

# Offices scarce but housing scarcer: Estimating the premium for London office conversions

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## Abstract

British planning is among the most restrictive in the world and has been restrictive for longer than elsewhere. Restrictive regulation substantially increases the costs of office space and, especially in London, increases the house prices. Partly in response to the crisis in housing supply an automatic right to convert offices to residential use was introduced in 2013. Some major office locations in central London and Manchester were excluded from this relaxation. We exploit the resulting boundary discontinuities to estimate the impact on prices of the new right to convert offices to housing. Using a panel data set of some 2,000 office transactions between 2009 and 2016, we find a significant increase in the price of offices eligible for this automatic conversion: our central estimate is a premium of 50%. This result demonstrates that London's restrictions on the supply of housing were substantially more severe than those on offices—already estimated to have been tighter than anywhere else in Europe. This article contributes to the small literature analyzing the restrictive effect of regulation on offices and is, as far as we are aware, the first analyzing regulatory restriction on offices relative to housing.

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## 1 | INTRODUCTION

This article examines the impact on office prices of the granting, in 2013, of new rights to convert office buildings to housing without the need to seek explicit permission. The background to this was, and is, the severe and longstanding constraint on the supply of housing in Britain in general and London, in particular. Constraints on the supply of housing, indeed all development, derive from the very restrictive system of land use regulation operational in England and Wales since the 1947 Town and Country Planning Act but tightening from 1955 with the introduction of the first Green Belt around London. That covered an area extending from the North Sea to Aylesbury, 60 km North West of London, effectively preventing all new development over the whole area.

Cheshire and Sheppard (2002), had already shown that in more restrictive communities in South East England these regulatory restrictions produced a substantial net welfare loss, estimated to have been equivalent to an income tax rate of nearly 4%,<sup>1</sup> with the costs mainly deriving from “containment policies.” Their analysis has been updated and supplemented by further studies such as those by Hilber and Vermeulen (2016) and Koster and Zabihidan (2019). Both these confirm the basic finding that Britain’s restrictive planning policies constrain the supply of land and of housing, substantially raising its price and, in the case of the Koster and Zabihidan study, as with that of Cheshire and Sheppard (2002), reduce welfare.

Underpinning the English system is the separation of the right to “develop” from other rights associated with freehold tenure. The 1947 Act expropriated these development rights so they were controlled by the state. This state control of development is exercised by political committees of local government (Local Planning Authorities—LPAs) making discretionary decisions. So, unlike Zoning in the United States or the European Master Planning system, all decisions concerning significant development proposals are individual and, within the framework set by legislation, political and unpredictable. The English system relies on legally defined “use classes” and changing any property’s use class is legally defined as “development” and so requires specific permission from the LPA. The result is that building on a previously undeveloped site or converting an office into apartments are treated equally: both require a formal proposal and explicit permission.

There are national planning guidelines, such as those set out in the National Planning Policy Framework (DCLG, 2012a) or policies identifying “Green Belts,” National Parks, Areas of Outstanding Natural Beauty or Sites of Special Scientific Interest. In these areas all development is effectively prohibited. Extensive Green Belts in particular restrict the supply of land around major cities where demand is highest (see Cheshire, 2018). Most policies, however, including Green Belt designation, are at the discretion of the lowest tier of government, the Local Authority.

The extent to which LPAs refuse proposals for development is a powerful influence restricting supply. Hilber and Vermeulen (2016) concluded that if the South East (the most tightly regulated English region) had accepted the same proportion of proposals as the North East of England (less regulated, but still restrictive by world standards), house prices in the South East would have been some 30% lower in 2015. Moreover, these are lower bound estimates for several reasons, including the fact that restrictions were already affecting prices in their base year, 1974. Overall real house prices—but not real incomes—have grown faster in the United Kingdom over the last 40 years than in any other OECD country (Hilber & Vermeulen, 2016).

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<sup>1</sup> See Cheshire & Sheppard (2002), Table 6.

Given that the planning system operates on the basis that all development requires explicit permission from the LPA then the opportunity to develop without permission might be expected to have a significant impact. This is what a change introduced in 2013 (DCLG, 2013a) did. It permitted the conversion of offices, in defined areas, into housing as an automatic right, introducing a new “permitted development right” (PDR). While this new PDR applied to most of the country, helpfully for our study zones in central London and Manchester, traditional office centres, were excluded. This makes it possible to estimate with some precision the impact the new PDR had on the price of offices.

Why is this of interest? Previous research (Cheshire & Dericks, 2020; Cheshire & Hilber, 2008) has already shown that British land-use planning does not just substantially increase the price of housing and reduce net welfare but the supply restrictions it imposes on office development also substantially raise the price of offices. Cheshire & Hilber (2008) estimated that the mean Regulatory Tax (measured as the percentage mark-up of price over construction cost per unit area) for the period 1999 to 2005 was between 330 and 810% in the prime London office zones (to which the PDR was not applied). Some way behind London, Frankfurt and Stockholm were the two next most restrictive European office centres. In contrast to London, the estimated Regulatory Tax in the comparatively unrestricted contexts of New York or Brussels, were 50 and 68%, respectively. Most relevant for the present results, in the London Borough of Hammersmith, an area to which the PDR, when introduced in 2013 did apply, the Regulatory Tax had still been estimated at 220%. This implies a substantial restriction on the supply of office space (see Cheshire & Hilber, 2008; Table 2) in even this subsidiary London office location.

In what follows, we apply a spatial difference in difference approach to estimate the price premium for office buildings entitled to the PDR. To do this, we use data for some 2,000 office sales over the period 2009 to 2016, bridging the introduction of the PDR. Before the introduction of the PDR, we observe no difference in price trends for the entitled and nonentitled offices but we find that the new ability to convert offices to housing without need for planning permission increased the price of such “entitled” offices by some 50%.

The estimated 50% premium conferred on offices eligible to convert to housing by the new PDR demonstrates, therefore, that while the supply of office space in London might have been severely restricted by the planning system, it was very much less restricted than was the supply of housing. Moreover, it strongly suggests that it was primarily planning restrictions which caused the higher price of housing since the change essentially affected the ability to bypass those restrictions. This has to be somewhat qualified, however, since the housing created in the former offices to which the PDR applied did not have to conform to the same design requirements that would have applied had standard planning procedures been in operation. This potential source of cost reduction has to be balanced against the costs incurred to convert offices to housing.

There has been a growing literature demonstrating the impact of regulatory constraints on land prices and housing affordability over the past 30 years. This is not just documented for Britain but also in the United States, especially on the East and West coasts (Albouy & Ehrlich, 2018; Glaeser *et al.*, 2005; Turner *et al.*, 2014; or Quigley & Raphael, 2005). The impact in Britain appears to be both bigger and more pervasive, however. Restrictions were imposed significantly earlier than elsewhere, they have been tighter and they have restricted the supply of all categories of real estate. In Britain, building heights were absolutely restricted from 1890 with only a partial easing in 1956 (see Cheshire & Dericks, 2020), the outward growth of all major cities was stopped when Green Belts were imposed in 1955 and new retail development was prevented outside central city sites from 1996. Together these make an analysis of the impacts of regulatory restriction in Britain more widely significant.

