



Department for Levelling Up,
Housing & Communities

The Additionality of Housing Supply Interventions

Research Report

29 March 2022

AMION Consulting

Contents

1. Executive Summary	1
2. Introduction	4
<i>Overview</i>	4
<i>Approach</i>	4
3. Additionality.....	7
<i>Introduction</i>	7
<i>Components of additionality</i>	7
<i>Current additionality guidance</i>	8
<i>Existing evidence</i>	10
4. Deadweight	12
<i>Introduction</i>	12
<i>Existing evidence</i>	12
<i>Case study evidence</i>	12
5. Displacement.....	15
<i>Introduction</i>	15
<i>Existing evidence</i>	15
<i>Econometric analysis</i>	16
<i>Development rates in the area</i>	18
<i>Scale of the supported development</i>	19
6. Conclusions and implications for guidance.....	21
<i>Introduction</i>	21
<i>Deadweight</i>	21
<i>Displacement</i>	24

Appendices	27
Appendix A – Case Study Selection.....	27
Appendix B – Literature Review	32
Appendix C – Displacement and Placemaking Effects	81
Appendix D – Hedonic Price Model – Methodology and Results	94
Appendix E – Development Appraisal Analysis.....	112

1. Executive Summary

- i. This report presents the results of research undertaken to support analysis for assessments of the additionality of the impacts of support for housing developments by the public sector.
- ii. 'Additionality' can be defined as the extent to which an activity and/or its results take place at all, on a larger scale, earlier or within a specific designated area or target group as a result of the intervention. The concept of additionality is central to the appraisal and evaluation of the outputs, outcomes and other benefits of public sector interventions. It is used to convert gross effects into net effects and is crucial to the meaningful assessment of, for example, the cost-benefits and cost-effectiveness of interventions.
- iii. The principal elements of the additionality of housing supply support concern the extent of deadweight and displacement. As well as a review of existing research documentation and previous guidance, these aspects have been explored through a combination of both top-down (econometric modelling) and bottom-up (case study) analyses of a sample of some 100 previous interventions.
- iv. The modelling focuses on the house price effects in surrounding areas of previously supported developments and, while the main analysis is primarily concerned with the additionality of interventions in terms of their principal outputs i.e. the number of housing units, it also sheds light on wider outcomes such as an area's housing affordability and its increased attractiveness for further development ('placemaking').
- v. The assessment of deadweight requires determination of what would happen (or would have happened) in the absence of the intervention. Existing research on deadweight in housing development interventions is limited.
- vi. Our research indicates that deadweight has not been a significant factor in many of the previously approved case study projects. This appears to be due to robust appraisals that assessed financial viability. Where an element of deadweight has occurred it has mainly related to the timing and type of development.
- vii. Consideration of a development's viability, why the market cannot deliver it and what would happen without the proposed support should always be a core part of appraisals. It should focus initially on a proposal's commercial viability and then consider the market failures that may inhibit such viability or which represent other barriers to development that may justify intervention. These could include assessment of factors such as whether finance could be accessed elsewhere; whether other agents might be able to undertake the development; whether strategic infrastructure or significant extraordinary on-site costs are required; whether there is a need for inputs from multiple sources resulting in barriers or failures of coordination; or the existence of difficulties in demonstrating market viability due, for example, to the innovative nature of the proposal.
- viii. In most cases the preferred approach to assessing deadweight will be to construct a bespoke counterfactual case scenario based on evidence-based judgments. However, the report includes a flowchart indicating the factors for consideration (including those outlined above) and a plausible range of values that could be applied based on the

research. These vary according to judgement of the significance of individual factors and the strength of the evidence.

- ix. There is also a lack of robust existing evidence regarding levels of displacement in supply-side housing interventions. Due to the difficulty in using housing units as a direct measure of displacement, trends in relative house prices have been employed as a proxy for displacement. Econometric modelling was undertaken to examine post-intervention trends in relative house prices, after allowing for local characteristics, in areas surrounding previous intervention sites (usually up to a maximum of 2.5km away).
- x. Where price reductions occur, these potentially could lead through the price mechanism to a reduction in other new supply due to reduced development viability (i.e. a displacement effect). However, supply side housing interventions can also lead to higher prices which may increase the commercial attractiveness of areas for developers (i.e. a placemaking or spillover effect). For the purposes of this framework these placemaking effects have been treated as 'wider benefits' rather than as part of the additionality assessment and are the subject of separate research commissioned by Homes England.
- xi. However, the potential for these contrasting effects highlights the importance of being clear about the objective of interventions (e.g. increasing affordability or stimulating further development) and potentially the need for complementary interventions to address consequential effects.
- xii. The main findings of the modelling were that:
 - price increase (placemaking) effects were slightly more prevalent than price reduction (displacement) effects (44% of cases as opposed to 38%);
 - price impacts tended to be relatively localised – i.e. highest closer to the intervention site and then declined with further distance away;
 - significant levels of price reduction or 'displacement' were more apparent in areas where there were already relatively high levels of development activity; and
 - the largest house price decreases tended to be in areas where housing was already relatively affordable. In areas with already high house price to earnings ratios, there is little evidence of reductions in house prices within the nearest 2.5km (suggesting that a sustained significant increase in supply is needed if supply-side measures alone are to be used to address such issues).
- xiii. The consequences of such price displacement for unit displacement (and therefore the significance of the above findings for appraisal guidance) were explored through further research which found that in an average West Midlands brownfield housing development scheme, a reduction in new house price values beyond 4% would render delivery of a scheme difficult and beyond 8% unviable. None of the modelled schemes had price-damping displacement effects of this magnitude across the whole of their areas and only 11% had reductions of greater than 2%. This suggests that unit displacement effects would usually be low. However, it is important to note that unit displacement effects could occur without an effect on price, which would not be picked up in the analysis.

- xiv. Three key variables were identified as being of particular significance for price displacement:
- affordability of existing housing in the area i.e. the more affordable the existing housing, the greater the displacement;
 - development rates in the area i.e. the higher the existing development rates, the greater the displacement; and
 - scale of supported development i.e. the larger the scheme, the greater the displacement.
- xv. For the appraisal of market housing proposals, these factors (and a range of metrics to be applied) are incorporated into the proposed additionality framework (summarised in flow chart form in the report). However, (in line with the DLUHC Appraisal Guide) displacement for the social rented and affordable rented housing element of any development should usually be assumed to be zero, (it is unlikely that affordable housing provision will result in unit displacement given widely recognised shortages and the generally rigorous prior appraisal of need for such provision).

2. Introduction

Overview

- 2.1 This report summarises the results of research undertaken by AMION Consulting, in association with Mott MacDonald, Thomas Lister and Professor Peter Tyler, for the now Department for Levelling Up, Housing and Communities (DLUHC).
- 2.2 The research has been undertaken to support the preparation of new guidance to determine the additional impacts (or additionality)¹ of housing supply interventions by the public sector. The guidance is intended to supplement and update the material on additionality in the 2014 Homes and Communities Agency (HCA) Additionality Guide² and the 2016 Department for Communities and Local Government (DCLG) Appraisal Guide³. Its focus is on housing supply-side interventions (i.e. support for housing developments) and it is primarily concerned with the assessment of the additionality of interventions in terms of their principal outputs i.e. the number of housing units. However it should be noted that the HCA Additionality Guide identified that projects can have effects on prices and impacts off the direct causal chain, as well as crowding in and crowding out effects. It also highlights that, “...Another longer term form of displacement could be the gentrification of an area, with low income residents being displaced”. The supporting research (particularly the econometric analysis) reflected in this report also raises issues about other outcomes including in particular price effects (both negative and positive) in local areas which in turn will have wider external impacts.

Approach

- 2.3 The principal elements of additionality with regard to housing supply support concern the extent of deadweight and displacement. As well as a review of existing research documentation and previous guidance concerning both of these dimensions, preparation of this report has involved primary research. This has analysed a sample of interventions which have been supported by Homes England or its predecessors (the HCA and English Partnerships) over the past decade or so. It has involved a combination of both top-down (econometric modelling) and bottom-up (case study) approaches:
- Deadweight was assessed via project and other documentation reviews and interviews with project managers and other stakeholders engaged in a number of case study housing development projects that have previously received public sector support.
 - Displacement was mainly assessed through the use of econometric modelling to examine attributable post-intervention trends in house prices in the areas surrounding the sites of previously supported developments (based on hedonic pricing models with distance-based rings from the intervention site). We originally sought to model housing units in this way, but it was not feasible with the data and modelling approaches currently available. However reduced prices arising from increased supply will via the price mechanism potentially reduce (i.e. displace) future supply. A deduction in additionality is usually made for this effect.

¹ The new HM Treasury guidance (the Green Book, December 2020) on how to appraise and evaluate policies, projects and programmes, defines additionality as the real increase in social value that would not have occurred in the absence of the intervention being appraised.

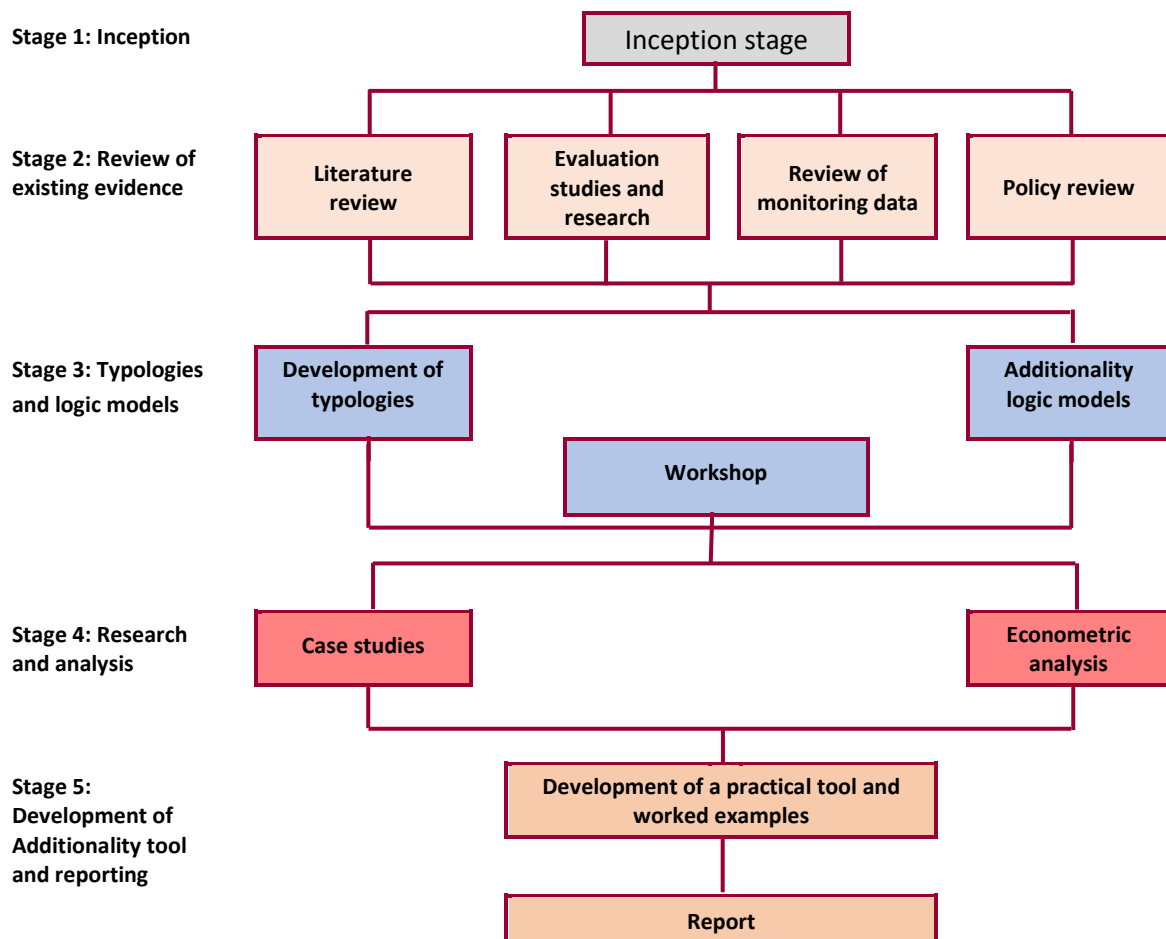
² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576427/161129_Appraisal_Guidance.pdf

The research also drew on the case study evidence to illustrate and verify findings on displacement from the modelling.

- 2.4 It is worth noting that the modelling of house price changes attributable to supported developments has also identified where higher prices have arisen in surrounding areas. These increases may thereby have increased the areas' commercial attractiveness for developers. Such 'spillover' or 'placemaking' effects have been treated as wider benefits rather than as part of the additionality assessment. Separate research has been commissioned by Homes England to examine these effects further.
- 2.5 Our overall approach to the research is summarised in Figure 2.1. Following an initial Inception stage, it has involved four further stages - Stage 2: Review of existing evidence; Stage 3: Typologies and logic models; Stage 4: Research and analysis; and Stage 5: Development of the Additionality Tool and Reporting. The approach was a mix of both top-down (econometric) and bottom-up (project) and quantitative and qualitative analyses, involving 100 case studies. Appendix A sets out details of the case study selection. Of the 100 interventions, 72 were successfully modelled using econometric analysis and 17 were subject to a programme of interviews with project managers, developers, property agents and local authorities.

Figure 2.1: Research methodology



Report structure

2.6 The report is structured as follows:

- Section 2 - Additionality (what it is, current guidance and existing evidence);
- Section 3 - Deadweight (case study and other evidence);
- Section 4 - Displacement (modelling and other evidence); and
- Section 5 - Conclusions and implications for guidance.

3. Additionality

Introduction

3.1 Additionality can be defined as:

“The extent to which activity takes place at all, on a larger scale, earlier or within a specific designated area or target group as a result of the intervention”⁴

Most interventions will have both positive and negative effects. It is important that all of these are taken into account when assessing impacts so that the net changes brought about by an intervention can be identified. The concept of additionality is therefore crucial to the appraisal and evaluation of the outputs, outcomes and other benefits of public sector interventions. It is used to convert gross impacts into net impacts and is therefore also vital to the meaningful assessment of, for example, the cost-benefits and cost-effectiveness of interventions.

Components of additionality

3.2 As illustrated in Figure 3.1, the conversion of gross impacts into net impacts entails consideration of a number of factors:

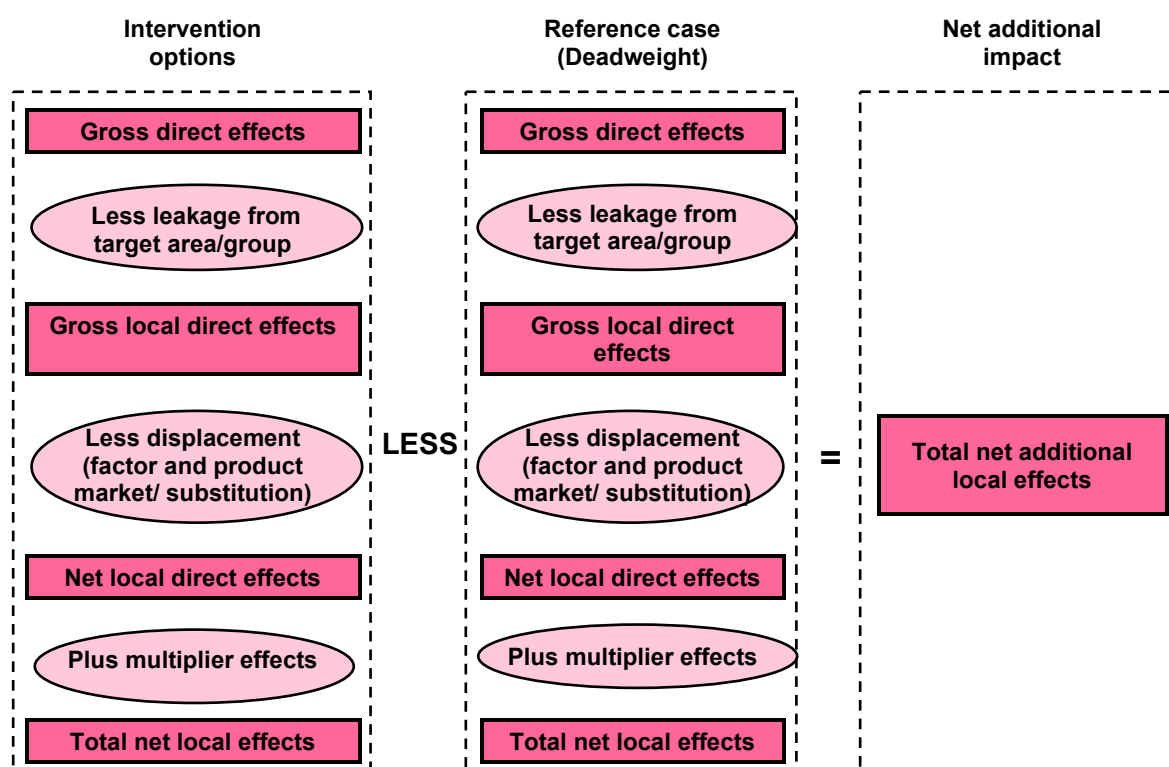
- **Deadweight** - i.e. the level of target outputs/outcomes that would be (or have been) produced if the intervention did not go ahead. It usually requires the construction and quantification of a specific counterfactual case (i.e. do nothing or business as usual) scenario e.g. what scale, if any, (and type) of housing development would have proceeded, and in what time frame, in the absence of the intervention.
- **Displacement** - i.e. the number or proportion of outputs/outcomes (occurring under the counterfactual and the intervention options) accounted for by reduced outputs/outcomes elsewhere in the target area. In the case of a housing development intervention this could take the form of a general reduction in development (potentially arising for example as a consequence of falling prices) within the local area or where a developer proceeds with the supported development instead of another (i.e. substitution).
- **Leakage** - i.e. the number or proportion of outputs (occurring under both the reference case and the intervention options) that benefit those outside of the intervention's target area (or group). In the case of supply-side housing interventions which are focused on a specific geography (i.e. site) the assumption is that leakage is zero. However, leakage may be a factor if the supported housing is targeting a particular group such as key workers.
- **Multiplier effects** - these usually relate to further economic activity (jobs, expenditure or income) associated with additional local income and local supplier purchases and are added to both the intervention and counterfactual case assessments. They can also include longer term development effects - for example where a housing development, through its impacts on an area's general

⁴ Additionality Guide, HCA, 2014, p.3.

attractiveness or through consequential house price increases, renders the area more attractive to further development. In reality, these effects are difficult to assess and are normally included as a positive externality (or benefit) rather than as part of the additionality adjustment for housing interventions.

- 3.3 While ultimately public sector interventions are most concerned with delivering outcomes, the project appraisal stage will usually be primarily concerned with assessing the net additionality of outputs such as the numbers of housing units built, refurbished or demolished. The focus for the assessment will therefore be primarily on the first two factors - deadweight and displacement.
- 3.4 Outcomes of supply-side housing include, for example, improved conditions, changes in tenure, reduction of turnover and satisfaction with accommodation. However, one key measure of outcomes for an area is provided by impacts on house prices. These can inform judgements as to how developments may impact upon the affordability of housing in an area and the degree to which there may be 'placemaking' benefits (a form of 'multiplier' as referenced above) resulting in the attraction of further housing investments. The econometric modelling that formed part of the research undertaken to inform this report provides useful evidence on the nature and scale of such effects and how they might vary according to the characteristics of developments.

Figure 3.1: Key components of project level additionality



Source: HCA Additionality Guide (Figure 2.3), 2014

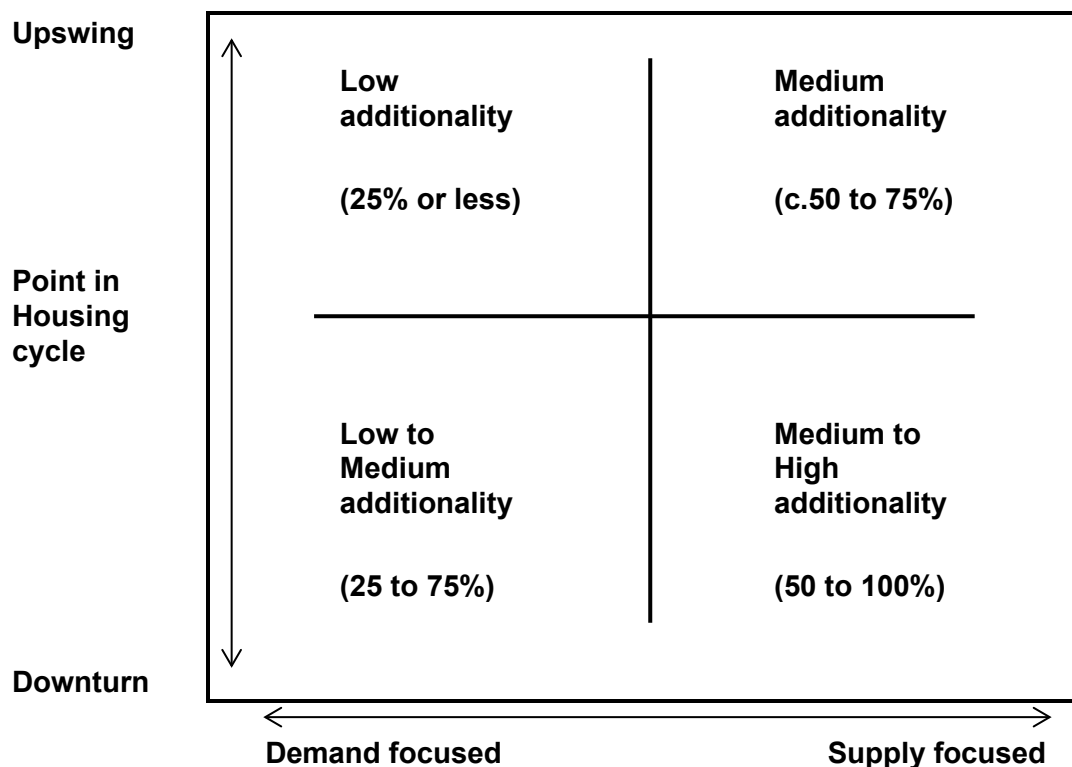
Current additionality guidance

- 3.5 Regarding housing interventions specifically, the most comprehensive reference document for estimating additionality has been the HCA Additionality Guide (the most recent of which was published in 2014). This was set within the wider framework of economic appraisal as set out in the HM Treasury Green Book. Consideration of

additionality is also a central component of the assessment of value for money as set out within the DCLG Appraisal Guide (2016).

