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Office Space Supply Restrictions in Britain: The Political Economy of Market Revenge

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Abstract

Office space in Britain is the most expensive in the world and regulatory constraints are the obvious explanation. We estimate the 'regulatory tax' for 14 British and 8 continental European office locations. The values for Britain are orders of magnitude greater than any elsewhere. Exploiting panel data, we provide strong support for our hypothesis that the regulatory tax varies according to local prosperity and its responsiveness to this depends on whether an area is controlled by business interests or residents. Our results also imply that the cost to office occupiers of the 1990 conversion of commercial property taxes from a local to a national basis – transparently removing any fiscal incentive to local communities to permit development – exceeded any plausible rise in property taxes.

JEL classification: H3, J6, Q15, R52.
Keywords: Land use regulation, regulatory costs, business taxation, office markets.

1 Introduction: The Problem in an International Perspective[1]

The cost of constructing a m^2 of office space in Birmingham, England, in 2004 was approximately half that in Manhattan.[2] This is not very surprising since Birmingham is a struggling, medium sized city on the flat plains of the British Midlands and Manhattan is big, topographically constrained, prosperous and highly dynamic. If we were looking for an American equivalent to Birmingham, maybe, St Louis, Missouri would pop up. When we couple the cost of construction with the costs of occupation of that same m^2, however, we do get a shock. In the same year, the total occupation costs per m^2 were 44% higher in Birmingham than they were in Manhattan (KingSturge, 2004). Something very odd must be going on. The obvious anomaly is the intensity and restrictiveness of land use controls in the UK and this paper sets out to investigate the economic costs of these restrictions and what drives them.

In the past few years US urban economists have become interested in the analysis of land use regulation and concerned about increasing regulatory restrictions influencing the supply and costs of housing[3] and perhaps sorting between cities[4]. Glaeser *et al* (2005) for example conclude that regulatory restrictions increase housing prices in the most tightly constrained metro areas by some 50% and by considerably more in Manhattan. This is potentially of concern because not only is the effective 'tax' substantial but it has been rising over time. However, no researcher has yet reported a significant effect of regulatory constraint on the costs of commercial space in the US. This is no great surprise given the fiscal incentives to local communities to allow commercial development.

The situation in the UK, however, is several orders of magnitude more restricted. This is partly because land use regulation in the UK takes the form of universal growth constraints: and growth constraints applied not just to the total area of urban land take for each city but individually to each category of land use within each city. So urban 'envelopes' are fixed by growth boundaries but within these envelopes the areas of land available for retail, offices, warehouses and industry are all tightly controlled. Although not entirely inflexible, Greenbelts surrounding cities have been more or less sacrosanct since they were established, out of town retail is effectively prohibited[5], and local planning authorities have been extremely reluctant to expand the area zoned for commercial space. There are, moreover, a raft of preservation designations and height controls on buildings. The present pattern of regulation was essentially set in aspic in 1947 so has been in place for two generations.

[1] We thank John Clapp, Robin Goodchild, Colin Lizieri, John Muellbauer, John Quigley, Tsur Somerville and Sotiris Tsolacos for helpful comments and suggestions. We are grateful to Robin Goodchild, courtesy of Jones Lang LaSalle, Peter Damesick from UK CB Richard Ellis and Simon Rawlinson from Davis Langdon for kindly providing essential data. Thanks also to an anonymous referee and the editor of this journal for helpful comments. Gerard Dericks provided excellent research assistance. The remaining errors are the sole responsibility of the authors.

[2] This uses the ratio of Birmingham office construction costs to those in London from Davis Langdon (see Section 3 of this paper), the ratio of Davis Langdon's London construction cost estimates to those from Gardiner and Theobald to apply to Gardiner and Theobald's construction cost data for New York offices to estimate figures on a comparable basis for both Birmingham and New York.

[3] See, for example, Brueckner (2000); Evenson and Wheaton (2003); Glaeser and Gyourko (2003); Glaeser *et al* (2005); Mayer and Somerville (2000); Mayo and Sheppard (2001); Phillips and Goodstein (2000); or Song and Knaap (2003).

[4] See Gyouko *et al* (2005).

[5] On two different grounds: to maintain the economic strength of city centres and to reduce car use. Whether either objective is actually served by this policy and, in so far as it is, at what cost – is unclear.

Any reluctance of local communities to allow expansion of commercial space may be at least significantly explained by the fact that they have strong tax incentives not to. Taxes on commercial real estate (the business rate) accrue to national not local government (and account for some 5% of national tax revenues) but local authorities have to provide services to commercial property. The only interesting (and for us, useful) exception is the City of London which, when the 'Uniform Business Rate' (UBR) was introduced, was granted a unique exception and allowed to retain up to 15% of revenues raised. In addition to the property tax implications, there are other costs to local voters associated with development. Together, these generate very strong NIMBY pressures. As the retiring political head of the planning authority for one of the office locations analysed in this paper said when asked what had been his major achievement in office:

> [our main achievement was that] "…not a single new major office development has been approved. We managed to keep development down." (*Reading Chronicle, 1989*).

As we argue below, with the important and helpful exceptions of the City of London and London Docklands, the only incentive for local communities to permit commercial real estate development is local voters' fears of unemployment.

A further factor is that constraints and growth controls in the UK have been being applied since 1947. The nearest equivalent form of regulation in the USA, in Portland Oregon, still much less restrictive than applies in the UK, has been in force only since 1973. Because regulatory constraints primarily affect new construction they only influence real estate prices progressively over time. As was noted in Cheshire and Sheppard (2005) their impact on housing prices only began to be observable from about ten years after they were introduced, that is from 1955 or so.

The result is that the economic effects of land use regulation are orders of magnitude greater in the UK than they are in the US. Using data for 1984 and with quite conservative assumptions, Cheshire and Sheppard (2002) estimated that the net welfare costs[6] of restrictions on land supply in a prosperous community in southern England, Reading, were equivalent to nearly 4% as an annual income tax. In 2003, at the outer boundary of permitted development in Reading, housing land was some £3,000,000 per hectare (Cheshire and Sheppard, 2005). A few feet away agricultural land, not within the urban envelope, was worth perhaps £7,500 per hectare. As Muellbauer (2005) commented, such price distortions are 'grotesque'. The constraints on the housing market have become so significant that the British Treasury and the Department of Communities and Local Government (formerly the Office of the Deputy Prime Minister) have now commissioned two separate enquiries (Barker, 2003; 2004 and 2006a and b).

Office space in London (KingSturge, 2003 to 2005; CBRE, 2004 and 2005) is not just more expensive than anywhere else in the world; it is some three times as expensive as the next most expensive city in Europe, Paris, and more than three times as expensive as in Manhattan. Even more telling, perhaps, are the costs of office space in British provincial cities. Birmingham was the next most expensive European city after Paris, and Glasgow, Edinburgh and Manchester were all more expensive than Manhattan; office space cost twice as much in any of those smaller and not very prosperous British cities as it did in San Francisco – a city which not only is highly prosperous and has some of the tightest regulatory constraints on

[6] Net in the strict sense that benefits were also quantified and so the measure was the excess value of total costs over benefits expressed in terms of equivalent income variation.

housing in the US but also has topographical constraints on land supply. Office space in Birmingham cost 124% more than in fast growing, twice as big and land strapped Singapore.

To date there has been rigorous quantification of the economic effects of land use constraints on the UK housing sector but not for any category of commercial property. The purpose of this paper is to address this gap in our knowledge and investigate the costs of land use regulation for commercial property in the UK in a rather more rigorous way than is possible when just comparing the rent and occupation costs.

An obvious problem in analysing the economic impacts of land use planning is identifying exactly what element in total occupation costs – the cost of space to economic agents - may reasonably be attributed to 'planning' restrictions. This is because i) such restrictions take many forms over and beyond restricting the supply of land or space; and ii) it is difficult to offset for the normal factors such as city size etc, that urban economic theory tells one should be expected to influence the price of land and space. Furthermore, if we want to estimate the economic impact of any measured increase in space costs resulting from regulation, we would need to go a second step – not included in this research. We should estimate the impact on output, employment and incomes generated by the increase in space costs produced by regulatory constraints. Then offset those costs against any benefits regulation produced.

In the context of the residential sector, a theoretically rigorous methodology was set out in Cheshire and Sheppard (2002) for estimating both the gross and the net costs of regulatory restrictions on the supply of residential land and so the net welfare cost these had. This, however, is demanding on data and research time and depends on being able to explicitly identify and estimate the economic impacts of the goods/amenities generated by planning, the impact of regulation on supply and the indirect utility functions of residents/citizens. Even if it were not so data intensive, it is not clear such a methodology could be adapted to estimating the economic and welfare impacts of regulation of the supply of non-residential property because of the difficulty of estimating the relevant production function.

We estimate here, just the first of these elements: a measure of the total cost of regulatory constraints on the price of office space expressed as a 'tax' – that is as a percentage of construction costs. To do this we adapt the methodology first developed and applied to the Manhattan condominium market by Glaeser *et al* (2005). The value of this measure and its interpretation is the subject of section 2 of this paper. The Glaeser *et al* (2005) methodology has the considerable attraction that it is intellectually coherent, resting on established microeconomic theory, and it is not too demanding with respect to data and estimation techniques. Its downside is that it is a 'black box' number in that it does not differentiate between costs that are imposed by different aspects of regulation and may miss certain types of cost that regulation imposes. It is an aggregate measure of the gross cost of regulatory constraints limiting the height and floor area of buildings and – more indirectly – the supply of land for the use in question. So it reflects the costs of restrictions on land supply, space by plot ratios or height restrictions, or common forms of conservation designation. It does not, however, capture costs imposed by compliance complexity or delays in decision making. In addition, it only gives a 'cost' not a **net** welfare or **net** impact on output measure. As is well known, there are measurable benefits from some aspects of regulation and, since space is substitutable to a degree in both production and consumption, the effects on output or welfare can only be estimated if both the benefits and the extent of substitutability are known. So the regulatory tax estimates are a lower bound estimate of a gross cost of land use regulation in any location.

Glaeser *et al* (2005) report their results for Manhattan apartments as a price to construction cost ratio (rather than as a quasi-tax rate; regulatory tax to marginal construction cost). For the most recent year they had data for, 2002, this ratio was 2.07. In our tax-rate measure and subject to the caveat that we are explicitly measuring from observed *marginal* construction costs, this would translate to a value of 1.07. They also investigated other data which suggested that the value of the regulatory tax on housing was higher in some West Coast urban areas, such as the Bay Area and Los Angeles, than it was in the New York urban area as a whole (it was much higher in Manhattan itself than it was in the New York metro area) although it was still substantial in the New York area. However, in 10 of the 21 urban areas investigated there was no measurable impact of regulation on house prices. Nor was there any indication of a significant 'regulatory tax' on office property in Manhattan. This provides some standard against which to evaluate the results for office property in the British cities reported below.

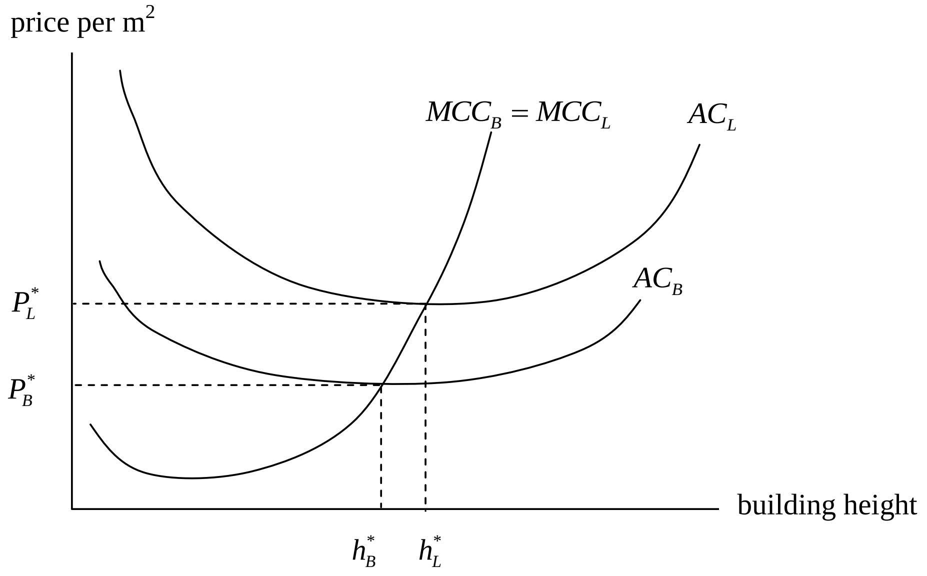
2 An Interpretation of the Regulatory Tax (RT) as a Measure of the Costs of Restrictions

The key idea of the Regulatory Tax (RT) approach is simple; in a world with competition among property developers and free market entry and exit, price will equal (minimum) average cost since this includes 'normal' profit. We would argue that competition between developers and free entry are reasonable assumptions both because of the low costs of entry to small scale development, such as converting a single building to office use, and the international nature of the development industry. In Britain the best known example of international entry might be Olympia and York, the Canadian developers of Canary Wharf, but most provincial office locations have examples of buildings developed by Japanese, German, Dutch or Swedish developers.

