0.0171***	-0.0162***	-0.0165***
Flat	-0.194***	-0.193***	-0.194***
Semidetached	-0.0468***	-0.0483***	-0.0486***
Terraced	-0.105***	-0.107***	-0.107***
Built 1900-1929	Reference	Reference	Reference
Built 1930-1949	0.0222***	0.0199***	0.0203***
Built 1950-1966	0.0397***	0.0373***	0.0379***
Built 1967-1975	0.0529***	0.0504***	0.0511***
Built 1976-1982	0.0463***	0.0435***	0.0443***
Built 1983-1990	0.0494***	0.0464***	0.0473***
Built 1991-1995	0.0630***	0.0596***	0.0606***
Built 1996-2002	0.0927***	0.0883***	0.0879***
Built 2003-2006	0.114***	0.109***	0.107***
Built 2007 onwards	0.109***	0.104***	0.102***
Built before 1900	0.00240***	0.00313***	0.00288***
Constant	4.726***	4.724***	4.727***
Location (Postcode district) Control	Yes	Yes	Yes
Observations	376,917	361,842	361,842
R-squared	0.626	0.626	0.626

Data: Zoopla/Whenfresh, CDRC, 2022

Definition:

Affordable segment= lowest tercile of PRS rent distribution

Results:

1. The results indicate a minimal but significant decline in rental price growth for F-G rated properties, as compared to A-E rated properties, during the period of 2015-2018

2. E rated properties did not experience any adverse policy impact on the growth rate of rental prices compared to the A-D group throughout the study period, whereas D-E rated properties experienced a negative impact on rental prices relative to the A-C group during Phases 2 and 4.

3. Overall, MEES does not seem to have had a sizable effect on market rents in the affordable market segment.

# Sales Transactions in the Residential Market

Distribution of Property Sales Recorded in the LR Price Paid Dataset

Time	Owner-occupied	Private Rent	Social Rent	Total
2014	578,506 (88.64%)	69,549 (10.66%)	4,607 (0.71%)	652,662
2015	583,614 (88.02%)	74,455 (11.23%)	5,007 (0.76%)	663,076
2016	579,708 (87.49%)	77,227 (11.65%)	5,694 (0.86%)	662,629
2017	579,530 (87.87%)	73,946 (11.21%)	6,031 (0.91%)	659,507
2018	564,522 (87.42%)	75,228 (11.65%)	6,004 (0.93%)	645,754
2019	407,018 (87.40%)	54,151 (11.63%)	4,531 (0.97%)	465,700
2020	491,263 (87.76%)	63,095 (11.27%)	5,410 (0.97%)	559,768
2021	694,357 (87.15%)	95,041 (11.93%)	7,376 (0.93%)	796,774
Total	4,478,518 (87.71%)	582,692 (11.41%)	44,660 (0.87%)	5,105,870

The observed trends do not suggest a large-scale shift of privately rental properties into the owner-occupier or other housing market segments, either in anticipation of the MEES regulations or throughout the implementation phases.