- 3.6 There have however been a number of changes to appraisal practice (and funding structures) since 2014. These have included the move in the DCLG Appraisal Guide towards appraising housing and commercial development schemes using the Land Value Uplift (LVU) approach. The 2014 Additionality Guide is focused more closely on sub-national additionality and how interventions lead to additional economic activity (against traditional jobs and GVA measures) within the localised economy. The DCLG Appraisal Guide presents a framework for assessing additionality (see Figure 3.2) that develops what is set out in the 2014 Additionality Guide by drawing a distinction between demand and supply focused interventions and the point in the housing cycle.

Figure 3.2: Framework for assessing additionality – DCLG Appraisal Guide (2016)



- 3.7 Notwithstanding these changes, the 2014 Guide remains the most comprehensive extant guide in terms of its guiding principles for dealing with key additionality concepts such as deadweight and displacement. The DCLG Appraisal Guide shares many of these key principles. Based on these documents, and other guidance from the European Commission and Scottish Enterprise, the following features and core principles that any new framework should recognise can be identified:

- a clear rationale for the intervention including a detailed assessment of the market failure and the evidence for its existence;
- an assessment of the counterfactual and comparison with a range of intervention scenarios;
- clarity over the study area for the various types and levels of impact under consideration. The previous Green Book (2018) (and DCLG Appraisal Guide) were clear that additionality at the national level was the primary focus. However,

the latest Green Book (2020) has put increased emphasis on place based analysis, noting “where proposals have a focus on a specific part of the UK, place based analysis should be performed and be central to appraisal advice.” Guidance on place based analyses is set out in Annex A2 of the 2020 Green Book. Housing need is most usefully considered at the level of the local housing market area;

- the need for judgements to be explained and informed by evidence regarding the intervention and the environment within which it is proposed to operate;
- a degree of flexibility regarding techniques and sources applied that are proportional to the scale and significance of the project;
- a more formalised approach to the use of qualitative evidence in assessments potentially involving the use of a range of questions or checklists;
- the rationale for the intervention should also set out the role of complementary investment (e.g. transport, other utility infrastructure) and planning policies and the degree to which additionality is dependent on these; and
- the focus for assessment of the additionality of residential developments should be on deadweight and displacement effects, with other additionality factors (such as leakage, substitution and multiplier effects) largely excluded from the analysis.

Existing evidence

- 3.8 A review of existing evaluation and other research evidence has been undertaken as part of this research. Its findings are summarised in Appendix B.
- 3.9 Multiple evaluation studies have been produced since the publication of the fourth edition of the HCA Additionality Guide in 2014, covering a range of economic development and growth interventions. However, only a limited number of these studies have specifically addressed the concept of additionality in relation to government interventions on house building.
- 3.10 The evidence base from existing evaluation reports for assessing levels of deadweight and displacement, particularly for housing, is therefore relatively weak and generally lacking in credible baseline and monitoring data and econometric (or statistical) analyses.
- 3.11 The main conclusions of the literature review and their implications for future approaches to the estimation of additionality are as follows:
- while there are various benchmark additionality values that can be drawn upon (such as the ready reckoners established by the HCA (2014) and additionality ranges provided by DCLG (2016)), there is limited guidance on the selection of appropriate benchmarks for individual projects and the justification for the scale of adjustment is often unclear. Research undertaken by the Department for Business, Innovation and Skills (BIS) in 2009 still represents the most comprehensive analysis of additionality benchmarks;
 - there is, therefore, a need to provide a more detailed framework to guide the application of additionality adjustments, potentially through the establishment of a standard set of additionality questions. This should be structured to ensure that data is available to provide satisfactory answers and explanatory hypotheses can be formulated;
 - the local housing market context is crucial to the assessment of additionality. While nationally there is a shortage of housing relative to need and a significant backlog of demand, this is not necessarily the case at the local level. This need

for the primary focus to be local is further supported by research evidence showing that the effects of a specific residential development on house prices are unlikely to be of significance beyond the neighbouring areas;

- the provision of grant funding to provide affordable homes has been found to be largely additional, especially considering the extent of market failures in this area. Research undertaken by Savills (2019) suggests that the additionality of affordable housing is close to 100%. This is supported by the results of the DCLG Housing Model (Meen et al., 2015), which found no evidence of crowding out effects. However it should be noted that neither report distinguished between the supply of different types of affordable housing. In addition the 100% additionality assumption implies that the provision of new affordable housing does not result in factor market displacement - in terms of, for example, construction capacity and labour and land supply;
- there are significant issues in establishing a meaningful counterfactual that disentangles the effects of an intervention from other related initiatives and wider changes within the economy and housing market. Their resolution can often require a triangulation of approaches, combining 'top-down' analysis of secondary datasets and 'bottom-up' analysis of primary data. Primary data is often drawn from qualitative interviews and surveys and is therefore dependent on self-reported assessments of impact with the assumption that respondents are answering from a position of knowledge, accurate recall and objectivity. Assessments where econometric analysis had also been applied, tended to provide more robust and clearer conclusions with regard to direct and indirect impacts; and
- an updated additionality framework needs to provide more specific qualitative guidance on the key areas of market failure, how to evidence them and how this then feeds into determining appropriate levels of additionality. In this context the overall housing market context within the intervention area is critical, as well as details about the site and scheme itself, as it fundamentally shapes the arguments set out in terms of the underlying rationale for public sector intervention.

4. Deadweight

Introduction

- 4.1 The key question to be addressed in considering deadweight in the context of housing supply interventions is to determine what would happen (or have happened) in the absence of the intervention. This entails estimation of what scale, if any, and what type of development would have taken place on the site, and within what time frame.

Existing evidence

- 4.2 Research on deadweight in housing development interventions is very limited. Previous evidence on wider housing and physical development support interventions would suggest that deadweight has ranged up to 34%. However, the amount of deadweight in a housing development intervention is likely to be very dependent on the design of the intervention itself. The HCA Additionality Guide used evidence from a number of evaluations and research regarding a broader typology of interventions to examine a number of benchmarks with potential relevance. These included:
- BIS (2009) Occasional Paper No. 1: Research to improve the assessment of additionality – regeneration through physical infrastructure sub-regional average of 7.5% deadweight and regional average of 33.9% .
 - DETR (2000) Final Evaluation of City Challenge – programme and project manager survey-based housing average of 41% deadweight, beneficiary survey-based housing average of 10%, and overall housing average of 26%.
 - AMION (2007) National Strategy for Neighbourhood Renewal: evidence on Progress and Value for Money – housing and environment interventions average of 24% deadweight.

Case study evidence

- 4.3 The research included interviews with project managers and other stakeholders involved in a number of public sector housing supply interventions undertaken over the previous 12 years.
- 4.4 As part of these case studies, views on what would have happened in the absence of public support were explored in order to gain an indication of the levels of deadweight involved. Views of consultees in the 17 case studies where this proved to be possible are summarised below. It should be noted however that, despite attempts to triangulate views, there may well remain an element of unintentional bias from consultees in favour of the interventions they were involved in.
- 4.5 In none of the 17 case studies of earlier support interventions undertaken for this research did consultees consider that, in the absence of support, the development would have come forward in its final form and/or within its final timeframe:
- in 7 of the sites the most probable outcome in the absence of support was considered to have been no development. A number of these developments were key elements in wider regeneration priority zones, and the outcome would in the view of consultees have been further decline in neighbouring areas;
 - in a further 8 of the sites, the support provided enabled development to proceed in a timely manner. Several of these developments had already been stalled for a

number of years and the support provided was often in the form of loans or equity (in effect bridging finance); and

- in the other 2 sites it was considered that development would have gone ahead but in a very different form – either as a standard housing development (as opposed to the exemplar scheme which was provided) or as a development focused on a very different market and lacking an affordable housing element.

4.6 The views of the consultees about what would have happened to each site without the Homes England support were as follows:

(i) No development would have taken place

- 40 housing unit grant funded scheme in Yorkshire and Humberside - nothing would have happened, and the site would have fallen into further disrepair.
- 339 housing unit joint venture in the East Midlands – the area was in a state of disrepair due largely to concentrated private ownership and landlord neglect. Without public intervention, nothing would have changed. Developers would not have gone near the project. A Special Purpose Vehicle (SPV) was needed to co-ordinate the site acquisition, Compulsory Purchase Orders (CPOs) and deal with the compensation payments.
- 50 housing unit acquisition and remediation scheme in the North East - nothing would have happened, and the area would have continued to decline.
- 18 housing unit grant funded scheme in Yorkshire and Humberside - the development itself would not have happened. Despite its small size it appears to have provided a stimulus to the wider area helping to counter the previous cycle of decline with low prices with limited potential for new investment.
- 215 housing units ownership transfer scheme in the East Midlands – the site would have remained farmland (leased) or possibly sold back to original owner in line with CPO regulations. The consequences would have been more flooding to the town centre but sluices were put in places to support the housing.
- 212 housing unit acquisition and remediation scheme in the North East - nothing would have happened given the scale of contamination. It would have taken a very long time to come forward – estimated 15/20 years.
- 30 housing unit acquisition and disposal in the East Midlands – the site would still be vacant.

(ii) Delayed development

- 49 housing units delivered through the sale of land and development support in the East of England – the site would have remained derelict for at least a few more years. It would likely have been built out eventually - probably 3-4 years later given the economic conditions at the time.
- 127 housing units delivered through equity investment in London - if the support had not been provided there would have been significant delay. It enabled other phases to be brought forward.
- 23 housing units delivered through equity investment in London – the site would have come forward at a much later date. Remediation costs were significant. However, the infrastructure put in place because of the 2012 Olympics would have eventually made the investment prospects more appealing to the private sector.

- 80 housing units delivered through loan funding in the South East - development of the site would have been delayed for several years.
- 187 housing units delivered through loan funding in London - would have resulted in further delay and detrimental impact on the rest of the development.
- 38 housing units delivered through loan funding in London - there would have been further delay in implementation due to financial market conditions (already delayed for 2 years).
- 20 housing units delivered through loan funding in the North West – the site was stalled and development would have been delayed.
- 152 housing units delivered through loan funding in London - without support development would have happened but in a more piecemeal and protracted way.

(iii) Different development form

- 38 housing unit grant funded scheme in the East Midlands - the site would have been built out but would have been standard housing and not an exemplar scheme.
- 12 housing unit grant funded scheme in the North West - likely to have either entered further disrepair or have been developed by a more exclusive developer who would have provided luxurious units but with no affordable housing element.

5. Displacement

Introduction

- 5.1 To overcome the deficiency in robust evidence, the research has used econometric modelling to examine post-intervention trends in house prices within distance-based rings radiating out from the intervention sites relative to a 'control' ring (usually a maximum of 2.5km from the development site) beyond which any impacts were not anticipated to occur. These trends were used to assess the extent to which interventions have resulted in reduced prices, after allowing for local characteristics, leading through the price mechanism to a reduction in other new supply due to reduced development viability (i.e. a displacement effect). It should be noted that price reductions are also likely to result in reduced land prices and an associated (at least partial) compensation in the area's development viability (i.e. reduced costs compensating for reduced revenues). However, landowners are generally unwilling to sell in a falling or adverse market and therefore this may result in further displacement effects. It should also be noted that the price fall analysis will not necessarily capture the full extent that homes on other sites are displaced. Government supported schemes may well result in slower build out rates of nearby schemes due to absorption rates⁵, without there necessarily being a material effect on price. However, the same factors that tend to affect the extent a Government supported scheme affects local prices would likely also affect the level of unit displacement.
- 5.2 Appendices C and D set out the results of the econometric modelling.
- 5.3 The research has also identified where resultant higher prices (and reduced affordability) may have increased the commercial attractiveness of areas for developers (i.e. placemaking or spillover effects). For the purposes of the additionality framework these placemaking effects have been captured as wider benefits rather than as part of the additionality assessment. As noted above, Homes England has commissioned separate research to investigate placemaking effects.
- 5.4 The research identifies the potential for supported schemes to, in some cases, result in relative price falls, making properties more affordable but potentially adversely affecting viability and in others to cause relative prices to rise through placemaking effects which make the area less affordable. This highlights the importance of being clear about the objective of intervening and potentially the need for complementary interventions to address consequential effects. Thus, for example, a regeneration focused intervention may be seeking to remove the blight caused on an area by redeveloping derelict buildings and sites for new homes. However, other interventions may be appropriate to ensure that existing local residents benefit and that there is sufficient affordable housing provision to allow those on lower incomes can remain in the area. The proposed approach to assessing displacement is the same irrespective of the objective of the intervention, although for relevant projects a placemaking impact would be added.

Existing evidence

- 5.5 Again, existing evidence on levels of displacement associated specifically with supported housing developments is limited. The HCA Additionality Guide (2014) used evidence

⁵ See Rt Hon Sir Oliver Letwin (June 2018) – Independent Review of Build Out Rates. The Letwin Review defined absorption rates as, 'the rate at which newly constructed homes can be sold into (or are believed by the housebuilder to be able to be sold successfully into) the local market without materially disturbing the market price'.

from a range of evaluations and other research to provide a number of benchmarks in terms of displacement. Of relevance to housing, this included:

- BIS (2009) Occasional Paper No. 1: Research to improve the assessment of additionality – regeneration through physical infrastructure sub-regional average of 38.7%, and regional average of 37.4%.
- DETR (2000) Final Evaluation of City Challenge – housing within City Challenge area 10%, immediately adjoining area 19%, and district 38%. The City Challenge evaluation identified that at larger spatial levels the displacement effects associated with housing rose to fully displace provision.
- AMION (2007) National Strategy for Neighbourhood Renewal: Evidence on Progress and Value for Money – housing and environment average of 15%.

5.6 The Guide also set out gross to net additionality ratios for a range of intervention types drawing on the evaluation of the Single Regeneration Budget (Rhodes *et al.*, 2002), which includes both displacement and deadweight. For housing, gross to net additionality ratios (i.e. the net additional outputs as a percentage of gross outputs) were identified as follows:

- Private dwellings completed – 48%
- Private dwellings improved – 45%
- Local authority dwellings improved – 37%
- Housing Association dwellings completed – 39%
- Dwellings in tenant management organisation – 65%

5.7 In addition to the benchmark values from previous evaluations, the Additionality Guide included 'ready reckoners' for displacement to be used in the absence of local information as follows: low – 25%, medium – 50% and high – 75%.

Econometric analysis

Overall results

5.8 The main findings of the modelling regarding price displacement were:

- in 82% of the 72 cases modelled there was an identified displacement (price reduction) or placemaking (price increase) effect associated with the public sector supported project. Where effects were evident, 'placemaking' was more apparent than 'displacement' – only 38% of projects resulted in a net decline (38%) in prices at an average of 1.9% (i.e., a displacement effect);
- impacts tended to be highest closer to the intervention site and then declined with further distance away - average losses in the two closest rings were 6.0% whilst they were 2.4% in the two outermost rings. The decline in values appeared to level off beyond rings 5 / 6 (beyond 1/1.25km for the majority of projects);
- significant levels of price reduction or 'displacement' - (i.e. 2% or more) were more apparent in areas where there were already relatively high levels of development activity (statistically significant once other factors were controlled for); and
- the largest house price decreases tended to be in areas where housing was already relatively affordable. In areas with already high house price to earnings ratios, there is little evidence of support enhancing affordability through reductions in house prices (suggesting a sustained significant increase in supply is needed

whereas the projects modelled were relatively small in scale – the average size was 118 units)⁶.

- 5.9 It is important to recognise that model outcomes are relative in the sense that they indicate the pattern of change in post-completion ring prices (for broadly comparable properties) relative to price patterns in the control ring. As such, negative outcomes should not be interpreted as an (absolute) price adjustment.
- 5.10 The relationship between price displacement and unit displacement, and therefore the significance of the above findings for the guidance, was explored through research and analysis by Thomas Lister (see Appendix E). This found that in an average West Midlands brownfield scheme, a reduction in new house price values beyond 4% would render delivery of a scheme difficult and beyond 8% unviable. None of the modelled schemes had price-damping displacement effects of this magnitude across the whole of their areas and only 11% had reductions of greater than 2%. This suggests that unit displacement effects would be low, although, as noted above, other developers may have adjusted their build out rate so as to not materially affect the market price. Thus unit displacement effects could occur without an effect on price, which would not be picked up in the analysis.
- 5.11 The econometric modelling identified that the displacement effects were predominantly very localised. Consequently, the additionality of housing supply interventions is likely to be broadly similar at the local and national level. It also found that the effects are relatively limited in relation to the case study projects, which are made up of mainly smaller schemes (58% of the projects were less than 50 units) reflecting the nature of most historic supply side interventions.
- 5.12 These conclusions were further supported through the qualitative case studies which found little evidence of any significant direct displacement effects on other development. However there was some evidence of supported developments serving as an enabler or catalyst for other developments (i.e. a placemaking effect).

Factors affecting levels of displacement

- 5.13 More detailed analysis using semi-parametric techniques was undertaken to look further into the pattern of net price change across projects and to investigate the extent to which there is evidence of a relationship with a range of key variables.
- 5.14 Three variables were identified as being of particular significance for price displacement:
- affordability (resident-based) of existing housing in the area;
 - development rates in the area; and
 - scale of supported development.
- 5.15 The distribution of results in relation to each of these is plotted in the following partial residual plots. The plots illustrate the relationship between net performance and each variable allowing for (in effect equalising for) variation in the impact of other variables in the model. The blue dots show partial residuals through which the (black line) relationship is modelled, with the red dashed lines indicating standard error ranges.

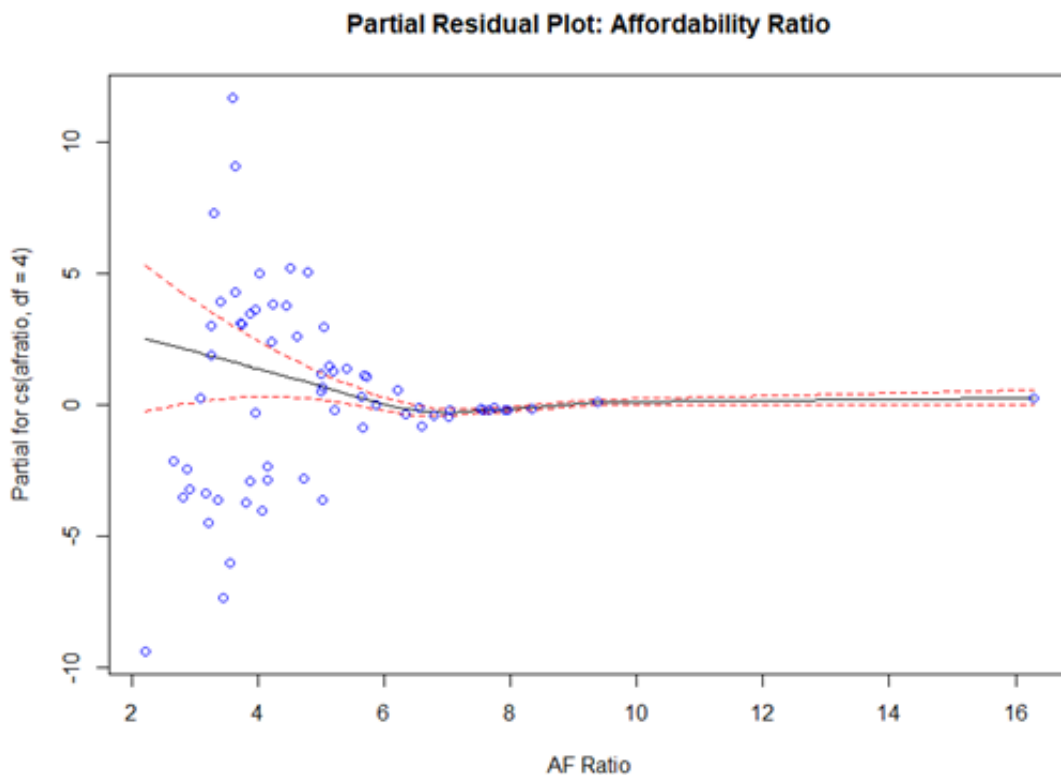
⁶ Both Meen (2011) 'A long-run model of housing affordability', *Housing Studies*, 26, and Fingleton et al (2019) 'Housing affordability: Is new local supply the key?', *Environment and Planning A*, 51, point to the very large scale of development necessary to materially alter affordability profiles in parts of England. This contrasts with the generally small-scale developments in this study. Additionally, while Meen finds that increases in housebuilding result in larger effects on affordability in southern regions where supply shortages are greater, the dynamic spatial panel model of Fingleton et al also points to complex spatial price effects in sub-regional housing markets whereby outcomes may be less clear cut.

- 5.16 Consistency between this analysis and the results of the more formal modelling referred to above (see also Appendices C and D) indicates that these factors should be an element in future guidance.

Affordability of existing housing in the area

- 5.17 The further analysis confirmed the earlier conclusions – in this case that the largest house price decreases (i.e. potential displacement) tended to be in areas where housing was already relatively affordable i.e. the more affordable the housing in the area, the greater the price impact (see Figure 5.1). This is likely to reflect the relatively more limited level of demand in these areas. There is little evidence of notable price impacts above moderate affordability ratio (low affordability/excess demand) areas suggesting a sustained significant increase in supply is needed to achieve such an impact.