Marginal construction costs rise with building height, so in the absence of restrictions on heights, buildings should rise to a point where the marginal cost of adding an additional floor equals its market price. If building higher is less profitable per m^2 than building over a greater area, we still should expect the marginal cost of an extra floor to be equal to price: buildings would just be lower on average but the overall urban land take would be greater. Bertaud and Brueckner (2005) demonstrate the formal equivalence of height restrictions compared to land supply restrictions. Any gap between the observed market price and the marginal construction cost can be interpreted, therefore, as a 'regulatory tax' – the additional cost of space resulting – in aggregate – from the system of regulation in that particular market. If the sales price of an additional floor of office space exceeded the marginal cost of building this additional floor then developers would have an arbitrage opportunity. The difference between the price of floor space and its cost of construction must be due to some form of regulation.

This is illustrated in Figure 1 which depicts the cost curves of representative competitive developers in (by assumption) two unregulated markets; one relatively prosperous and 'attractive' office market, say, London (L) and one less prosperous and 'attractive' market, say, Birmingham (B). For illustrative convenience, we assume that the marginal construction cost curve (MCC) is identical in both markets implying that wages, materials and other variable costs do not vary regionally. We also assume – quite reasonably – that buildings of a given type have an optimal floor plan to height ratio (given the price of land). To make the diagram easier to follow we intentionally exaggerate the extent to which marginal construction costs rise with building height.

Fig. 1: A Developer's Cost Curves without Space Restrictions



In a competitive market P=MCC=AC and is given. The demand curve that the firm faces is flat. The regulatory tax RT is P-MCC=0 in both cases.

In Figure 2, we illustrate the economic rent of land for the two markets.

Fig. 2: Land Rents

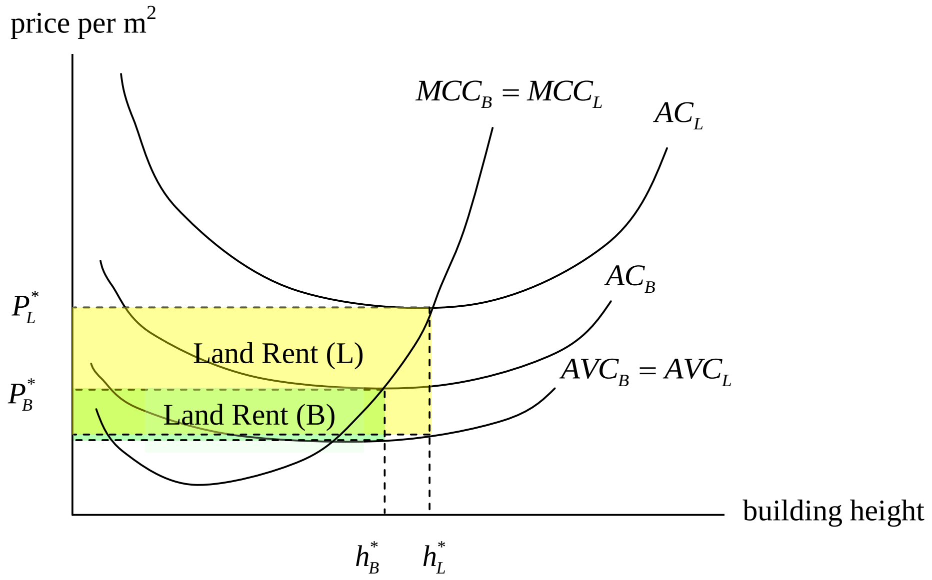


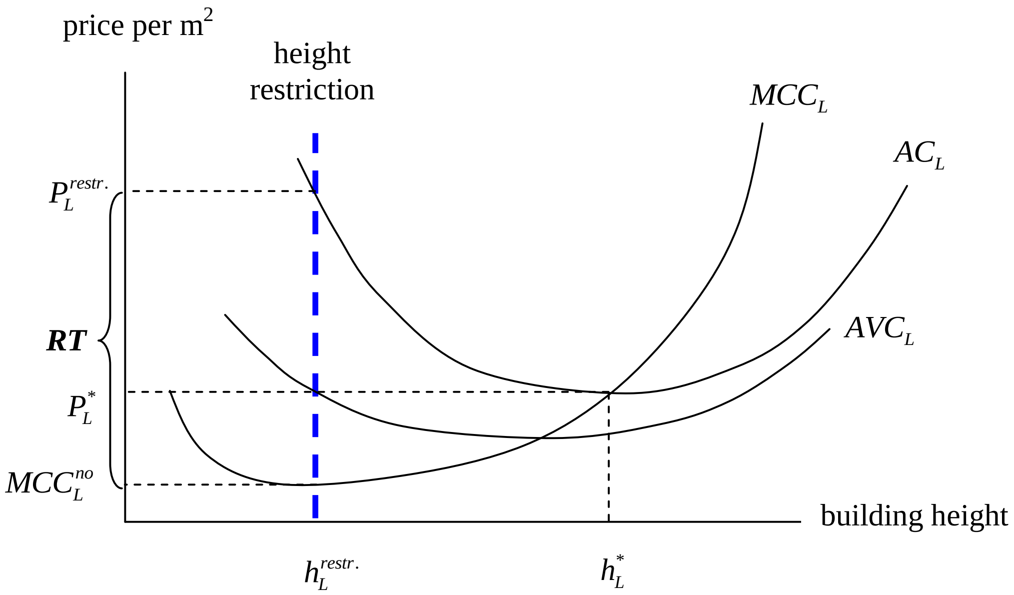
Figure 2 also includes the average variable cost curve, AVC, which covers all inputs except land. The average cost curves, AC, of course include the costs of the fixed factor, land. The differences between the price and the average variable costs at the optimal building height can therefore be interpreted as land rents (subject to site preparation and infrastructure costs). The illustrated cost curves imply that building heights will be higher, and so MCC will also be higher, in London. Underlying 'pure' land values are relevant in the sense that, given different input costs, the optimal capital to land ratio will be different in different markets. The land rent is greater for London than for Birmingham so buildings are higher but the difference in land rents between the two markets does not affect the value of the RT. In the absence of restrictions, RT will be zero. This, indeed, is one of the attractions of the RT measure. Since land costs are an element in fixed costs, they never affect the measured RT. Since land costs are difficult to measure and it is considerably more difficult still to estimate any impact of land use regulation on the cost of land, the RT measure of the costs of regulation entirely avoids a difficult problem.

We can think about this in more detail by considering two cases. Case F is the unregulated situation while Case R is the regulated one.

Case F: Suppose we have an unregulated world with a competitive development and office market and the cost of an additional floor rises with building height: then building heights rise until, per m^2 Marginal Cost of Construction (MCC)=Marginal Revenue (MR)=Average Cost (AC)=Price (P)=Average Revenue (AR). In such a market, therefore, the price per m^2 includes all costs for a given building: construction + land + normal profit. Suppose we then add a hypothetical additional floor. The MCC per m^2 is higher for this additional floor than for the existing highest floor but price is not. The 'land' is already paid for in the existing building, part of fixed costs and included in AC. There is, then, no appreciable RT.

Now consider the regulated world of Case R in which there is a constraint on building heights. We have an existing building and a competitive development and office market, but it is no longer true that building height rises to the point at which MCC=MR. They could profitably be higher but this profit is capitalised into the price paid for land so profits are still 'normal'. Land is a fixed cost included, therefore, in average costs. So if we now add a hypothetical floor to an existing building, there is no extra land cost. The marginal cost is only the extra construction cost but the price reflects the constrained supply, now without land rents having to be paid for, so price exceeds MCC and the difference represents the gross cost of regulation – or the RT. This is illustrated in Figure 3.

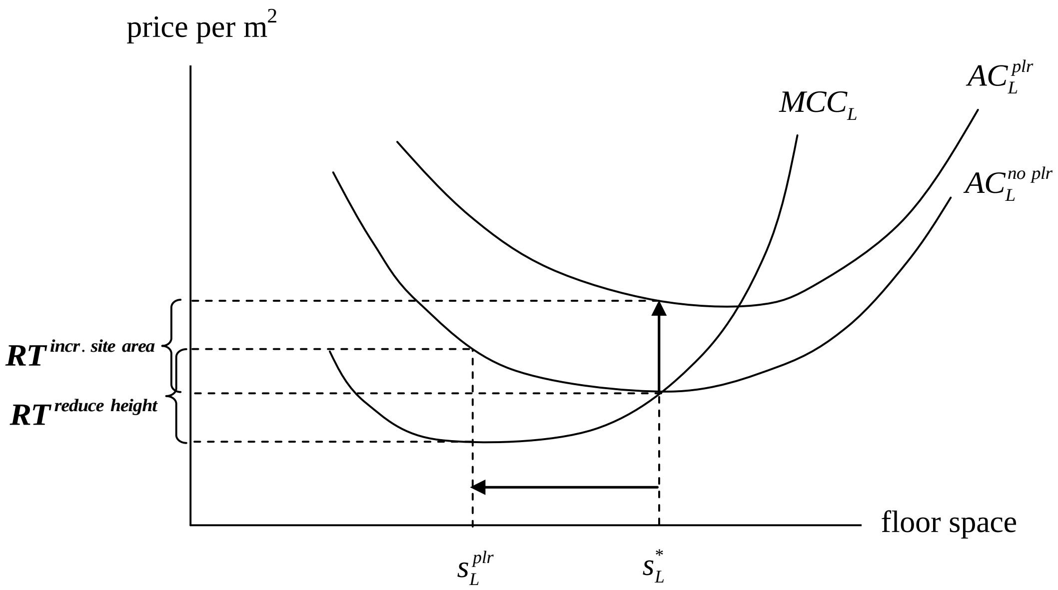
Fig. 3: A Developer's Cost Curves with Height Restrictions (London only)



The fact that the price of the extra space in Case R is higher has nothing to do with paying for the land but reflects the constraint, including scarcity of space. Although the RT measure eliminates the impact of land costs in the current regulated market conditions if the market were unregulated, land costs per m^2 would be lower: so the observed MCC in a regulated market is likely to differ from that in an unregulated market.

Other forms of planning imposed constraint are possible, however. Plot ratio constraints (in the USA floor area ratios) which determine the maximum floor space relative to the size of the site are common. Again consider first a world without constraints. In the absence of any regulations the developer would choose an optimal floor plan and corresponding optimal height such that MCC=AC=P. Moreover, the developer could ignore negative externalities, such as restricted views the building causes to its neighbours, so would have an incentive to choose the site just big enough to accommodate the floor plan subject to user preferences and impacts of plot ratios on the productivity of the building.

Fig. 4: A Developer's Cost Curves with Plot Ratio Constraints (London only)



With the plot ratio constraint, however, in order to build the identical property, the developer would have to either (a) increase the size of the site, keeping the floor plan constant or (b) reduce the height of the building, again keeping the floor plan constant. Consider case (a) first. The additional land needed to reduce the plot ratio to reach the threshold level adds fixed cost, so increases AC, but has no effect on MCC. This effect is illustrated in Figure 4. The RT in this case is the difference between AC^{plr} and MCC at the original optimal floor space s^*. Alternatively (case b), the developer could reduce the height of the building until the corresponding floor space reduction (from s^* to s^{plr}) is sufficient to conform to the plot ratio constraint. This case is equivalent to the height restriction constraint described above. In this case the RT would be the difference between $AC^{no\ plr}$ and MCC at the point s^{plr}. The observed RTs in the two cases will not typically be the same but they will both be strongly positively correlated with the degree to which the plot ratio is binding.[7] Of course, the

[7] In fact it can be easily demonstrated for the case of linear MCC curves and land as the only fixed cost that both RT measures increase with the rigidness of the plot ratio constraint. The RT associated with a height reduction is always larger than the RT associated with a proportional increase in the site area. For example, if the optimal floor space needs to be reduced in half to comply with the plot ratio constraint, then the RT associated with the site increase is exactly 2/3 of the proportional height reduction. The relative difference between the two RT measures decreases with increasing rigidness of the constraint. In the limit, with the rigidness of the plot ratio constraint becoming extremely binding, the two RT measures become identical.

developer has a third option, to reduce the floor plan itself, keeping the site area and building height constant. In Figure 4 with floor space on the x-axis this is equivalent to the height-reduction case.