Housing is both the most important form of real estate (by both value and extent) and the most studied. In Britain, the impact on housing prices of restrictive regulation has been documented at least since 1989 (Cheshire & Sheppard, 1989). Housing still accounts for the great majority of studies. Studies of its impact on the office sector, or other real estate sectors, are far fewer. Those that have focused on other sectors have shown substantial impacts on costs (Cheshire & Hilber, 2008), form (Cheshire & Dericks, 2020) and severely reduced total factor productivity in the super-market sector (Cheshire *et al.*, 2015). To date, the documentation of this combination of impacts across multiple real estate sectors and the severity of their economic impacts on both welfare and total factor productivity appears to be confined to Britain. The findings reported here add to this evidence showing that the economic effects of restrictive land-use regulation in Britain are extreme and spread to more sectors of real estate than is the case elsewhere in the world. In terms of anticipating the regulatory burden of restrictive land use, Britain appears to be the canary in the coal mine. Where Britain is today, because of the slow cumulative effects of regulatory restriction, other countries may be in the future. And, so far as we are aware this study is also the first to estimate the comparative incidence of regulatory restrictions across real estate sectors.

The article is structured as follows: we start by explaining in more detail how the British planning system works and how, within this system, the PDRs to convert some office structures to residential use, work. We then define and describe the data used. The next sections discuss some theoretical considerations and our methodology and then set out the model we test. Section VI describes the main results followed by a section describing some of the robustness tests and alternative specifications we ran. Section VIII concludes.

## 2 | THE BRITISH PLANNING SYSTEM: PERMITTED DEVELOPMENT RIGHTS

The British planning system differs from the rules-based systems commonly implemented elsewhere,<sup>2</sup> such as the USA's zoning system or continental Europe's Master Planning system. In Britain, the Town and Country Planning Act of 1947 expropriated landowners' right to develop, redevelop, or change the legal use of the land or buildings they owned without the explicit approval of the state (Evans & Hartwich, 2005). The probability that any application to develop will be approved varies systematically across the country (Hilber & Vermeulen, 2016). If a project is rejected this can be appealed in a quasi-judicial process first to the Planning Inspectorate and ultimately to the government minister responsible for the planning system. Thus, all decisions about development are uncertain because they are political decisions, so subject to lobbying and the personal tastes or prejudices of local representatives: moreover, only a minority of LPAs in fact have an up to date local plan and such plans are not binding (see Cheshire & Carozzi, 2019). So not only are all decisions uncertain but they are also gameable. Appeals or lobbying involve further investment of time, resources, and money and there is no guarantee of success. This introduces

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<sup>2</sup> British-style discretionary systems have been exported to some countries formerly dependent on the UK. New Zealand's planning system, for example, embodies many of the same features and generates similarly unaffordable housing. Housing in Auckland (surrounded by an extensive containment or green belt zone) competes to be the most unaffordable in the world (Cox & Pavletich, 2019). India similarly, separates ownership of land from how, and whether, that land can be developed and imposes similar rigid height restrictions in its major cities to those in London (Bertaud & Brueckner, 2005) and case-by-case, politically discretionary decision making on development proposals.

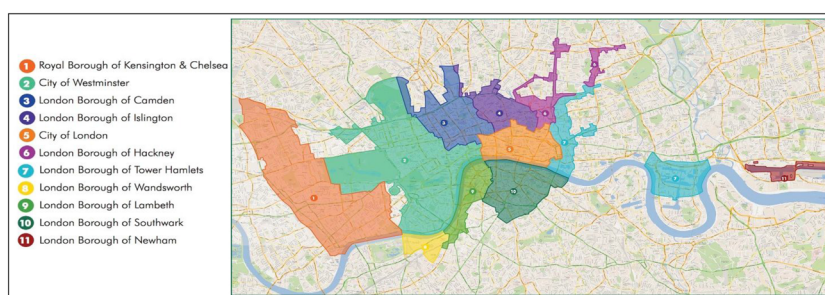


FIGURE 1 All exemption zones [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

additional risk and uncertainty to the development process: risks which further reduce housing supply (Mayo & Sheppard, 2001) and also of other types of buildings.

PDRs refer to those changes between use classes that Parliament permits as a right. Such changes of use, therefore, do not need individual project approval. In January 2013, (DCLG, 2013a), the Government announced the introduction of a new PDR allowing change of use from office<sup>3</sup> to residential (Smith, 2015). The rights were initially temporary,<sup>4</sup> for a period of 3 years from May 30th 2013 (CBRE Planning, 2013). They were applicable across England but fortunately for this article there were areas of exemption, notably in some specific areas of London and Manchester deemed to be key office locations. To improve our estimates of the impact the new PDR had on values, we focus just on exempt and entitled buildings in central London, thereby improving likely matching and reducing, so far as possible, the potential for geographical factors to skew results.

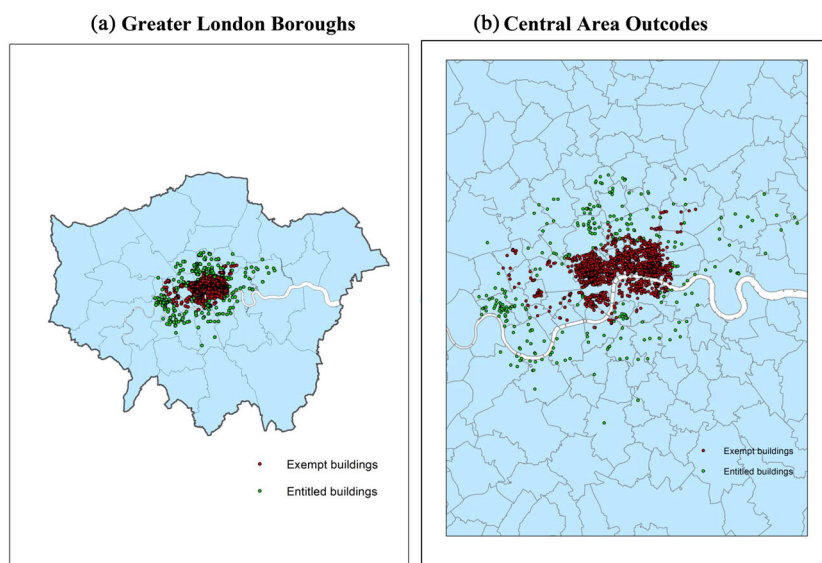
London's exempt areas where the PDRs did not apply are shown in Figure 1.<sup>5</sup> These exempt areas followed idiosyncratic boundaries and were supposed to protect selected highly agglomerated commercial office clusters and to prevent the loss of core office stock in prime markets. As with all PDRs, local authorities had the right to appeal against the change of use by applying for a so-called "Article 4 direction" to remove the entitlement, however, these were difficult to obtain.<sup>6</sup> There is no systematic data allowing us to account for such cases where the PDR was overridden, although a CBRE study (CBRE Planning, 2013) reports a very low success rate of appeals, suggesting that the results reported here will be little affected by the potential Article 4 direction.