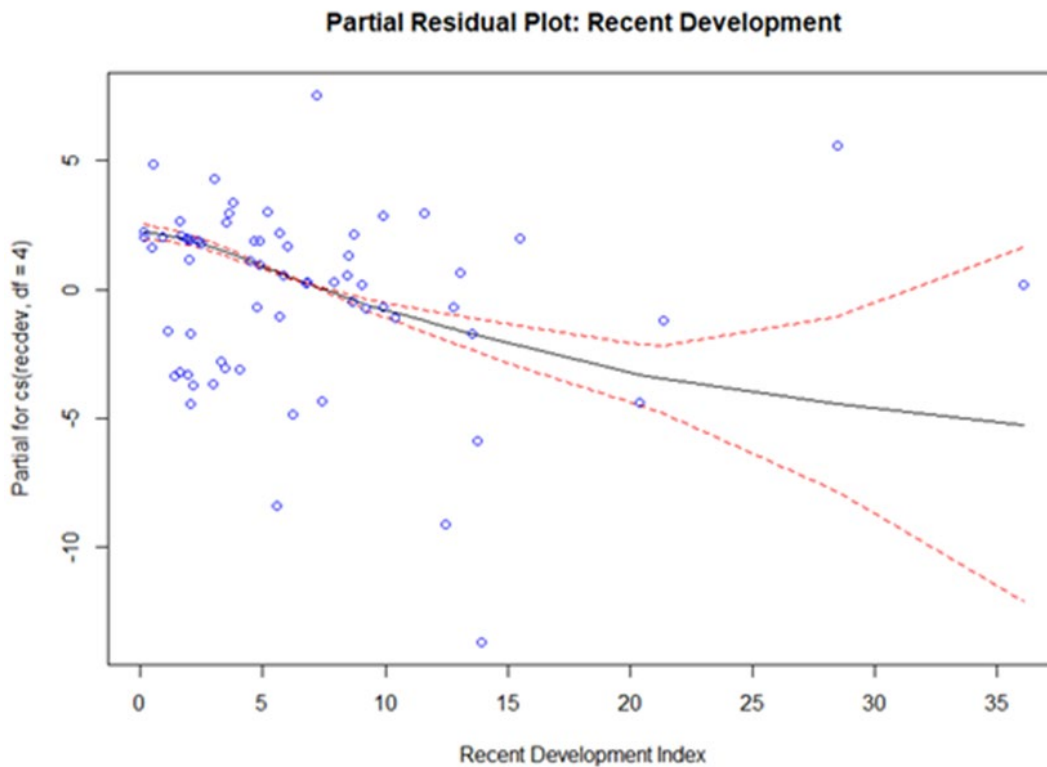
Figure 5.1: Partial Residual Plot: Affordability Ratio



Development rates in the area

- 5.18 The more prevalent (net) negative impacts (i.e. displacement) noted earlier for projects in areas with higher development activity is confirmed by further analysis. As Figure 5.2 shows, the higher the development rate in the area, the greater the price impact. Higher rates of housing development are likely to mean there is more private sector supply against which a supported project will compete.

Figure 5.2: Partial Residual Plot: Recent development

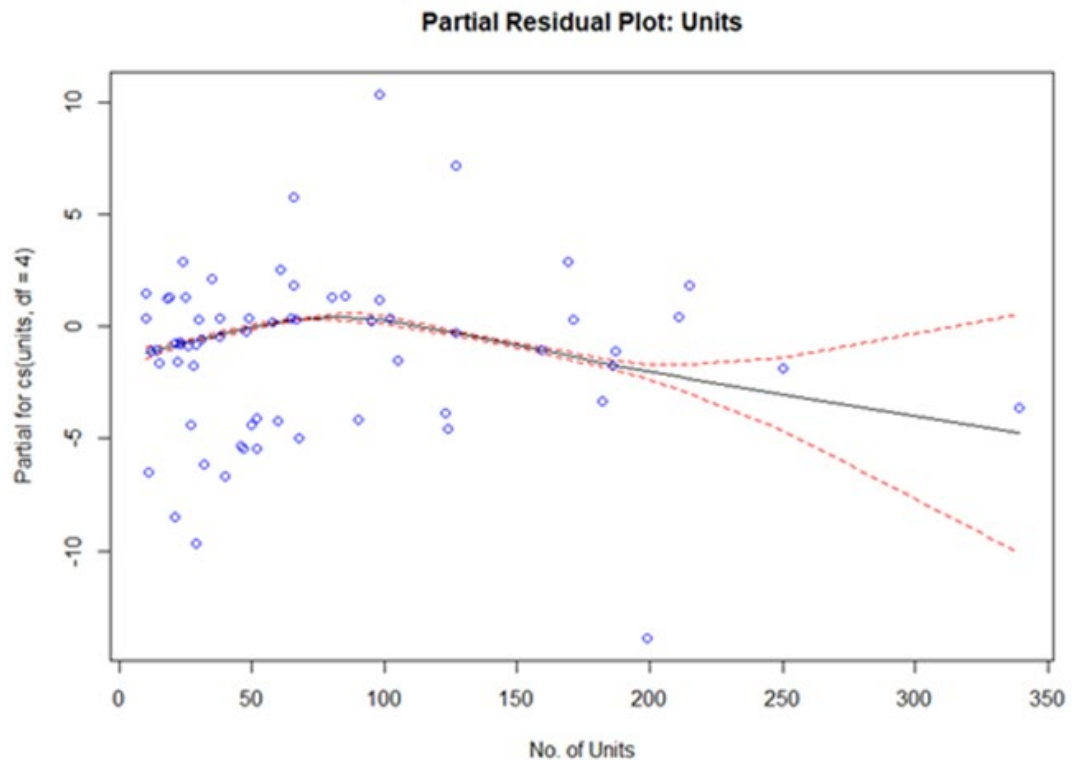


- 5.19 There is a declining price impact from the offset with the rate of decline moderating (but continuing) from some 20% of the area base. Standard errors (red lines) again expand due to the small sample numbers and thereby there is greater uncertainty of outcomes at higher values.
- 5.20 The analysis suggests greater potential placemaking impacts via higher prices in areas with lower development rates.

Scale of the supported development

- 5.21 Results suggest a tendency that the larger the size of the scheme, the greater the identified price displacement attributable to the scheme. The modelled simulations indicate that unit numbers is a relatively strong driver, particularly for larger schemes.
- 5.22 As shown in Figure 5.3, there exists a small increase in prices with lower numbers of units. Prices start to decline somewhere between 80 and 100 units with negative price effects thereafter. Here again standard errors expand in the light of few larger schemes in the sample.

Figure 5.3: Partial Residual Plot: Units



6. Conclusions and implications for guidance

Introduction

6.1 The following summarises the main conclusions from our research and the implications for guidance on the assessment of additionality in supported housing developments. It focuses on the two key elements of deadweight and displacement.

Deadweight

6.2 Our research indicates that deadweight has not been a significant factor in many of the previously approved and implemented case study projects. Where an element of deadweight has occurred this has mainly related to the timing and type of development. This appears to be due to robust appraisals that assessed financial viability and were clear about the rationale for public sector intervention (i.e. the market failure that was preventing the market from bringing all or part of the development forward).

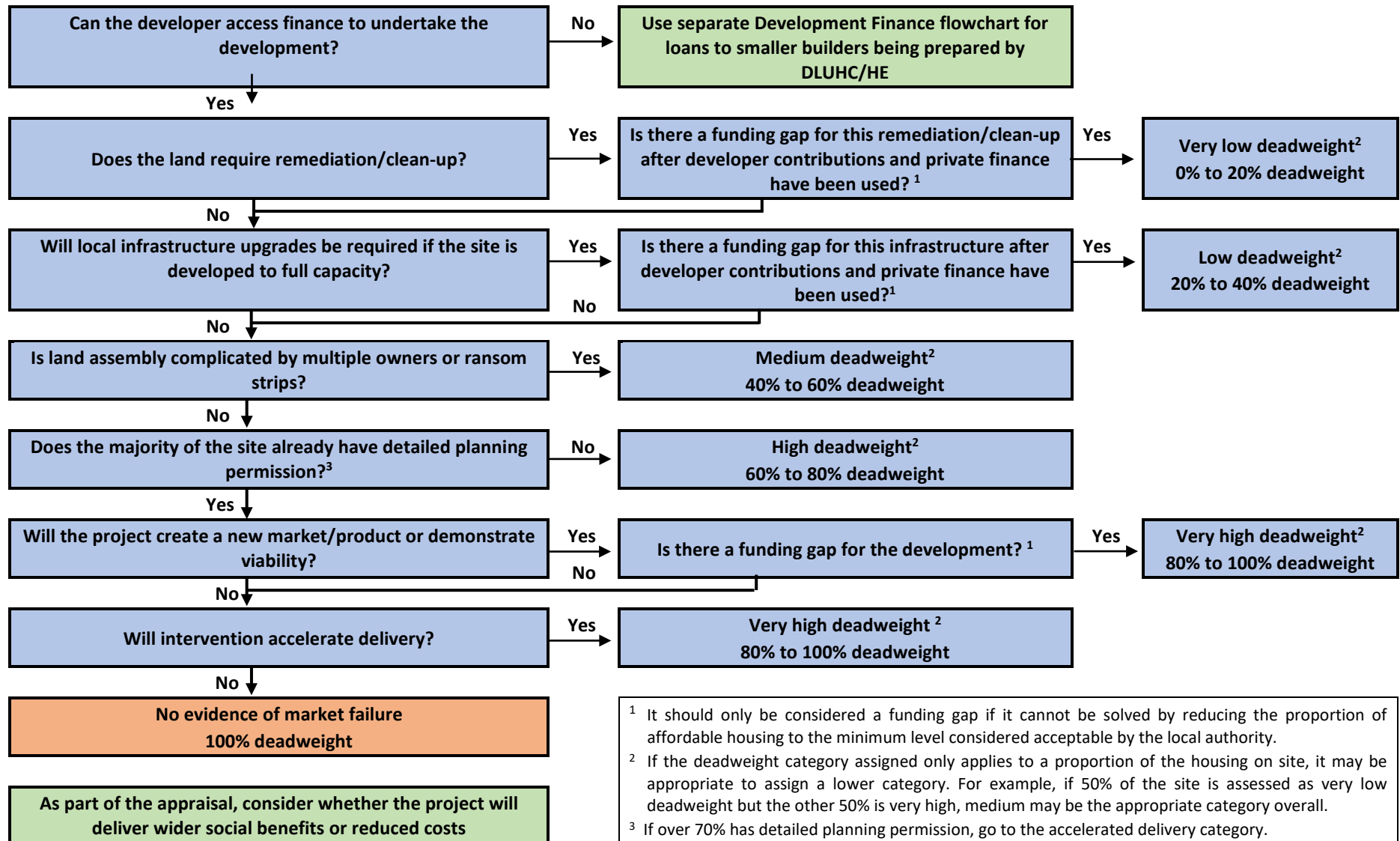
6.3 The assessment of deadweight will always be bespoke to the project. Consideration of its viability, why the market cannot deliver the development and what would happen without the proposed support should always be a core part of appraisals.

6.4 The initial assessment needs to focus on the commercial viability of the development of the site for housing purposes (or part thereof), taking into consideration all the costs involved and the projected revenues, as well as the availability of funding. The remainder of the assessment needs to consider the market failures that may inhibit commercial viability or which represent other barriers to development that may justify intervention. The relevant considerations are as follows:

- **Imperfect Information – loans/equity**
 - How strong is the evidence that the developer cannot access finance elsewhere?
 - Was a loan application unsuccessful due to the applicant being a small and medium sized enterprise (SME)?
 - Could the site be brought forward by other agents?
- **Negative externalities**
 - Does the project require significant on site work such as that needed to address past contamination or blight?
- **Public good**
 - Does the project require strategic infrastructure to enable delivery?
- **Co-ordination failure**
 - Does the project require multiple parties to work together to deliver a site? Is land assembly complicated by multiple owners or ransom strips?
 - Are there significant and long-lasting barriers which prevent parties from working together?
- **Imperfect information – market viability**
 - Will the project create a new market/product or demonstrate viability?

- 6.5 The strength of the market failure evidence will be important when considering a decision to invest in a housing supply intervention. In addition, the planning status of the project and any impact expected on the timing of activity will also need to be assessed.
- 6.6 In most cases the preferred approach to assessing deadweight will be to construct a bespoke counterfactual case scenario based on evidence-based judgments. For example, in relation to transport schemes that facilitate the delivery of housing, Department for Transport (DfT) Transport Analysis Guidance (WebTAG) Unit 2.2 Induced Investment provides guidance on developing a do nothing scenario. This will help analysts to understand what is the actual problem that the public sector is trying to solve and how the proposed intervention will contribute to resolving it.
- 6.7 However, in order to guide analysts, the flowchart in Figure 6.1 has been constructed based on the market failure and other issues discussed above to indicate how the deadweight associated with a housing supply intervention could be assessed, along with a plausible range of values based on the research. These range from very low deadweight (0%-20%) to 100% deadweight where there is no evidence of market failure. This flowchart relates to supply side housing projects except those that involve the provision of development finance – for which a separate flow chart is being developed. The degree of deadweight that should be applied will vary according to judgement of the significance of individual factors and the strength of the evidence.

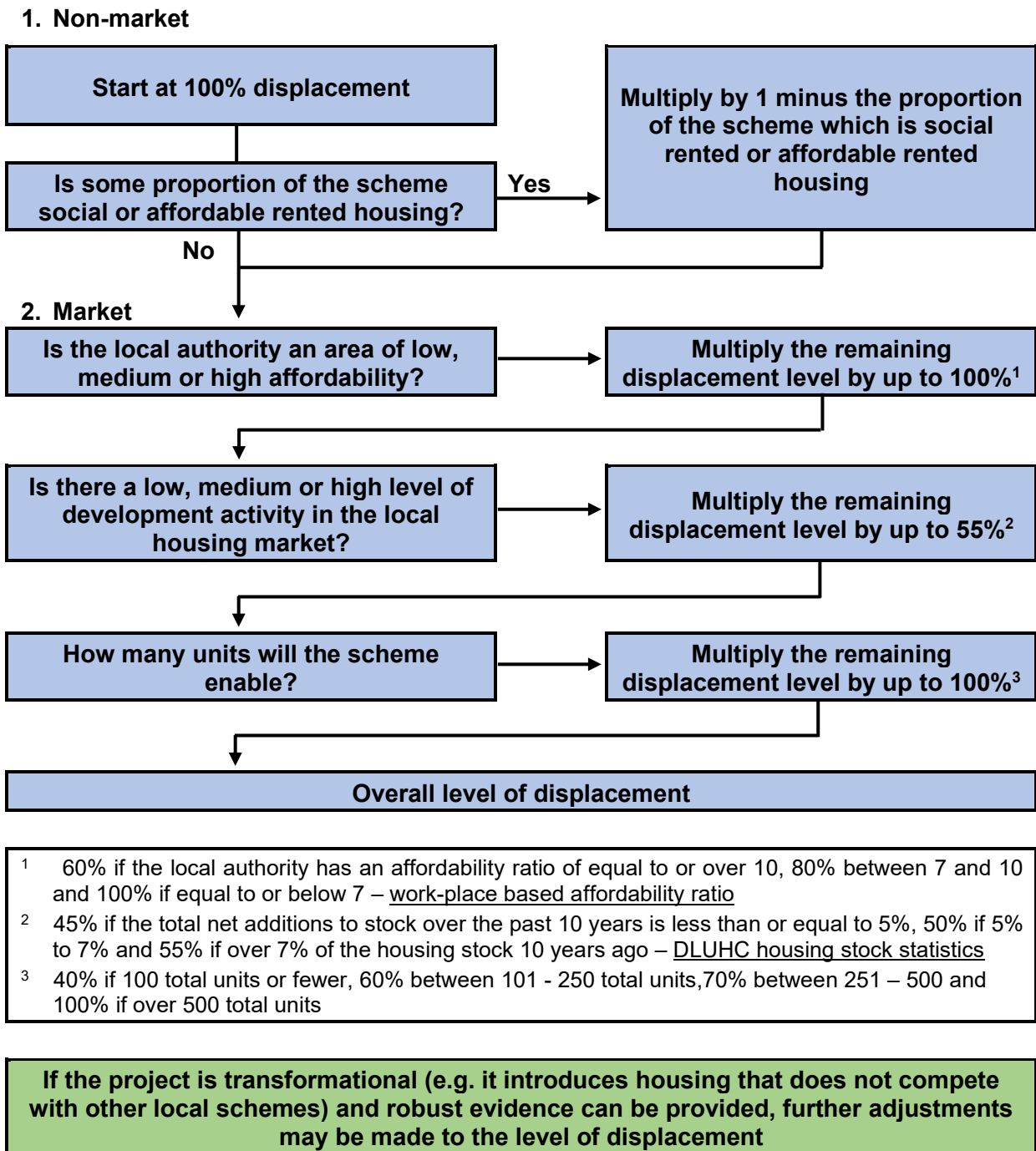
Figure 6.1: Deadweight Overall Framework



Displacement

- 6.8 In terms of market housing, the key factors influencing the scale and nature of unit displacement that need to be incorporated into the additionality framework have been identified as:
- Affordability i.e. what is the local authority affordability ratio?
 - Development activity i.e. what has been the recent local development rate?
 - Scale of development i.e. how many market homes will the scheme deliver?
- 6.9 The results of econometrics have been used to produce additional modelled simulations of displacement (based on negative net price movements) that extend beyond the research sample. A regression-based model has been used to simulate net price change in the light of differing combinations of units, affordability and development. To enable a flowchart approach we have selected flowchart adjustment factors which produce displacement profiles close to the model outputs.
- 6.10 It is unlikely that affordable housing provision will result in unit displacement given a widely recognised shortage of such provision nationally and in many areas that there will have been rigorous prior appraisal of need. Displacement for the social rented and affordable rented housing element of any development should therefore usually be assumed to be zero. This is in line with the DCLG Appraisal Guide that identifies there is strong evidence to suggest that housing of this type is unlikely to be built by private developers in the absence of policy and very little crowding out of private development occurs in practice. However, there is more likely to be potential competition for intermediate type affordable products such as shared ownership.
- 6.11 The overall framework for the assessment of displacement is summarised in the flow chart in Figure 6.2.

Figure 6.2: Displacement Overall Framework



6.12 Displacement factors are determined by a modelling process which simulates net price impacts of varying combinations of scale, affordability and recent development. In practice, factors are defined via an optimisation process which best replicates the pattern of simulation outcomes from the model. They were also tested/benchmarked against prior assessments of Housing Infrastructure Fund (HIF) and small construction schemes.

6.13 Based on the results of the econometric analysis, and tempered by reference to prior evaluation and appraisal experience, appropriate factors by which the starting point displacement level (100% or full displacement) would be adjusted are:

- How many social rented or affordable rented homes will the scheme deliver? (deduct proportion from 100%)

- What is the local authority affordability ratio? When an area is more affordable there is likely to be less demand and thus more displacement (multiply by adjustment factor - based on ONS House price (existing dwellings) to work-place based earnings ratio data, [work-place based affordability ratio](#))

Low (more affordable)	100% (i.e. no adjustment)
-----------------------	---------------------------

Medium	80%
--------	-----

High (less affordable)	60%
------------------------	-----

- What has been the recent local development rate? Higher rates of local development mean that there is more likely to be greater private sector supply to displace (multiply by adjustment factor - based on DLUHC Live tables on housing supply net additional dwellings by local authority district and Council Tax Base data, [DLUHC housing stock statistics](#))

Low	45%
-----	-----

Medium	50%
--------	-----

High	55%
------	-----

- How many market homes will the scheme deliver? When fewer supported new builds are released into the local market they are less likely to displace other housebuilding (multiply by adjustment factor)

<100	40%
------	-----

101-250	60%
---------	-----

251-500	70%
---------	-----

>501	100%
------	------

6.14 Again, the flowchart is provided to guide analysts, who should use evidence-based judgements to decide on project specific displacement effects.

Appendices

Appendix A – Case Study Selection

A1 Introduction

- A1.1 The Additionality Research methodology includes both top down (econometric modelling) and bottom up (case study) research of completed housing projects. This Appendix sets out the basis upon which the 100 projects for econometric analysis have been selected, along with the sub-set of 50 case study projects.
- A1.2 The projects were selected from the Homes England Project Control System (PCS) using a stratified sample based on several criteria to ensure that they are reasonably representative of the population. The basis upon which the selection was made and the selected projects are detailed below.

Sample Selection Criteria

- A1.3 The focus for the econometric modelling and case study research is upon a population of Homes England supported housing projects completed before 2015. The use of projects with a completion date before 2015 allows for a sufficient number of property transactions before and after the project to enable the longitudinal analyses. In order to ensure that the sample of projects selected for review is reasonably representative, we have used a multi-dimensional stratified sample frame, using the following selection criteria:
- **Type of project** – a representative cross-section has been selected of project types, with the housing interventions classified into the following project typology: advice, loan/equity, grants, acquisition/disposal, and off-site infrastructure. In the case of the advice project type there are few in the population and the sample has been boosted to ensure two projects are included;
 - **Spatial distribution** – projects have also been classified spatially by Homes England Operating Area to ensure a geographic spread. Again, a broadly representative sample was used based on the following Operating Areas: (1) London, (2) Midlands, (3) North East, Yorkshire and The Humber, (4) North West, (5) South East, (6) South West, and (7) National. In the case of London, which has relatively few projects compared to its scale, the sample has been boosted to 15 projects;
 - **Size of project** – the sample is also structured to be representative of the scale of projects based on the number of housing completions. The projects have been segmented into three bands - Low (0-50), Medium (51-250) and High (251+); and
 - **Market context** – a final check has been applied to ensure a reasonable distribution in terms of housing market context for each case study based on housing demand in the local market.

A1.4 The criteria were applied in the following way:

- (i) a quota of 100 completed projects was set; and
- (ii) the selection criteria were then applied in the following hierarchical order:
 - Project type;
 - Spatial distribution;
 - Scale of project; and
 - Market context.

Population characteristics

A1.5 Table A1 summarises the profile of projects by type completed in each operating area before 2015.

REGION	Advice		Loan/ equity		Grants		Acquisition/ disposal		Off-site		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
LONDON	-	-	30	9%	19	7%	10	3%	-	-	59	6%
MIDLANDS	1	25	72	22%	38	13	54	18%	7	47	172	18
NORTH EAST, YORKSHIRE AND THE HUMBER	-	-	87	26%	30	10	10	3%	4	27	131	14
NORTH WEST	1	25	60	18%	28	10	68	22%	-	-	157	17
SOUTH EAST	2	50	36	11%	138	48	146	48%	2	13	324	34
SOUTH WEST	-	-	45	14%	36	12	18	6%	2	13	101	11
ENGLAND	-	-	2	1%	-	-	-	-	-	-	2	0%
TOTAL	4	100	332	100	289	100	306	100	15	100	946	100
TOTAL ALL TYPES	4	0%	332	35%	289	31	306	32%	15	2%	946	100

A1.6 Table A2 shows the population of pre-2015 projects by project type and scale (number of housing completions).