In reality, however, the two cases are not equivalent since at some point the cost per floor starts to rise exponentially with the number of floors. To illustrate this argument, consider the following case: To provide 36,000 m^2 of space (a large office building) with a floor plan of 1,200 m^2 would imply a 30 storey building and so a height of, say, 100 metres: to get the same space with a floor plan of only 25m^2 per floor would imply 1,440 stories – a building some 4.75 kilometres high. Clearly, apart from issues of technical feasibility, at some extreme height the cost of adding an additional storey will become astronomically high.

Now consider another extreme of hypothetical regulation: suppose that there are no constraints on building or land availability at all, but stringent compliance costs related to, say, permits, but such costs are a function **only** of individual buildings so are a fixed cost. Once the compliance process has been completed, the agreed building can be constructed with no further compliance costs at all. In such a case, the costs of compliance will appear as a fixed cost and, if the results related to the incidence of Impact Fees are applicable (Ihlanfeldt and Shaughnessy, 2004) will be fully (negatively) capitalised into land prices. Thus, there could be no impact on marginal construction costs or on the price of space. There will be a deadweight loss, but this loss will fall uniquely on the price of land although given that the profitability of transferring land from agricultural to urban use will be reduced, it could reduce the overall supply of urban land and so have some affect on space costs.

For illustrative purposes, the analysis above has been in a partial equilibrium setting from the perspective of a single developer or building. However, in practice not all regulatory constraints are as simple as this. In Britain there are simultaneous restrictions imposed on plot ratios, building heights and on the total area of land on which, in any city, it is permitted to build offices as well as compliance costs. In these circumstances in any city in which there is a strong demand for office space, there will be a binding constraint on total space availability driving up both the price of space and the price of land with permission to develop. It will still be clear, however, that AC (which includes the costs of land) will be above MCC so the RT measure will reflect the overall space constraint in the market.

What these examples suggest is that the relationship between measured RT and the actual gross costs of regulation (if these could be measured exactly) is, in principle, a variable one and will depend on the precise form the regulatory constraints take. So long as at least an element of the regulatory constraints takes the form of restrictions on the height of buildings and plot ratios, however, the measured RT will be strongly and positively correlated with the actual gross costs of regulatory constraints. The RT measure, however, will likely be a **lower bound** estimate of the gross costs because, for example, some of the regulatory constraints may relate to compliance costs or costs of delay.

Need this concern us particularly in the case of British offices? Restrictions on building heights take several forms but are applied in all British markets. In the City of London, for example, no less than eight separate 'view corridors' of St Paul's cathedral (both foreground and background) are protected from building above some 55 metres and five 'view corridors' of the Monument are similarly protected as are four street blocks around the Monument (City of London, 1991). There are, in addition, extensive 'Conservation Areas' within which very limited changes to the external appearance of buildings is possible – obviously including height - and, throughout the City – as in all British cities – there are 'plot ratios' controlling the total size of buildings relative to the size of the site. These were set at 5.1:1 in the City (City of London, 1991, para. 16.42). There are, in addition, other regulations affecting the design of buildings which limit height and space within them. Planning policies in London's West End are substantially more restrictive than those in the City, since very large areas – most of Mayfair and Belgravia – are designated Conservation Areas where it is not possible to build higher than the existing structure and changes to the external appearance of buildings are prohibited. If the building is individually listed – as a high proportion of buildings in London's West End are – then even internal alterations are prohibited. Such historic conservation regulations undoubtedly generate amenity values, not included in a measure of RT.

In summary, then, the RT measure of the gross costs of regulatory constraints on buildings is something of a black box in that it will incorporate the cost of restrictions on the supply of land for the use in question and restrictions on building heights. These may arise from various sources but are imposed in all British office locations by 'plot ratio' controls. Since land use planning is a national system in Britain it seems likely that compliance costs and costs of delay do not vary significantly across locations but such costs will not be fully captured in the RT measure and may not be captured at all. So we can conclude that estimated RT values will be strongly and positively correlated with actual gross costs of regulatory constraints but in absolute terms may be lower bound estimates.

3 Data and methodology

Here we discuss the data used to estimate regulatory tax values which as noted above, we express as a rate relative to marginal construction costs. The total unemployment rate and service employment growth rate data used in the subsequent analysis are discussed in Section 6. To estimate the RT we need 'price' and 'marginal construction cost' data. Our empirical analysis builds on the best available data for the British office market and a number of continental European cities. After careful and detailed discussion to agree how best to measure *marginal costs of construction* (i.e., the estimated cost of adding an additional hypothetical floor to an existing building) Davis Langdon estimated time-series data for the agreed definitions by market (per square metre). Davis Langdon is the leading UK producer of construction cost data for the building industry and produces the Spon Handbooks used by quantity surveyors and architects (Davis Langdon, 2005). A detailed description of the methodology Davis Langdon used to derive the marginal cost of construction is explained in Cheshire and Hilber (2007). Gardiner and Theobald (2006) – Davis Langdon's major competitor – provide (average) construction cost data for our sample of continental European cities. Unfortunately, comparable time-series data on the market *price* of office space, in the sense of capital values, is not readily available; only data on rents, yields, vacancies and rent free periods can be obtained. CB Richard Ellis (CBRE) the largest property consultancy in the UK, provided the relevant data for British markets. Similar data (although estimated on a different basis) were also provided by Jones Lang LaSalle (JLL) for a number of our British locations and all the continental European ones we report estimates for in Table 2. We used the common British locations to make the best adjustment we could to a comparable basis.

Only rental not capital values are available because office buildings are treated as income producing assets that are typically leased floor by floor. We therefore need to impute the market price per m^2 of an additional floor of office space (the 'capitalised value') using the available information on rents, yields, rent-free periods and vacancy rates. The estimation procedure is briefly described below and descriptive statistics of the relevant data are provided in Appendix Table A1. Since we do not observe transaction prices but must rely on estimates, we carry out a quite extensive sensitivity analysis using the most 'conservative' and 'radical' assumptions which are defensible to estimate capital values. These provide a range of estimates for the RT (see Table 1) although most of the discussion is in terms of what we regard as a relatively conservative, 'central' estimate.

TABLE 1
Summary Statistics: Regulatory Tax relative to Marginal Construction Cost

Variable: Ratio: Regulatory Tax / MCC	Obs.	Mean	Std. Dev.	Min.	Max.
Specification:					
Based on prime rent (*no adjustment*)	480	3.70	2.92	0.13	22.06
Prime rent *partially adjusted* for rent-free periods	480	3.03	2.66	-0.05	19.81
Prime rent *fully adjusted* for rent-free periods and vacancy rates (**central estimate**)	480	2.64	2.37	-0.14	17.55
Upper bound: Assume 10% premium for top floor plus 50% of fully adjusted total occupation cost markup	480	3.88	3.10	0.15	23.95
Based on fully adjusted prime rent plus 10% premium for top floor	480	3.01	2.60	-0.05	19.41
Lower bound: As central estimate but assume 0.5 percentage point higher yield	480	2.37	2.15	-0.18	15.78

Data Sources: CBRE (prime rent, yield and total occupation cost information), Davis Langdon (marginal construction cost information), IPD (national void rate index) and ODPM (regional vacancy rates).

Our data for the RT estimates for British office locations come from four different sources. CBRE (which incorporates the former CB Hillier Parker and before that Hillier Parker, the first agency to publish rental and yield data including the Investors Chronicle Hillier Parker reports) provided us with (headline) prime rents and equivalent yield and rent-free period data for 14 office locations in the UK (see Appendix Table A2 for a list of the markets and data available). Most time-series go back to 1973 with two series (those for the City of London and London West End) reaching back to 1960. CBRE also provided us with total occupation cost data, although only for 2004 and 2005 and for 8 of the 14 relevant markets. We obtained the matching marginal construction cost data for all 14 markets from Davis Langdon, based on actual construction projects in those markets going back to 1961. Finally, we obtained regional vacancy rate information from the Office of the Deputy Prime Minister (ODPM) and national rental void (vacancies) data from Investment Property Databank (IPD).

The data for the RT estimates for European office locations come from two additional sources. JLL provided us with prime rent and equivalent yield data from 1990 to 2005 (continental European cities) and for 1987 to 2005 (British cities). These allow us to compute hypothetical capital values (so called 'Peter Pan values') based on the assumption that the buildings are permanently renewed. Unfortunately, JLL could not provide us with matching information on voids or vacancies, so we use the ratio of the CBRE to JLL estimated values where we have common locations (for six British locations) to obtain as comparable as possible a set of capital values for all locations, British and continental European. Gardiner and Theobald's (2006) 'International Construction Cost Survey' provides *average* (as opposed to *marginal*) construction cost data back to 1999 so we can estimate RT values from 1999 to 2005. We use the ratio of marginal to average construction costs from Davis Langdon and Gardiner and Theobald for the two markets (the City of London and London West End) for which both sets of data are available to estimate the hypothetical marginal cost of construction for the continental European office locations.[8]

Imputing Missing Values

Our raw data come in different time-intervals. The prime rent data, for example, are quarterly for the City of London and London's West End back to 1960; however, they are quarterly, monthly, half-annually and annually for the other 12 markets, in all but three cases, back to 1973. Similarly, the yield data come in various time intervals. The construction cost data are annual. Hence, in order to make our data comparable, we use annual numbers when available and compute annual numbers when not.

Even though we use annualised data, we still have missing values for a number of variables and markets. For example, we only obtained *rent-free period data* for two markets (the City of London and London's West End) and only between 1993 and 2006. For the remaining years and other markets we need to impute the rent-free periods using the available data (see Cheshire and Hilber, 2007, for details). Similarly, we need to impute *equivalent yields* prior to 1972 using the available data (again see Cheshire and Hilber, 2007, for details). The imputed values obviously introduce an additional degree of uncertainty into estimates prior to 1972. We also have to impute *vacancy rates* from relatively short time-series of regional data from ODPM and longer time-series data from IPD; details are again available in Cheshire and Hilber (2007). Imputing values of yields could, we believe, have a significant impact on the final estimates of RT. So we should be very cautious with respect to any interpretation of estimated values of the RT prior to 1972. The absolute differences to estimates resulting from any plausible alternative values of rent free periods and vacancy rates are, however, comparatively small. We are confident, therefore, that while the need to impute values for such data is not entirely satisfactory, the additional margin of error it may introduce into the estimates is small in relative terms.

We have to impute *missing rental values* using national rent-index data from Hillier Parker (today CBRE). The Hillier Parker ICHP national rent-index data is available back to 1965 but only for three years. This does allow us to impute missing rental values between 1965 and 1972 but for missing years, we assume a linear trend.

Finally, we impute total occupation cost by assuming a constant scaling factor to fully adjusted prime rents using the ratio: average of the total occupation cost for each market in 2004 and 2005 divided by fully adjusted prime rent. We can match prime rent and total occupation costs for 8 of the 14 markets. For the remaining 6 markets we assume the ratio of the geographically closest market for which data are available.

[8] This approach is imperfect as it is unlikely, as an anonymous referee pointed out, that the relationship between average construction cost (ACC) and marginal construction cost (MCC) is constant across markets and over time. In fact, one can show that to the extent that continental European markets have lower ACC and MCC and are less strongly regulated (compared to the two London markets) we will overestimate the RT for the low cost and less rigid markets, suggesting that the true RT for the least regulated market (Brussels) might be even closer to zero than we estimate. Similarly, to the extent that the true RT in any continental European market is decreasing (increasing) over time, our approach will tend to understate the change. Observations for the City of London for which we have the two alternative estimates of the RT appear to confirm the predicted bias; when we use the actual MCC we estimate quite a steep decline in the RT between 1999 and 2005. When we have to rely on adjusted ACC information we find a much less steep decline.

Our goal is to estimate, as accurately as possible, the magnitude of the RT over time for the 14 local office markets. The RT (expressed as a tax rate) can be formulated as:

$$RT_{jt} = \frac{V_{jt} - MCC_{jt}}{MCC_{jt}} = \frac{V_{jt}}{MCC_{jt}} - 1 \tag{1}$$

where V_{jt} is the market value of an additional square metre of office space in market *j* at time period *t* and where MCC_{jt} is the corresponding marginal construction cost of adding one square metre of an additional floor.

The market value of a square metre of additional office space is estimated using the 'Equivalent Yield Model', which is probably the most commonly used model to value income producing property in Britain (see Brown and Matysiak, 2000, for details). According to the equivalent yield model, the property value can be expressed as:

$$V_{jt} = \frac{I_{jt}}{y_{jt}} + \frac{R_{jt} - I_{jt}}{y_{jt}\left(1 + y_{jt}\right)^{n_{jt}}} \tag{2}$$

where V_{jt} is the value of the property (in location *j* at time period *t*), y_{jt} is the corresponding equivalent yield, R_{jt} is the so called 'current rental value', I_{jt} is the 'passing income' and n_{jt} is the number of years to the next rent review.