Sales Transactions in the PRS Market

Distribution of Sales Transactions for PRS Rental Properties (N = 551,383)
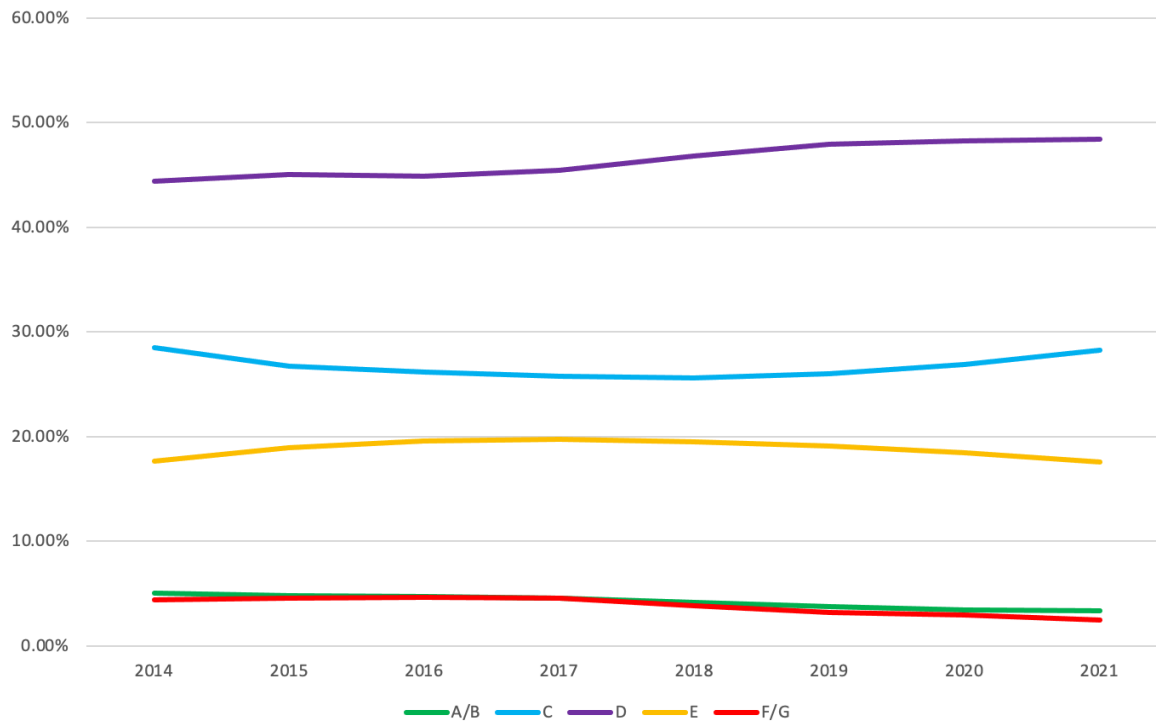
Percentage change in EPC bands of sold PRS properties compared to the previous year
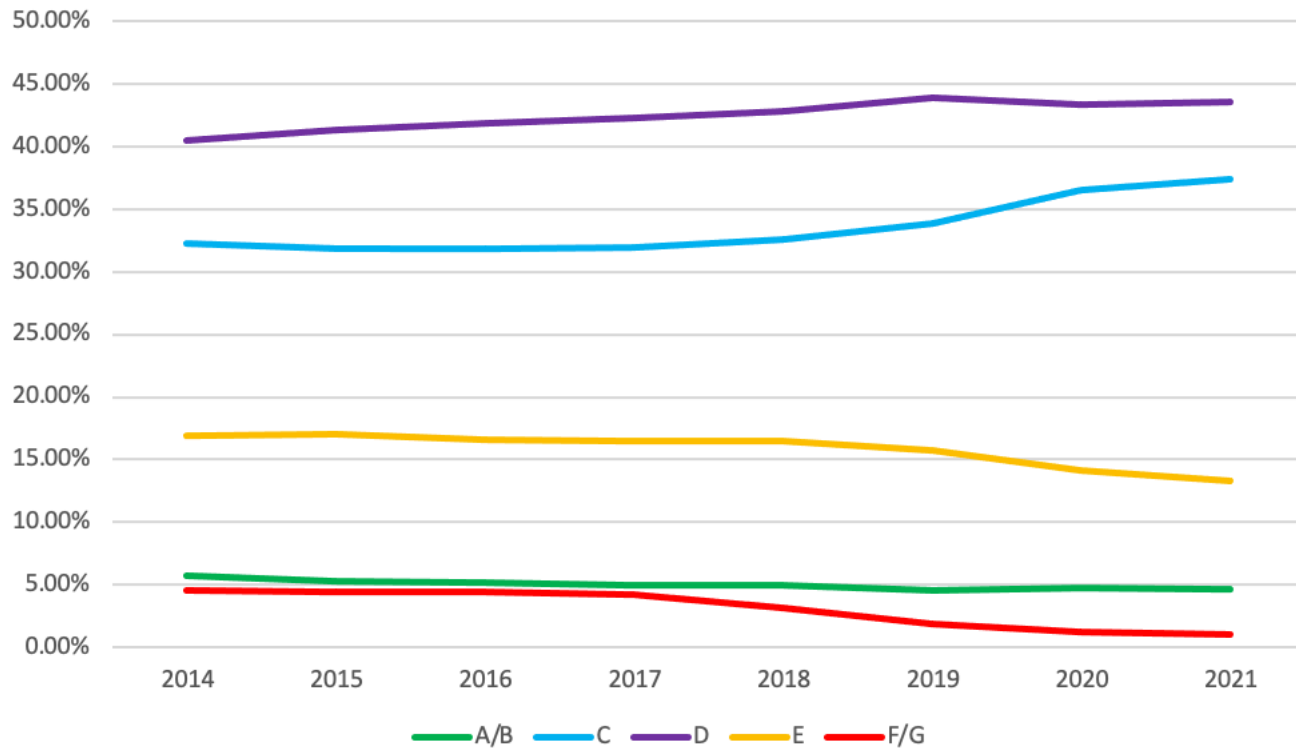
Year	Band A/B	Band C	Band D	Band E	Band F/G
2014-15	-0.23%	-1.77%	0.65%	1.22%	0.12%
2015-16	-0.06%	-0.56%	-0.16%	0.65%	0.13%
2016-17	-0.22%	-0.42%	0.51%	0.21%	-0.08%
2017-18	-0.34%	-0.09%	1.42%	-0.25%	-0.73%
2018-19	-0.40%	0.35%	1.12%	-0.43%	-0.63%
2019-20	-0.32%	0.92%	0.32%	-0.65%	-0.28%
2020-21	-0.10%	1.31%	0.16%	-0.87%	-0.49%