SIZE	Advice		Loan/ equity		Grants		Acquisition/ disposal		Off-site		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
SMALL, 0-50	1	25%	198	60	172	60	174	57%	2	1	547	58%
MEDIUM, 51-250	3	75%	123	37	101	35	119	39%	5	3	351	37%
LARGE, 251+	-	-	11	3%	16	6%	13	4%	8	5	48	5%

TOTAL	4	100	332	100	289	100	306	100	15	1	946	100%
TOTAL ALL TYPES	4	0.4%	332	35	289	31	306	32%	15	2	946	100%

Stratified Sample

A1.7 The sample frame by type and region, based on the application of the criteria detailed above, is set out in Table A3.

REGION	Advice		Loan/ equity		Grants		Acquisition/ disposal		Off-site		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
LONDON	-	-	7	22%	5	14%	2	7%		0%	15	15%
MIDLANDS	1	50%	6	19%	4	11%	6	17%	1	2%	17	17%
NORTH EAST, YORKSHIRE AND THE HUMBER	-	-	7	22%	3	8%	1	3%	0	1%	12	12%
NORTH WEST		0%	5	15%	3	8%	7	21%		0%	15	15%
SOUTH EAST	1	50%	3	9%	13	38%	15	45%	0	1%	32	32%
SOUTH WEST	-	-	4	12%	3	10%	2	6%	0	1%	9	9%
ENGLAND	-	-	0	1%		0%		0%			0	0.2%
TOTAL (REGION)	2	100%	33	100%	30	89%	33	98%	2	5%	100	100%
TOTAL ALL TYPES	2	2%	33	34%	30	30%	33	33%	2	2%	100	100%

A1.8 Table A4 shows the sample frame based on size of project.

TABLE A4: PROJECT TYPE DISTRIBUTION BY NUMBER OF HOUSING COMPLETIONS (SAMPLE FRAME)												
	Advice		Loan/ equity		Grants		Acquisition / disposal		Off-site		Total	
SIZE	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
SMALL, 0-50	-	0%	20	60%	18	60%	19	57%	0	13%	56	57%
MEDIUM, 51-250	2	50%	12	37%	10	35%	13	39%	1	33%	38	38%
LARGE, 251+	-	-	1	3%	2	6%	1	4%	1	53%	5	5%
TOTAL (REGION)	2	50%	33	1	30	1	33	1	2	1	100	100%
TOTAL ALL TYPES	2	2%	33	34%	30	30%	33	33%	2	2%	100	100%

Appendix B – Literature Review

B1. Introduction

B1.1 Given the changing context in terms of appraisal methodology and the limitations when it comes to applying additionality in practice (as described further in the sections below), there is a requirement to re-visit the additionality research and evidence base as part of the overall study. This literature review examines the existing evidence base with a particular focus on the following:

- Building on the HCA Additionality Guide, the review of literature has principally focused on research undertaken post 2014, although a selection of earlier studies are examined.
- The main focus of the study is on the additional impact of housing interventions and this is reflected in the literature that has been reviewed. However, the review also considers the wider evidence.
- Given the focus on housing interventions and current appraisal guidance, the overall concept of additionality is considered but with an emphasis on deadweight and displacement (defined below).

B1.2 The literature review has been undertaken to inform the development of the framework for forecasting additionality and aims to provide:

- An overview of the existing approach taken to assessing additionality within appraisal guidance, and the evidence base behind this.
- Evidence that can directly inform the typologies and logic models to be developed – for example, how evidence differs in relation to the identified market failure, type of intervention or the types of benefits being assessed.
- Related to this, any insights into how additionality varies by types of housing and commercial interventions and by locality/region.
- To develop and identify evidence to better support the quantification of additionality.
- A description of the key weaknesses and areas of uncertainty within the evidence base that the framework needs to address and help to improve.

B1.3 The review has included all relevant literature and evidence as identified by the research team and study steering group. The documents examined, although scanning a variety of purposes for clarity, have been categorised broadly into the following types: existing appraisal guidance, evaluation studies, research papers and policy papers.

B1.4 The approach has been to review each relevant document in terms of its overall scope, findings and the implications and limitations for the development of the additionality tool.

B1.5 Overall, the evidence base relating to the impact of housing interventions is not extensive which has meant it has not been appropriate to apply a formal quality appraisal framework but the limitations of each of the studies has been considered carefully.

Background

Overview of additionality

B1.6 Additionality is perhaps best defined as: “The extent to which activity takes place at all, on a larger scale, earlier or within a specific designated area or target group as a result of the

intervention” (Additionality Guide, HCA, 2014, p.3). It is a term that is used to refer to the combination of factors that are applied to convert gross impacts into net impacts, including⁷ (with the first two particularly important for assessing housing intervention schemes at a national level):

- **Deadweight:** refers to the impacts that would have occurred without the intervention. This is used to determine the difference that can be attributed to an intervention. The best practice approach is to estimate deadweight by calculating the outputs and outcomes that would have been achieved under the counterfactual (do nothing or business as usual option). Given in reality that it is not always possible to construct a counterfactual, deadweight might be estimated by assuming that a proportion of the total gross additional local effects would go ahead anyway in the absence of the proposed intervention.
- **Displacement:** the proportion of intervention outputs/outcomes accounted for by reduced outputs/outcomes elsewhere in the target area.
- **Leakage:** refers to the proportion of outputs that benefit those outside of the intervention’s target area or group.
- **Multiplier impacts:** further economic activity (jobs, expenditure or income) associated with additional local income and local supplier purchases.

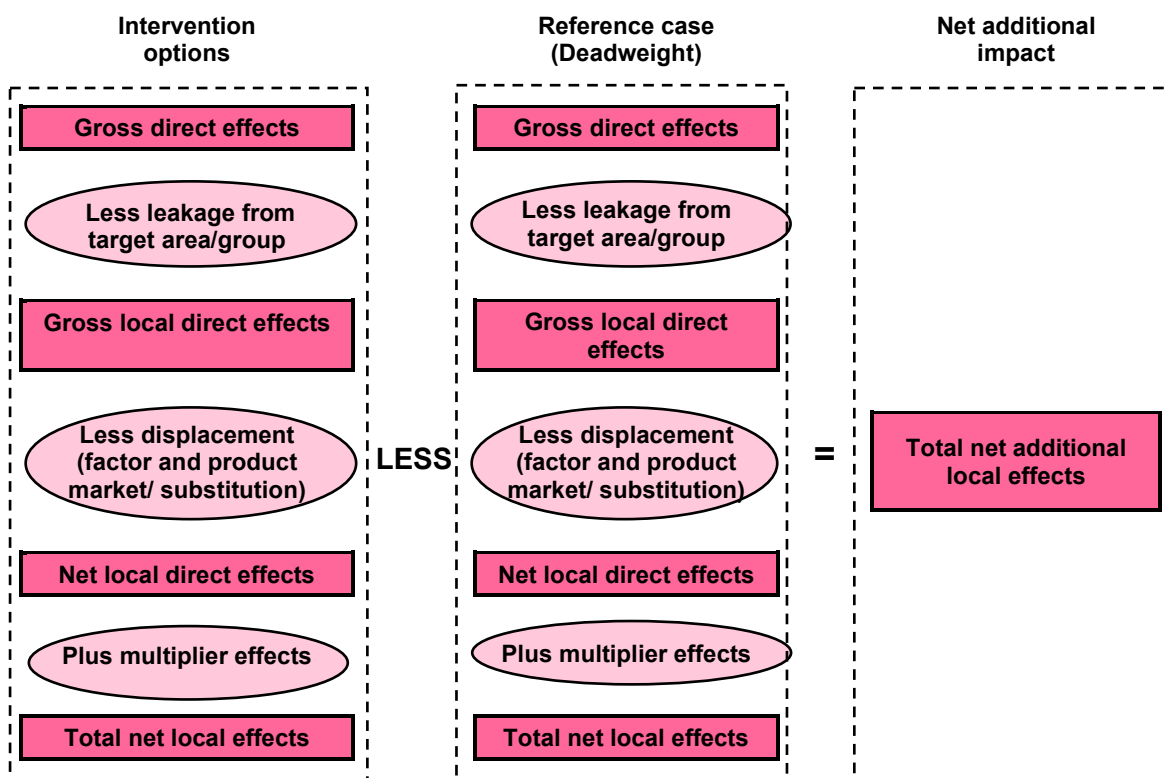
B1.7 This overall framework is perhaps best captured by Figure 2.3 within the 2014 Additionality Guide (reproduced overleaf in Figure B1).

B1.8 As noted by McPherson and McDonald (2010, p.139), *“Additionality can be viewed as belonging to a family of techniques for making evaluative judgements, including, amongst others, cost-benefit analysis, cost-effectiveness analysis and economic impact analysis”*. The evolution of the concept of additionality and the different ways it has been applied in practice is described succinctly by Wren (2007, pp.9-12), emerging from *“dissatisfaction with the macro-methods in opening-up the ‘black-box’ of evaluation”* and the assessment of UK Government-funded regional policy evaluations in the 1970s onwards.

B1.9 Consideration of additionality has since remained a core factor within the assessment of value for money set out within UK Government appraisal guidance (see, for example, the DCLG Appraisal Guide (2016)). It is also considered as part of European regional policy evaluation (see, for example, Ex-post verification of additionality 2007-2013 (2017), European Commission), albeit evaluations undertaken for the European Commission commonly adopt a Cost Benefit Analysis approach with less explicit adjustments for additionality.

⁷ Note substitution may also be relevant (although tends to be less common), which is the effect that arises when a firm substitutes one activity for a similar one to take advantage of public sector assistance.

Figure B1: Approach to assessing project level additionality – key components



Source: HCA Additionality Guide (Figure 2.3), 2014

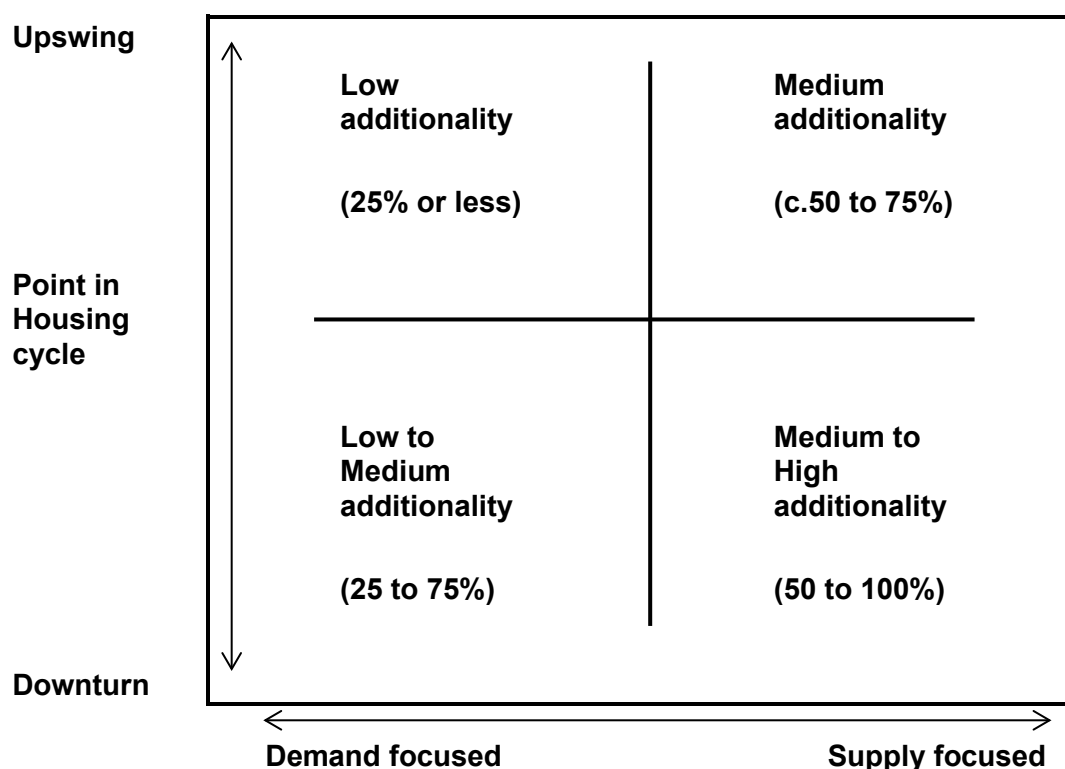
Approach to economic appraisal

B1.10 Since 2014 and the publication of the 4th edition of the HCA Additionality Guide (originally published in 2001⁸), economic appraisal methodology has moved on significantly. For smaller scale area based interventions, the common approach to appraisal was in practice focused on cost effectiveness analysis, with value for money measured through cost per unit of output ratios, as outlined within the HCA Calculating Cost per Job Best Practice Note (2015). There has since been a move towards a greater focus on calculating Benefit Cost Ratios (BCRs), both in terms of housing and employment-led interventions, through the monetisation of costs and benefits, bringing appraisal practice more in line with the HM Treasury Green Book.

B1.11 At the national level, there has been a corresponding step change away from the traditional approach to capturing economic impacts, which was based on job creation and associated Gross Value Added (GVA) impacts, and instead the recommended approach is to calculate the Land Value Uplift (LVU) of an intervention, which is fully outlined in HM Treasury’s Green Book (2020) and the DCLG Appraisal Guide (2016). The DCLG Guide also sets out a framework for assessing additionality that moves on from the 2014 Additionality Guide which is shown below in Figure B2. The Department for Transport (DfT) also includes LVU in its assessment of the impact of transport investments on ‘dependent development’ (Transport Appraisal Guide Unit A.2.2 (2018)).

⁸ A Standard Approach to Assessing the Additional Impacts of Projects – Method Statement, AMION Consulting in association with Dr Peter Tyler, May 2001, for English Partnerships.

Figure B2: Framework for assessing additionality – DCLG Appraisal Guide (2016)



Source: DCLG Appraisal Guide (Figure 9), 2016

B1.12 In terms of calculating LVU, the value of land is determined by factors such as market demand, use, location, nearby infrastructure and the cost of development for an alternative use. The change in value is defined as the value of the land in its new use (for example, commercial or residential) minus the value of the land in its existing use.

B1.13 Any increase in land value as a result of a change in its use reflects the economic benefits of conversion to a more productive use. The value to society of a development can therefore be derived from the land value. This estimate should then be adjusted for any change that would still occur without the proposed intervention (deadweight), displacement of demand from other potential developments and wider effects of the resulting development (for example, any change in amenity value, transport costs, environmental impacts or health outcomes).

Report structure

B1.14 The remainder of this report is structured as follows:

- **Key findings** – an overview of the literature review and key findings and implications for the research.
- **Literature review** – a summary of each of the documents examined, drawing out the overall scope of the research, key findings and implications.
- **Annex A: Bibliography** – the full list of the documents reviewed.

B2. Key findings – snapshot

Additionality – existing approach and key considerations

- B2.1 The most comprehensive reference document for estimating the additionality of government sector interventions over the last 20 years has been the HCA Additionality Guide (the most recent of which was published in 2014), within the wider framework of economic appraisal as set out in the HM Treasury Green Book. This guidance was developed in the context of inherently different funding structures than today. As set out in the introduction, there have also been a number of changes to appraisal practice since the latest version of the Additionality Guide was published including the move towards appraising housing and commercial development schemes using the LVU approach, as set out in the DCLG Appraisal Guide (2016).
- B2.2 The other key consideration is the study or target area or target group that additionality is assessed for. The Additionality Guide is focused more closely on sub-national additionality and how interventions lead to additional economic activity (against traditional jobs and GVA measures) within the localised economy. Despite this, it perhaps remains the most comprehensive guide in terms of its guiding principles for dealing with key additionality concepts such as deadweight and displacement. The DCLG Appraisal Guide, which is now the key document for assessing the additionality of housing developments, shares many of these key principles but it aims to assess impacts at the national level and, as discussed, focuses on LVU, as well as the external impact of the intervention.
- B2.3 A summary of the key appraisal (and evaluation) guidance relating to additionality is set out in Table 2.1. As well as the HCA Additionality Guide and DCLG Appraisal Guide, wider guidance from the European Commission and Scottish Enterprise has also been considered.

Table 2.1: Assessing additionality – key existing appraisal (and evaluation) guidance					
HCA Guide	Additionality	DCLG Appraisal Guide	Scottish appraisal, and guidance	Enterprise monitoring and evaluation	Evalsed (European Commission guidance on evaluation of socio-economic development)
<ul style="list-style-type: none"> • Guide to assessing additionality of local growth and housing interventions. • Provides framework for assessing additionality, specifically in relation to deadweight, leakage, displacement, substitution and multiplier effects. • Identifies additionality evaluation benchmarks and 		<ul style="list-style-type: none"> • Sets out the appraisal framework for assessing developments in the residential and commercial sectors. • Guidance provided on quantifying the size of additionality, specifically in relation to deadweight and displacement. • Brings appraisal practice closer in line with the HM Treasury Green Book and DfT guidance 	<ul style="list-style-type: none"> • Outlines Scottish Enterprise approach to the assessment of the economic impacts of its interventions. • Assessment of additionality includes deadweight, displacement, leakage, substitution and multiplier effects. • Focus on assessment of additional impact in terms of jobs and GVA for Scotland as a whole. 		<ul style="list-style-type: none"> • Guidance focused on evaluation of EU cohesion policy but also relevant to evaluation of other socio-economic development tools. • Relatively limited discussion of the concept of additionality but guidance provided relating to counterfactual impact evaluation. • Details various approaches to

HCA Guide	Additionality	DCLG Appraisal Guide	Scottish appraisal, and guidance	Enterprise monitoring and evaluation	Evalued (European Commission guidance on evaluation of socio-economic development)
	<p>‘ready reckoner’ values.</p> <ul style="list-style-type: none"> Limited evidence of appropriateness of benchmarks to individual projects Principal focus on the assessment of additionality at the sub-national level. 	<ul style="list-style-type: none"> Default additionality ranges provided but the guide does not include further evaluation evidence to support these values. Identifies that additionality should be assessed at the national level (although proposed approach introduces local considerations for estimating displacement). 	<ul style="list-style-type: none"> Includes standard question set to inform assessment of deadweight and displacement. No evaluation evidence provided to support additionality adjustments. 		<p>estimating the counterfactual, using quantitative and qualitative methods.</p> <ul style="list-style-type: none"> No evaluation evidence provided in terms of likely scale of additionality effects.

Source: Mott MacDonald, based on various.

B2.4 Overall the following features are core principles that underpin the assessment of additionality and should be carefully considered in any new framework:

- **Need to provide a coherent and thorough strategic narrative**, setting out the rationale for the intervention. The qualitative evidence underpinning the assessment of the market failure is critical given it provides the fundamental logic behind why the intervention is needed in the first place and why additionality is likely to be high. The underlying market failure must be assessed in detail since this will directly influence the levels of deadweight that can be justified.
- **Importance of setting out the counterfactual**. A strength of the Additionality Guide in terms of practicality is the provision of ready reckoners but it is clear within the guidance that appraisal should always look to set out the counterfactual (Do Nothing or Do Minimum) against a range of Do Something scenarios which test the intervention clearly. This ensures that the assessment of deadweight is as clear as it can be.
- **Clarity over the study area**. There is still a varied approach amongst practitioners over the spatial area that interventions are assessed according to. Whilst the previous Green Book (2018) (and DCLG Appraisal Guide) were clear that additionality at the national level was the primary focus, the latest Green Book (2020) has put increased emphasis on place based analysis, noting “*where proposals have a focus on a specific part of the UK, place based analysis should be performed and be central to appraisal advice.*” Many schemes, particularly commercial developments, have more important impacts at a subnational level and perhaps going forwards the framework needs to be clear in setting out these various levels of impact / assessment.
- Advice on how to assess displacement in the Appraisal Guide introduces the local level (paragraph 4.12) with the consideration of ‘housing need’. Housing need is most usefully considered at the level of housing market area (usually groupings of 2-10 local authorities). While there may be agreement about how to assess displacement effects

of a scheme in its local housing market area, there remains a challenge about how to present this in a national context. New supply in a constrained housing market area will have a greater beneficial effect at the national level than new supply in an unconstrained housing market area.

- **The need to apply an element of judgement.** Ultimately the assessment of additionality has long been recognised as *“not a mechanistic process but [dependent] on the appraiser’s judgement and knowledge of the intervention and the wider environment”*⁹ with ex-ante assessment **being extremely difficult to quantify**. Judgements must be informed by evidence and explained. This clearly remains the case today with limited detailed evidence regarding levels of additionality in ex-post evaluation. The most in-depth research is still that undertaken by the then Department for Business, Innovation and Skills (BIS) in 2009 that used the evidence base gathered by Regional Development Agencies (RDAs)¹⁰. However, this did not consider housing schemes specifically.
- **Proportionality is also important** as set out across all guidance. The DCLG Appraisal Guide sets out three ways to potentially capture displacement:
 - o By estimating the total change in land prices for all areas, which for instance could draw on a land-use transport interaction model;
 - o Using a spatial general-equilibrium model to estimate how an intervention affects the spatial and sectorial distribution of economic activity, or;
 - o Adjusting the land value uplift for areas with new development.

B2.5 It recognises the need for proportionality and inherently with an approach that uses complex modelling solutions the additionality of the intervention becomes harder to understand. Furthermore, such solutions are not often possible within the timescales or budget of projects. A degree of flexibility is required as part of any practical additionality framework.

- **Qualitative evidence could become more formalised** as it is often noted as important but there are scant details / guidance as to what this might be. A range of questions or checklists could be important here for assessing the evidence base that underpins assumptions, based on project specific information and a degree of professional judgement. It could also look at different levels of evidence gathering proportionate to the intervention. It will also be important when using qualitative evidence for the practitioner to assess the overall quality and rigour of the evidence being assessed.
- **Importance of complementary investment.** The strategic rationale for the intervention should also set out the role of complementary investment and the degree to which additionality is dependent on these. Increasingly the success of housing sector interventions are linked closely to investment around transport, other utility infrastructure and planning policies. Isolating a government intervention in one area is difficult and the framework should consider all factors and how they impact on additionality.

⁹ Additionality Guide (2014), HCA, p.7

¹⁰ Research to improve the assessment of additionality, Department for Business, Innovation & Skills (BIS), October 2009. This research collated and examined analyse new evidence gathered on additionality at the time, particularly as a result of the independent assessment of the impact of the spending of the nine English Regional Development Agencies (RDAs). Full details are provided in Section 3.