The equivalent yield is equal to the internal rate of return (IRR) of two cash flow streams (a stream of 'passing incomes' up to the rent review and then a stream of current rental values, assumed to be constant, in real terms, in perpetuity). The 'passing income' (which is expressed in nominal terms) only includes the rents that the tenants 'pass' on to their landlord. Tenants that are still in their rent-free period or non-rented space do not contribute to the passing income. Hence, in order to get from the (headline) prime rent to the passing income, adjustments for rent-free periods and vacancies have to be made as follows:

$$I_{jt} = Prime\ Rent_{jt} \times \left(1 - \frac{Rent\ Free\ Period_{jt}}{Typical\ Contract\ Length}\right) \times \left(1 - \frac{Vacancy\ Rate\ in\ \%_{jt}}{100}\right). \tag{3}$$

The 'current rental value' is measured in real terms and is assumed to remain constant in perpetuity. The capitalised value of the current rental value reflects the reversion value at the time when the current lease expires.

If we make the reasonable assumption that the current rental value (in real terms) equals the passing income, then the property value can be expressed as

$$V_{jt} = \frac{I_{jt}}{y_{jt}}. \tag{4}$$

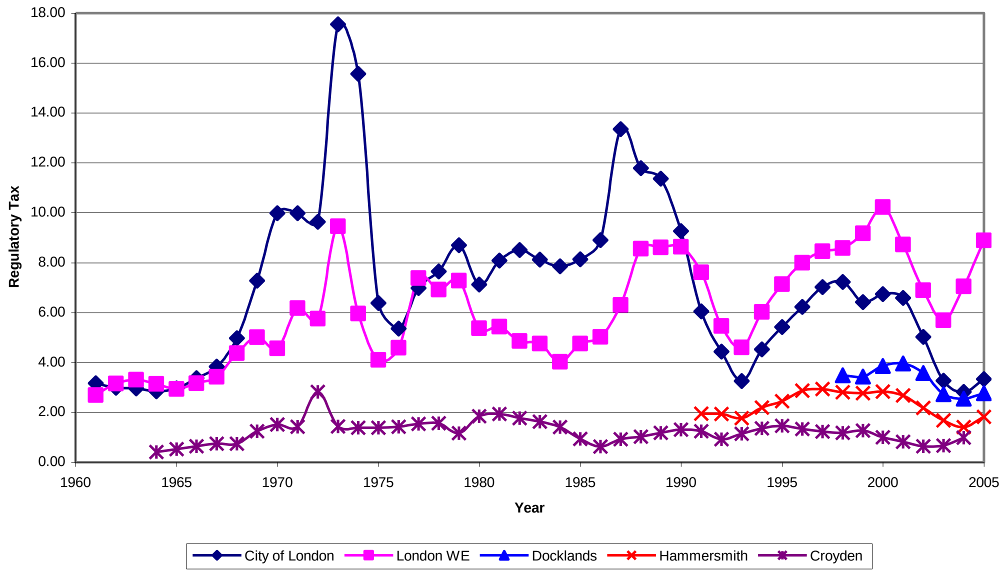
Using equation (3), the estimated value can finally be expressed as:

$$V_{jt} = \frac{\text{Prime Rent}_{jt} \times \left(1 - \frac{\text{Rent Free Period}_{jt}}{\text{Typical Contract Length}}\right) \times \left(1 - \frac{\text{Vacancy Rate in \%}_{jt}}{100}\right)}{y_{jt}}. \quad (4.1)$$

The main advantage of using the equivalent yield model to estimate the capitalised value of office space is that it requires estimates of only two unknown variables – passing income and the equivalent yield. The equivalent yield can be estimated from comparable properties in the local market place that have recently been sold.

Although the equivalent yield model is simplistic and obviously has a number of serious economic shortcomings, it provides surprisingly accurate valuations. This is probably for some combination of two reasons: First, professional valuers ('appraisers' in the US) are familiar with subtle changes in the market that will influence the choice of yield; and second, valuers' valuations – based on the equivalent yield model – are the basis for transactions. Hence, even if a valuation does not reflect the 'true value' of a property (reflecting all future cash flows discounted at the 'correct' rate), as long as buyers and sellers use the same valuation model, they will end up agreeing on a (transaction) price that reflects the model's predicted value.

Fig. 5: Regulatory Tax (Central Estimate)
London Office Markets



The regulatory tax rates, RT, are reported for all 14 markets and for all time periods with available data (see Figures 5 to 8).

The above outlines the way in which we estimated the 'central' value of the RT. Given that the RT is not directly observed but must be estimated making various assumptions, it is sensible to carry out a robustness check of results altering the underlying assumptions: specifically, we estimated RT values for three different sets of assumptions.

1. <u>Upper Bound</u>: Assume that 50% of the difference between total occupation cost and prime rent is due to a regulatory tax and assume a 10% rent-premium for top floor space.

2. Use the fully adjusted prime rent as the basis (as in the central estimate) but assume a 10% premium for top floors.
3. <u>Lower Bound:</u> Use the fully adjusted prime rent as the basis (as in the central estimate) but assume a 0.5 percentage point higher yield than reported by CBRE.

Fig. 6: Regulatory Tax (Central Estimate)
South East Office Markets

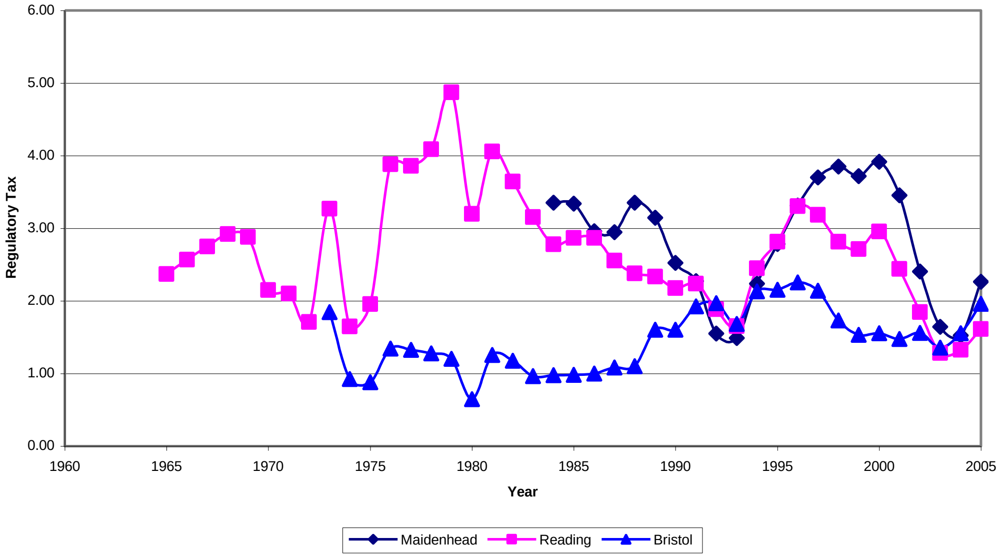


Fig. 7: Regulatory Tax (Central Estimate)
Midlands and North Office Markets

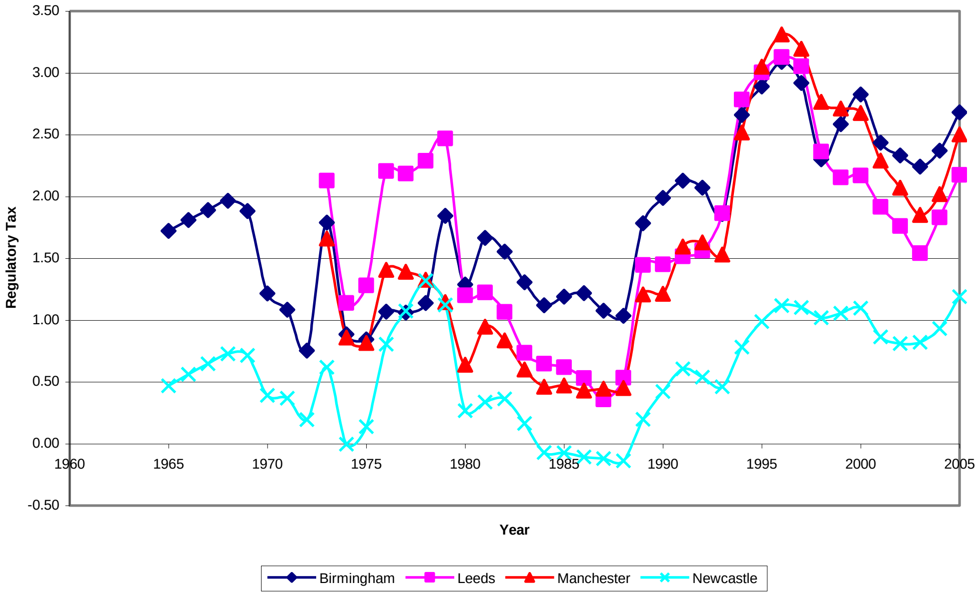
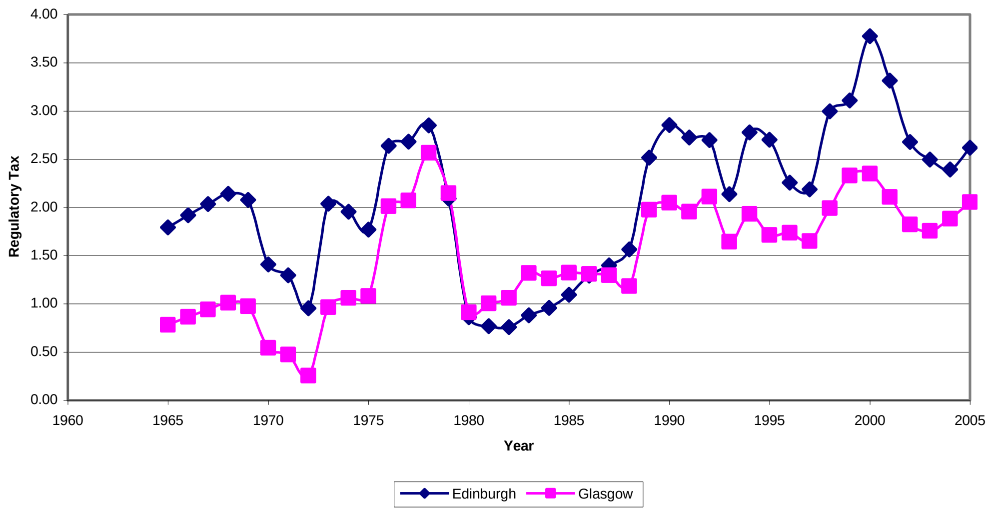


Fig. 8: Regulatory Tax (Central Estimate)
Scottish Office Markets



4 Results and their Interpretation

The results are summarised in Tables 1 and 2 and in Appendix Table A3. Table 1 illustrates the sensitivity of the results to alternative assumptions. It is clear from this that there are no realistic assumptions which eliminate a substantial RT. The mean value, at 2.37, even for the most conservative lower, lower bound estimate, is more than twice the highest value estimated for Manhattan housing by Glaeser *et al* (2005).

Table 2 reports the RT (central estimate) for all 14 UK office markets with available data and for 8 continental European locations as well as values for Manhattan offices from Glaeser *et al* (2005). The UK markets were selected to cover as wide and representative a range as possible including the main office locations in Scotland. We report values for 1999, 2005 and the mean for years from 1999 to 2005. Our focus on those years is because they are the only common years for which we have RT estimates for all locations.

The Appendix Table A3 shows the annual mean values. We should largely discount values before 1973 since these are i) weighted to the two London markets; and ii) they are less reliable for reasons given above. It is immediately clear that the value of the regulatory tax moves with the real estate cycle. In principle – at least in the longer term – it should not be influenced by demand but real estate prices are substantially more volatile than are construction costs. This, of course, is one effect of regulatory restrictions which constrain supply and so reduce its elasticity in the upswing and increase the volatility of the cycle. An interesting point is that the standard deviation of completions relative to stock of office space in Brussels – our continental European location with the lowest estimated RT (see Table 2) – was twice that of London over the period 1986 to 2001 (Jones Lang LaSalle, 2001). The high point of 4.01 for the mean value for British locations, reached in the boom of 1973, has not been exceeded since although this is partly a weighting issue: in 1973 the London markets had a greater weight in the mean. Nevertheless, the basic message is clear: the value of the estimated regulatory tax on office space averaged across all British office markets is an order of magnitude higher than the peak observed in the most highly regulated sector of the most regulated market in the US and substantially more than in comparable continental European locations.