<sup>3</sup> The legal use class "office space" is defined as B1(a), which refers to all office space excluding that which is occupied for research and development, industrial, or banks, buildings societies, and other services which the public generally have access to. Residential is defined as C3, which refers to buildings where 6 or fewer people live together as a single household (ARUP, 2014).

<sup>4</sup> The rights were made permanent in October 2015.

<sup>5</sup> Map taken from CBRE Planning (2013), and reproduced with the written permission of the CBRE Planning department.

<sup>6</sup> The reluctance of the government to approve Article 4 directions is clear from the following written statement made by the former planning minister Nick Boles (2014): "Ministers are minded to cancel Article 4 directions which seek to re-impose unjustified or blanket regulation, given the clearly stated public policy goal of liberalizing the planning rules and helping provide more homes... Ministers wish to send a clear message to the housing industry that we will act to provide certainty, confidence and clarity, and that we are supporting their investment in these new homes to bring under-used property back into productive use as housing."



**FIGURE 2** Observations by entitled and nonentitled. (A) Greater London Boroughs, (B) Central area outcodes [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

### 3 | DATA

Data on office characteristics and transactions are taken from the CoStar Group. This source is widely used commercially and has been used in previous academic studies of commercial property (for an early example, see Eichholtz *et al.*, 2010). CoStar's data (CoStar, 2017) contains transaction, leasing and building information for each commercial building, and is widely regarded as a consistently updated and reliable source of information.

The dataset used in the analysis is a panel, spanning 12 London boroughs from 2009 to 2016. The areas covered are shown in Figures 1 and 2A, B. The sample period, from January 1st 2009 to March 31st 2016, gives a near symmetric timeframe either side of the policy announcement, allows us to estimate pre- and post-treatment time trends and reduces various other problems including the cyclicity of the commercial property market. Data were extracted for every commercial building registered on CoStar wholly or partly designated as office space (either B1 or A2 use).<sup>7</sup> Each observation has a field for transaction date and price, address, and many individual building characteristics including a CoStar-specific measure: the “star rating.” This measure grades buildings from 1 to 5 according to an overall assessment of their physical attributes including performance, construction, energy efficiency and design. This is a useful control, as it proxies for a large number of difficult to observe building characteristics and is included in the analysis as

<sup>7</sup> The data does not define which of these observations are B1(a), Offices, so subject to the PDR, as compared to A2, premises of Banks, Building Societies or Professional services. If we are able to assume that other buildings in the sample experienced similar trends between the control and treatment groups over the period in question, the only effect the inclusion of this data will have is to negatively bias the magnitude of the coefficient on the exemption effect. In other words, since there is no reason to believe that other buildings should have displayed divergent trends within what happens to be the exemption zone for B1(a) buildings, their inclusion will only underestimate the premium found in this study. A better dataset, which extracted only B1(a) buildings, might therefore be expected to yield even stronger relative value increases for entitled buildings.

**TABLE 1** Sample and variable definitions

<b>Sample</b>	
Full (2009-2016)	All transactions with a recorded transaction price on buildings with any office use between January 2009 and February 2016
Sole use (2009-2016)	All transactions between same dates excluding any buildings with a secondary use such as retail or residential
Core (2009-2016)	All transactions between same dates excluding transactions of both listed buildings and buildings with a secondary use
<b>Variable</b>	
Entitlement effect	A binary variable with a value of 1 if the transactions was on a PDR-entitled building and occurred after chosen pivotal date
Post	A binary variable with a value of 1 if the transaction took place after the chosen pivotal date, and 0 otherwise
Entitled	A binary variable with a value of 1 if the building was entitled to the PDR, and 0 otherwise
Refusal rate	The percentage of major residential projects which were refused planning permission between 1979 and 2008 in each borough
Office-based employment	The number of jobs in the information and communication, financial and insurance, real estate professional, scientific and technical, and administrative and support service industries as a percentage of total employment in each borough
Age	Number of years since the building was built, or, if a renovation has taken place, since the building was last renovated
Star rating	A rating between 1 (poor) and 5 (strong) based on an overall assessment of a building's physical attributes including performance, construction, energy efficiency and design
Rentable floor area	The total area of the building in thousands of square foot which can be rented
Percent leased	The percentage of the building that was leased as at the date of data extraction (March 2016)
Number of floors	The number of floors in the building
Number of elevators	The number of elevators in the building

a dummy variable with star rating 1 normalized to zero. The star rating is independent of location, so it can be included in the regression without introducing multicollinearity.

Samples and variables are defined in Table 1 and descriptive statistics for the “Core” sample in Table 3. Table 3 then shows descriptive statistics for buildings used for the analysis divided between “Entitled” (treated) and “Nonentitled” (untreated) and differences in means of building characteristics before and after the date of treatment in 2013. Over the period of interest, 2009 to 2016, there were 14,875 recorded “transactions” of buildings with office space in them across all boroughs and years. Only a minority of these transactions had a recorded price, however, leaving a potentially usable sample of 3,842. The spatial distribution of the groups of observations by borough is shown in Table 2. Column (1) relates to the whole sample; column (2) to all observations with a recorded price. Columns (3) and (4) show the same information for respectively those observations with complete information including price, omitting those buildings which were not in sole office use (e.g., had retail or residential premises within them) and finally the “core” sam-

**TABLE 2** Sample sizes

	(1)	(2)	(3)	(4)
	2009 to 2013			
	Original	Cleaned	Sole use	Core
Camden	2,212	523	245	212
City of London	1,325	692	466	413
Hackney	878	168	77	72
Islington	1,328	381	179	175
Kensington & Chelsea	876	113	46	43
Lambeth	594	98	47	43
Newham	287	23	14	14
Southwark	1,040	288	128	118
Tower Hamlets	684	129	80	73
Wandsworth	579	76	33	33
City of Westminster	4,391	1,216	650	568
Hammersmith & Fulham	681	135	72	71
Total	14,875	3,842	2,037	1,835

ple, excluding buildings officially listed as of historic interest or outstanding architectural merit. These are excluded since they are subject to stringent controls, so making conversion to residential use a very different commercial proposition, indeed perhaps impossible. Because of missing data for some observations for control variables, the numbers used for the analysis reported in Table 4 are consistently rather smaller than the building samples.

Tables 3 shows that for buildings used in the analysis those that were not entitled to the PDR were bigger, had a higher Star rating and were more expensive but otherwise similar to those buildings which qualified for the PDR. That they were bigger and “superior” is not surprising since the policy was devised explicitly to exclude prime office locations. It is reassuring for the analysis that with respect to other attributes, such as age or percent leased there was little evidence of significant differences. The second and third panels of Table 3 provide further evidence on the differences between the two groups and how these changed following the introduction of the PDR. Most saliently the price differential between the groups fell significantly after the introduction of the PDR, reflecting the fact that the PDR increased the value of entitled buildings. There are also hints that within the group of entitled buildings, sales for conversion to housing were disproportionately concentrated in the smaller but better quality entitled offices.