Additionality – existing evidence

- B2.6 A range of studies have been examined to gather evidence relating to the overall levels of additionality experienced across various types of public sector economic development interventions. Overall, the evidence base for assessing levels of deadweight and displacement, particularly for housing, is relatively weak in terms of both the quantum of evidence but also the lack of many evaluation studies with credible baseline and monitoring data and econometric (or statistical) analyses. This is perhaps not unexpected given the difficulties and nuances involved in evaluating housing interventions, which would often be cost prohibitive to achieve higher scores in relation to robustness.
- B2.7 The review has provided an overall indicative rating of the robustness of the research methods (for the evaluation studies), using the Maryland Scientific Methods Scale (SMS)¹¹. In most cases there are very few examples of quantitative evidence based on a very detailed counterfactual assessment.
- B2.8 Overall based on the review the most comprehensive literature remains the 2009 BIS publication which, alongside the Additionality Guide, has informed numerous studies subsequently.
- B2.9 There are, though, a number of informative conclusions that can be drawn from the literature in terms of developing a framework for estimating additionality:
- Despite the limited evidence base, there are a variety of benchmark additionality values that practitioners can draw upon, including the ready reckoners established by the HCA (2014) and additionality ranges provided by DCLG (2016). Both of these sources stress the importance of taking into account project specifics when applying such default values. However, given the inherent uncertainties associated with ex-ante appraisal, it is common for appraisal practitioners to rely in large part on such values (i.e. to use the ready reckoners).
 - The overreliance on such values is particularly problematic when the underpinning justification for the scale of adjustment is unclear. This is evident, for example, in relation to the displacement weighting factors included in additionality guidance from Scottish Enterprise (2014), but also applies to the ready reckoners set out within the Additionality Guide and DCLG Appraisal Guide.
 - The additionality benchmarks provided by BIS (2009) are driven from a more explicit evidence base and provide a relatively detailed breakdown in terms of project characteristics. However, there is limited guidance as to assessing the appropriateness of these benchmarks for individual projects. This is reflective of much of the research literature, where there is an understandable reluctance to state how the additionality estimates derived from a particular study can be applied more widely (see, for example BEIS (2018)).
 - Consequentially, in parallel to improving the overall evidence base, there is a need to provide a more detailed framework to guide the application of additionality adjustments, potentially through the establishment of a standard set of additionality questions. As recognised in the evaluation literature (European Commission, 2013),

¹¹ The Maryland Scientific Methods Scale (SMS) is a five-point scale ranging from 1, for evaluations based on simple cross-sectional correlations, to 5 for randomised control trials. Most of the studies examined would only score 1 on this overall scale.

this will need to be structured such that data is available to provide satisfactory answers and explanatory hypotheses can be formulated.

- The benchmarks established by the 2009 BIS publication predominantly relate to employment outputs, which limits their use in terms of assessing the additionality of physical outputs such as housing. This is not surprising given the appraisal context at the time and is evident in much of the evaluation literature, driven by the nature of the interventions under consideration which were often concerned with employment and business growth (see, for example, Einiö & Overman (2016)).
- A further complication is driven by the requirement within the HM Treasury Green Book and DCLG Appraisal Guide for additionality to be considered at the national level. The available additionality benchmarks are almost exclusively subnational. Moreover, the displacement effect of economic development interventions can often be relatively spatially narrow.
- At the national level it is recognised that there is a shortage of housing relative to need and a significant backlog of demand. But this is not necessarily the case at the local level. In some housing market areas, particularly in the northern parts of the country, supply can be considered to be broadly meeting demand. In others, particularly in the south east and in London, supply is significantly short of demand. Research shows that the effect of residential development on house prices is unlikely to be of any significance beyond the neighbouring areas (Meen *et al.*, 2015)). For example, a new housing development in Newcastle is not going to affect house prices or land values in Exeter.
- Where the research literature is clearer is with regard to the additionality of affordable housing. Research undertaken by Savills (2019) suggests that the additionality of affordable housing is close to 100%. This is supported by the results of the DCLG Housing Model (Meen *et al.*, 2015), which found no evidence of crowding out effects. A number of caveats should be noted, however: firstly, that both reports did not distinguish between different types of affordable housing; and secondly, that no consideration was given to how additionality might vary depending on the outcome being measured (for example, LVU as opposed to distributional benefits).
- A further limitation to the affordable housing literature, and one shared with many other research studies, is that a 100% additionality assumption implies that the provision of new housing does not result in factor market displacement. This in turn relies on assuming sufficient construction capacity and an adequate supply of skilled labour and land, which is by no means certain given the challenges facing the UK housing market (Letwin, 2018).
- The evaluations of the additionality of the Help to Buy scheme (Finlay *et al.*, 2016 and Whitehead and Williams, 2018) clearly demonstrate the issues in establishing a meaningful counterfactual and disentangling the effects of the policy from other related initiatives, as well as the wider changes within the economy and housing market. This is identified across intervention types (see, for example, What Works Centre for Local Economic Growth, 2019).
- The Help to Buy evaluation adopted a triangulation of approaches, combining analysis of secondary datasets and primary data. The primary data was drawn from qualitative interviews with stakeholders and a survey of 1,500 buyers. The results of the analysis were therefore dependent on self-reported assessments of impact with the assumption

that “respondents are answering from a position of knowledge...and have accurately recalled their position at the time of purchase” (DCLG, 2018, p.98).

- The reliance on evidence from qualitative surveys was a common factor in a number of the research documents reviewed as part of this analysis (see, for example, RSM, 2019). For those assessments where econometric analysis had been applied, it tended to follow that a clearer conclusion with regard to direct and indirect impacts could be reached. An example of this is provided in the analysis of placemaking impacts undertaken by AMION (2016), which established statistically significant effects in terms of prices to the development itself and neighbouring areas. It will be important to also draw on the results of counterfactual impact evaluations where possible.

UK housing market and underlying market failures

B2.10 Building more homes and tackling the housing shortage remains a key government priority, as set out in the Housing White Paper, Fixing our broken housing market. The underlying issues within the UK housing market that are constraining supply are complex and vary by location but largely¹² relate to the structure of the market, complex planning barriers, affordability and low ownership issues, and a lack of diversity in the housing offer holding back absorption rates and the overall build out on large sites.

B2.11 There is a general consensus that sustained house building will have a material impact on house prices and affordability but only if sustained over the long term¹³. Addressing affordability and low home ownership will rely on providing advice and support which target the relevant groups. The provision of grant funding to provide affordable homes has been found to be largely additional given the market failures in this area so long as it does not impact on supply factors of production.

B2.12 In the context of assessing additionality, the overall housing market context within the intervention area is critical as it fundamentally shapes the arguments set out in terms of the underlying rationale for public sector intervention. It is also important to consider where the intervention effects the market, in terms of whether it is a supply side intervention (which is the focus of this review) or demand side intervention. There are further nuisances here in terms of which actor the intervention is targeting. In some cases, this may be the landowner or the developer (such as gap funding) whereas in others it may be the local planning authority (such as New Homes Bonus). Recognising this, an updated additionality framework should provide more specific qualitative guidance on the key areas of market failure, how to evidence these and how this then feeds into determining appropriate levels of additionality.

¹² As set out in the Letwin review (Independent Review of Build Out, Final Report, RT Hon Sir Oliver Letwin MP, October 2018) and the 2017 Housing White Paper (Fixing our Broken Housing Market, Department for Communities and Local Government, February 2017).

¹³ As set out in research by the National Housing and Planning Advice Unit (NHPAU) report ‘Affordability still matters’ (2008) which reported that holding all else equal if the housing stock increases by 1 per cent, house prices would fall by around 2 per cent.

B3. Literature review summary

Existing appraisal guidance

B3.1 Outlined below is a summary of the key appraisal guidance relating to additionality. This includes a review of the HCA Additionality Guide, which has formed the principal reference point for practitioners over the last 20 years, and the DCLG Appraisal Guide. The latter has introduced a number of changes to the approach to economic appraisal (as discussed in Section 1), which has implications for the assessment of additionality. A review is also provided of wider guidance from the European Commission and Scottish Enterprise that has informed the assessment of additionality in practice.

Additionality Guide, Homes and Communities Agency, 2014 (including previous editions 2008, 2004 and 2001)

Overall scope

- Guide to assessing the additionality of local growth and housing interventions produced by the HCA (Homes England's predecessor), following earlier editions in 2008, 2004 and 2001 (produced by English Partnerships, HCA's predecessor).
- The Additionality Guide has acted as the principal framework for assessing additionality for local government and other public sector funded interventions within the economic development and regeneration sector over the last 20 years. As well as its guidance on additionality concepts, it provides useful information relating to appraisal generally including study area definitions, time periods and persistence assumptions and alignment with other government guidance.
- The guide provides a framework for assessing additionality as well as benchmark evidence on the scale of the additionality factors and 'ready reckoner' values.
- The guide is clear that it should be used proportionately according to the overall project size or if there are known data limitations, for example this can impact on the scope to build a detailed do nothing case.
- The primary focus of the guide is on the methodology for calculating additionality (not on other appraisal issues, such as the quantification of costs and benefits).
- A separate appendix is included that presents further examples of how to assess the additional impact of housing programmes and projects.

Key findings

- The production of the guide itself did not involve any primary research in terms of scale of additionality factors. However, it does draw on evidence from evaluations and research to provide a range of benchmarks.
- In terms of deadweight and specifically in relation to housing, relevant research and benchmarks identified in the guide are as follows:

- BIS (2009) Occasional Paper No. 1: Research to improve the assessment of additionality – regeneration through physical infrastructure sub-regional average of 7.5%, regional average of 33.9%¹⁴.
- DETR (2000) Final Evaluation of City Challenge – programme and project manager survey-based housing average of 41%, beneficiary survey-based housing average of 10%, overall housing average of 26%.
- AMION (2007) National Strategy for Neighbourhood Renewal: Evidence on Progress and Value for Money – housing and environment average of 24%.
- The benchmark values relating to displacement include:
 - BIS (2009) Occasional Paper No. 1: Research to improve the assessment of additionality – regeneration through physical infrastructure sub-regional average of 38.7%, regional average of 37.4%
 - DETR (2000) Final Evaluation of City Challenge – housing within City Challenge area 10%, immediately adjoining area 19%, district 38%, county 84%, region 100%, UK 100%
 - AMION (2007) National Strategy for Neighbourhood Renewal: Evidence on Progress and Value for Money – housing and environment average of 15%
- The guide also sets out gross to net additionality ratios for a range of intervention types drawing on the evaluation of the Single Regeneration Budget (Rhodes et al., 2002). For housing, gross to net additionality ratios are identified as follows:
 - Private dwellings completed – 48%
 - Private dwellings improved – 45%
 - Local authority dwellings improved – 37%
 - Housing Association dwellings completed – 39%
 - Dwellings in tenant management organisation – 65%
- In addition to the benchmark values from previous evaluations, the guide includes ‘ready reckoners’ for displacement as follows: low – 25%, medium – 50%, high – 75%. Ready reckoners are recommended in the absence of local information and are based on the evidence reviewed.

Implications and relevance to this research study

- Overall, the analytical framework, guidance, data sources and recommendations within the Additionality Guide clearly remain relevant including the evidence base on deadweight and displacement and the data sources recommended for assessing additionality impacts. However, the latest Additionality Guide is over six years old and predates the move towards LVU as a key metric.
- The evaluation benchmarks set out in the Additionality Guide provide a useful indicator of potential levels of additionality. However, the majority of the benchmarks identified are at a subnational level. The focus on subnational impacts contrasts with the DCLG Appraisal Guide, which emphasises that “additionality estimates should be at the national

¹⁴ Regional applies to a government office region, e.g. the North West, whilst sub-regional refers to an area within that region which in practice varied from very local to local authority to a wider sub-region (e.g. Greater Manchester). The BIS paper examined many evaluations examining the additionality of Regional Development Agency (RDA) interventions which at the time given their remit focused on assessing overall impact at a regional or sub-regional level (i.e. rather than a national level).

rather than local level". Furthermore, they are based primarily on self-reported survey evidence and not the results of counterfactual impact evaluations.

- The ready reckoners within the additionality guide are also more focused on assessing the additionality of a wider variety of interventions than housing alone and were developed prior to the DCLG Appraisal Guide, which focuses on LVU. However, given many of the fundamental principles remain valid for a housing intervention they are still applicable even if the key metrics being assessed have changed.
- The guide recognises the limitations of the analytical framework it adopts in terms of assessing national level impacts, given that it does not account for macro-economic adjustments. However, it argues that accounting for macro-economic adjustments is often not practical or even possible in the context of relatively small interventions.
- Notwithstanding the spatial level to which the benchmarks apply, the guide presents relatively limited evidence relating to the appropriateness of the evaluation benchmarks to individual projects and programmes. The guide itself emphasises that the level of additionality will vary considerably depending on the nature of the activity and the local economic circumstances.
- The appropriateness of the benchmarks is even more an issue in terms of the 'ready reckoners', with limited guidance provided as to the circumstances in which low, medium and high levels of displacement would be expected.
- The Additionality Guide again recognises these limitations, stressing the need for care to be taken in using default or ready reckoner values. The best practice framework set out in the guide recommends a 'best' approach of bespoke investigation using surveys and/or bespoke economic modelling. Where this is not feasible, benchmark values should be chosen with consideration of project and context specific issues.
- One of the key implications for further research is therefore to provide a more comprehensive framework for appraisal practitioners to identify suitable levels of deadweight and displacement given the nature of the interventions under consideration and the context in which they are situated.
- Ideally, building on the evidence presented in the Additionality Guide, there also needs to be a more fine-grained analysis of the levels of deadweight and displacement that are typically associated with varying intervention types and geographies, which moves beyond the use of simple 'ready reckoners'.

The DCLG Appraisal Guide, Department for Communities and Local Government, 2016

Overall scope

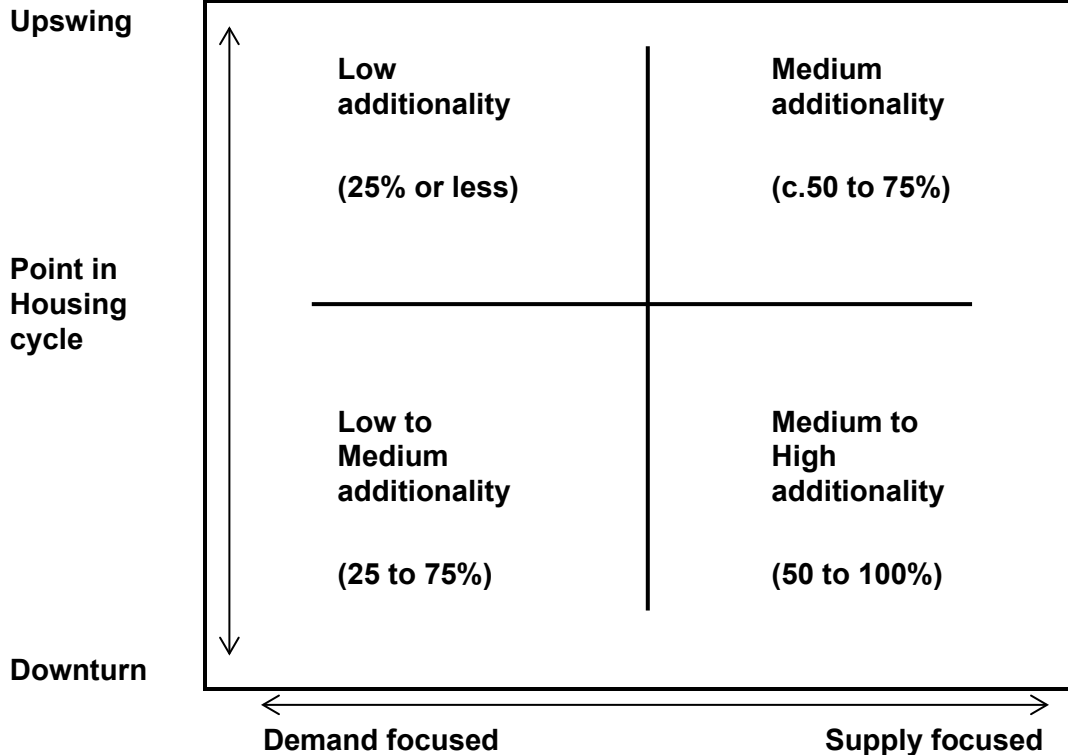
- Sets out the appraisal framework to be used by economists in the now DLUHC (and those across other departments and sectors where applicable) for assessing specific developments in the residential and commercial sectors, albeit with wider applications and of potential relevance to economists in other areas of the public sector.
- The guide was developed alongside the then HM Treasury Green Book 'refresh' and is consistent with DfT's recommended approach for appraising dependent development.
- While the guide focuses on economic appraisal, it emphasises the importance of evaluation evidence in developing the evidence base underlying an appraisal.
- The purpose of the guide is to help ensure consistency in DLUHC appraisals, improve the audit trail and justification for certain assumptions and improve the quality of methods and assumptions employed in appraisals by improving transparency and understanding.

- The scope of the guide covers the methodological and theoretical basis for appraising and valuing development beyond considerations of just additionality. In doing so, it identifies the requirement for value for money metrics to be assessed at the national level, meaning additionality estimates should be at the national rather than local level.
- In terms of the additionality, guidance is provided on quantifying the size of additionality, with reference to deadweight and displacement. This includes broad additionality ranges for residential and non-residential developments, linked to the nature of the intervention and market context.

Key findings

- In line with the HCA Additionality Guide, the DCLG Appraisal Guide stresses the importance of developing an appropriate counterfactual in determining the level of deadweight. This should be informed by the rationale for intervention and the underlying market failure that the scheme is seeking to address.
- The guide recommends a number of ways in which displacement can be assessed, including:
 - Estimating the total change in land prices for all areas, e.g. using a land-use transport interaction model.
 - Using a spatial general-equilibrium model to estimate how an intervention affects the spatial and sectoral distribution of economic activity.
 - Adjusting the land value uplift for areas with new development. Generally speaking, this approach is used in the vast majority of cases given the difficulties in applying the first two.
- The additionality ranges set out within the guide are considered separately for residential and non-residential developments. In terms of residential developments, the framework is based on the degree to which an intervention can be argued to be demand or supply focused, as well as the point in the housing cycle (timing) the measure comes into force.
- Potential additionality assumptions for housing interventions that can be used in the absence of alternative evidence are contained within the guide, including the following:

Figure 9: Framework for assessing additionality – DCLG Appraisal Guide (2016)



Source: DCLG Appraisal Guide (Figure 9), 2016

- 0-25% additionality: demand focussed and / or about bringing forward housing delivery (as opposed to delivering additional housing units). Less prevalent market failure.
- 25-50% additionality: demand or supply focussed policies but the level of additionality is higher because of the point in the housing cycle when the intervention takes places, and / or because the market failure is stronger.
- 50-75% additionality: supply focussed with good supporting evidence justifying the additionality assumption (for example, Affordable Housing where there is strong evidence this type of housing would not be delivered by private builders in the absence of government policy).
- 75%+ additionality: strong supply focus with good supporting evidence (for example, high 'clean-up' costs which mean the site is unviable, site in an area of high housing need, general economic conditions relatively muted).
- A similar framework is provided for non-residential developments with the category of additionality (0-25%, 25-50%, 50-75%, 75-100%) influenced by the strength of evidence in terms of market failure and strategic rationale, type of sector and alternative available uses for the land.

Implications and relevance to this research study

- The analytical framework for assessing additionality presented within the DCLG Appraisal Guide is broadly consistent with the HCA Additionality Guide. The DCLG Appraisal Guide, however, provides some further considerations for forming judgements as to whether a given intervention is likely to achieve 'low', 'medium' or 'high' additionality, driven to a large extent by the nature of intervention (demand or supply side), point in the housing cycle and the strength of evidence for market failure.
- The focus of the guide in terms of additionality is on deadweight and displacement effects, with other additionality factors (such as leakage, substitution and multiplier effects) largely excluded from the analysis – the implication being that these factors are not material considerations when assessing the additionality of residential and commercial developments at the national level.
- Similar to the HCA Additionality Guide, it is emphasised that the default additionality ranges presented within the guide should be adjusted to reflect policy specifics and scheme specific information. However, given the inherent uncertainties associated with ex-ante appraisal, it is common for appraisal practitioners to rely in large part on such values.
- While the DCLG Appraisal Guide has expanded the framework in which to identify appropriate default additionality values, and the relative rankings of market failure have a sound rationale, there is a need for further evidence to justify the values or inform different ones. This research study is aiming to provide such evidence.
- Similarly, the guide does not specifically consider how additionality might differ depending on the nature of intervention (beyond it being supply or demand side) and the type of market failure being addressed. For example, establishing the rationale for loan funding will involve testing a different set of criteria than grant support.
- The default values within the guide combine both deadweight and displacement considerations. It might be beneficial in updated guidance to separate out deadweight and displacement, which would better steer external appraisers in developing a more considered counterfactual by taking account of deadweight separately.
- For users, it would be helpful if there was reference to appropriate data to estimate the current point in the 'housing market cycle'.
- Finally, the focus on national level additionality raises some challenges on the methodology side. While this approach brings appraisal practice closer in line with theory and the HM Treasury Green Book, the modelling requirements to appropriately assess the broader macroeconomic effects of a given intervention are likely to be prohibitively complex and costly, apart from for large scale investments. Consideration of demand/supply is most relevant (and advised) at the level of the housing market area; introducing sub-national considerations into the estimate of additionality.

Additionality and Economic Impact Assessment for Appraisal, Monitoring and Evaluation: A Guidance Overview, Scottish Enterprise, 2014

Overall scope

- Outlines the approach that Scottish Enterprise takes, and wants others to take, to assess the economic impacts of its interventions.

- The guide relates to appraisal, evaluation and monitoring undertaken between the appraisal and evaluation processes. A specific focus of the guide is the assessment of additionality.
- In considering additionality, the guide makes the distinction between the narrow view of additionality as effectively being the converse of deadweight and additionality as a broader concept that includes factors such as displacement, leakage and multiplier effects. It is this latter broader definition that forms the basis for the guide.
- The guide provides an overview of the key additionality concepts and approaches, with a focus on assessing the net impact of interventions in terms of jobs and GVA.