TABLE 2
Estimates of Regulatory Tax for UK Office Markets and Selected European Cities

City	Estimated Regulatory Tax Rate (RT)		
UK Markets†	1999	2005	Average 1999-2005
London West End	9.18	8.89	8.09
City of London	6.41	3.34	4.88
Canary Wharf	3.43	2.77	3.27
London Hammersmith	2.77	1.82	2.19
Manchester	2.71	2.50	2.30
Newcastle upon Tyne	1.06	1.19	0.97
Croydon	1.18	0.99	0.94
Edinburgh	3.11	2.62	2.91
Glasgow	2.33	2.05	2.04
Maidenhead	3.72	2.27	2.70
Reading	2.71	1.61	2.03
Bristol	1.53	1.96	1.57
Birmingham	2.59	2.68	2.50
Leeds	2.15	2.17	1.93
Selected European Cities‡	1999	2005	Average 1999-2005
London West End	7.62	8.37	8.00
City of London	4.68	4.31	4.49
Frankfurt	5.44	3.31	4.37
Stockholm	4.28	3.30	3.79
Milan	2.07	4.11	3.09
Paris: City	2.35	3.75	3.05
Barcelona	2.23	3.16	2.69
Amsterdam	2.12	1.92	2.02
Paris: La Défense	1.41	1.93	1.67
Brussels	0.52	0.84	0.68
United States (based on Glaeser *et al*, 2005)	1996 (cycle bottom)	2000 (cycle peak)	
Manhattan (New York City)	0	0.50	

† Estimates of capital values are based on data provided by CBRE, IPD and DCLG. Estimates of the marginal construction costs of space for each location were specially calculated for us by Davis Langdon. It is thought that these data together provide a more accurate estimate of underlying values of the 'Regulatory Tax' than do the average adjusted data used for Continental European locations. The parallel estimates for the two London locations provide a comparison. ‡ Estimates are based on capital value data provided by Jones Lang LaSalle (JLL) and construction cost data provided by Gardiner and Theobald. The data from JLL are hypothetical capital values based on mid-point yields and prime rent information. We adjusted these values to predict actual capital values. The Gardiner and Theobald *average* construction cost estimates are adjusted by another scaling factor to estimate *marginal* construction costs. This scaling factor is derived by using marginal construction cost information from Davis Langdon. Details of the computation methods are available in Cheshire & Hilber (2007).

It is more revealing, however, to look at the time series data for the individual markets reported in Figures 5 to 8 – continuing to focus on the central estimate. The most revealing point of all is the contrast between the City and West End of London and the role of Canary Wharf and the development of the Docklands. Until the early 1980s, the City office market dominated supply and the City was the dominant location, with a quasi-monopolistic control. It had a highly restrictive planning policy both in terms of height restrictions (which still endure) and historic designation. Even as late as 1981, 22 conservation areas, affecting 28% of its land area were designated (Fainstein, 1994). The response to the expansion in demand for office space from the 1960s was a rapid rise in prices reflecting the supply restrictions. The estimated value of the RT reached a high point in 1973, only just below a value of 18 (a 'tax rate' of 1800%). This fell back to just more than 5 in the downturn of the mid-1970s.

Another difference between the City and all other office locations except London's Docklands – a special case controlled by the London Docklands Development Corporation (see Section 6) – is that of the political economy of the control on planning. In all locations other than the City (and Docklands), voting, and so political control, rests with the resident adult population. As has been cogently argued by Fischel (2001), depending on rates of owner occupation which are high in the UK, this produces a pressure to restrict development to protect house owners' asset values. This is likely to be re-enforced by the asymmetry of the incidence of costs and benefits of physical development. The costs - both short term disruption and in terms of asset value losses - are very localised while benefits are thinly and widely spread. In the City of London, however, political control of the planning system rests with the City Corporation which is controlled by the local business community and its interests.[9] While these include property owners and real estate investors, the business community is dominated by other groups who have a mutual interest in retaining the City as a successful and competitive location for their businesses.

As is explained by Fainstein (1994), the threat of the deregulation of financial services, actually introduced in 1986, concentrated the City fathers' minds wonderfully.

> "….once the economic benefits of restricting growth ended, attitudes towards physical change easily became more flexible….Financial firms that already possessed space adjacent to the Bank of England benefited from their monopoly position and had no motivation to favour expansionary policies. Financial deregulation and competition changed the stakes. Competitive office development in the nearby Docklands threatened the interests of… the City ….Once the decision to reverse the previous conservationist attitudes had been made, the City's officers embarked on an active promotional effort. The planning director solicited advice from firms concerning their space needs and encouraged developers…to accommodate them…until the 1980s the City did not have a planning officer but only an architect who concerned himself with design approvals…new developable land was designated…and floor area ratios were modified to…permit an average of 25% expansion in the size of buildings." Fainstein (1994, page 40)

The planning system in the City is likely, therefore, to be responsive to the interests of commercial tenants and threats to local competitiveness. Such threats were visible by the early 1980s. By the time of the property market recovery of the second half of the 1980s, and despite the growth of the financial services sector, the City was already under threat from both

[9] This goes back to the ancient privileges of the medieval city and the leverage its tax revenues gave it in negotiating a high degree of independence and local control from the crown.

Docklands and other financial centres (including satellite centres such as Reading in which more office space was constructed during the early 1980s than in the City itself) and its planning policies were becoming notably more relaxed. Its Unitary Plan, lodged in 1991 (City of London, 1991), but drawn up in the second half of the 1980s, identified as its first policy "To encourage office development in order to maintain and expand the role of the City as a leading international financial and business centre" (para. 3.19). By the end of the 1980s, there were already large scale modern developments in the City, built to the highest international standards. Broadgate, for example, opened in 1991, provided 360,000 m^2 of new office space.

Moreover, there was a radical change to the taxation of business property introduced in April 1990. Before then business property taxes (the business rates) had been set by local governments (which were also the Planning Authorities) and - subject to standard procedures for 'rate equalisation' across the country - the revenues had accrued to local communities. There was concern in the then Conservative government that anti-business, left wing local councils were boosting revenues and attempting to run re-distributive local policies funded by setting ever higher local business rates. This, it was thought, would hinder the long term competitiveness of British business. So in 1990 the Uniform Business Rate (UBR) was introduced with national rate-setting and with revenues accruing to central government. There was one exception, however; the City Corporation (self-evidently not anti-business!) was allowed to add its own 'precept' to collect its own revenues. Thus from 1990 there has been a strong and entirely transparent negative fiscal incentive for any local government in Britain, except the City of London, to permit any commercial development.

While the value of the RT in the City rose during the later 1980s as property values rose rapidly in the boom, it never reached the high of 1973. Indeed, in contrast to the rest of Britain, the RT estimate for the City has been on a downward trend since 1973. We can see from the evidence that is available for the Docklands that the regulatory regime was far less restrictive there, with an estimate of the RT never exceeding 4 – though that still represents a quasi-tax rate of 400%. The West End, where there is political control by residents and a negative fiscal incentive for development, is a market which specialises in sectors other than financial services. It has much stronger planning protection for conservation reasons, with height restrictions which are impossible to breach (unlike in the City where, outside the conservation areas or protected sight lines, employing a 'trophy architect' has been an emerging mechanism for building higher). As a consequence, the West End has, in contrast to the City, experienced a steady increase in estimated RT with its high value of 1973 exceeded in 2000 and with an estimated value of 8.1 for the period 1999 to 2005 – almost twice that in the City.

The pattern outside the London locations is much as would be expected. The estimated RT was much lower until quite recently and in Newcastle in the 1980s was negative for a short time.[10] In a representative, prosperous, satellite centre such as Reading, which was a major

[10] Although our judgement is that it is safest to use the estimated RT values as an *index* of regulatory costs, the fact that in locations where we know planning systems are flexible – most obviously Manhattan, for offices, and Brussels – absolute values are estimated to be close to, or zero – suggests RT is at least not inconsistent with an *absolute* measure. The fact that in a depressed local economy, as Newcastle was in the 1980s, values are estimated to be around zero also re-enforces this point. Note also that for the one market where we have precise information on land values (see Cheshire and Sheppard, 2005) and so can estimate average total costs directly – Reading in 1984 – our calculated RT values are very close to those estimated using the methodology outlined in section 3: 2.46 or 2.82 (depending on whether one measures for a 6 or 7 storey building) compared to 2.78 as estimated.

recipient of the back office move from London from the late 1960s, the value of the RT was high during the late 1970s and early 1980s but fell back somewhat as the market expanded. By 2000, the local market was quite specialised in hi-tech companies and the value of the RT fell below 2 as the dot.com boom collapsed. It has been creeping up since 2002/2003. The absolute value varies in provincial centres, with Edinburgh, Birmingham and Leeds seemingly the most restrictive. But it has been tending to rise in all centres since the mid 1990s and has only been consistently below a value of 2 in Newcastle, in the relatively depressed North East.

All these numbers relate to our 'central' estimate but, of course, values of measures on alternative assumptions follow similar trends – just absolute values differ. Perhaps the salient fact is that even on the most conservative of all assumptions there is a significant positive estimated value for the RT in all locations for recent years. The lowest – Newcastle – has a value of more than 1.6 and most major provincial centres are around 2; London's West End has had an estimated value of between 4 and 9 since the early 1970s. These are estimated on the most conservative assumptions, so are lowest of bounds, and compare with a value not significantly different from zero for offices in Manhattan (Table 2). Moreover, there may be a degree of endogeneity between construction costs and planning restrictiveness. In areas like the City or the West End developers may need an expensive design and a 'trophy architect' to get planning permission for buildings offering more rentable space per unit area of the site. In Newcastle during the 1980s, the local community may have been so pleased that any developer wanted to build that it was correspondingly easier to get permission. This possible endogeneity will mean that our central estimate systematically tends to understate the value of the RT rather than overstate it, however, and this should be borne in mind in interpreting the alternative estimates and selecting the most plausible. Against this we do find zero values in the least constrained locations (see footnote 10).

5 International Comparison of Regulatory Tax Values

Table 2 also reports estimated RT values for a number of cities across Europe; Amsterdam, Barcelona, Brussels, Frankfurt, Milan, Paris City, Paris La Défense and Stockholm. We use essentially the same methodology as described above but different data sources (JLL instead of CBRE and Gardiner and Theobald instead of Davis Langdon) and have to make a number of additional adjustments – described in Cheshire and Hilber (2007) – to compute values of RT as comparable as possible to the more accurately computed values for British locations.

We also report RT values for two British office markets for which both Davis Langdon and Gardiner and Theobald construction cost data are available – the City of London and London West End. This provides a cross-check on the comparability of estimates. There is only a relatively small difference in estimated values (as the mean of the RT between 1999 and 2005) for the two markets; 4.5 versus 4.9 for the City and 8.0 versus 8.1 for the West End. Overall, the relatively small differences suggest that our estimates for the continental European markets are quite comparable to those for the British office markets (see also footnote 8).

When we compare our RT estimates for the various European office markets the first result that catches one's eye is the fact that the two London Markets top the 'league table' with the West End's RT estimate of 8.0 being more than twice that of any continental European city except Frankfurt with 4.4. Stockholm and Milan also appear to have comparatively high RT values with 3.8 and 3.1. This is consistent with anecdotal evidence for these markets. For example, Milan is a very tightly regulated city with strict height restrictions in place. Not surprisingly, suburban locations have started to develop outside Milan; first Milano 2 and Milano 3 in the late 1960s and 1970s and now Milano Santa Giulia.

As in London, estimated RT values in Paris differ quite substantially within the metro area; they are much higher in the 'historic' City of Paris, where conservation regulations are tight, than they are in La Défense, a purpose planned new office and commercial centre on the edge of the historic centre. Finally, the city that we had expected to have the lowest RT is indeed at the bottom of the 'league table'. Belgium is well known to have a flexible land use regulation system which imposes little constraint on supply. In Brussels – despite the rapid increase in demand for office space as a result of the increasing size and influence of the EU institutions - we estimate a low RT of 0.7, although this value is still higher than that estimated by Glaeser *et al* (2005) for the office market of Manhattan.

Overall, the RT comparison for the European office markets suggests (a) that the British office market is by orders of magnitude more supply constrained by regulation than other office markets in Europe and (b) that European cities generally seem to be subjected to tighter regulatory restrictions on supply and consequently higher RT values than those found in the United States. Below, we turn again to the British office markets in an attempt to explain the determinants of their restrictiveness.