The status of transacted buildings with respect to their entitlement to the PDR was identified manually, using maps of each borough which defined the exemption zone boundaries (DCLG 2013b). Each observation was located on a digital map by postcode and matched to the relevant PDR boundary map. A binary variable “Entitled” was constructed, with a value of 1 assigned to buildings qualifying for the PDR. Some boroughs (City of London and Kensington & Chelsea) were entirely exempt, and so all observations were assigned a value of 0 instantly. However other boroughs, notably Westminster, Hackney, Islington and Tower Hamlets, had exemption zones intended to identify less economically significant office locations (Figure 1), and so observations were more labour intensive to assign. While the irregularity of the boundaries made assignment

**TABLE 3** Summary statistics for core sample

Variable	Mean	SD	Minimum	Maximum
Last sale price (£million)	79.2	201.5	0.04	1,700
Refusal rate (%)	19.2	4.4	12.3	29.9
Office-based employment (%)	43.4	21.1	9.9	81.1
Star rating 1	0.003	0.1	0	1
Star rating 2	0.1	0.3	0	1
Star rating 3	0.5	0.5	0	1
Star rating 4	0.4	0.5	0	1
Star rating 5	0.1	0.2	0	1
Rentable floor area ('000 sq ft)	55.6	97.2	0.5	1,340
Percent leased (%)	92.8	23.4	0	100
Number of elevators	1.5	2.5	0	26
Number of floors	7	4	1	62
Summary statistics for buildings by entitled/nonentitled				
	Entitled		Nonentitled	
	Mean	SD	Mean	SD
Last sale price (£ million)	21.7	56.5	82.2	205.9
Age	54.6	57.3	59.4	71.5
Star rating 1	0.01	0.1	0.0005	0.02
Star rating 2	0.2	0.4	0.05	0.2
Star rating 3	0.6	0.5	0.5	0.5
Star rating 4	0.2	0.4	0.4	0.5
Star rating 5	0.02	0.1	0.05	0.2
Rentable floor area ('000 sq ft)	33	68.8	55.6	98
Percent leased (%)	95.5	19.2	93	22.6
Number of floors	4.8	3.3	7.3	3.8
Number of elevators	0.7	1.6	1.5	2.5
Observations	321		1,889	
Difference in means for building characteristic before and after treatment date*				
	Before treatment (Obs = 1119)	After treatment (Obs = 1091)		
	Difference	Difference		
Log (transaction price)	−1.88*** (0.15)	−1.47*** (0.15)		
Age	−4.41 (6.17)	−4.74 (5.76)		
Star rating 1	0.01*** (0.005)	0.006** (0.002)		

(Continues)

TABLE 3 (Continued)

Difference in means for building characteristic before and after treatment date*		
	Before treatment (Obs = 1119) Difference	After treatment (Obs = 1091) Difference
Star rating 2	0.17***(0.02)	0.15***(0.02)
Star rating 3	0.075*(0.04)	0.1***(0.04)
Star rating 4	−0.23***(0.04)	−0.22***(0.04)
Star rating 5	−0.03*(0.02)	−0.04*(0.02)
Rentable floor area	−21.94***(7.11)	−25.06***(8.77)
Percent leased	−2.59(2.12)	−2.17(1.65)
Number of floors	−2.43***(0.32)	−2.56***(0.32)
Number of elevators	−0.73***(0.21)	−0.94***(0.21)

\*, \*\* & \*\*\* Statistically significant at respectively 10, 5 and 1 percent levels.

more difficult, it created a quasi-experimental setting, with greater geographic mixing of entitled and nonentitled buildings. Furthermore, a BCO (2015) report states that the exemption boundaries were sometimes determined by legal or practical factors, rather than solely economic ones. This enables closer matching of exempt and entitled buildings, as economic factors will be more highly correlated with transaction price than legal or practical ones. Figure 2A and B plot each observation used in the analysis by entitlement status.

Finally, neighbourhood level controls were identified to explain some of the transaction price variation. The refusal rate of major residential projects as a measure of planning restrictiveness across boroughs was used by Hilber & Vermeulen (2016) and was found to be an important causal influence on variations in house prices across LAs. It is included here, interacted with entitlement, to see whether the premium for the PDR was greater for office buildings in these more restrictive boroughs. A number of studies (see Cheshire & Dericks, 2020) have found office prices are higher, the higher is the local density of office-based employment. So that, too, is included using data from Nomis (2011). The borough-level unemployment rate (Aldridge *et al.*, 2015) is also included in some models as an indicator of local prosperity although, given that the spatial limits of London's housing market extend widely, prosperity at the borough level may not be significant. In addition, fixed effects are included for the Postcode “outcode” level: that is the area defined by the part of the alphanumeric British Postcode before the space. We have observations in 119 such outcodes as shown in Figure 2A but for samples used in the analysis between 112 and 114. In the process of adding these controls, some additional observations were lost so the analysis reported in Tables 5 through 7 is generally somewhat smaller than for the full “Core” sample of buildings.

## 4 | THEORETICAL CONSIDERATIONS

If the real estate market was in equilibrium and uses were freely interchangeable, then one would expect that at the margin, prices of office and housing space would be equal. That would be true independently of whether on average it costs more to build housing than offices or vice versa once costs of conversion had been taken into account. Given, however, that uses are not interchangeable because of the way in which the British Planning system works, a price differential could

**TABLE 4** Main results

Sample	Dependent variable is log of transaction price date used is July 25, 2013		
	(1) 2009-2016	(2) Sole Use	(3) Core
Entitlement effect	0.5281*** (0.2003)	0.5002** (0.2287)	0.4499* (0.2335)
Post	0.4865*** (0.1656)	0.5658*** (0.1729)	0.4664** (0.1935)
Entitled	−0.8160 (0.4970)	−0.7539* (0.4509)	−1.1356*** (0.4267)
Refusal rate	0.4473 (1.9943)	−0.4091 (1.8031)	1.3446 (1.8983)
Office based employment	3.4182*** (1.0024)	3.8017*** (1.0734)	3.6538*** (1.1437)
Age	0.0003 (0.0006)	−0.0002 (0.0005)	−0.0001 (0.0006)
Star rating 2	0.2484 (0.4138)	0.3716 (0.4370)	0.2765 (0.4643)
Star rating 3	0.6506 (0.4222)	0.7578* (0.4261)	0.7012 (0.4600)
Star rating 4	1.4851*** (0.4257)	1.5603*** (0.4348)	1.5453*** (0.4721)
Star rating 5	1.8336*** (0.4486)	1.9043*** (0.4349)	1.9015*** (0.4739)
Rentable floor area	0.0071*** (0.0007)	0.0064*** (0.0006)	0.0065*** (0.0007)
Percent leased	−0.0036*** (0.0009)	−0.0028*** (0.0010)	−0.0032*** (0.0010)
Number of floors	−0.0081 (0.0191)	0.0074 (0.0224)	0.0021 (0.0228)
Number of elevators	0.0346** (0.0140)	0.0167 (0.0144)	0.0213 (0.0146)
Other controls	Yes	Yes	Yes
Within $R^2$	0.4385	0.458	0.4649
Between $R^2$	0.4335	0.4045	0.4153
Overall $R^2$	0.4184	0.4004	0.4071
Number of observations	2,210	1,939	1,743
Number of groups	114	112	112
Average number of observations per group	19.4	17.3	15.6

Notes. Fixed effects model at Postcode “outcode” level: Specification includes quarter and year dummies.