Key findings

- The guide stresses the importance of setting out the rationale for intervention and providing a Theory of Change Logic Model (covering the Inputs, Activities, Outputs, Outcomes and Impacts stages): “Without a clear rationale there may be considerable deadweight or displacement, both of which result in the net impacts of the intervention being limited”.
- While the guide considers the five additionality factors of deadweight, displacement, leakage, substitution and multiplier effects, it suggests that leakage and substitution effects are generally minor and that the other three factors tend to predominate.
- In terms of calculating additionality, Scottish Enterprise has developed a standard question set that should be used to inform the values for the additionality factors. It is recognised that the wording of the questions may need to be changed depending upon the type of activity being evaluated.
- For deadweight, two sets of questions are identified:
 - What do you forecast the turnover of your business activities in Scotland will be with and without Scottish Enterprise support?
 - What do you forecast employment will be in your business in Scotland with and without Scottish Enterprise support?

The structure of this approach leads the appraiser to constructing a separate counterfactual scenario, consistent with both the HCA Additionality Guide and DCLG Appraisal Guide.

- In relation to displacement, again two sets of question are suggested:
 - Approximately what percent of your main competitors are based in Scotland?
 - Would you say market conditions have declined strongly, declined moderately, are about the same, improved moderately, or improved strongly?

Displacement is higher where a larger proportion of competitors are based in Scotland and market conditions are poor, with the market conditions question acting as a displacement weighting factor (see Table 2 extract).

Survey Questions	Displacement Weighting Factor
Declined strongly	0.50
Declined moderately	0.75
Are about the same	1.00
Improved moderately	1.25
Improved strongly	1.50

- The purpose of the question set is to help ensure that the appraisals and evaluations Scottish Enterprise undertakes use consistent approaches for assessing impact.

Implications and relevance to this research study

- The analytical framework established within the guidance provided by Scottish Enterprise is again broadly consistent with the HCA Additionality Guide and mirrors the factors

considered. It also reiterates the importance of understanding the rationale for intervention in terms of then providing a robust assessment of additionality.

- The relevance of the guidance to this research study is somewhat limited due to the focus on GVA and employment impact analysis. However, the framework applied in terms of linking the scale of additionality to a specific set of questions provides clear advantages for developing a standardised approach.
- The standard question set used within the guide in terms of deadweight and displacement is solely dependent on self-reported measures, which presents recognised validity problems. There is also no evidence as to the justification for the displacement weighting factors identified in the guide in relation to market conditions.

<p>Evalsed - The resource for the evaluation of Socio-Economic Development (Sourcebook and Guide), European Commission, 2013</p>
<p>Overall scope</p>
<ul style="list-style-type: none"> • An online resource produced by the European Commission to provide guidance on the evaluation of socio-economic development. Evalsed is focused on the evaluation of EU cohesion policy but is also relevant to the evaluation of other socio-economic development tools. It consists of two parts: The Guide and a Sourcebook. • The Guide defines the role of evaluation in socio-economic development, discusses various ways to develop evaluation capacity and elaborates on evaluation approaches as well as providing guidance on how to design and implement evaluations and how to ensure their quality. • The Sourcebook describes a range of evaluation methods and techniques that are applied in the evaluation of socio-economic development interventions. • The discussion of the concept of additionality within Evalsed is relatively limited, relating predominantly to guidance on beneficiary surveys for business support services and cost effectiveness analysis. However, the guidance contains more detailed discussion of counterfactual impact evaluation which is of relevance to this study.
<p>Key findings</p>
<ul style="list-style-type: none"> • In discussing the theoretical underpinnings of socio-economic development, the guide emphasises the importance of estimating additionality: “...<i>whether public investment is in fact additional or whether it simply substitutes (or crowds out) investment that might have occurred otherwise becomes important to establish</i>”. • In relation specifically to the concepts of deadweight and displacement, the guide suggests that evaluation can best contribute to answering questions about these factors when the scale of an intervention or programme is large in relation to other possible explanations of outcomes (which may not be the case in smaller interventions). • The importance of evaluability is highlighted within the guidance in terms of whether evaluative questions are likely to be answered. This is also of relevance to ex-ante appraisal if additionality is to be considered based on answers to a standard question set (see, for example, Scottish Enterprise additionality guidance). • The intrinsic difficulties associated with determining an appropriate counterfactual through self-reported responses is discussed within the guide with regard to what is commonly referred to as the ‘respondent effect’ – respondents purposely exaggerating or down-playing the impact of assistance. • The guidance on counterfactual impact evaluation broadly considers the various techniques in relation to two basic approaches: (i) using the outcome observed for non-beneficiaries; or (ii) using the outcome observed for beneficiaries before the intervention. The critical factor for each approach is determining a plausible causal interpretation and isolating the effect of the intervention from other factors.
<p>Implications and relevance to this research study</p>
<ul style="list-style-type: none"> • Of specific relevance to this research study are the difficulties and limitations outlined within Evalsed associated with establishing a robust counterfactual. This is particularly of relevance to smaller scale interventions where the cost and complexity of obtaining data may be disproportionate. Notwithstanding this, in the context of ex-ante appraisal, establishing a credible counterfactual and potential displacement effects is greatly aided by having a comprehensive evaluation base upon which to draw from.

- While the guidance provided on evaluability relates to evaluation questions, there are lessons to be applied in terms of structuring suitable standard additionality questions from an ex-ante appraisal perspective. In particular, whether by answering the questions explanatory hypotheses can be formulated and whether there is data that can be used to provide satisfactory answers.

Evaluation evidence

- B3.2 Multiple evaluation studies have been produced since the publication of the fourth edition of the HCA Additionality Guide in 2014, covering a range of economic development interventions. However, a limited number of these studies have specifically addressed the concept of additionality in relation to government interventions on house building. Given the limited evidence base, this report has not sought to undertake a systematic review. Rather, a sample of evaluations has been provided with the intention of:
- Identifying existing housing additionality benchmarks provided within the evaluation literature (expanding on the benchmarks outlined in appraisal guidance).
 - Providing examples of current evaluation practice relating to economic development interventions – this has included a selection of non-housing interventions.
 - Highlighting the limitations and lessons that can be learned from the current evidence base to inform the specific issues and additionality questions that need to be addressed as part of this research study.
- B3.3 When selecting the evaluations to be reviewed, consideration was given to demonstrating the application of appraisal guidance in relation to a range of intervention types. In addition, as this study is, in part, looking at how the evidence base has developed since the HCA Additionality Guide, most of the studies chosen were published post 2014 – the exception being the research undertaken by the then Department for Business, Innovation and Skills (BIS) in 2009, which still represents the most comprehensive analysis of additionality benchmarks.
- B3.4 For each evaluation and research study an overall indicative assessment is made against the Maryland Scientific Methods Scale (SMS). The SMS ranks policy evaluations from 1 (least robust) to 5 (most robust) according to the robustness of the method used and the quality of its implementation. Robustness, in terms of the SMS, is defined as the extent to which the method deals with the selection biases inherent to policy evaluations/research. The five-point scale used in the SMS ranges from 1, for evaluations/research based on simple cross-sectional correlations, to 5 for randomised control trials.
- B3.5 The robustness scores (based on an adjusted Maryland SMS) are:
- **Level 1** - Either a cross-sectional comparison of treated groups with untreated groups, or a before-and-after comparison of treated group, are used without an untreated comparison group. No use of control variables in statistical analysis to adjust for differences between treated and untreated groups or periods.
 - **Level 2** - Use of adequate control variables and either (a) a cross-sectional comparison of treated groups with untreated groups, or (b) a before-and-after comparison of treated group, without an untreated comparison group. In (a) control variables or matching techniques used to account for cross-sectional differences

between treated and controls groups. In (b), control variables are used to account for before-and-after changes in macro level factors.

- **Level 3** - Comparison of outcomes in the treated group after an intervention, with outcomes in the treated group before the intervention, and a comparison group used to provide a counterfactual (e.g. difference in difference). Justification given to choice of comparator group that is argued to be similar to the treatment group. Evidence presented on comparability of treatment and control groups. Techniques such as regression and propensity score matching may be used to adjust for difference between treated and untreated groups, but there are likely to be important unobserved differences remaining.
- **Level 4** - Quasi-randomness in treatment is exploited, so that it can be credibly held that treatment and control groups differ only in their exposure to the random allocation of treatment. This often entails the use of an instrument or discontinuity in treatment, the suitability of which should be adequately demonstrated and defended.
- **Level 5** - Research designs that involve explicit randomisation into treatment and control groups, with Randomised Control Trials (RCTs) providing the definitive example. Extensive evidence provided on comparability of treatment and control groups, showing no significant differences in terms of levels or trends. Control variables may be used to adjust for treatment and control group differences. There should be limited or, ideally, no occurrence of 'contamination' of the control group with the treatment.

Research to improve the assessment of additionality, Department for Business, Innovation & Skills (BIS), October 2009

Overall scope

- The study was undertaken to collate and analyse new evidence gathered on additionality at the time, particularly as a result of the independent assessment of the impact of the spending of the nine English Regional Development Agencies (RDAs) (PwC, 2009).
 - The purpose of the study was to undertake an assignment which would capture additional evaluation evidence on additionality as well as explore the latest thinking on particular areas of the adjustment, most notably agglomeration economies and their relevance for the multiplier adjustment.
 - A key driving factor behind the study was that the "absence of additionality 'benchmarks', with which to compare and contrast results emerging from evaluations, has long been a major hindrance to the evaluation community". In response, the study sought to provide a substantially larger database of benchmarks covering a wide range of economic development and regeneration themes.
 - The study looked at additionality data from over 280 evaluations relating to deadweight, leakage, displacement, substitution and multiplier effects at two spatial levels: the sub-regional level and the regional level. These were independent evaluations undertaken on behalf of various government departments or agencies with the majority being undertaken for RDAs. They were selected based on their level of robustness and all relevant additionality data then extracted. They covered the
-

following intervention areas: business development & competitiveness, regeneration through physical infrastructure and people and skills.

- Evaluations were selected based on whether there was clear, quantitative data on each of the main components of additionality. Each evaluation was scored on a range of 0 to 5 based on the incidence of specific additionality estimates presented in the report.
- Data was also captured on key project characteristics allowing the additionality data to be disaggregated according to intervention types, whether the intervention was a programme or project and the rationale for intervention.
- For this study the indicative SMS rating is assessed as 1/2.

Key findings

- Taking all intervention types into account, the overall mean net additionality ratio identified by the study was 45.8% at the sub-regional level¹⁵. The largest contributory factor was deadweight, at an average of 39.5%, followed by displacement with an average of 21.5%.

Table X1. Summary of additionality estimates at the sub-regional level

Additionality estimate	Number of observations (N)	Lower end of range %	Upper end of range %	Mean %	Median %	+/- at 95% Conf Level
Deadweight	148	0.0	97.5	39.5	38.5	5.0
Displacement	158	0.0	80.0	21.5	12.0	3.6
Leakage	51	0.0	90.0	15.8	6.0	6.9
Substitution	37	0.0	100.0	2.7	0.0	5.4
Multiplier (not % in columns 2-5)	137	1.00	2.71	1.25	1.21	3.9
Net additionality ratio	74	0.0	152.9	45.8	47.0	6.8

- In terms of capital projects (a sub-theme of 'Regeneration through physical infrastructure'), which is the category of most relevance to this research study, deadweight had an average of 10.3% at the sub-regional level (based on 15 projects), while the average for displacement was 43.1%. Although not fully detailed in the report it is likely that the evaluation evidence underpinning these additionality estimates was largely based on surveys of direct and indirect beneficiaries (for assessing both displacement and deadweight). Moreover, the majority of evaluations assessed additionality in terms of GVA and employment impacts only.
- In comparison, the overall mean net additionality ratio at the regional level was 50.5%, with average deadweight and displacement figures of 40.0% and 29.6% respectively.

¹⁵ This refers to the net additional impact of the intervention at a sub-regional geography which in practice covered a variety of spatial scales, from the very local (e.g. 5 miles), through the local authority to the wider sub-regional level (e.g. Greater Manchester within the North West). Regional referred to the government office region.

Table X3. Summary of additionality estimates at the regional level

Additionality estimate	Number of observations (N)	Lower end of range %	Upper end of range %	Mean %	Median %	+/-at 95% Conf Level
Deadweight	363	0.0	98.0	43.0	43.0	2.6
Displacement	367	0.0	100.0	29.6	25.0	2.7
Leakage	233	0.0	87.0	11.3	5.0	2.1
Substitution	192	0.0	87.5	3.4	0.0	2.2
Multiplier (not % in columns 2-5)	326	1.00	3.25	1.45	1.43	3.1
Net additionality ratio	226	0.0	189.0	50.3	48.8	3.8

- For capital projects, the mean level of deadweight at the regional level was 40.0%, whereas for displacement it was 35.6%.
- Comparing across the two spatial levels for capital projects, deadweight was much higher on average at the regional level than sub-regionally. However, the average regional displacement rate was lower than the sub-regional average. This result contrasts with what logically would be expected, with displacement typically greater at wider spatial levels.
- With regard to market failure, only the categories of public good, imperfect information and externalities had observations over 10. The mean deadweight at the regional level for these market failures was 41.6%, 36.9% and 43.5%, with displacement of 21.4%, 25.4% and 20.4% respectively.

Implications and relevance to this research study

- The study, which adopts an analytical framework consistent with the HCA Additionality Guide, remains one of the most comprehensive on additionality, particularly in terms of its breadth of coverage on benchmark values.
- Of particular note, is that the study sought to provide benchmarks for a range of intervention types and themes, recognising that *“characteristics of the intervention are likely to influence the level of additionality”*, highlighting the scale of investment, activities of the subject interventions, type of end use or beneficiary, and market failure.
- The study was somewhat constrained by the availability of consistent data by key contextual variables. Moreover, the majority of evaluations considered additionality in terms of employment outputs, which limits the extent to which the benchmarks can be applied to physical outputs such as housing. This is not surprising given the appraisal context at the time. The study itself emphasised that the *“data will be of greatest use to those involved in programmes and projects targeted at employment and skills”*, with the benchmarks on leakage, displacement, substitution and multiplier effects less applicable to physical outputs.
- It is also worth noting that the data used within the study was captured without any re-calculation and taken at face value from the selected evaluations. While a sifting process was undertaken, this principally related to the availability of additionality data within the evaluations. The estimates of additionality were based, to a large extent,

on surveys of direct and indirect beneficiaries, with a focus on additionality at the regional level.

- Usefully, the study considered future areas for focus in terms of improving the measurement and assessment of additionality. A point that continues to resonate is that *“Government guidance documents have focused on what additionality is and how the concept should be applied, but there is little practical guidance on what questions to ask”*. While the study discussed this in terms of evaluation, it is also of relevance from an ex-ante appraisal perspective in determining appropriate additionality adjustments.
 - The need for identifying more consistent additionality questions also links to the study’s other area of challenge, which is on developing a better understanding of factors influencing additionality, with *“an opportunity to define a standard suite of explanatory variables”*. This would significantly improve the potential for additionality benchmarking in the future.
-

Evaluation of the Help to Buy Equity Loan Scheme, DCLG, Authors: Stephen Finlay, Ipsos MORI, in partnership with Peter Williams, Christine Whitehead and the London School of Economics, February 2016

Evaluation of the Help to Buy Equity Loan Scheme, DCLG, Authors: Christine Whitehead, Peter Williams, Ipsos MORI and the London School of Economics, MHCLG, October 2018

Overall scope

- Assessment of the additionality of the Help to Buy Equity Loan scheme, defined in the report as the increase in the production of housing services (either through a greater number of new homes built or through a production of bigger homes) as a result of the policy, over and above what would have been produced in its absence.
- The assessment also provided evidence of the experiences and implementation of the scheme from the perspectives of both providers and consumers.
- The 2018 study provided an updated evaluation with the principal aim to provide a comprehensive evidence base focused on the additionality of the scheme, covering both demand and supply additionality.
- The evaluation provided an overall assessment of the scheme (discussed further below) as well as reporting on provider and consumer perspectives, including the view of developers, lenders and agents.
- Within the 2016 study, the estimate of additionality was based on a ‘triangulation of various data sources’, encompassing data on new build transactions supported by Help to Buy Equity Loan, analysis of consumers who bought with assistance of Help to Buy Equity Loan in terms of whether they would have been able to afford the same or similar property without the scheme’s assistance and interviews with stakeholders.
- The 2018 study included analysis of existing secondary sources (in part, replicating the assessment used for the 2015 study as well as individual Help to Buy Equity Loan transactional data), along with interviews with developers and lenders, and a survey of 1,500 buyers using the Help to Buy scheme since June 2015.
- For this study the indicative SMS rating is assessed as 1.

Key findings – 2016 study

- From a demand-side perspective, drawing from the results of a telephone interview survey of 501 respondents, the analysis found that a total of 43% of the respondents stated that they would not have been able to afford the property they wanted and moved into (nor a similar property) without assistance.
- In terms of the differences between those buyers identified to be additional and those considered to be not additional, additional buyers tended to use significantly lower deposit amounts to purchase the property. However, there was no statistically significant difference with regard to average gross household income levels.
- The only other significant differences in characteristics between additional and non-additional buyers noted in the study was that those identified to be additional were less likely to be aged under 25, more likely to have purchased a detached property and less likely to have purchased a flat.
- In relation to supply-side perspectives on additionality, large developers were recorded as being all very positive about the scheme. This was also the case for small and medium sized developers, albeit there were relatively few sales amongst those interviewed.
- Large developers noted four main sources of additionality:
 - Stopping possible falls in activity rates after April 2013 – data on private enterprise starts showed a significant increase in starts following the introduction of Help to Buy
 - Increases in the demand for new build properties including Help to Buy Equity Loan sales which lead directly to higher levels of output – the study estimates that a reasonable average for the Help to Buy Equity Loan contribution to all new build transactions is around 33%.
 - The confidence that the Help to Buy Equity Loan has added to the general market (including more interest in new build rather than existing units) which has led developers to increase starts above pure 1 sale to 1 start levels.
 - As a result of greater confidence and cash flow the capacity to buy land and to increase activity levels in line with expanding business plans and in some cases above these levels.

For small and medium sized developers, the impact in terms of market confidence was seen as particularly important and very positive.

- Interviews with lenders found that they did not feel the scheme had negatively impacted on other government supported schemes, such as shared ownership. Lenders' estimates as to how much new development had increased ranged from 0% to 10%, reflecting resource constraints such as materials, labour and land.
- Bringing the evidence together, the study estimated that the direct impact on supply as a result of the scheme was equivalent to contributing 14% to new build output. Allowing for wider market additionality factors, the study reported that this proportion could have been as high as 45% in 2013/14 falling back to maybe 25% in 2015.

Key findings – 2018 study

- The 2018 evaluation study replicated the assessment used within the 2016 study but included new questions to enable the additionality assessment to account for those who may have been able to afford a smaller property without assistance. The revised analysis resulted in a central additionality estimate of 37% (this compares to the estimate of 43% from the 2016 evaluation study).

- Central demand-side additionality was found to be proportionally higher in more pressured housing markets, notably the South & South West and London – for example, 41% of buyers were considered to be additional in London compared to 30% in the North West.
- First-time buyers, older buyers, those living in smaller households and those coming from rented sectors and moving into flats were more likely to be classed as additional. The study suggests that this is, at least in part, due to the scheme assisting those who conventionally had a more limited capacity to access the homeownership market.
- In terms of supply-side perspectives, developers suggested two main sources of additionality: direct sales and the impact of increased confidence among consumers, developers and other stakeholders.
- Developers' reported view on additionality was that up to 20% of their private sales would not have happened without Help to Buy. This compares with the study's own estimate of supply additionality, which identifies that on average 39.3% of private new build transactions have been made using Help to Buy during a seven quarter period between 2015 and 2017.
- Combining the demand and supply additionality assumptions suggests that the scheme's contribution to new build output is 14.5% (or 16% if the same methodology is applied as adopted in the 2016 study).
- The analysis of local data suggests that the hypothesis that Help to Buy activity is directly increasing new build prices is not correct but that there is weak support for the hypothesis that higher proportions of Help to Buy are associated with higher levels of completions.

Implications and relevance to this research study

- Recognising the challenges with determining additionality and particularly in relation to establishing a meaningful counterfactual, the Help to Buy evaluations adopted a *"triangulation of primary and secondary data sources"*. In doing so, the studies were able to report on variations relating to geographic region and the characteristics of beneficiaries, with some evidence that demand-side additionality was highest in more pressurised housing markets.
- To an extent though, the studies were still heavily reliant on perception-based questions. As recognised by the authors of the 2016 study, the validity of the results are dependent on the assumption that *"respondents are answering from a position of knowledge about the housing market, the mortgage market and their own personal finances, and have accurately recalled their position at the time of purchase"*.
- While the approach adopted of looking at additionality from both a demand and supply-side perspective provided a detailed analysis of the perceived impact of the scheme from a range of stakeholders, the level of statistical analysis was relatively limited. It is therefore difficult to disentangle the identified effects of the scheme on, for example, recorded changes in starts and completions from the effect of changes to the wider economy and housing market.
- The studies also noted the complexities associated with allowing for 'wider market additionality'. This includes positive second round and indirect effects from increased confidence amongst consumers, developers and lenders, which both evaluations suggested could be significant. However, there is also the indirect effect of increased demand for new homes coming at the expense of demand for existing homes.

The (Displacement) Effects of Spatially Targeted Enterprise Initiatives: Evidence from UK LEGI, What Works Centre for Local Economic Growth, 2016

Overall scope

- Study undertaken to analyse the impact of the UK's Local Enterprise Growth Initiative (LEGI) – a government programme that provided £418 million of funding support (including grants and loans) to 30 deprived areas between 2006 and 2011. The programme aimed to increase employment and entrepreneurial activity within these areas by supporting local businesses in the retail and service industries.
- The study assessed the overall effects of the programme by comparing the areas that were just eligible for support (based on ranking below 50th place on one of the six deprivation rankings) to areas that did not receive support but were very close to eligibility, applying the regression discontinuity design (RDD) method.
- The logic for applying this method was that the eligible and non-eligible areas selected had similar deprivation ranks and therefore differences in outcomes could be attributed to the provision of government support through the LEGI programme.
- The specific focus of the study was on understanding the displacement effects of the programme on the areas that did not receive support. The approach adopted involved splitting treatment and control areas into one-km-wide zones based on the distance from the treatment area boundary in order to identify displacement effects in surrounding local markets.
- This evaluation was assessed as having a SMS rating of 3/4.

