# Room for improvement: Appendix

This appendix provides technical detail on the modelling and calculations used in the report *Room for Improvement: Creating the financial incentives needed for economic growth*.

The appendix is formed of three sections.  Section one sets out the analysis used to estimate the size of the incentive created by retaining or relocalising business rates.  Section two sets out the modelling and assumptions used to estimate the impact of the New Homes Bonus (NHB).  Section three outlines the calculations behind the comparison of the business rate incentive and NHB.

## Section 1: Estimating the size of the incentive created by relocalising or retaining business rates

Our estimate of the size of the incentive created by relocalising or retaining the business rate, henceforth referred to as "the policy change", is arrived at by looking at the change in the growth rate of a subset of commercial and industrial floorspace between 1977 to 1985 and 2000 to 2008.

A panel regression was run using the English regions and Wales to estimate the difference in the growth rate of commercial floorspace between the two periods.

### Years of data

The data for 1977 to 1985 ("the first period") is taken from the Office of the Deputy Prime Minister's *Commercial and Industrial Floorspace Statistics 1974-1985*.[1] The year 1974 is excluded as no data is available for 1975 and 1976, meaning that annual growth rates cannot be calculated

The data for 2000 to 2008 ("the second period") is taken from commercial and industrial floorspace and rateable value statistics, available between 1998 and 2008.[2] The years 1998 and 1999 are discarded because a discontinuity between 1999 and 2000, due to increased Valuation Office Agency activity in capturing floorspace data for the purposes of the revaluation exercise.[3]

Clearly, the large gap between the two available data periods is a challenge for this analysis.  The nationalisation of business rates took place in 1990.  It would have been desirable to have data for the years that precede and follow the policy change.  Based on the available date, we have been unable to avoid this inherent weakness and as such caution is required in interpreting the results.

### Non-factory floorspace

For the main specification a subset of the floorspace data was used, to aid comparability between the two periods and ensure that, as far as possible, we are measuring the affect of planning restrictions on development.

1. www.communities.gov.uk /archived/publications/planningandbuilding/commercialindustrial
2. www.communities.gov.uk /planningandbuilding/planningbuilding/planningstatistics/commercialindustrial/
3. See page 58, ODPM (2005) *Commercial and Industrial Floorspace and Rateable Value Statistics 1998–2004*, London: ODPM

In the first period, our floorspace aggregate includes: warehouses (covered), shops with accommodation, shops and restaurants, and commercial offices. In the second period the aggregate includes: warehouses, retail premises, commercial offices, and, from 2005 onwards, other bulk.

Industry (1974-85) or factories (1998-2008) were excluded as the floorspace in this class declined over the period, related to the retrenchment of the manufacturing sector. We do not consider this to be an artefact of planning policy or restrictive land supply.

We also calculated a second specification, only looking at the growth of commercial office space.

## Transformation of regions

In the first period the data by regions is produced in Standard Statistical regions. These differ slightly from the Government Office regions used for the later period for some of the regions.[4] The data for the first period was transformed from the Standard Statistical regions to the Government Office regions using weights from the 1998 floorspace statistics.

## Control variables

Control variables are used for the state of the national economy and the regional economic environment. National GDP (ABMI) is used to control for the growth of the national economy.

On a regional basis, the total number of employees is taken from the Census of Employment (pre-1991) and Annual Business Inquiry (post-1998). For years where no data is available, results are interpolated. The claimant count unemployment rate is also used and is available between 1974 and 2010.

## Regression output

The outputs for the regressions are presented below. Logarithms have been taken of all variables. The business rate dummy is used to identify years in the first period prior to the policy change.

Dummies were also used to account for the "Dot Com" bubble (years: 2000-02) and for the revaluation in 2005.

As can be seen, for the main specification, the business rate dummy is significant at the one percent level. The change in the number of employees and the change in the claimant count rate are significant at the 10 percent level, with an increase in both variables associated with an increase in the growth rate of non-factory floorspace.

The difference between the policy change dummy for the North and Southern regional subsets can also be seen. However, the Business Rate dummy is only significant at the 10 percent level for the Northern regions. With the office space specification the coefficient on the business rate dummy increases, from 0.01 to 0.014. However, it is now only significant at the 5 percent level.

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4. Part of the old Northern region, which covered the North East and North West, was transferred to the North West. Part of the old South East was transferred to East Anglia, creating a larger East of England region.