Standard errors are clustered at the postcode outcode level in parentheses. Star rating 1 is normalized to zero.

\*, \*\*, & \*\*\* Statistically significant at respectively 10, 5, and 1% levels.

emerge. The supply of space for each category of use is independently determined by administrative fiat, taking no account of the impact of decisions on prices, so if the balance of demand and supply for the categories differs, then a price differential will arise at the margin of use whether that margin refers to a spatial boundary or a “quality” margin. The size of any such price differential would reflect the relative scarcity of the two categories of space.

We have independent evidence of a restriction on the supply relative to demand of both office and housing space in London (Cheshire & Hilber, 2008; Hilber & Vermeulen, 2016) so *a priori* we cannot say whether the entitlement to the PDR would or would not generate a premium. If office space was in relatively more restricted supply, there would be no impact on its price since there would be no incentive to convert it to residential use (subject to the proviso that the office space in question was fit for purpose). If housing space is more restricted relative to demand than is office space, then when the PDR was introduced a premium for office buildings entitled to be converted should emerge. It is, thus, an empirical question and the measurement of any premium for the PDR-entitled office space, provided it is robustly and consistently estimated, would be evidence that the shortage of housing in London was even greater than that of offices: its size would be an indicator of the extent of that differential shortage.

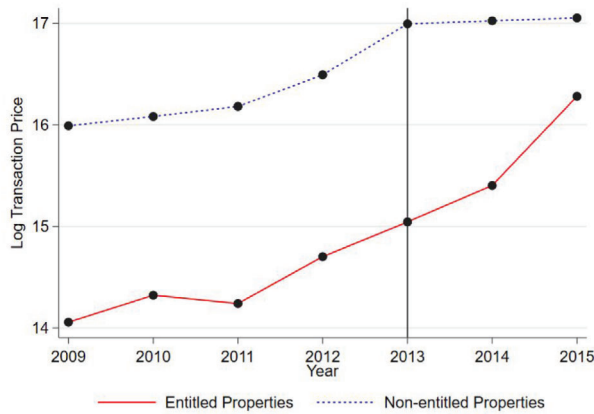
Entitled buildings in areas which have more pronounced shortages of residential relative to commercial supply could benefit from an even higher value growth than similar entitled buildings in areas where the difference in supply shortages of residential and commercial space is narrower, depending on the elasticity of substitution in London’s housing market across boroughs.

Finally, subject to conversion costs, office space should only be lost to residential use to the point where it is valued equally to residential use, and competing land uses are in equilibrium. Over time this should moderate any major, prolonged imbalances as developers have both greater incentive and ability than policy makers to respond to value changes.

## 5 | METHODOLOGY

Entitlement to the PDR is a binary characteristic which applies to some, but only about 15% of buildings, in the sample. As such, difference in difference methods can be employed to estimate its value. The exemption zones, with their somewhat idiosyncratic boundaries, create an environment where the policy is geographically discontinuous, thereby creating a quasi-experimental setting with distinct treatment and control groups. The treatment group consists of all buildings entitled to the rights, and the control group consists of all buildings without such entitlement. The data spans approximately 3 to 4 years either side of the policy announcement and introduction with, as Table 3 shows, the sample more or less evenly split. As Table 3 suggests and Figure 3 shows, price trends before the policy change were very similar for both treated and untreated buildings. So by estimating changes in trends in transaction prices between treated and untreated buildings before and after the policy change, one can identify any change in trend observed post-treatment either to the announcement, or the introduction of, the PDR. There is a further discussion of pre- and post-trends in Appendix A.

The policy was formally announced on January 24th, 2013 and came into effect on May 30th, 2013. Given the forward-looking nature of investors, a bigger response might be expected following announcement than introduction. It is known from studies of other related phenomena that expected future values of relevant variables are capitalized into land prices: see for example, Cheshire & Sheppard (2004) or Mense & Kholodilin (2014). However, there was necessarily uncertainty as to the exact delimitations of exemption zones and timings until the policy actu-



	Number of Observations per Year							
	2009	2010	2011	2012	2013	2014	2015	2016
Entitled	20	35	35	26	62	68	65	10
Non-entitled	131	186	206	285	357	388	303	33

**FIGURE 3** Price trends for entitled and nonentitled properties [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

ally came into effect; indeed there could have even been uncertainty as to whether the policy would be introduced at all. This would at least have reduced any price likely to have been paid for the potential value of the new PDR when formally announced. Indeed, to further complicate the identification of a clear cut date for the policy to have had an impact on prices, it had been announced, in principle, nearly a year earlier in the March 2011 Budget (DCLG, 2012b). The result is that the announcement effect may have been graduated over time as belief in the reality of the policy increased as, too, did knowledge of its details with these being finally revealed in May 2013.

In light of these considerations, we select as our critical date that of the policy's actual introduction on May 30th, 2013. However, identifying the appropriate "treatment" date is further complicated by the financial and administrative lags inherent in commercial property transactions. These mean that transactions are completed (and therefore recorded) up to several months after a transaction price has been offered and agreed. Taking a crude average lag between offer and completion dates of 8 weeks, we therefore, select July 25th, 2013 as the most plausible treatment date. If 6 weeks is a good estimate of the mean period between an accepted offer and legal completion, the average building recorded by CoStar as being sold on or after July 25th will have been under offer on or after May 30th. We have also experimented with other possible "treatment" dates, including 8 weeks after the announcement date: the results of this alternative treatment date are reported in Table 5 while the main results, those for a treatment date of July 25th, 2013, are shown in Table 4.