The proportion of F/G rated PRS properties remained relatively stable in the selling market throughout the study period.

PRS properties rated as Bands C and D have higher level of selling market activity after 2018.

Lease Transactions in the PRS Market

Distribution of Lease Transactions for PRS Rental Properties (N = 1,096,389)

Percentage change in EPC bands of leased PRS properties compared to the previous year

Year	Band A/B	Band C	Band D	Band E	Band F/G
2014-15	-0.44%	-0.44%	0.81%	0.21%	-0.14%
2015-16	-0.10%	0.02%	0.55%	-0.44%	-0.03%
2016-17	-0.14%	0.05%	0.42%	-0.15%	-0.18%
2017-18	-0.05%	0.61%	0.58%	-0.01%	-1.13%
2018-19	-0.38%	1.31%	1.03%	-0.75%	-1.22%
2019-20	0.15%	2.66%	-0.54%	-1.63%	-0.64%
2020-21	-0.10%	0.92%	0.20%	-0.78%	-0.24%

Prior to 2018, the proportion of F/G rated PRS properties remained stable. However, since the initial implementation of MEES in 2018, there has been a noticeable decrease in F/G rated properties.

PRS properties rated as Bands C and D exhibit higher leasing activity after 2018, similar to sales transactions.

Data: Zoopla/Whenfresh, CDRC, 2022

Key Takeaways

- MEES is associated with a slight decline in rental price growth for F-G rated properties, as compared to A-E rated properties, particularly in the most recent period

- An increase in rental price growth for above-threshold properties in the EPC E band and/or D is detected in the wake of MEES implementation.

- No evidence is found for a significant sell-off of rental properties into the owner-occupied market or vice versa.

- The share of PRS properties in EPC bands F and G on overall sales transactions remained stable but their share in lease transactions fell (as expected).

- PRS properties in EPC bands C and D exhibit higher trading frequency in both lease and sale transactions compared to properties in other EPC bands.

- Caveat: parallel trends assumption does not hold in most tests due to the phased nature of introducing MEES. Any effects of MEES that were already priced into the market prior to 2014 are hence not reflected in this analysis.

Thank you!

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