6 The Political Economy of Planning Restrictiveness

If the estimated value of the RT really represents a measure of the costs of regulatory restrictiveness – we should be able to model its determinants. As noted above, in areas where there is control of planning policy by local residents – overwhelmingly owner occupiers – we should expect a strong resistance to development. Not only are there short run costs to local residents from large scale construction but there are likely to be environmental costs and losses of amenity values. Benefits – in the form of more jobs or higher wages – are likely to accrue as much to non-residents as to residents given the small size of local government areas in the UK. In addition – re-enforced since the introduction of the UBR in 1990 – there will be a powerful fiscal disincentive; even before 1990, the impact on local budgets of business property development was probably unfavourable because of the high proportion of local revenues coming from central government and rate revenue equalisation across local communities. Since the introduction of the UBR local communities are, in effect, fined for allowing any commercial development so the only incentive for local residents to allow the development of commercial real estate would presumably be perceptions of falling local prosperity. This is likely to be most plausibly formulated as fear of job loss and unemployment. Not only is unemployment – at least as measured by the monthly count of the unemployed – immediately available, unlike any other indicator of local prosperity, it is also the focus of real media and political interest. It is not chance that it has been continuously published for both Local Authority Areas and Parliamentary Constituencies since the 1960s. It is the only economic indicator published monthly for Parliamentary Constituencies and the House of Commons Library even publishes a separate report, *Unemployment by Constituency*. As one of us put it a long time ago:

> "For as long as there has been interest in the regional problem…..Unemployment differences have almost been *the* regional problem; they have certainly been used as the key indicator…" (Cheshire, 1973 page 1, emphasis in the original)

We should expect the City of London and Docklands to behave rather differently, however, since in these jurisdictions business interests control planning policy. The City has a unique local governing body, the Corporation of the City of London. This is an historic entity and it has been exempt from all the major reforms of local government in the modern era, in particular from both the Municipal Corporations Act of 1835 and the legislation in 1969 which abolished the 'business' vote. The City is, in effect, a Central Business District with a few thousand residents, so the business electorate (including land owners and property companies but dominated by financial and other businesses located in the City) controls the Corporation, the planning authority for the area. Business voting power is weighted by the number of employees. The London Docklands Development Corporation (LDDC) was established in 1981. This was a directly appointed body, not an elected and representative one, with the specific brief to regenerate the large – 8.5 square miles - derelict port area immediately to the east of the City of London. The LDDC was responsible for all the major planning for the area until it was abolished in 1998 when planning responsibilities reverted to the local Boroughs of London. However, by then, the area had been transformed with the most notable development being Canary Wharf. In total over 2.3 million m^2 of office and industrial floor space had been developed.

Given, therefore, their different controlling interests we should expect these two planning authorities to be less restrictive of development, other things equal[11], and much more responsive to local economic conditions than resident-controlled planning authorities. For any given (change in the) level of local prosperity, the business controlled LAs would be expected to relax their constraints on development substantially more than would the resident controlled communities. We might, furthermore, expect to observe a change in regulatory restrictiveness as a result of the introduction of the UBR in early 1990, with all other British office locations becoming more restrictive relative to the City of London which, alone, retained the capacity to raise revenues locally from business property.

As noted above the best measure of 'local economic prosperity' would seem to be the unemployment rate of residents. It has the additional advantage that it is measurable, if with considerably more difficulty than might be imagined.[12] Because of the difficulties of estimating consistent long term time series for local area unemployment rates for our office locations, we experimented with four alternative techniques described in Cheshire and Hilber (2007). Appendix Table A4 provides summary statistics of our preferred unemployment rate measure used in the empirical analysis below. The very reassuring outcome, however, was

[11] But of course, other things are not equal since the restrictions (in terms of plot ratios, for example) are more or less constant across locations but demand for space is not, so a given restriction is more binding where demand is greater. This is reflected in the larger location fixed effects observed for the City (Table 3) than for other locations.

[12] There are two basic sources of data on unemployment in the UK: survey based data, conforming to ILO norms, available from 1973; and count-based, 'registration' data available since the early 20th Century. The problem is that prior to 1999 the sample for the survey based data was too small to give reliable results for local planning authority jurisdictions; and the registration measure is highly sensitive to both the incentives to register and rules governing who is actually counted. As unemployment rose from the late 1970s politicians could not resist manipulating the unemployment figures (registration data is released very quickly and is what the media focus on) by frequently changing both the incentive to register and the rules governing who was counted. Each of the changes had the effect of reducing measured 'registered' unemployment. To estimate unemployment rates for our local government units (representing the Local Planning Authorities) we calculated the ratio of survey to registration unemployment rate for the Government Office regions (NUTS 1) containing the local authority for each time period and used that to adjust the registration rate for the local authority area to a quasi-survey based value.

that the basic analytical results were essentially unaffected by the particular series for local unemployment used.

In summary our hypotheses are:
1. As unemployment rises, planning becomes less restrictive: that is, the RT is supply side determined;
2. The supply elasticity of response to unemployment is stronger in business compared to resident-controlled LPAs;
3. The City of London would have become less restrictive relative to all other locations following the introduction of the UBR in 1990;
4. The impact of the UBR on business costs <u>indirectly</u> via the increased fiscal disincentive to permit development might have more than offset any property tax reduction.

Table 3 shows the results from our first specification, pooling all 480 observations and including both year and location fixed effects. We estimate the following:

$$RT_{jt} = \beta_0 + \beta_1 \times U_{jt} + \varepsilon_{jt} \tag{5}$$

$$RT_{jt} = \beta_0 + \beta_1 \times \left(U_{jt} \times D_B\right) + \beta_2 \times \left(U_{jt} \times D_R\right) + \varepsilon_{jt} \tag{6}$$

Where:

RT = estimated value of Regulatory Tax
U = estimated British Labour Force Survey-equivalent unemployment rate
D = dummies for $_B$, business controlled, and $_R$, resident controlled local government
$_{j,t}$ refer to the location and year

We show results for five separate versions of the specifications in (5) and (6); in columns 1 and 2 we use contemporaneous values of the RT as the dependent variable. Column 1 reports results for the specification outlined in equation (5). We use the unemployment rate of the Greater London Area for the City of London, the West End and the Docklands and local unemployment rates for the actual nearest equivalent planning authority areas for Croydon and Hammersmith and all other non-London office markets.[13] All subsequent columns 2 to 5 report results for the unemployment rate interacted with a dummy for business or resident control (the estimating specification formulated in equation 6). The models reported in columns 3 to 5 use a moving average of the RT rather than the contemporaneous measure. This is one attempt to minimise the potential problem created by the RT measure being cyclically sensitive. Although in principle the impact of regulatory restrictions should not be sensitive to demand shocks, because the price of space is far more sensitive to the cycle than are constructions costs, in fact the RT measure is cyclically sensitive. Using moving averages of the RT should reduce this effect, albeit at the expense of degrees of freedom. We experiment with 3-, 5- and 7-year moving averages and using them produces the reassuring finding that results are, if anything, stronger. In subsequent tables we focus on the 3-year moving average of the RT as the dependent variable, particularly because we also use 3-year moving averages in the 'narrow window' specifications discussed below and want to maintain consistency. The 'narrow window' estimates provide a more stringent test of the pre- and post-1989 changes in the UBR but to use longer than a 3-year moving average would reduce

[13] In the case of Croydon and Hammersmith we experimented using the unemployment rate for the Greater London Area. However, the alternative unemployment measure made no difference to our findings. Results are reported in Cheshire and Hilber (2007).

TABLE 3
Explaining the Regulatory Tax—*Unbalanced Sample with Year Fixed Effects*
(Fixed Effects Model, 1961-2005, all locations)

	Dependent Variable: Regulatory Tax Rate (RT)				
	Contemporaneous		3 year moving av.	5 year moving av.	7 year moving av.
Explanatory Variable	(1)	(2)	(3)	(4)	(5)
Unemployment rate in local office market†	-10.936 (3.278)***				
Unemployment rate† × business controlled (b_B)		-27.881 (6.017)***	-28.319 (5.360)***	-27.937 (4.729)***	-26.129 (4.169)***
Unemployment rate† × resident controlled (b_R)		-10.531 (3.241)***	-9.681 (2.930)***	-7.646 (2.647)***	-5.610 (2.402)***
City of London	6.187 (0.303)***	7.294 (0.446)***	7.632 (0.404)***	8.066 (0.362)***	8.358 (0.326)***
London West End	5.280 (0.303)***	5.338 (0.299)***	5.427 (0.270)***	5.606 (0.242)***	5.729 (0.218)***
London Docklands (Canary Wharf)	2.072 (0.483)***	3.279 (0.599)***	3.486 (0.563)***	3.686 (0.549)***	3.639 (0.608)***
Croydon (Outer Suburban London)	0.008 (0.321)	0.031 (0.318)	0.0964 (0.287)	0.242 (0.259)	0.393 (0.234)*
London Hammersmith (Inner Suburban London)	1.192 (0.374)***	1.156 (0.370)***	1.256 (0.339)***	1.335 (0.313)***	1.413 (0.292)***
Maidenhead (South East)	1.131 (0.424)***	1.121 (0.419)***	1.200 (0.381)***	1.389 (0.345)***	1.558 (0.315)***
Reading (South East)	1.325 (0.348)***	1.353 (0.344)***	1.436 (0.312)***	1.609 (0.283)***	1.780 (0.258)***
Bristol (South West)	0.153 (0.328)	0.150 (0.325)	0.242 (0.292)	0.374 (0.262)	0.514 (0.236)**
Birmingham (West Midlands)	0.984 (0.270)***	0.993 (0.267)***	0.993 (0.238)***	1.023 (0.210)***	1.056 (0.186)***
Leeds (Yorkshire and Humberside)	0.310 (0.343)	0.310 (0.339)	0.399 (0.308)	0.543 (0.277)*	0.679 (0.251)***
Manchester (North West)	0.979 (0.281)***	0.949 (0.278)***	0.999 (0.247)***	1.007 (0.218)***	1.003 (0.194)***
Edinburgh (Scotland)	0.941 (0.311)***	0.962 (0.307)***	0.999 (0.276)***	1.093 (0.247)***	1.185 (0.223)***
Glasgow (Scotland)	1.206 (0.275)***	1.195 (0.271)***	1.194 (0.242)***	1.166 (0.214)***	1.131 (0.190)***
Year Fixed Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	-2.681 (0.887)***	-3.172 (0.889)***	-3.271 (0.773)***	-3.180 (0.666)***	-2.311 (0.580)***
Observations	480	480	452	424	396
Number of locations	14	14	14	14	14
Adjusted R-squared	0.75	0.76	0.81	0.86	0.90

Notes: Standard errors are in parentheses. *** Significant at 1%; ** significant at 5%; * significant at 1%. Newcastle is the omitted location. F-tests reject null-hypotheses b_B=b_R with 99% confidence. White-tests cannot reject null-hypothesis of homoskedasticity. †The unemployment rate of the Greater London Area (GLA) is used for the City, the West End and the Docklands. Local unemployment rates are used for Croydon and Hammersmith. Results are virtually unchanged if we use the unemployment rate of the GLA for all five London markets. Results are documented in an earlier working paper version of this study (see Cheshire and Hilber, 2007).

the stringency of the test. Results for the 5- and 7-year moving average specifications for the full balanced sample produce basically the same results and are available from the authors upon request.

The results in Table 3 show a significant negative relationship between local unemployment and our measure of planning restrictiveness – the RT. Moreover, as expected, the estimated value of the parameter is much larger in the business controlled compared to the resident controlled locations: the estimated value of the coefficient is three to four times as great in absolute terms in the business controlled locations (in the specifications reported in columns 2 to 5 of Table 3) and an F-test shows that these values are significantly different in statistical terms. Most location and year fixed effects are statistically significant. A White-test cannot reject the null-hypothesis of homoskedasticity, so we report normal standard errors.

There are two obvious problems with these results. The first is that estimated values of the RT become possible at different dates for different locations, with less reliable estimates for the first few years only being available for the City and the West End so our data are less reliable and our sample is unbalanced. Thus, the composition of the sample and the implicit weight of different locations within it change over time. To address this we restrict the data in all subsequent specifications, reported in Tables 4 and 5, to the 11 locations for which there is annual data on a continuous basis since 1973 (see Appendix Table A2 for a list of these 11 locations and Appendix Table A4 for summary statistics of the unemployment rates for this sample).

The second problem is that although we are interpreting local unemployment as a 'supply side' variable, operating on the restrictiveness of planning constraints via the local political process, it could also be interpreted as a 'demand side' measure. We would argue that the real evidence in support of our hypothesis that the intensity of constraints imposed is politically determined and relaxes only under the pressure of unemployment, is not so much that the coefficient on the unemployment rate across all office locations (column 1 in Table 3) is highly significant but that there is much greater sensitivity to unemployment in business controlled compared to resident controlled locations (columns 2 to 5 in Table 3). Nevertheless, there is an identification issue perhaps only partly addressed by using the moving average of the RT as the dependent variable. In the subsequent models we therefore include as direct a measure of demand for office space as we can find, as an additional explanatory variable.