Key findings

- Treatment areas were, unsurprisingly, found to have smaller levels of employment, fewer businesses, a larger unemployed population and a lower employment rate at the start of the assessment period compared to the average control area.
 - The areas receiving LEGI support performed better in terms of employment and business growth between 2004 and 2009 but worse with regard to unemployment. Over the longer term, from 2004 to 2012, employment and the number of businesses declined and unemployment increased in LEGI areas compared to the control areas.
 - Of particular note is that between 2004 and 2009 employment in the 1km control ring decreased by around 4% while the 1km treatment ring saw an increase in employment of approximately 10.6% on average. This difference though becomes minor over the longer term (2004 to 2012).
 - As the authors of the study suggest, these descriptive statistics indicate displacement caused by the LEGI programme at the treatment area boundary but that these effects do not persist after the programme was abolished.
 - Comparable findings emerge from the econometric modelling. Between 2004 and 2009, employment growth was identified as being significantly faster within the treatment area compared to the 1km control ring just outside it, while the differences between the treatment area and control rings further out were much less pronounced. Over the longer term (2004 to 2012) the treatment area grew no faster than the control areas.
 - The results of the modelling suggest that the LEGI programme caused the displacement of employment from untreated to treated areas, particularly in areas close to the treatment boundary. However, this displacement effect was not sustained post-treatment.
-

-
- In contrast to employment, no statistically significant impact was found in terms of the number of businesses and unemployment.

Implications and relevance to this research study

- Taking the findings of the research as valid, the study highlights the potentially significant displacement effects of spatially targeted economic development programmes, with interventions simply shifting *“economic activity from one place to another without any aggregate net benefits”*.
 - The risk of significant levels of displacement underlines the importance of developing a robust approach to assessing additionality that is not reliant on broad benchmarks or default values without sufficient consideration given to the nature of the intervention.
 - The authors of the study suggest that *“the lack of real impact may be due to the design of LEGI which provided non-selective support to businesses that predominantly served local markets. This contrasts to the findings for selective RSA [Regional Selective Assistance]”*. The evaluation of RSA determined that the programme significantly improved areas’ economic outcomes and that this was not offset by reduced performance in non-eligible areas, highlighting the importance of a programme’s design.¹⁶
 - The study also demonstrated the importance of assessing displacement effects at the appropriate spatial level, with differences only of significance within 1km of the treatment boundary – *“the spatial scope of job displacement is too narrow to generate any statistically detectable differences in employment trends at a more aggregate level”*.
-

Scottish Loan Fund Strategic Review and Economic Impact Assessment, A Final Report to Scottish Enterprise, Malcolm Watson Consulting, June 2018

Overall scope

- Strategic review and economic impact assessment of the Scottish Loan Fund (SLF) commissioned by Scottish Enterprise and undertaken by Malcolm Watson Consulting. The purpose of the review was to assess the rationale for intervention and the net economic impact generated, as part of establishing the value for money produced by the Fund.
- The study was based on a review of information on the Fund and its client business performance, consultations with stakeholders and a review and analysis of data and opinion on the market for finance for Scottish SMEs.
- In analysing the impact of the Fund, loans completed between the establishment of SLF in March 2011 and September 2016 were considered, covering loans to 31 businesses over the period as a whole with a total value of £68.85 million.
- This evaluation was assessed to have an SMS rating of 1.

Key findings

- The rationale for the SLF was to a large extent driven by prevailing market conditions at the time it was established, with severe constrictions in the supply of corporate finance across a range of providers. Specifically, the rationale for the Fund highlighted that *“many companies are struggling to access the debt capital they need to grow their business”*.
-

¹⁶ Criscuolo, C., Martin, R., Overman, H., & Van Reenen, J. (2012), The causal effects of an industrial policy (No. w17842), National Bureau of Economic Research

- The constrictions in terms of the supply of corporate finance were identified as having particularly severe implications for higher risk investments in growing and ambitious businesses.
- In terms of the objectives for the Fund, the study summarised these as broadly being: to help viable and ambitious firms in the short/medium term by providing commercially priced finance; and encourage in the medium/longer term the development of private sector supply of such products. In assessing the scale and additionality of the economic benefits, the study therefore sought to consider the direct benefits to client businesses and the wider impact in terms of market adjustment.
- The study found that market adjustment, in the form of more commercial provision of mezzanine finance to Scottish businesses, had not occurred to any significant extent. Initial market adjustment was evident in attracting commercial banks and pension funds to invest in the Fund but their rationale for involvement was driven by corporate social responsibility.
- In assessing the potential of SLF-funded activity to displace other economic activity in Scotland, the study looked at the growth status of the markets the beneficiaries were operating in and the location of competitors.
- Further to this, the study sought to determine what would have happened in the absence of the SLF funding in terms of expected business performance and whether the businesses would have continued to investigate other sources of funding.
- While in relation to the Fund itself the study considered there was 'absolute additionality' (in the absence of the public sector initiative the SLF concept would not have come into being), the impact assessment took into account the additionality of individual loans based on the individual circumstances of each business, any alternative forms of finance and the length of time of the loan.
- Overall, a gross to net additionality ratio of 8.8% was applied to the estimated GVA impact, allowing for adjustments in terms of deadweight, leakage and displacement effects (it should be noted that the scale of these individual adjustments was not explicitly identified within the study). This resulted in a GVA to public sector cost ratio of 2.68.

Implications and relevance to this research study

- The study provides an example of the application of the Scottish Enterprise additionality guidance in practice. In doing so, the limitations associated with that guidance in terms of relevance to this research study are again evident (for example, the focus on GVA impacts). However, a number of useful lessons can also be drawn from study around the challenges practitioners face in estimating additionality.
 - The dual objective of SLP in terms of directly supporting the growth of businesses in the short/medium term and longer term aim of market adjustment reflects a common goal outlined in the appraisal literature of achieving sustainable growth. However, while the study concludes no market adjustment occurred, it is not evident how any such adjustment would have been measured – specifically, with regard to how any increase in the private supply of similar financial products could have been attributed to the Fund as opposed to a general upturn in the market.
 - The assessment of deadweight and displacement was entirely reliant on self-reported measures (for example, perceived location of competitors and business performance in the absence of the Fund). Moreover, in translating the responses received by consultees into additionality adjustments, it is assumed that the study was reliant on the
-

displacement weighting factors in Scottish Enterprise guidance, which do not have a clear rationale in terms of their scale.

- The study itself highlights the difficulties associated with what it calls the ‘dilution of additionality’, where businesses have received multiple public sector funded assistance. As recognised by the study, while it is possible to separate the financial performance of loans in such circumstances, it is much more difficult to apportion economic benefits. The authors of the study concluded that *“while we sought evidence on the relative importance of each form of support...we do not consider this to provide a robust basis for assessing and quantifying the relative additionality of each form of assistance”*.
-

Evaluation of the New Homes Bonus, DCLG, December 2014

Overall scope

- Evaluation of the New Homes Bonus based on a combination of internal DCLG and externally commissioned research and analysis, covering the first four years of its implementation.
- The Bonus is a grant paid by central government to all upper and lower tier councils to incentivise them to increase the number of available homes. Each additional home is added to the council tax base resulting in an authority receiving an annual Bonus payment based on the national average council tax band relevant to each property, and are paid annually for six years (this has subsequently been reduced).
- The primary focus of the internal evaluation was the impact on attitudes and behaviours towards housing growth as a consequence of implementing the Bonus, including on local authority officers, councillors and the community.
- The internally led evaluation involved a combination of internal and externally commissioned research and analysis across five work-strands: logic modelling (in-house mapping), independent external research on attitudes and behaviour, in-house analysis of the British Social Attitudes (BSA) survey and local government financial analysis.
- The externally led work was undertaken by a consortium led by the University of Sheffield who undertook a combination of qualitative and quantitative research into the impact of the Bonus on the attitudes and behaviours of key factors such as local authority officers and elected members, house builders and community groups. The research involved undertaking an online survey of all England’s Local Planning Authorities and case study analysis.
- This evaluation was assessed to have an SMS rating of 1.

Key findings

- The financial analysis showed how the Bonus has provided a clear financial incentive for authorities with payments rising in line with the total number of new homes being made available over time. The financial impact and subsequent strength of the incentive was found to vary for different authorities depending on the current and forecast state of their overall finance and the report provides detailed comparisons against different council types.
 - In terms of attitudes and behaviour the research found that around half of all planning officers agreed that the Bonus had acted as a powerful incentive and around 40% agreed the Bonus had resulted in officers and their elected members being more supportive of new homes. However, this was found to be much less the case in the wider community where only 10% of planning officers agreed the Bonus had begun to increase support
-

for new homes for this group. More broadly however the British Social Attitudes survey showed there had been a substantial drop in public opposition to new homes from 2010 to 2013.

- Evidence from the case studies found that the Bonus was part of a number of factors that were encouraging and supporting a more proactive approach to new house building amongst authorities. The Bonus was seen to be a contributory factor towards reinforcing attitudinal shifts towards new homes, but was not found to be directly shaping attitudes so far.
- The Bonus was so far found to be having only a modest direct impact on Local Plan making and having only a limited role and impact on planning applications and decisions.
- Receipts were found to be largely used to support authorities' general fund or core services however there were numerous examples of receipts being used to directly support housing growth.
- The research did not find evidence the Bonus and its accompanying affordable housing enhancement was providing an additional incentive in increasing support specifically for more affordable homes.

Implications and relevance to this research study

- The study highlights the complexity of factors that impact on housing supply and difficulty involved in targeting supply side interventions effectively. Although the Bonus was found to assist with the planning process and help to break down barriers to supply in this area, it has had less impact on the attitude to affordable homes in general and was not found to provide additional incentive for the provision of more affordable homes.
 - The study undertook various strands of research including beneficiary surveys and case studies but there is limited quantitative evidence about the counterfactual and whether supply of new homes was significantly higher than it would have been. The impact on local government finances was assessed in terms of additionality given the available data.
 - This highlights the difficulties faced in disentangling the various factors impacting on supply and the need for a clear counterfactual to be set out.
-

Research reports

B3.6 Outlined below are a series of research reports relating to the assessment of additionality but also more generally the impacts of housing development. This includes the analysis of the impact of new housing on surrounding areas in order to inform the discussion of potential displacement effects. In terms of housing additionality, the research remains relatively limited, with what exists focusing on affordable housing. Again, the focus has been on research studies produced following the publication of the HCA Additionality Guide.

Understanding the Local Impact of New Residential Development: a Pilot Study, Christine Whitehead and Emma Sagor with Ann Edge and Bruce Walker, London School of Economics, April 2015

Overall scope

- Pilot study assessing the impact of new housing development on the immediately surrounding area and population. The particular focus of the study is on examining whether house prices in the surrounding area will always fall, whether pricing patterns are associated with different types of development and whether other factors affecting prices can be identified.
- The study looked at eight sites in detail to help identify the factors that determine whether development will have a positive, negative or neutral effect on the locality and consequently house prices.
- Given the narrow focus on a small selection of case studies, the authors recognise that the study can only provide indicative evidence as to the potential impact of new housing development on prices. In this context, the study therefore seeks to indicate how a more comprehensive approach might be formulated.
- The approach involved scoping and preliminary research to identify suitable study sites (all of which were smaller than 300 units), interviews with developers to clarify site profile and development narrative, and analysis of price impacts. Price data covering the period 2009 to 2014 was collected from three sources: Hometrack, Zoopla and the Land Registry.
- This research study was assessed as having a SMS rating of 1.

Key findings

- Broadly, the research found that for sites that were previously greenfield or recreation land the data suggested there was some negative impacts on surrounding property values as a result of the new development. However, this tended to be during and/or immediately after the construction period – outside of this period, impacts on prices appeared to be limited. The results for each of these case studies in terms of neighbourhood house prices (0.3 mile radius) are as follows:
 - **Clayton Mills** – 17% drop in property prices between 2010 and 2012 during middle of selling/construction period compared to prices rising in the larger comparator area. Prices began to recover after the construction period.
 - **Limes** – no decrease during the construction period but drop in prices of 39% between 2010 and 2012 immediately after construction ended.
 - **Meadowbrook** – no decrease during the construction period but drop in prices of 20% in the year after development was completed.
 - **Acacia Park** – 5% drop in property prices between 2012 and 2013 during the construction period in the context of rising prices in the larger comparator area, albeit prices started to recover before construction was finished.
 - **Meriden Gate** – 14% drop in property prices between 2011 and 2012 during the construction period in the context of rising prices in the larger comparator area, albeit again prices started to recover before construction was finished.
 - For the three sites built on brownfield land, replacing unattractive, derelict buildings, two of the sites revealed no negative impact on neighbouring property values, with prices continuing to rise in parallel with trends for the postcode and local authority area.
-

- For the other site built on brownfield land, prices in both the study and neighbouring areas decreased after the development (by approximately 7% over a two year period). It should be noted though that the data counts for this site's neighbouring area were very low, raising questions about the robustness of the analysis.
- Overall, in relation to the study's key question of whether house prices in the surrounding area will always fall, the answer implied by the research is that this is not always the case. Where a price reduction was recorded, this tended not to be sustained for more than two years following construction.
- An adverse impact on prices is more likely to be the case for sites that are viewed as having a high existing amenity value prior to the new development. Conversely, for those sites in poor condition, it is expected that prices would be little affected and may even rise.
- In terms of additional factors related to new development that the authors of the study identified as potentially influencing surrounding house prices, these included the scale of development, the past use and ownership of the land, the quality and nature of the design and the role played by planners in mitigating negative impacts.

Implications and relevance to this research study

- Despite its narrow focus and absence of statistical modelling to control for other variables, the study provides a useful overview of the potential impact of new housing development on prices at the local level. As identified by the study *"there are large numbers of studies that examine the effect of new housing supply on prices at national and regional levels, but there are very few that look at the effect on the local area..."*
 - Notwithstanding this, it is not possible to draw any definitive conclusions from the study due to the small number of sites considered and lack of statistical analysis. For example, the negative impact on surrounding property values associated with the greenfield developments could be due to a loss of amenity, an increase in housing supply, a combination of these and other factors, or wider market trends.
 - The study does though highlight a number of variables that would need to be controlled for if, for instance, the impact of additional supply in relation to lowering house prices was to be analysed such as scale of development and quality of design.
-

Overall scope

- Presents the results of the 2015 DCLG housing simulation model constructed by a team from the University of Reading. The model itself has five main interacting blocs: a quarterly model that primarily determines national house prices; a model of demographics and household formation; a model of housing supply; a model of housing demand; and a model of regional housing affordability.
- The report discusses the results of the modelling in relation to a number of specific questions, including the level of housing construction necessary to improve affordability, the differential effects of building different types of properties and the effects of policies set out in the Government's manifesto.
- Of particular relevance to this research study is that the model has also been used to assess the relationship between affordable housing provision and additionality, specifically the extent to which affordable housing replaces pure market housing.

Key findings

- The report identifies the main housing market problems as continuing to be an inadequate housing supply, worsening affordability, decline in home ownership and differences in conditions around the country.
- The results of the modelling suggest that improving affordability by supply policies alone has become even more difficult. This is due to:
 - The unresponsiveness of housing supply to changes in house prices.
 - Short term supply being restricted by credit shortages from the Global Financial Crisis
 - Public sector and affordable housing more generally continuing to remain weak, with no evidence that this has been compensated for by a rise in market housing.
 - A strongly growing economy, subsequent to the financial crisis, leading to faster house price growth because the income elasticity of house prices is greater than one.
 - Low levels of mortgage rates supporting demand, although constrained by finance shortages, particularly for first-time buyers
 - The Buy to let market has become more important adding to the coemption faced by first-time buyers (as well as adding to market volatility).
- As a consequence, the report concludes that *"increases in construction have to be very large to induce major improvements to affordability; in fact no plausible increase in supply can fully stabilise affordability in a growing economy"*.
- While sensitivity of house prices to changes in the stock has been found to be high, new completions each year are only a small proportion of the stock. Therefore, large changes in net additions to the stock are needed to produce significant changes in house prices.
- The modelling found no evidence of crowding out of market housing by affordable housing. In fact, there is evidence of the reverse occurring ('crowding in') through positive multipliers. This is particularly the case in the South.
- It is worth noting that the report cautions that the crowding in effect cannot be a permanent outcome over the longer term due to capacity limits being reached in **relation**

to labour and land, although it may be sustained over a given period where construction remains below the long-run trend.

Implications and relevance to this research study

- The report is consistent with the conclusions drawn from the Savills research into the additionality of affordable housing but provides further rigour in terms of econometric modelling. The modelling implies that affordable housing can be treated as effectively 100% additional, with no evidence found that it crowds out private supply.
 - A number of caveats should be noted though, as recognised within the report. Not least that, due to the absence of information, the data sample used is dominated by a major boom until the financial crisis. Levels of additionality could well vary depending on the stage of the economic cycle.
 - As with the Savills research, the report does not distinguish between different types of affordable housing. There is also no discussion of the potential for increased affordable housing provision to impact on capacity constraints and the consequential effects in terms of factor market displacement.
-

Additionality of Affordable Housing, Final Report, Savills, April 2019

Overall scope

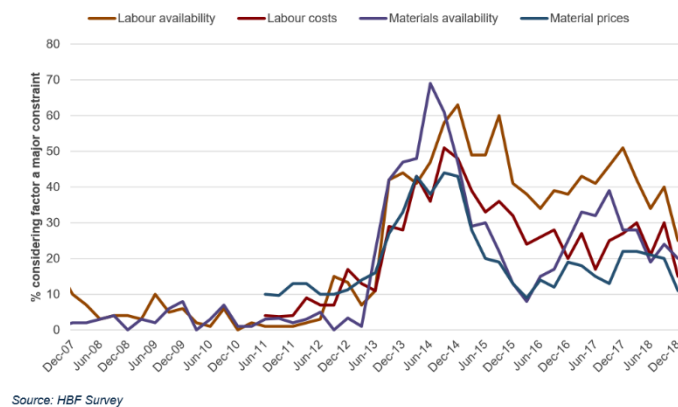
- Investigates the additionality of affordable housing, based on the extent to which an increase in affordable housing leads to an increase in overall housing supply in England, in the context of the Government target of increasing housing supply to 300,000 additional homes per annum by the mid-2020s.
 - The report seeks to address the key question of *“the extent to which overall housing supply would be increased by additional grant funding to increase the supply of new affordable housing, to include social rent, affordable rent and shared ownership homes”*.
 - The analysis focuses on the limits to market capacity in terms of being able to deliver the target of 300,000 new homes per annum, as well as considering examples where grant funding of affordable housing can make unviable sites deliverable, thereby making local regeneration policy objectives realisable.
 - In assessing the additionality of affordable housing, consideration is given to the wider market context in relation to housing supply, market capacity, current policy initiatives and potential constraints in terms of construction capacity and availability of land.
 - The assessed SMS rating of this research is 1.
-

Key findings

- The analysis by Savills suggests a major shortfall in the supply of affordable housing of at least 60,000 affordable homes per annum. Based on affordability, Savills’ estimate that the additional annual need for affordable housing in England is 2.6 times greater than supply. This rises to a multiple of 7.6 in London.
 - The report notes a recent slowing in housing delivery and that supply has become increasingly reliant on larger housebuilders, with the number of builders having declined since the financial crisis – the figures presented by Savills show that nine major housebuilders accounted for around 40% of total new build completions. Access to land, the cost and complexity of planning and access to finance are identified as the major constraints to SME housebuilders.
-

- Savills point towards the tapering and potential withdrawal of Help to Buy, lower house price inflation and slower transaction environment as presenting risks to the speed and scale of housing development. Coupled with continuing build cost inflation, this reduces the scope for the amount of cross subsidy available to fund affordable housing.
- The issue of housing affordability has continued to worsen in all regions, albeit particularly in London where the report identifies a house price to earnings ratio of 13.2 compared to a national average of 7.8.
- In terms of construction capacity, the report identifies a decline in build cost inflation in real terms, indicating that the construction sector has adjusted to the extra demand for new homes. Savills suggest that this implies if the expansion of affordable housing is phased in line with past expansion then there should not be any crowding out of private sector construction capacity.
- The availability of skilled labour is flagged as a more significant constraint to development in the report, with SME housebuilders highlighting the shortage of skilled workers as the fourth largest constraint on activity (behind land, planning and finance).
- Overall, the report concludes that *“if there is adequate land, development management and construction capacity, then grant funding to enable the viable development of more affordable housing will have high additionality of close to 100%”*. It is recognised though that *“grant funding needs to be accompanied by measures to ensure that higher levels of affordable housing development do not crowd out private sector development”*.

Figure 39 – Housebuilder constraints on development - labour and materials



Implications and relevance to this research study

- The report suggests potentially very high levels of additionality associated with grant support for affordable housing, based on a counterfactual case that there are limits to market capacity to deliver the government target of 300,000 homes annually by the mid-2020s. This is dependent though on factor market displacement being constrained by sufficient construction capacity and an adequate supply of skilled labour and land.
- While the report indicates that the development of affordable housing could potentially have additionality of close to 100%, it does not identify a specific suggested benchmark value. This is understandable given the dependency of this conclusion on wider market factors and highlights the risk of simply assuming displacement will be 0%.
- There is no discussion on how the level of additionality might differ depending on the tenure of affordable housing. For example, Shared Ownership and Affordable Rent to Buy might be expected to result in lower levels of additionality given they are home ownership products.
- Another factor to consider is that Savills’ analysis is principally at the macro-level. For an individual project, it will be important to consider an appropriate counterfactual in terms of whether the provision of capital grant is required to deliver additional affordable homes – in other words, that the investment is delivering affordable homes that the private sector developer would not otherwise have built. For example, the additionality

associated with infrastructure investments that more indirectly support the provision of additional homes, some of which will be affordable, may be different to direct investment in developments as part of the Affordable Housing Programme.

- Finally, the report recognises that it “*does not review the very significant social and economic roles played by affordable housing*”. This is important in considering how additionality might vary depending on the outcome being measured. For example, the potential for crowding out may mean that it is appropriate to apply an element of displacement to the calculation of LVU. However, the distributional benefits of affordable housing may be seen as fully additional given it is market housing that is being displaced.