## 1. Dependent Variable - Change in all floorspace minus factory floorspace

|  | All Data | North | South |
|---|---|---|---|
| L.D.Employees | 0.204 | 0.256 | 0.080 |
|  | (0.092)* | (0.166) | (0.072) |
| L.D.Claimant Count | 0.017 | 0.028 | 0.010 |
|  | (0.008)* | (0.013)* | (0.010) |
| L2.D.GDP | -0.063 | -0.048 | -0.036 |
|  | (0.039) | (0.053) | (0.046) |
| L3.D.GDP | 0.058 | 0.000 | 0.098 |
|  | (0.034) | (0.035) | (0.024)** |
| Business Rate Dummy | 0.010 | 0.006 | 0.014 |
|  | (0.003)*** | (0.003)* | (0.004)** |
| Dotcom Dummy | 0.007 | 0.006 | 0.016 |
|  | (0.002)*** | (0.003)* | (0.003)** |
| Reevaluation Dummy | 0.010 | 0.007 | 0.011 |
|  | (0.014) | (0.024) | (0.007) |
| Constant | 0.020 | 0.019 | 0.006 |
|  | (0.002)*** | (0.003)*** | (0.002)*** |
| Observations | 154 | 90 | 64 |

*All variables have been logged*
*Variables in brackets are robust standard errors. ***,**, and * denote significance at the 1%, 5% and 10% levels respectively*
*D. represents a differenced variable*
*L. represents a lagged variable, with the number representing how many years the variable is lagged*

## 2. Dependent Variable - Change in office floorspace

|  | All Data | North | South |
|---|---|---|---|
| L.D.Employees | 0.319 | 0.181 | 0.189 |
|  | (0.132)** | (0.235) | (0.109) |
| L2.D.Employees | 0.224 | 0.239 | -0.062 |
|  | (0.097)** | (0.115)* | (0.062) |
| L2.D.GDP | -0.328 | -0.295 | -0.260 |
|  | (0.112)** | (0.179) | (0.136) |
| L3.D.GDP | 0.148 | 0.197 | 0.012 |
|  | (0.114) | (0.231) | (0.111) |
| Business Rate Dummy | 0.014 | 0.006 | 0.019 |
|  | (0.005)** | (0.010) | (0.004)** |
| Dotcom Dummy | 0.002 | 0.000 | 0.013 |
|  | (0.006) | (0.009) | (0.006) |
| Reevaluation Dummy | -0.014 | -0.004 | -0.027 |
|  | (0.008) | (0.012) | (0.009)* |
| Constant | 0.021 | 0.025 | 0.019 |
|  | (0.003)*** | (0.006)*** | (0.003)*** |
| Observations | 154 | 90 | 64 |

*All variables have been logged*
*Variables in brackets are robust standard errors. ***,**, and * denote significance at the 1%, 5% and 10% levels respectively*
*D. represents a differenced variable*
*L. represents a lagged variable, with the number representing how many years the variable is lagged*

## Section 2: Modelling the Impact of the New Homes Bonus

Modelling the future impact of an incentive like the NHB is very difficult.  Unlike the case of business rate relocalisation we cannot draw on past experience, instead we need to make assumptions as to how local authorities might react.  Inevitably, this makes our estimates a good deal less reliable.

### Estimating a local authority's response

Our model follows the approach of DCLG's impact assessment.[5]  First, we estimate the  percent that each lower tier local authority would need to reduce their annual net additions by in order to maintain spending per head at a constant level, in response to a one percent reduction in the Formula Grant.  For example, we estimate that Reading Unitary Authority would reduce its net additions by 30 percent in response to a one percent cut in its Formula Grant.

This percentage reduction is then scaled by the probability that a local authority will adopt this response.  We assume the smaller the initial number of net additions the lower the probability that a local authority will adopt this response.  The figure generated is then used as an income elasticity.  Across all lower tier councils the average response to a one percent spending cut is to reduce net additions by around five percent.

### Establishing a baseline

We then seek to establish a baseline that we can compare our policy response to.  This has necessarily been done on a simplistic basis.  For year 0 (net additions in October 2009-10; financial year 2011-12) we use the net additions specified in the New Homes Bonus initial reward, which totalled 133,656.  These figures use the council tax base metric, rather than DCLG's net additions

The average number of net addition between 2004 and 2010, using DCLG net additions, was also calculated for each lower tier authority. If net additions in October 2009-10, on the council tax base metric, were lower than the average number of net additions between 2004 and 2010, the council tax base metric was used for the year 1 baseline (net additions in October 2010-11; financial year 2012-13). Otherwise, an average of these two figures was used.

Beyond year 1, a baseline was constructed based on historic housing market recoveries. The underlying assumptions used are:

| | |
|---|---|
| Average years of house building decline | 5 |
| Implied recovery following 2008 decline | 2012-13 |
| Net additions growth rate years 1-3 of recovery | 3.8% |
| Net additions growth rate years 3-5 recovery | 1.5% |

Once aggregated to the national level, this generated the following baseline.

| 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 |
|---|---|---|---|---|---|---|---|---|---|---|
| 133,656 | 130,400 | 130,400 | 135,400 | 140,500 | 145,800 | 148,000 | 150,300 | 152,600 | 154,900 | 157,300 |

Clearly these baseline numbers can be disputed, but given that average net additions between 2000 and 2010 were 161,800, the baseline seems to arrive at a reasonably realistic level.