The fundamental specification is given below in Equation (1). The natural log of the most recent transaction price is regressed on the interaction of the dummy variables "Post" and "Entitled"—which takes a value of 1 only when a building is both entitled to the PDR and sold after the chosen treatment date. This interaction isolates the effect of entitlement, and is consequently called the "entitlement effect." The specification also includes a dummy variable "Post" which takes a value of 1 for all buildings transacted after the treatment date, and therefore, identifies the time trend in the price of all buildings, and a dummy variable "Entitled," which takes a value of 1 if the building is entitled to the PDR. This coefficient, therefore, estimates the price differential of the treated buildings without controlling for time. A range of controls is included, and the error term

TABLE 5 Treatment date adjustment

Sample	Dependent variable log of transaction price Treatment date used is March 22, 2013		
	(1) 2009-2016	(2) Sole use	(3) Core
Entitlement effect	0.3692*	0.3056	0.2118
	(0.1926)	(0.2158)	(0.2127)
Post	0.1421	0.2908	0.2283
	(0.2044)	(0.2298)	(0.2544)
Entitled	-0.6939	-0.5472	-0.9840**
	(0.4877)	(0.4354)	(0.3948)
Refusal rate	0.3239	-0.7567	1.3493
	(1.9538)	(1.6961)	(1.7664)
Office based employment	3.5266***	3.9818***	3.8281***
	(1.0340)	(1.1251)	(1.2028)
Age	0.0003	-0.0002	-0.0000
	(0.0006)	(0.0005)	(0.0006)
Star rating 2	0.3197	0.4489	0.3295
	(0.4028)	(0.4306)	(0.4462)
Star rating 3	0.7113*	0.8341**	0.7485*
	(0.4082)	(0.4133)	(0.4340)
Star rating 4	1.5492***	1.6379***	1.5945***
	(0.4092)	(0.4179)	(0.4433)
Star rating 5	1.9078***	1.9943***	1.9548***
	(0.4338)	(0.4211)	(0.4497)
Rentable floor area	0.0072***	0.0065***	0.0066***
	(0.0007)	(0.0006)	(0.0007)
Percent leased	-0.0036***	-0.0029***	-0.0033***
	(0.0009)	(0.0010)	(0.0010)
Number of floors	-0.0099	0.0050	0.0003
	(0.0189)	(0.0220)	(0.0225)
Number of elevators	0.0336**	0.0165	0.0217
	(0.0142)	(0.0145)	(0.0146)
Other controls	Yes	Yes	Yes
Within $R^2$	0.4328	0.4509	0.4595
Between $R^2$	0.4263	0.3922	0.4042
Overall $R^2$	0.4106	0.3886	0.3971
Number of observations	2,210	1,939	1,743
Number of groups	114	112	112
Average number of observations per group	19.4	17.3	15.6

Notes. Fixed effects model at Postcode "outcode" level: Specification includes quarter and year dummies. Standard errors are clustered at the postcode outcode level in parentheses. Star rating 1 is normalized to zero.

\*, \*\*, & \*\*\* Statistically significant at respectively 10, 5, and 1% levels.

is denoted by  $\varepsilon_{it}$ .

$$\log(\text{Price}_{it}) = \beta_0 + \beta_1 \text{EntitlementEffect} + \beta_2 \text{Post} + \beta_3 \text{Entitled} + \{\text{Controls}\} + \varepsilon_{it} \quad (1)$$

A fixed effects model is employed on the panel data, with transactions observed across 12 boroughs and 8 years (although observations in 2016 are few with only 10 for entitled buildings). As noted above, fixed effects are defined at the Postcode “outcode” level. This is a small enough area for the office buildings within it to be reasonably similar in unobservables (consistent with this judgement is the fact that no outcode area contains both entitled and nonentitled buildings). On the other hand, outcodes are large enough for each to contain sufficient observations. Standard errors are clustered at outcode levels (although experiments clustering at the “Nonentitled” level gave very similar results). There are no absolute rules governing the choice of clusters for spatial difference in difference analysis although both Angrist & Pischke (2009) and MacKinnon & Webb (2017) advise more rather than less clusters, with MacKinnon and Webb particularly advising a choice of more, and more evenly sized, ones. There are at least 112 outcodes in each model, well exceeding Angrist & Pischke’s light-hearted suggestion of 42.

The controls can be divided into three distinct categories: neighbourhood level, individual level and time trends. Neighbourhood-level controls include factors that vary by boroughs, such as planning restrictiveness, office-based employment and the unemployment rate. Individual-level controls include age, star rating, rentable building area, typical floor size, percentage leased, number of elevators and number of floors. Only the results for the main controls are reported in the tables.

Additionally dummy variables for each year were included to control for time trends in commercial property and the wider economy, and quarterly dummies were included to control for within-year seasonality of transactions. In an online appendix, Appendix A, we have a more detailed analysis of time trends for treated and untreated properties separately. This confirms the conclusion that time trends before the chosen “treatment” date were similar but significantly diverged thereafter (except for 2016 when the very small number of observations produces a perverse but wholly nonsignificant difference).

## 6 | RESULTS

Table 4 details the main results, with an identical specification run on three samples. The variable “Entitlement effect” measures the causal impact on value growth of being entitled to the PDR. This impact is very highly positive and statistically significant in all samples, with a 53% higher value associated with buildings entitled to the PDR in the full sample (1) and a 50% increase if buildings not in sole office use are excluded (2). The core sample (3) removes all transactions of buildings which are excluded from the PDR even in entitled zones, which could confound the analysis. The finding in this sample is a 45% higher growth rate for entitled buildings, statistically significant at the 10% level. Weaker significance for this sample, here and in later tables, probably reflects the reduced number of observations. All else equal, buildings qualifying for the PDR exhibited a significant price premium following its introduction.

On the whole, coefficients on the remaining regressors perform as expected. There are substantial, statistically significant higher transaction prices associated with selling the building after March 2013, as suggested by the findings for the variable “Post.” This is consistent with the strengthening of the commercial market typical of a postrecession recovery period. All else equal,

entitled buildings were found to sell for 75 to 110% less, consistent with the diagnosis that the PDR buildings tended to be in secondary locations and/or have other negative but unobserved characteristics so be subject to a discount. The level of local authority restrictiveness, as measured by the refusal rate, although both here and in the results reported in Table 6 mainly has the expected sign, is never statistically significant. Local office based employment has a very high, positive and statistically significant effect on transaction prices across all samples. This is intuitive given that higher office based employment in a borough will be an indicator of localized agglomeration economies.

A higher star rating is associated with an increase in a building's value, with most of that increase associated with the two top grades, 4 and 5. These are also the only star rating values which are statistically significant at the 1% level. Together these points imply that the only real premium is for the really top-end buildings. The effect of a building's age, which might have been expected to have an impact, is not statistically different from zero, but the benefits of a newer building are likely to be largely captured by the star rating variable. The effect of the rentable floor area is significant in the anticipated way but the number of floors is not, although it is positive and significant in some of the specifications in Table 7, independently of the building's floor area, echoing results from the emerging "tall buildings" literature (see Koster *et al.*, 2014 or Ahlfeldt & Mcmillen, 2018). There is also some evidence to suggest the number of elevators, independently a building's size, raises transaction price. Building occupancy, as measured by percent leased, displays a small, negative impact on transaction price, which again seems counterintuitive. The explanation may be that higher occupancy closes off options for buyers in terms of redevelopment and re-leasing.

## 7 | ROBUSTNESS

Having obtained the main body of results, the next step is to investigate how these findings hold under a variety of changes to the specification. The main robustness checks reported here are changing the treatment date, excluding various controls, and excluding the most central and peripheral observations.