The most obvious variable measuring demand for office space is employment growth in office employing sectors. Changes in employment in office sectors is well established in the real estate economics literature as a measure of demand in, for example, models of 'take-up' and rents (see, for example, Wheaton *et al*, 1997, or Hendershott *et al*, 1999). The r^2 between annual 'take-up' of office space and change in employment in financial and business service sectors in Greater London between 1984 and 2004 was 0.76 (Tsolacos, 2004).[14] Since we were aiming to measure a demand side variable, we constructed our office employment series for Local Authority areas and for each of the five London locations individually, rather than using office employment for Greater London as a whole for any of them. There have been three significant changes in industrial classification since 1971 affecting local area

[14] This does not necessarily imply a strong correlation between growth in office sector employment and the 'price' of office space since that relationship is further mediated from take-up to rents and via yields to capital values. As we observed in the second half of 2007, it is possible to have stable or growing rents but rapidly falling capital values.

employment statistics. To minimise the impact of these we constructed two alternative series: one for a broad definition – all service employment. The second series is based on a narrower definition, covering only financial services, banking, public administration and 'other' services and excluding sectors such as distribution which are not primarily office employing sectors. Fortunately there is a bridge year available for each change in classification so in constructing the two office employment indices for each location we used this overlap to scale one series to the next. Details of how these office employment measures were estimated are available in Cheshire and Hilber (2007). We report results for the narrower definition of service employment as this is likely to be more closely related to demand for office space. However, results for the broad definition are in all cases virtually the same (and are available from the authors upon request). Summary statistics for the narrow measure of service employment growth used in the empirical analysis are provided in Appendix Table A4.

Tables 4 and 5 report the results but now fitted only for a balanced sample of 363 observations (or 349 where the three year moving average of the RT is the dependent variable). The models are as before but now include a control variable for local office employment growth:

$$RT_{jt} = \beta_0 + \beta_1 \times U_{jt} + \beta_2 \times S_{jt} + \varepsilon_{jt} \tag{7}$$

$$RT_{jt} = \beta_0 + \beta_1 \times (U_{jt} \times D_B) + \beta_2 \times (U_{jt} \times D_R) + \beta_3 \times (S_{jt} \times D_B) + \beta_4 \times (S_{jt} \times D_R) + \varepsilon_{jt} \tag{8}$$

where other variables are as before and S equals the local service employment growth rate. Table 4 shows the results first with location but without year fixed effects (columns 1 to 4) and, then including both fixed effects (columns 5 to 8). As might be expected the results for the balanced sample are significantly stronger than those for the unbalanced sample and those with year fixed effects are stronger than those without. Columns 1 to 3 and 5 to 7 show results for models using the three year moving average of the RT as the dependent variable and – for comparison – columns 4 and 8 show the full model estimated on the contemporaneous value of RT. Results are shown for directly comparable models i) excluding and ii) including the office sector employment growth rate as an additional independent variable. Including service employment, whether interacted with the business/resident control or not, makes no essential difference to the results with respect to the unemployment variable. In all models there is a numerically substantial and statistically significant difference in the size of the estimated parameters between business and resident controlled locations. In all models with both location and year fixed effects this difference is significant at the 1% level. The results for the office employment growth rate are mainly not significant although where they are the parameter has the 'correct' positive sign. On balance service sector growth seems to have a slightly more significant impact on RT in the resident controlled locations. This is consistent with the supply of office space being on average even more inelastic where residents control the planning process. The results with respect to unemployment are, if anything, even more significant when the three year moving average of RT is used.

Table 5 shows the results of testing for the introduction of the UBR in a comparable set of models. As explained above, this change could be expected to have significantly increased the fiscal disincentive to permit development for all local communities relative to the City of London. The new basis for business property taxation came into force in April 1990, although it may have been partly anticipated.. To test the hypothesis we include a dummy for all markets except the City from the end of 1989.[15] We provide two sets of results. Columns 1 to

[15] However, results do not change significantly whether we choose 1989 or 1990 as the break point.

TABLE 4
Explaining the Regulatory Tax—*Balanced Sample without and with Year Fixed Effects*
(Fixed Effects Model, 1973-2005, 11 locations)

	Dependent Variable: Regulatory Tax Rate (RT)							
	3 Year Moving Average[‡]			Contemp.	3 Year Moving Average[‡]			Contemp.
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unemployment rate[†] × business controlled (b_B)	-38.900	-39.482	-38.910	-46.225	-47.644	-47.608	-47.115	-54.041
	(14.118)***	(14.110)***	(14.190)***	(21.713)**	(6.737)***	(6.756)***	(6.873)***	(8.088)***
Unemployment rate[†] × resident controlled (b_R)	-4.352	-4.227	-4.205	-4.906	-9.470	-9.489	-9.407	-10.091
	(1.005)***	(1.013)***	(1.014)***	(1.177)***	(3.155)***	(3.165)***	(3.175)***	(3.627)***
Service employment growth rate		1.627				-0.148		
		(1.206)				(1.345)		
Service employment growth rate × business controlled			0.028	-1.172			-1.322	-2.640
			(5.885)	(6.457)			(3.195)	(3.753)
Service employment growth rate × resident controlled			1.920	3.015			0.096	1.331
			(0.943)**	(0.957)***			(1.475)	(1.692)
Location Fixed Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year Fixed Effects	*No*	*No*	*No*	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	2.169	2.141	2.136	1.948	2.708	2.713	2.699	2.890
	(0.198)***	(0.194)***	(0.193)***	(0.146)***	(0.486)***	(0.489)***	(0.491)***	(0.411)***
Observations	349	349	349	363	349	349	349	363
Number of locations	11	11	11	11	11	11	11	11
Adjusted R-squared	0.83	0.83	0.83	0.77	0.84	0.84	0.84	0.79

Notes: Standard errors are in parentheses. *** Significant at 1%; ** significant at 5%; * significant at 1%. F-tests reject null-hypotheses b_B=b_R with 98% confidence in columns (1)-(3), with 94% confidence in column (4) and with 99% confidence in columns (5) to (8). White-tests cannot reject the null-hypothesis of homoskedasticity except in columns (1) to (4). Robust standard errors are reported in these cases. [†] The unemployment rate of the Greater London Area is used for the City of London, London West End and London Docklands. Local unemployment rates are used for Croydon and Hammersmith and all other non-London office markets. [‡] No moving averages of the RT measure are available for 1973 for Bristol, Leeds and Manchester and for 2005 for all locations.

TABLE 5
Explaining the Regulatory Tax—*Balanced Sample with Post 1989 Dummy (Fixed Effects Model)*

	Dependent Variable: Regulatory Tax Rate (RT)							
	Entire Period: 1973-2005				Narrow Window Around UBR Introduction: 1985-1994			
	3 Year Moving Average‡			Contemp.	3 Year Moving Average			Contemp.
Explanatory Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Unemployment rate† × business controlled (b_B)	-38.900 (14.139)***	-39.199 (14.136)***	-38.910 (14.211)***	-46.225 (21.744)**	-107.851 (17.821)***	-111.489 (17.597)***	-127.637 (18.837)***	-148.765 (23.676)***
Unemployment rate† × resident controlled (b_R)	-3.925 (0.812)***	-3.867 (0.819)***	-3.856 (0.819)***	-4.534 (1.066)***	-8.776 (2.872)***	-8.758 (3.028)***	-8.794 (2.805)***	-11.149 (3.479)***
Service employment growth rate		0.836 (1.175)				2.851 (3.945)		
Service empl. growth rate × business contr.			0.028 (5.894)	-1.172 (6.466)			15.507 (10.261)	22.413 (12.666)*
Service empl. growth rate × resident contr.			0.986 (0.869)	2.111 (0.966)**			-2.912 (3.521)	-2.877 (4.039)
Dummy: Post 1989, all markets except City of L.	0.657 (0.073)***	0.648 (0.073)***	0.646 (0.073)***	0.606 (0.085)***	0.481 (0.118)***	0.529 (0.148)***	0.432 (0.144)***	0.400 (0.172)**
Location Fixed Effects	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year Fixed Effects	*No*	*No*	*No*	*No*	*No*	*No*	*No*	*No*
Constant	1.791 (0.151)***	1.782 (0.151)***	1.781 (0.150)***	1.652 (0.143)***	7.185 (0.606)***	7.165 (0.647)***	7.205 (0.594)***	7.438 (0.675)***
Observations	349	349	349	363	110	110	110	110
Number of locations	11	11	11	11	11	11	11	11
Adjusted R-squared	0.85	0.85	0.85	0.78	0.92	0.92	0.92	0.90

Notes: Robust standard errors are in parentheses. *** Significant at 1%; ** significant at 5%; * significant at 1%. F-tests reject null-hypotheses b_B=b_R with 98% confidence in columns (1)-(3), with 94% confidence in column (4) and with 99% confidence in columns (5) to (8). White-tests reject the null-hypothesis of homoskedasticity in all cases. † The unemployment rate of the Greater London Area is used for the City of London, London West End and London Docklands. Local unemployment rates are used for Croydon and Hammersmith and all other non-London office markets. We also estimated specifications using 5 year and 7 year moving averages. The coefficient on the post 1989 dummy variable is virtually unchanged in these cases. ‡ No moving averages of the RT measure are available for 1973 for Bristol, Leeds and Manchester and for 2005 for all locations.

4 report results estimated on data for the whole period with columns 1 to 3 using the three year moving average of RT and with column 4 using the contemporaneous RT. Columns 5 to 8 show results for exactly comparable models but estimated on just a narrow window of data, five years either side of 1989. This approach ensures a greater focus on the before-after transition (by getting rid of the not-so-informative years) and thereby provides a more demanding test for the hypothesis.[16]

Comparing the results reported in columns 1 to 3 and 5 to 7 shows that including the office employment growth rate makes no significant difference to the results for the unemployment variable. Now with the post-1989 dummy the model continues to perform well but we observe a significant across the board increase in estimated planning restrictiveness in all locations compared to the City of London from 1989. The results for the 'narrow window' (columns 5 to 8) confirm this result. The parameter estimate for the post-1989 dummy is rather smaller but still significant at the 1% level for all except the contemporaneous RT measure where it is only significant at 5%. The rather smaller value of the dummy parameter seems intuitively plausible because of the durable nature of real estate. The annual flow of new office space is small relative to the stock even though, since we are looking at 'prime' office space, the flow will be larger relative to the stock than would be the case of all office space. Thus one would expect a change which led all locations except the City of London becoming even more restrictive in their planning policies than previously would have a cumulative impact on supply, and so prices, over time. The narrow window excludes changes after 1994 and so is likely to indicate a smaller absolute increase in prices relative to costs (in other words in the RT) than when the impact of the UBR is estimated over the whole period for which data are available. Nevertheless, the strong results for the narrow window provide useful and more direct additional evidence supporting the conclusion that the introduction of the UBR generated an even stronger incentive for local communities to restrict office development.

Overall, therefore, these results seem to provide strong support for the interpretations offered and reinforce our confidence in the RT as a reasonable measure of the impact of planning restrictiveness on the costs of office space. Although demand and supply may not be fully identified, the most obvious direct measure of demand – office employment growth – is hardly significant and, when included in the models, has no impact on the estimated effect of the unemployment variable, designed to measure local political pressures for the relaxation of planning restrictiveness. The strongest evidence for the hypotheses, however, is probably provided by the difference in the estimated impact of the unemployment variable depending on the form of local political control. The estimates show that business controlled planning authorities react significantly more strongly to local unemployment than do resident controlled authorities and that fiscal (dis)incentives for local communities have the expected impact on permitting development. These results are confirmed whether the contemporaneous value or a moving average of RT is used as the dependent variable. Since the moving average measure of RT should minimise the impact of short-term demand shocks this seems to provide further support for the conclusion that values of RT really do reflect drivers of the impact of the supply side restrictions.

[16] Thanks to an anonymous referee for this suggestion.

7 Conclusions

The Regulatory Tax measure of the gross costs of land use regulations for occupiers of property seems to be a useful one. Although it will not reflect certain forms of regulatory constraint, such as compliance costs or costs associated with delays and is, therefore, a lower bound measure, the ease with which it can be estimated is a very substantial advantage. In this paper, we provide the first estimates for commercial property and show that for office buildings in British cities the RT is substantially larger than it is in comparable continental European cities. Despite using different data sources for the international comparison, which includes the City of London and London West End, we get values for the two London markets that are very comparable. The conclusion is that supply in the British office market, like the British residential sector, is highly constrained by regulation and this costs business occupiers a substantial amount. It is, in effect, a tax on office users. Unless space is perfectly substitutable in production, therefore, there will be further costs in terms of output and employment.