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5. DCLG (2010) *New Homes Bonus Consultation*, London: DCLG

## Working of the model

Following the introduction of the NHB, essentially, we assume that the incentive faced by the local authority is reversed. In reaction to a one percent budget cut, local authorities increase their net additions by the same percentage as they would have previously reduced net additions.

We then apply an annual model, whereby in reaction to the change in their budget relative to the previous year, local authorities alter their house building plans. Initially, a change in the net additions in each local authority is a response to the size of the public spending cut faced. In line with DCLG's assumption that local authorities only seek to build away 10 percentage points of the 26 percent spending cuts, we restrict the percentage change in their budget that they offset with net additions in anyone year to 38 percent.

In later years, the reduction in the formula grant as a result of the NHB top slice, which reduces the distributed Formula Grant, generates the response. On top of this, each local authority receives a payment for the net additions that they have made over the previous six years, which is added to their total spending power.

Because authorities receive the New Homes Bonus, some councils will see their budget increase. Under the basic response (1), local authorities that see their budget increase relative to the previous year – "winner authorities" - do not change their net additions. We model house building up to 2019-20.

## Responses constrained relative to baseline

However, within the model local authorities were not allowed to exercise a free response to changes in the budgets. They are constrained by external factors of both demand and supply. And are only able to increase or decrease house building by a certain percentage relative to the baseline.

Firstly, no authority is able to reduce or increase house building by more than 30 percent relative to their individual baseline. There are also a set of further constraints, depending on demand or supply that may bind before this level. These are detailed below:

|  | Demand | Supply |
|---|---|---|
| *Assessing* | Ability of private sector to deliver new housing | Land available for building |
| **Metric** | *Affordability :* Average house price / average income | *Land use statistics*: (Land available for housebuilding X regional density) / Average net additions |
| **Upper bound** | >median | Greater than five years of supply |
| **Upper bound baseline restriction** | 30% | 30% |
| **Middle bound** | First quartile to second quartile | 3 to 5 years land supply |
| **Middle bound baseline restriction** | 20% | 20% |
| **Lowest bound** | Lower quartile | <3 years land supply |
| **Lowest bound baseline restriction** | 10% | 10% |

The lowest of the restrictions faced by a local authority binds. For example, a local authority in the bottom quartile of the affordability distribution - i.e. with affordable house prices relative to local wages – would only be able to increase net additions by 10 percent over the local baseline.

# Other responses of "winner" local authorities

In addition to the basic response (1), we also model two other responses for the "winner" authorities. Authorities that see their budget decline continue to react in the same way.

## Response 2:

Local authorities which see a yearly increase in their expenditure as a result of the NHB payment reduce the number of net additions. The authorities do this with the same level of responsiveness as they increase their net additions in response to a decline in their spending power.

This option results in a smaller response to the NHB as local authorities that do well reduce their housebuilding, offsetting the increases seen in other authorities.

## Response 3:

Local authorities which see a yearly increase in their expenditure as a result of the NHB payment increase their net additions – "going for growth". The extent to which they increase net additions depends on whether the authority is pro or anti growth. This is determined by the proportion of major planning applications rejected during the past thirty years.

The responsiveness to the NHB incentive and propensity to add extra homes is calculated by multiplying the previously generated income elasticity by a scaling factor, dependent on each authority's pro or anti growth stance. These are shown in the table below.

| Quartile | Proportion of major planning applications refused (1979-2008) | Scaling factor |
|---|---|---|
| Quartile 1 | 0 – 19% | 0.6 |
| Quartile 2 | 19-25% | 0.3 |
| Quartile 3 | 25-30% | 0.15 |
| Quartile 4 | >30% | 0.05 |

## Scenarios – a combination of responses

The three responses are then combined to form three possible scenarios, which are ultimately used to assess the affect of the NHB. For each scenario a local authority is considered to have a given probability of pursuing each of the responses. In the central scenario, all possible responses are weighted equally. The scenarios are weighted as such:

| | Probability of local authority pursuing response | | |
|---|---|---|---|
| Scenario | Basic response (1) | Response 2 | Response 3 |
| Scenario 1 | 50% | 50% | 0% |
| Central scenario (2) | 33% | 33% | 33% |
| Scenario 3 | 0% | 50% | 50% |

## Outputs

The number of net additions by each local authority can be then compared with that authority's baseline and the figures can be analysed on an aggregate basis.