Table 5 presents the findings when the treatment date is changed from July 25th, 2013 (8 weeks after the introduction) to March 22nd, 2013 (8 weeks after the announcement) for each sample. As expected, the findings generally suggest a smaller and mainly nonsignificant price effect, as the policy was not a surprise to the industry when it was formally announced, and uncertainties still remained as to the exact boundaries of the zones which would be entitled. In the full sample entitled buildings experienced 37% higher value growth, only statistically significant at the 10% level. For the other two samples, the estimated premium was lower and not statistically significant. The main specifications were also repeated using a randomized treatment date (as in Votsis & Perrels, 2016). No statistically significant coefficient was found for  $\beta_1$ , indicating that the value divergence recorded post July 25th, 2013 was not a temporal coincidence. Together these results support the choice of this date, 8 weeks after all details of the change were published and the policy was implemented, as the most accurate to represent the "treatment date."

The main specification was adjusted to test alternative methods for controlling for time-fixed effects. Results for the full 2009-2016 and core samples are presented in Table 6. The results show that controlling for time trends by interacting quarter and year dummies, yields results very similar in magnitude and significance to the main findings reported in Table 4, a 45 to 49% premium for PDR-entitled buildings, statistically significant at 5%.

**TABLE 6** Specification adjustments

Sample	Dependent variable log of transaction price: treatment date July 25 2013	
	(1)	(2)
	2009-2016 Quarter dummies interacted with years	Core Quarter dummies interacted with years
Entitlement effect	0.4931** (0.2003)	0.4537** (0.2246)
Post	0.8366** (0.3319)	0.8561** (0.3544)
Entitled	−0.8325 (0.5032)	−1.0826** (0.4211)
Refusal rate	0.6510 (1.9444)	1.1741 (1.8738)
Office based employment	3.3943*** (1.0018)	3.6893*** (1.1866)
Age	0.0001 (0.0006)	−0.0004 (0.0006)
Star rating 2	0.3036 (0.4876)	0.3489 (0.5076)
Star rating 3	0.6991 (0.4997)	0.7600 (0.5088)
Star rating 4	1.5368*** (0.5025)	1.5968*** (0.5241)
Star rating 5	1.8853*** (0.5000)	1.9835*** (0.5069)
Rentable floor area	0.0072*** (0.0007)	0.0066*** (0.0007)
Percent leased	−0.0038*** (0.0008)	−0.0036*** (0.0009)
Number of floors	−0.0089 (0.0194)	0.0012 (0.0232)
Number of elevators	0.0336** (0.0140)	0.0202 (0.0151)
Other controls	Yes	Yes
Within R <sup>2</sup>	0.45	0.4758
Between R <sup>2</sup>	0.4369	0.4209
Overall R <sup>2</sup>	0.4318	0.4161
Number of observations	2,210	1,743
Number of groups	114	112
Average number of observations per group	19.4	15.6

Notes. Fixed effects model at Postcode “outcode” level. Standard errors are clustered at the postcode outcode level in parentheses. Star rating 1 is normalized to zero.

\*, \*\*, & \*\*\* Statistically significant at respectively 10, 5, and 1% levels.



TABLE 7 Exclusion of outcodes

Sample	Dependent variable is log of transaction price   Treatment date used is July 25, 2013					
	(1)	(2)	(3)	(4)	(5)	(6)
	2009-2016			Core		
	Dropped inner city	Dropped periphery	Dropped inner city & periphery	Dropped inner city	Dropped periphery	Dropped inner city & periphery
Entitlement effect	0.3879** (0.1809)	0.7396*** (0.2280)	0.5785*** (0.2046)	0.2679 (0.2217)	0.6230** (0.2631)	0.4286* (0.2480)
Post	0.6052** (0.2659)	0.5018*** (0.1676)	0.6295*** (0.2726)	0.6784** (0.3092)	0.4668** (0.1972)	0.6917** (0.3216)
Entitled	-0.6275 (0.4513)	-0.9053* (0.4995)	-0.7141 (0.4623)	-0.8490** (0.4188)	-1.2267*** (0.4412)	-0.9691** (0.4369)
Refusal rate	0.5371 (1.7731)	0.2427 (1.9474)	0.3875 (1.7477)	0.9656 (2.0825)	1.2909 (1.9116)	1.1214 (2.1140)
Office-based employment	3.1214*** (1.1175)	3.3947*** (1.0064)	3.1170*** (1.1015)	3.2763** (1.5411)	3.6359*** (1.1370)	3.2313** (1.5222)
Age	0.0005 (0.0010)	0.0002 (0.0006)	0.0004 (0.0010)	-0.0001 (0.0010)	-0.0002 (0.0006)	-0.0003 (0.0010)
Star rating 2	0.5175 (0.3873)	-0.1881 (0.3575)	-0.0925 (0.2625)	0.5211 (0.4363)	-0.1937 (0.4358)	-0.1839 (0.3434)
Star rating 3	0.8507** (0.4221)	0.2190 (0.3419)	0.2583 (0.2855)	0.9059* (0.4804)	0.2426 (0.3874)	0.2312 (0.3224)
Star rating 4	1.6787*** (0.4344)	1.0528*** (0.3297)	1.0809*** (0.2823)	1.6624*** (0.5072)	1.0774*** (0.3898)	0.9583*** (0.3347)
Star rating 5	2.4421*** (0.6009)	1.4232*** (0.3145)	1.9389*** (0.4365)	2.4313*** (0.5822)	1.4467*** (0.3568)	1.8152*** (0.3699)
Rentable floor area	0.0079*** (0.0007)	0.0072*** (0.0007)	0.0082*** (0.0008)	0.0062*** (0.0009)	0.0066*** (0.0007)	0.0066*** (0.0010)

(Continues)



TABLE 7 (Continued)

Dependent variable is log of transaction price   Treatment date used is July 25, 2013					
Sample	(1)	(2)	(3)	(4)	(5) (6)
2009-2016 Core					
Percent leased	-0.0043*** (0.0013)	-0.0036*** (0.0009)	-0.0047*** (0.0012)	-0.0035*** (0.0015)	-0.0033*** (0.0010)
Number of floors	0.0247 (0.0163)	-0.0106 (0.0192)	0.0214 (0.0166)	0.0651*** (0.0181)	0.0011 (0.0232)
Number of elevators	0.0931*** (0.0289)	0.0308** (0.0141)	0.0784*** (0.0280)	0.0627* (0.0340)	0.0176 (0.0151)
Other controls	Yes	Yes	Yes	Yes	Yes
Within R <sup>2</sup>	0.4714	0.4429	0.4786	0.5127	0.4683
Between R <sup>2</sup>	0.5350	0.3286	0.4584	0.5065	0.3001
Overall R <sup>2</sup>	0.4594	0.4072	0.4542	0.4738	0.3879
Number of observations	1,210	2,137	1,137	917	1,683
Number of groups	78	95	59	76	95
Average number of observations per group	15.5	22.5	19.3	12.1	17.7

Notes : Fixed effects model at Postcode “outcode” level. Specification includes quarter and year dummies. Dependent variable is the natural logarithm of recorded transaction price. Standard errors are clustered at the postcode outcode level in parentheses. Star rating 1 is normalized to zero.