We argue that such a level of regulatory restriction – an order of magnitude greater than the peak observed in the most restricted sector, in the most restricted markets in the US – is to be expected given the aims of British planning policy, the form of its instruments, the fragmented geographical scale of decision making (which internalises costs associated with development but not benefits), and the fiscal disincentive to local communities to allow commercial development. In this context we would expect differences in regulatory constraints between those authorities controlled by business interests compared to those controlled by residents. We are fortunate that the creation of the LDDC and the historical anomaly of the City of London – controlled by business interests since the middle ages and exempt from all the major reforms of local government of the modern age – allow us to test this proposition. We find strong evidence that business control makes a significant difference to the tightness of regulatory constraints on office building and on the reaction of restrictiveness to local economic prosperity measured by the unemployment rate. Including a direct measure of demand for office space and using a moving average to reduce the effect on RT of demand side shocks makes no difference to the central result, reinforcing our conclusion that we are observing variation in regulatory constraints – the supply side.

It is also possible to test the hypothesis that regulatory restriction responds to fiscal incentives and that, in particular, changes in the incentives to allow commercial development resulting from the introduction of the UBR early in 1990, led to even more restrictive land use regulation. This, again, is because the City of London was in large measure protected from the change and continued to be able to levy its own tax on business property. Again, we find strong evidence that the elimination of any fiscal incentive to permit commercial development was associated with an increase in the value of the RT in all other British locations relative to the City of London. This conclusion is confirmed by estimating the models on just a narrow window of data five years either side of the introduction of the UBR. The UBR, by further restricting the supply of office space, increased its cost.

Together these findings support our confidence that the RT measure is really capturing – or at least closely correlated with – the gross costs imposed by land use regulation.

One of the interesting speculations this prompts is about unintended consequences. As discussed above, the 1980s Conservative government perceived left wing local authorities as engaged in a concerted effort to frustrate efforts to increase incentives, privatise state industries, sell off social housing and reduce the total tax take. To finance these efforts to offset the adverse and regressive impact central government actions were perceived as having, local governments were (perceived to be) increasing their tax revenues from the business rate, perhaps as part of a punitive anti-business crusade. Central government's response was to introduce the UBR. This removed control of business property taxes from local communities, turning business property taxes into a national tax. It managed, therefore, not only to eliminate all tax revenue gains to local communities from commercial real estate development but to make this fact perfectly transparent. Nevertheless, local governments continued to have a legal obligation to provide services to local businesses. So it produced a powerful and transparent fiscal disincentive for local communities to permit any commercial development.

Over time, our results suggest, this has restricted the supply of offices and pushed up the value of the RT. The increase in business costs this represents may more than offset any costs that might realistically have been imposed by old-style left wing councils attempting to raise money from local business rates; especially given the demise of old-style left wing councils that occurred between 1989 and the present.

TABLE 6
Effect of the Introduction of the Uniform Business Rate
on a Medium Size Office Firm with 1500m^2 Space Usage

	Increase in Annual Occupation Cost			
	Based on 3 Year Moving Average RT (Table 5—*Column 3*)		Based on Contemporaneous RT (Table 5—*Column 4*)	
Office Market	in 1989 £	in 2005 £	in 1989 £	in 2005 £
London West End	59823	89555	56119	84010
Croydon	62794	94003	58906	88182
Reading	47251	70736	44326	66356
Bristol	45529	68158	42710	63937
Birmingham	41702	62428	39120	58562
Leeds	41988	62857	39388	58965
Manchester	48639	72813	45627	68304
Newcastle	56926	85219	53401	79942
Edinburgh	36528	54683	34267	51297
Glasgow	38143	57100	35781	53564
Average (all markets)	47932	71755	44964	67312

Indeed, we can quantify this effect because of the fortunate fact that the City of London alone was given a partial exemption from the UBR. Consider a medium sized firm with about 200 employees. We assume that the firm uses an office building of 1,500 m^2. This is about the smallest office building that can realistically accommodate 200 employees.[17] We first ask the question of how much in UBR such a company would be paying annually, to have a benchmark against which to compare our results. This calculation is based on an existing firm/office building in the London Borough of Camden that matches our above brief. The

[17] Based on the London Employment Sites Database (Roger Tym & Partners, 2005) the space usage in Inner London is 19 m^2 per office job, suggesting an office building of 3,800 m^2 for a medium size firm with 200 employees. Hence, our assumption of 1,500 m^2 is a very conservative one, implying that we are underestimating rather than overestimating the regulation induced increase in annualised occupation cost.

building is located at 7/8 Greenland Place, London, NW1 0AP and in 2005 had a rateable value of £112,250 with the rate multiple set at 42.6p so the firm had a liability for UBR of £47,819.

Next we explore the (estimated) effect of the UBR on the price of office space via increasing the RT. Our computations are based on the most conservative and, we believe, most accurate estimates for the entire balanced sample period (columns 3 and 4 in Table 5): that is a post-1989 dummy value of either 0.646 or 0.606. Although the estimated impact of the UBR on our RT measure in our various markets relative to the City of London is assumed to be uniform (in effect a mean for all markets), the impact on the price of office space in £s in any given location will vary because the RT is expressed as a quasi-tax relative to MCC, which varies across markets.

Table 6 illustrates the estimated effect of the UBR on the annual occupation cost of a hypothetical office building of 1,500 m^2 (relative to the City of London) for the two alternative estimates of the post-1989 dummy. We use market specific yields in 1989 to transform changes in capital values to changes in annual rent cost or (assuming that other occupation cost are constant) occupation cost, respectively.

We report the estimated impact both in 1989 terms (when the UBR was introduced) and in 2005 terms, using the Consumer Price all items Index to adjust the values. The latter figure allows us to compare the regulatory cost imposed by the UBR to the UBR tax itself, that is, £47, 819 per year for a 1,500 m^2 office building in Camden. As is illustrated in Table 6, the estimated positive impact of the UBR on annual occupation cost is greater across all markets and both specifications, compared to our benchmark UBR tax estimate.

Thus the implication is that moving to the UBR far from having the intended effect of reducing business costs had the perverse effect of increasing them. The law of unintended consequences is powerful indeed.

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Appendix Tables

TABLE A1
Summary Statistics—*Data Used to Calculate Regulatory Tax*

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Unbalanced Sample (1961-2005)					
Headline rent per m^2 office space (type A, prime), based on 10 year lease, annualised	480	175.0	157.9	5.60	881.3
Marginal construction cost per m^2 (based on prime office buildings)	480	556.7	357.2	36.9	1472.4
Equivalent yield for office space (type A, prime), with imputed values prior to 1973†	480	6.69	1.20	4.00	10.56
Vacancy rate (in %), with imputed missing values†	480	9.29	1.60	5.32	15.03
Rent free period in years based on 10 year lease, annualised average, with imputed missing values†	480	1.55	0.27	0.35	2.40
Imputed capital value per m^2 of office space (adjusted for rent free periods and vacancy rates)	480	2171.5	2291.1	57.9	14554.5
Balanced Sample (1973-2005)					
Headline rent per m^2 office space (type A, prime), based on 10 year lease, annualised	363	188.3	159.7	14.0	881.3
Marginal construction cost per m^2 (based on prime office buildings)	363	608.2	307.5	118.5	1472.4
Equivalent yield for office space (type A, prime), with imputed values prior to 1973†	363	6.48	1.25	4.00	10.56
Vacancy rate (in %), with imputed missing values†	363	9.16	1.61	5.32	15.03
Rent free period in years based on 10 year lease, annualised average, with imputed missing values†	363	1.56	0.27	0.35	2.40
Imputed capital value per m^2 of office space (adjusted for rent free periods and vacancy rates)	363	2397.0	2416.4	150.3	14554.5

Data Sources: CBRE (prime rent, yield and total occupation cost information), Davis Langdon (marginal construction cost information), IPD (national void rate index) and ODPM (regional vacancy rates). † The methodologies used to impute missing values are described in detail in Cheshire and Hilber (2007).

TABLE A2
Investigated UK Office Markets and Data Availability

Office Market	Years with Available Data	14 Market Sample (Unbalanced)	11 Market Sample (Balanced)
City of London	1961-2005	Yes	Yes
London West End	1961-2005	Yes	Yes
London Docklands (Canary Wharf Tower)	*1998*-2005	Yes	No
Croydon (Outer Suburban London)	1965-2005	Yes	Yes
London Hammersmith (Inner Suburban London)	*1991*-2005	Yes	No
Maidenhead (South East)	*1984*-2005	Yes	No
Reading (South East)	1965-2005	Yes	Yes
Bristol (South West)	1973-2005	Yes	Yes
Birmingham (West Midlands)	1965-2005	Yes	Yes
Leeds (Yorkshire and Humberside)	1973-2005	Yes	Yes
Manchester (North West)	1973-2005	Yes	Yes
Newcastle (Upon Tyne)	1965-2005	Yes	Yes
Edinburgh (Scotland)	1965-2005	Yes	Yes
Glasgow (Scotland)	1965-2005	Yes	Yes

TABLE A3
Summary Statistics: Average Regulatory Tax for all Available UK Office Markets over Time (1961-2005, Central Estimate)

Year	Obs.	Mean	Std. Dev.	Min.	Max.
1961	*2*	*2.93*	*0.33*	*2.70*	*3.16*
1962	*2*	*3.07*	*0.12*	*2.98*	*3.15*
1963	*2*	*3.13*	*0.24*	*2.96*	*3.31*
1964	*2*	*2.99*	*0.20*	*2.85*	*3.13*
1965	*8*	*1.68*	*1.04*	*0.42*	*2.96*
1966	*8*	*1.85*	*1.13*	*0.53*	*3.37*
1967	*8*	*2.02*	*1.24*	*0.64*	*3.83*
1968	*8*	*2.36*	*1.63*	*0.73*	*4.97*
1969	*8*	*2.69*	*2.33*	*0.71*	*7.27*
1970	*8*	*2.69*	*3.22*	*0.39*	*9.98*
1971	*8*	*2.88*	*3.42*	*0.37*	*9.99*
1972	*8*	*2.58*	*3.36*	*0.20*	*9.63*
1973	11	4.01	5.08	0.62	17.55
1974	11	2.86	4.49	0.00	15.57
1975	11	1.87	1.81	0.14	6.37
1976	11	2.43	1.53	0.80	5.36
1977	11	2.86	2.29	1.06	7.38
1978	11	3.00	2.30	1.14	7.65
1979	11	3.13	2.64	1.12	8.70
1980	11	2.06	2.24	0.27	7.12
1981	11	2.42	2.42	0.34	8.08
1982	11	2.34	2.45	0.36	8.51
1983	11	2.16	2.37	0.16	8.13
1984	12	2.08	2.19	-0.07	7.85
1985	12	2.18	2.32	-0.07	8.13
1986	12	2.20	2.54	-0.11	8.90
1987	12	2.61	3.79	-0.12	13.35
1988	12	2.73	3.66	-0.14	11.79
1989	12	3.10	3.36	0.20	11.36
1990	12	2.95	2.88	0.42	9.27
1991	13	2.61	1.97	0.60	7.61
1992	13	2.24	1.32	0.54	5.46
1993	13	1.91	1.03	0.46	4.60
1994	13	2.63	1.35	0.78	6.02
1995	13	2.96	1.65	0.99	7.13
1996	13	3.24	1.91	1.12	7.99
1997	13	3.30	2.14	1.10	8.46
1998	14	3.23	2.15	1.02	8.58
1999	14	3.21	2.16	1.06	9.18
2000	14	3.45	2.41	1.10	10.22
2001	14	3.09	2.17	0.86	8.73
2002	14	2.56	1.64	0.81	6.90
2003	14	2.07	1.26	0.63	5.69
2004	14	2.17	1.53	0.67	7.05
2005	14	2.63	1.91	0.99	8.89

TABLE A4
Summary Statistics—*Explanatory Variables*

	Obs.	Mean	Std. Dev.	Min.	Max.
Unbalanced Sample					
Unemployment rate in local office market	480	0.0795	0.0488	0.00685	0.273
Unemployment rate in markets with business controlled development	53	0.0619	0.0343	0.00871	0.132
Unemployment rate in markets with resident controlled development	427	0.0817	0.0499	0.00685	0.273
Balanced Sample					
Unemployment rate in local office market	363	0.0908	0.0479	0.0159	0.273
Unemployment rate in markets with business controlled development	33	0.0765	0.0297	0.0187	0.132
Unemployment rate in markets with resident controlled development	330	0.0922	0.0492	0.0159	0.273
Service employment growth rate	363	0.0133	0.0449	-0.142	0.257
Service employment growth rate in markets with business controlled development	33	0.00714	0.0585	-0.115	0.120
Service employment growth rate in markets with resident controlled development	330	0.0139	0.0434	-0.142	0.257

Notes: The unemployment rate of the Greater London Area (GLA) is used for the City of London, London West End and London Docklands (Canary Wharf). Local unemployment rates are used for Croydon and Hammersmith.