To provide a fuller understanding, below we publish the headline results of the analysis. However, these results **should not** be interpreted as an explicit forecast, but used to comprehend the approach that has been taken to analyse the potential impact of the NHB.

| Financial year | Housebuilding year | Projected (S1) | Projected (S2) - central | Projected (S3) | Baseline | Difference from S2 |
|---|---|---|---|---|---|---|
| 2011-12 | 2009-10 | 133,656 | 133,656 | 133,656 | 133,656 | 0% |
| 2012-13 | 2010-11 | 145,000 | 145,000 | 145,000 | 130,400 | 11% |
| 2013-14 | 2011-12 | 151,000 | 151,000 | 151,000 | 130,400 | 16% |
| 2014-15 | 2012-13 | 153,000 | 154,000 | 157,000 | 135,400 | 14% |
| 2015-16 | 2013-14 | 159,000 | 160,000 | 163,000 | 140,500 | 14% |
| 2016-17 | 2014-15 | 162,000 | 165,000 | 169,000 | 145,800 | 13% |
| 2017-18 | 2015-16 | 159,000 | 164,000 | 172,000 | 148,000 | 11% |
| 2018-19 | 2016-17 | 160,000 | 165,000 | 174,000 | 150,300 | 10% |
| 2019-20 | 2017-18 | 162,000 | 167,000 | 177,000 | 152,600 | 10% |
| 2020-21 | 2018-19 | 163,000 | 169,000 | 179,000 | 154,900 | 9% |
| 2021-22 | 2019-20 | 164,000 | 171,000 | 182,000 | 157,300 | 9% |
| Total 2017-2022 | | 808,000 | 836,000 | 883,000 | 763,000 | |
| | | 6% | 10% | 16% | 15,000 | |

For a more detailed explanation the CLG's Homes Bonus model, see: CLG (2010) *New Homes Bonus: consultation*.

## Section 3: Comparing the size of the New Homes Bonus and business rates incentive

This section details the calculations which underpin the analysis comparing the size of New Homes Bonus, relative to the incentive created by a retained business rate, presented on page 44 of Room for Improvement.

### Basic development details

| Field | Value | Source |
|---|---|---|
| Basic site requirement | 250 house development | Average major housing development: X |
| Average dwellings per hectare | 43 | www.communities.gov.uk/publications/corporate/statistics/lucs2009provisionaljuly |
| Required land | 58,140 m sq | Basic site requirement / Average dwellings per hectare X 1000 |
| Plot to land ratio (low) | 0.42 | Out of town industrial (p.101) www.communities.gov.uk/documents/planningandbuilding/pdf/147540.pdf |
| Plot to land ratio (high) | 3 | Average density, Greater London (p.247) www.london.gov.uk/thelondonplan/docs/londonplan08.pdf |
| Commercial development (low) | 24,419 | Required land X plot to land ratio |
| Commercial development (high) | 174,419 | Required land X plot to land ratio |

### New Homes Bonus

| Field | Value | Source |
|---|---|---|
| Band C council tax payment | £1,279 | Majority of homes that received payment in first year of NHB were band C. |
| Affordable homes bonus | £350 | |
| Percentage of affordable homes | 30% | |
| **NHB payment** | **£346,000** | (£1279 X 250) + (£350 X 250 X 0.3) |

## Business rates incentive

| Field | Value | Source |
|---|---|---|
| Rateable Value/m2 (2008) – Total | £64 | www.communities.gov.uk/documents/planningandbuilding/xls/1179479.xls |
| Rateable Value/m2 (2008) – Office | £119 | |
| Multiplier (2011/12) | 43.3p | www.voa.gov.uk/rli/static/HelpPages/English/faqs/faq146-what_are_the_current_multipliers.html |
| Business rate incentive – Total (low) | £676,688 | Commercial development (low) X Multiplier X RV/m2 (total) |
| Business rate incentive – Total (high) | £4,833,488 | Commercial development (high) X Multiplier X RV/m2 (total) |
| Business rate incentive – Office (low) | £1,258,217 | Commercial development (low) X Multiplier X RV/m2 (office) |
| Business rate incentive – Office (high) | £8,987,267 | Commercial development (high) X Multiplier X RV/m2 (office) |

## Community Infrastructure Levy

We assume CIL is not received on affordable homes, although this policy is currently being consulted on by ministers.

| Field | Value | Source |
|---|---|---|
| Payment per house | £7,500 | Suggested range £5,000–£10,000: www.communities.gov.uk/documents/planningandbuilding/pdf/infrastructurelevyfinal.pdf |
| CIL payment | £1,312,500 | Homes X (1 – %affordable) X payment per home |

*Room for Improvement: Creating the financial incentives needed for economic growth* is available from
www.centreforcities.org/roomforimprovement

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