\*, \*\*, & \*\*\* Statistically significant at respectively 10, 5, and 1% levels.

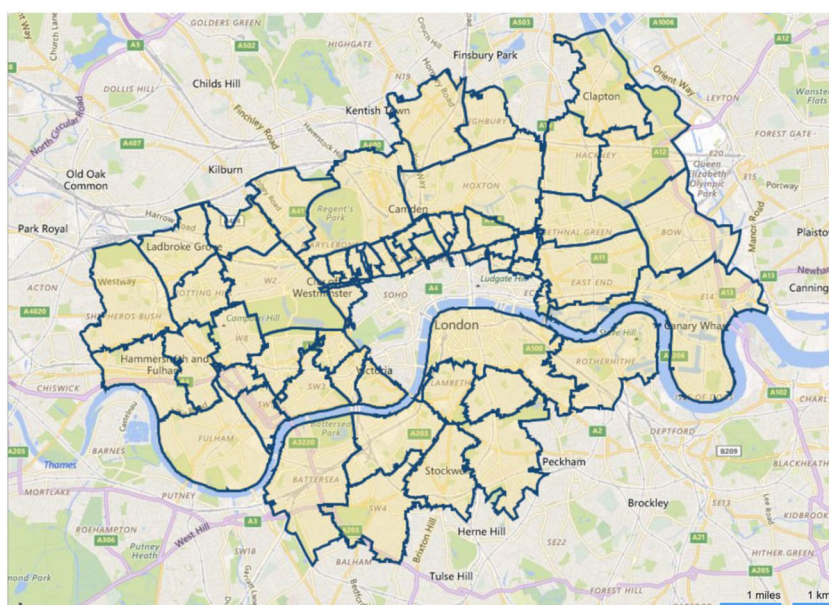


FIGURE 4 Band of observations [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

The final adjustment which is undertaken is to remove sections of the sample which might be least matched to other observations. The most central buildings are likely to have the most substantial location value, and therefore, their potential entitled value may not be accurately represented by the outer-middle observations. Similarly, the most peripheral observations may not realistically provide a fitting counterfactual for boundary locations. The most central and the most peripheral outcodes are dropped from the basic sample, ensuring that observations are closer to the boundaries, and therefore, more closely matched. Table 7 presents results for each of the full and core samples when inner city observations are removed, when peripheral observations are removed and when both are removed, leaving a “circular band” of observations (Figure 4). Entitlement causes high value growth in all three cases across both samples. In just one model (4) in which observations from the core sample located in the CBD are excluded, this premium is not statistically significant. Again it is likely the smaller size for the core samples is involved with the generally lower significance of results in columns (4) to (6). The magnitude of the finding falls when the innermost observations are dropped, and rises when peripheral observations are dropped, suggesting that the residential–commercial land price differential is highest in relatively more central locations. The sample of adequate size and the least geographical variation among its observations—column (3)—yields an estimated 58% premium for entitled buildings, statistically significant at the 1% level.

## 8 | CONCLUSIONS

The main findings of this article indicate that buildings in London that became entitled to an automatic right to be converted from office to residential use experienced an economically and a statistically significant increase in value compared to those that did not. Our estimates of this

conversion premium vary according to specification but are around 50% in our main results. In other specifications of varying plausibility they span this value. So, results are relatively stable.

Beyond providing yet more evidence that planning regulations influence real estate prices what is the wider significance of this finding? The UK, in general, and London in particular, we would claim, is a particularly interesting context in which to examine the impact on prices (and welfare and productivity) of restrictive land-use regulations. The history of rigid regulation is longer—now nearly 75 years: the regulation is both more binding—land supply has been effectively frozen since Green Belts were imposed round major cities in 1955—and more pervasive. Heights as well as outward expansion are rigidly controlled. Yet while the system is more rigid in the sense of exerting a binding restriction on the supply of space, it is at the same time less certain. There is no zoning system: all controls are imposed by an essentially political process. So there is both uncertainty and gameability.

The effects of land-use restrictions, moreover, are cumulative over time because they only influence new construction—a relatively small proportion of the total stock in most countries and, in the UK, less than 1%. So the length of time there has been restrictive land-use policy in Britain alone, means the effects are likely to be more pronounced. What is observed in Britain today is likely to be observed in other countries, with similar current degrees of restriction, in the future.

The results reported here do not tell us about the absolute restriction imposed on the supply of housing. There is evidence from Hilber & Vermeulen (2016) that real house prices in Britain have increased at a faster rate since 1975 than in any other advanced country. At the same time, there is independent evidence that the supply of office space is more severely restricted in London than any other major office centre in Europe or the United States (see Cheshire & Hilber, 2008). For the zones covered by our sample of offices here, the regulatory tax they estimated for offices varied by location and with the property cycle but the mean value for the period 1999 to 2005 as a percentage mark-up on marginal construction costs ranged from 219 (Hammersmith) to 809 (West End). It was never more than 50% in New York. While the evidence is that the supply of office space in London was restricted, the evidence we have analyzed here suggests the supply of residential space was very much more strongly restricted. The 50% premium we estimate as being paid for those offices which became subject to the right to convert them into residential use without planning permission being required, is evidence of that.

The 50% premium was a direct measure of the value of the right to convert but two further factors need to be taken into account when interpreting it as the “price of the shortage of housing relative to office space.” On the one hand, the developer was buying a right to convert but still had to incur significant construction and financing costs to physically convert and market the structures. On the other hand, since it was not necessary to apply for planning permission, both the quality—so costs of construction—may have been reduced and the uncertainty associated with the process of applying for planning permission was eliminated. So it was much easier for a developer to forecast the expected returns from the premium they paid. These two factors will have opposite effects on the value of the premium paid for PDR-entitled buildings but we do not know their respective sizes, so cannot judge the precise extent to which they offset each other.

This study has significant implications for planning policy. Its results reinforce the findings of the existing literature to demonstrate the degree of planning restrictiveness on housing supply: especially in London, and especially since the shortage of office space is itself most significant in London. Clearly, there is scope for further investigation: it should be possible to test and quantify the extent to which housing units generated by the PDR were discounted when sold compared to “normal” housing space in comparable locations. It would also be of interest to see if there were further value changes as a result of making the rights permanent in April 2016. Nevertheless the

results reported in this article fit into a clear pattern of the causes of the housing affordability crisis in Britain which has its epicentre in London. They suggest the possibility of similar issues of the affordability of living and working space emerging in contexts where there may be a comparable degree of restriction now but it has been in place not for 75 years, as in Britain, but perhaps 50 years as in Portland Oregon. They may also suggest that a similar premium would emerge if PDRs were extended to the conversion of retail premises to housing.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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