Placemaking and Value, AMION Consulting, December 2016

Overall scope

- AMION Consulting was commissioned by the Peel Group to look into the extent to which investments that adopt a holistic and transformational approach to new housing development can lead to wider benefits and in particular increased house prices. The study labelled this process as ‘placemaking’.
- The research has involved the analysis of house price trends in two contrasting localities following two major housing developments (referred to as Accordia and Chapel), with the aim of isolating and identifying the impacts which good design might have on house prices within both the developments and surrounding localities. Both the case studies were considered to be of developments characterised by a high standard of design.
- The econometric modelling approach adopted within the study sought to explore the localised effects of the two developments in terms of: (i) the existence/maintenance of price effects for each development relative to surrounding areas: and (ii) the existence or otherwise of identifiable locality price effects beyond the sites themselves.
- The approach involved identifying the development footprint, defining a series of distance-based spatial rings around the developments and undertaking a longitudinal hedonic analysis of property price transactions.
- This study was assessed as having a SMS rating of 3.

Key findings

- The study identified clear evidence that property price premiums exist and have been maintained on both of the case study sites since development. Controlling for other factors, the price premiums were found to be a consequence of the approach to placemaking in both areas (in other words, were attributable to good design).
 - The extent of the price premium differed depending on the size of the comparator areas considered – for the Accordia development, the extent of the effect was identifiable to a ring of between 0.75-1km, whereas for Chapel the effect only stretched to a ring of 0.25km.
 - The scale of the price premium over the period 1995-2015 with regard to the Accordia development ranged from between 15% and 30%, whereas for the Chapel development the impact was between 30% and 33%, albeit compared to a smaller geography.
 - In terms of local price effects beyond the sites themselves, the study found a clear additional positive spillover effect for both case studies in the immediate vicinity of the development but a decline (negative spillover or displacement effect) in the next
-

contiguous ring. There was also weak evidence for the Accordia development of a positive spillover effect at a wider spatial level.

- The evidence suggested that at a 0.5km ringset the Accordia development resulted in an uplift in prices of between 19% and 23% in ring 2, a decline in prices of between 25% and 30% in ring 3 and a less significant uplift of 10% in ring 4. This compared to an uplift for the Chapel site of 50% in ring 2 and a decline in prices of between 10% and 15% in ring 3.

Implications and relevance to this research study

- The case studies chosen to inform the study were specifically selected due to being characterised by a high standard of design. Given this and that only two case studies were analysed, significant caution should be adopted in applying the specific findings of the research to other housing developments and in interpreting the results with regard to the impact of housebuilding more generally.
 - Nevertheless, the study provides useful context in terms of the impact of new housing supply on prices at the local level. In this instance, regression analysis was undertaken that sought to control for property characteristics, location characteristics (amenity and deprivation) and year effect variables.
 - The decline in house prices that was recorded for both case studies in the surrounding area between 0.25km and 0.5km from the development sites is suggestive of potential displacement effects from the additional supply of new housing.
-

Impacts of Commercial Property Development, Department for Business, Energy & Industrial Strategy (BEIS), Research Paper Number 2019/001, July 2018

Overall scope

- Research by Cambridge Econometrics, Savills and Professor Peter Tyler to investigate the impacts of commercial property developments (CPD) on local labour markets in general, and productivity more specifically.
- The research sought to provide evidence as to the economic impacts of CPDs on both firms that occupy the new sites and on the surrounding geographic area. To do so, the study undertook econometric analysis to consider two main hypotheses:
 - A local unit that moves to a newly-opened commercial property development (CPD) will experience higher levels of growth in employees, turnover and average productivity than local units with similar age, size and sectoral characteristics from the same geographic region that moves to another type of location.
 - A geographic area adjacent to a newly-opened CPD will experience higher total employee growth, higher average productivity growth, and higher average wage growth in the following years, than an economically similar geographic area with no adjacent CPD
- The testing of hypothesis 2 is of most relevance to this research study as it provided evidence of the displacement effects on employee growth, turnover and productivity.
- The econometric analysis was supported by a review of the existing evidence base on the impact of CPDs and the methodologies used to estimate these. In addition, the report draws upon the findings of eight case studies to understand the impact of CPDs at the site level.

- This research has been assessed as having a SMS research rating of 3.

Key findings

- The econometric modelling found positive impacts on employees and turnover of firms as a result of moving to a new CPD compared to moving to another property. While these impacts tended to build over time, most of the impact occurred within the first year after moving. In contrast, the estimated productivity impacts were positive but not statistically significant.
- After one year of moving, employment was estimated to be 11% higher while turnover was 14% higher. This compared to estimated impacts of 15% and 18% respectively at four years after moving.
- The employee and turnover impacts for local units was particularly strong for those moving between 2007 and 2010 compared to those units moving between 2010 and 2012. The study suggests that this could have been due to the higher productivity of the local units moving in the earlier period.
- For hypothesis 2, the modelling identified evidence for displacement effects on employee and turnover growth in the surrounding areas following the opening of new CPDs. The concentration of these effects were within the 0-1km and 1-2km rings around the CPDs, with non-significant impacts further away.
- The employee and turnover growth displacement effects were more evident in the three years after the opening of the CPDs, particularly in relation to employee growth. These effects largely disappeared over longer time periods, although a statistically significant displacement effect in employee growth was identified within the 0-1km ring at seven years after moving.
- In terms of the CPD postcodes, the strongest positive impact on employee, turnover and productivity growth was recorded at incubator sites and, to a lesser extent, science/research parks. Interestingly, the report notes that this was not accompanied by displacement, whereas for offices, which also saw a strong uplift in productivity, statistically significant displacement was recorded in the 0-1km and 1-2km rings.
- With regard to the case study analysis, the report concluded that *“that CPDs with a specific sectoral focus tended to see the highest growth in productivity, and if correctly targeted, the lowest vacancy rates. The ability to interact with similar firms plays a major role in this.”*

Implications and relevance to this research study

- The study provides a good demonstration of how additionality impacts can vary over time, by geography and by intervention category, both in terms of the positive growth impacts over and above the counterfactual as well as in relation to displacement effects. It is also of note that the success of the CPDs reviewed as part of the study is linked to the targeting of specific market failures / sectoral requirements.
- The modelling undertaken as part of the study gives a useful indication of the scale of local additionality effects associated with the provision of new commercial space. However, while not a criticism of the study given its intended scope, the transferability of the modelling results to ex-ante appraisals is not clear.

The Economic Impacts of Help to Buy, Felipe Carozzi, Christian A. L. Hilber and Xiaolun Yu, London School of Economics & Centre for Economic Performance, 2019

Overall scope

- Research paper that sets out to investigate the causal impact of Help to Buy (HtB) on housing construction, house prices, the size of newly constructed units and the performance of residential developers.
- The research focuses on the Equity Loan scheme (ELS), which provides an equity loan for up to 20% of the housing unit's value (or 40% within the Greater London Authority, GLA) to buyers of new build properties.
- The ELS expands housing credit and thus increases demand for housing. The paper developed a simple theoretical framework with heterogeneous households and credit constraints to explore how such a positive demand shock in the housing market affects construction and prices. The model predicts that the impact of the policy depends crucially on the supply price elasticity of housing.
- In a setting with elastic supply, HtB can be expected to mainly stimulate construction numbers as intended by the policy. However, when supply is price inelastic (i.e., regulatory constraints or physical barriers to residential development impede a supply-response), the effect of the policy may be mainly to increase house prices, with the unintended consequence of making housing less rather than more affordable.
- The empirical analysis exploits spatial discontinuities in the generosity of the ELS and the timing of implementation (pre vs. post) to identify the causal impact of HtB on housing construction and house prices.
- The study analysed properties sold on either side of the Greater London Authority (GLA) boundary and on either side of the English/Welsh border partially to ensure spatial discontinuities in the scheme's conditions but also as their regulatory land use restrictiveness and barriers in physical development differ starkly.
- An SMS rating of 3 / 4 has been assessed for this research.

Key findings

- The literature review undertaken as part of the study provided theoretical and empirical credence to the notion that expansions in credit supply lead to higher prices, especially in areas with tight planning conditions.
- Differences in the intensity of the HtB-treatment have heterogeneous effects depending on local supply restrictions and the local price elasticity of housing supply.
- In the GLA, where the supply elasticity is low, the introduction of the more generous London version of the ELS led to a significant increase in prices for new build units of roughly 6%. However, it had no appreciable effect on construction activity or on aggregate private mortgage lending.
- Conversely, in the relatively high supply elasticity areas around the English/Welsh border, where only a small fraction of land is developed and developable land is readily available, there is found to be a significant effect on construction activity and no effect on prices.
- The introduction of the more generous HtB-price threshold on the English side of the border increased the likelihood of a new build sale by about 6 to 7% (compared to the Welsh side of the border). Moreover, it decreased the size of newly constructed units on the English side of the border by nearly 7%. Consistent with this, a bunching analysis

reveals that the English ELS led to significant bunching of properties right below the price threshold, shifting construction away from larger properties above the threshold towards smaller units.

- The research also found evidence that the scheme caused an increase in developers' financial performance, leading to larger revenues, gross profits and net profits.
- Collectively, these results suggest that the effects of HtB largely depend on local supply conditions. It was found that the scheme fails to trigger more construction activity, but instead causes house prices to increase inside the GLA, precisely the region that is most strongly adversely affected by the 'affordability crisis'. This has distributional implications and the findings suggested that the main beneficiaries of HtB in already unaffordable areas may be developers and (typically well-off) landowners rather than struggling first-time buyers.
- Only a very limited number of studies have shed light on the effects of HtB on housing and mortgage markets and to date there has been no state-of-the-art evaluation of the impacts of the policy on house prices and construction volumes, which this paper looks to address.
- The findings suggest that HtB has stimulated housing construction in the 'wrong areas'; that is, it has stimulated construction in areas where planning constraints are less rigid and it is therefore comparably easy to build, not in areas where productivity and employment concentration are highest and new housing is most needed.
- Two key reasons are identified as to why the policy may not have helped the population of credit constrained households in the most unaffordable areas of the country. First, the policy pushed up house prices, increasing housing costs rather than housing consumption in square meters. Only developers or land owners, not new buyers, benefited from the policy-induced price increases. Second, the design of the ELS is such that those borrowers who took advantage of the scheme to gain access to the owner-occupied housing ladder, unlike existing homeowners, do not participate in the same way in future capital gains. This is because, at the time of sale, they have to pay back the equity loan at market value. If the price increases, so does the amount that the borrower owes the government.

Implications and relevance to this research study

- This study through empirical research demonstrates the importance of understanding supply side conditions within the housing market and how these differ across the UK. The focus was specific to HtB and relates to understanding how demand side interventions affect supply.
- Nevertheless, the study demonstrates that it will be important for the additionality framework to consider carefully the elasticity of supply. This will differ across the country and is likely to be much lower in the tightly constrained markets in the South East and the additionality of housing market interventions is likely to be higher.

A6MARR Evidence Paper B: Land Value Uplift Analysis (Residential), Final Report, Savills and SQW, November 2019

Overall scope

- Research on behalf of Transport for Greater Manchester (TfGM) to examine LVU effects associated with the A6 to Manchester Airport Relief Road (A6MARR).
- Focused on residential land only and examined potential for incremental LVU over the broad study area and considered evidence of a step-change in LVU at specific sites using a series of case studies.
- Two forms of LVU were considered including an increase in land value per hectare (tested via the sale price of new homes) and an increase in market capacity for development (tested by build out rates and land coming forward for future development).
- Included identifying an Impact Zone and a Control Zone.
- This research was assessed as having a SMS rating of 1.

Key findings

- There was no significant growth in second hand residential values in the Impact Zone relative to the Control Zone.
- Some evidence that the average price premium of new build in the Impact Zone over the new build in the Control Zone has been increasing since 2016 but the relationship is volatile and influenced heavily by the variable location of new build development within each Zone.
- At this stage there is insufficient evidence to suggest that there is a significant price premium attributable to the road.
- However, it did appear that there had been a market response to the new road, with an increased volume of new home sales in the Impact Zone and a higher level of planned development activity. This implies that there is developer confidence that higher rates of market absorption can be achieved in the future.
- Case study analysis was also inconclusive on the potential impact that the A6MARR has had on property prices at specific development sites. Some evidence was found that suggested the road may support developers in marketing their sites by demonstrating the benefits of the improved connectivity.
- Discussion with the Local Authority offices suggested that in planning terms, no development schemes under construction have been directly enabled, or dependent on, the development of the A6MARR to date. The bigger impact by officers was identified as likely to be on commercial development and office development potential at Manchester Airport City North and logistics and warehousing at Airport City South.

Implications and relevance to this research study

- Although this is one study it highlights the difficulty post scheme of directly attributing housing development to transport interventions. This demonstrates the difficulty in assessing the deadweight of schemes which are often influenced by a combination of factors and transport interventions often indirectly influence the housing market.
- It is difficult to assess the direct linkages between the land values and transport intervention in the short term and over the longer term more evidence is likely to be available to assess such. This again highlights the difficult nature of designing evaluation and ex post evaluations to assess the additionality of schemes.

Recent UK housing policy

B3.7 In addition to reviewing the existing research, evaluation and appraisal literature relating to additionality, it is also informative to summarise recent UK housing policy more generally in terms of the challenges facing the UK housing market. This is principally captured in two main reports: the independent review of build out led by the Rt Hon Sir Oliver Letwin MP and the White Paper: Fixing our broken housing market. Of specific relevance to this research study are the key characteristics of the housing market that are currently constraining delivery.

Independent Review of Build Out, Final Report, RT Hon Sir Oliver Letwin MP, October 2018

Overall scope

- Final Report of the Independent Review of Build Out Rates, commissioned by the Chancellor of the Exchequer at the time of the Budget in Autumn 2017. The report, published in October 2018, focusses on the issue of the build out rate of fully permitted new homes on the largest sites in areas of high housing demand.
- The report presents recommendations about ways in which the Government could increase the variety and differentiation of what is offered on large sites, raise the proportion of affordable housing and raise the rate of build out.
- The review was undertaken in response to concerns around the significant gap between housing completions and the amount of land allocated or permitted in areas of high housing demand, with the view expressed in some quarters about “land banking” and “intentional delay” on the part of major housebuilders.
- The aim of the analysis was to determine: what the build out rate on large sites in areas of high housing demand actually is; why the rate of build out on these sites is as it is; and which factors would be most likely to increase the rate of build out on these sites without having other, untoward effects.

Key findings

- The analysis concluded that the fundamental drivers of the slow build out rate for large sites is the homogeneity of the types and tenures of the homes being provided on these sites, along with the limits on the rates at which the market will absorb such homogenous products.
- As a consequence, the review suggests that to accelerate absorption rates, and as such overall build out rates, the housing offer in areas of high demand needs to become much more varied in terms of types, designs and tenures, along with large sites providing more distinctive settings, landscapes and streetscapes, with the resulting variety matching the differing desires and financial capacities of people wanting to live in these areas.
- Other potential constraints were considered by the review, with the availability of skilled labour identified as being another key factor that could impede build out rates. The supply of bricklayers in particular was highlighted as a potential binding constraint in the immediate future unless there is either a substantial move away from brick-built homes, significant import of bricklayers from abroad or a rapid move to modular construction techniques.
- While not impeding the build out rate itself, the review also emphasised the urgent need for more effective coordination between government departments, agencies and private

sector operators to improve and speed up the delivery of transport and utility infrastructure in order to facilitate the development of large brownfield sites.

Implications and relevance to this research study

- The analysis undertaken to inform the Letwin review principally relates to the accelerated build out of large development sites. However, there are a number of findings that apply more broadly to the additionality of housing interventions. In particular, it is evident that the emphasis on increasing diversity should also be a factor when considering the potential scale of additional impact associated with housing developments supported by the public sector.
- The requirement for a diverse housing offer as part of tackling the current challenges facing the UK housing market does not only relate to the provision of affordable housing, albeit this is a key component, but also encompasses providing a mix of types and sizes that reflect local housing demand, along with good quality new homes.
- Similarly, it would seem reasonable to assume that interventions that address other potential constraints, such as the availability of skilled labour or suitable development sites, should be expected to achieve higher rates of additionality, all other things being equal.

Fixing or Broken Housing Market, Department for Communities and Local Government, February 2017

Overall scope

- Housing White Paper setting out the government's plans to reform the housing market and boost the supply of new homes in England, over the long term creating a more efficient housing market whose outcomes more closely match the needs and aspirations of all households and which supports wider economic prosperity.
- The White Paper outlines the different challenges facing the UK housing market and how the government is intending to address these.

Key findings

- The principal conclusion of the White Paper is that the problem with the UK housing market is threefold:
 - Insufficient planning by local authorities for the level of homes needed. There is a need for local decision makers to continue to engage proactively with their communities to ensure a suitable plan is in place to provide certainty around housing delivery in line with the identified needs for the area.
 - House building has been too slow with a large gap between permissions granted and new houses built. The reasons for this include permissions being contested and changes to market conditions and onerous planning conditions. However, there is also concern that land for housing is held back as prices continue to rise.
 - The structure of the housing market which makes it harder to increase supply. A handful of very big companies are responsible for most new builds. Building at scale exposes commercial developers to significant financial risk so there is little incentive to invest in innovative methods of construction which could deliver many new homes.

- In response to these challenges, the White Paper sets out a number of proposals under the headings of 'Planning for the right homes in the right spaces', 'Building homes faster', 'Diversifying the market' and 'Helping people now'.
- The proposals include a range of changes to the planning system, making it more open and accessible, as well as changes to the way objectively assessed housing need is calculated to encourage councils to plan on a consistent basis.
- The White Paper also recognises the need for specific interventions to ensure infrastructure is in the right place at the right time, that steps are taken to address the skills shortages in the construction sector and that the market is diversified through supporting new and different providers, more innovation in methods of construction and new investors into residential development.
- In terms of 'Helping people now', the White Paper recognises the affordability issues across England, and not just within London and the South East. This emphasises the need to continue to help people afford a decent home through the continuation of schemes such as Help to Buy and the Affordable Homes Programme.

Implications and relevance to this research study

- As with the Letwin review, the relevance of the White Paper to this research study is in terms of identifying those key constraints that are acting as a barrier to housing delivery. Not all of these constraints can be addressed at the individual programme or project level but there is a number of different elements that can be extracted from the policy context to help inform a framework for estimating additionality.
- For example, in addition to the issues of diversifying the market, which have been discussed above, and identifying an appropriate housing need, the White Paper discusses the low levels of productivity growth in the construction sector. Part of the policy response to this is to encourage modern methods of construction in house building.

Bibliography

- AMION (2007), National Strategy for Neighbourhood Renewal – Evidence on Progress and Value for Money.
- AMION (2016), Placemaking and Value.
- BEIS (2018), Impacts of Commercial Property Development, Final Report. *BEIS Research Paper*, Number 2019/001.
<https://www.gov.uk/government/publications/impacts-of-commercial-property-development> [Last accessed May 2020]
- BIS (2009), BIS Occasional Paper No. 1: Research to improve the assessment of additionality.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/191512/Research_to_improve_the_assessment_of_additionality.pdf [Last accessed May 2020]
- Carozzi, F., Hilber, C.A.L., and Yu, X. (2019), The Economic Impacts of Help to Buy, London School of Economics & Centre for Economic Performance.
- <https://www.inrev.org/system/files/2019-10/NTRP-The-Economic-Impacts-of-Help-to-Buy-2019.pdf> [Last accessed May 2020]
- DCLG (2014), Evaluation of the New Homes Bonus.
- https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387152/NHB_Evaluation_FINAL_report.pdf [Last accessed May 2020]
- DCLG (2016), The DCLG Appraisal Guide.
<https://www.gov.uk/government/publications/department-for-communities-and-local-government-appraisal-guide> [Last accessed May 2020]
- DCLG (2017), Fixing our broken housing market.
<https://www.gov.uk/government/publications/fixing-our-broken-housing-market> [Last accessed May 2020]
- DETR (2000), Final Evaluation of City Challenge.
<https://www.thenbs.com/PublicationIndex/documents/details?Pub=DETR&DocID=306498> [Last accessed May 2020]
- DfT (2018), TAG Unit A2.2, Appraisal of Induced Investment Impacts. *Transport Analysis Guidance*. <https://www.gov.uk/government/publications/webtag-tag-unit-a2-2-induced-investment-may-2018> [Last accessed May 2020]
- Einio, E. and Overman, H. G. (2016), The (Displacement) Effects of Spatially Targeted Enterprise Initiatives: Evidence from UK LEGI. *SERC Discussion Paper*, 191.
<http://eprints.lse.ac.uk/66493/> [Last accessed May 2020]
- European Commission (2013), EVALSED: The resource for the evaluation of Socio-Economic Development.
https://ec.europa.eu/regional_policy/en/information/publications/evaluations-guidance-documents/2013/evalsed-the-resource-for-the-evaluation-of-socio-economic-development-evaluation-guide [Last accessed May 2020]

Additionality Literature Review

- European Commission (2017), Ex post verification of additionality 2007-2013. *Communication from the Commission*, COM (2017) 138 final, 23.03.2017. https://ec.europa.eu/regional_policy/en/information/publications/communications/2017/ex-post-verification-of-additionality-2007-2013 [Last accessed May 2020]
- Finlay, S., Williams, P., and Whitehead, C. (2016), Evaluation of the Help to Buy Equity Loan Scheme. DCLG. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/499701/Evaluation_of_Help_to_Buy_Equity_Loan_FINAL.pdf [Last accessed May 2020]
- HCA (2014), An Additionality Guide, Fourth Edition. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf [Last accessed May 2020]
- HCA (2015), Calculating Cost Per Job, Best Practice Note, 3rd Edition. <http://www.nwueu.ac.uk/NWUEU/LatestUpdates/PDF/CPJ%20BPN%20%202015%203rd%20Edition%20-%20Final.pdf> [Last accessed May 2020]
- HM Treasury (2020), The Green Book: Appraisal and Evaluation in Central Government. [The Green Book \(2020\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/499701/The_Green_Book_(2020)_-GOV.UK_(www.gov.uk))
- Letwin, O. (2018), Independent Review of Build Out, Final Report. Ministry of Housing, Communities and Local Government. <https://www.gov.uk/government/publications/independent-review-of-build-out-final-report> [Last accessed May 2020]
- McPherson, A. and McDonald, S. (2010), Measuring the outcomes and impacts of innovation interventions: Assessing the role of additionality. *International Journal of Technology Policy and Management*.
- Mean, G., Burrows, V., Goody, J., and Nygaard, C. (2015), The New DCLG Housing Model. The University of Reading. https://www.midsussex.gov.uk/media/3195/rd_20-university-of-reading-full-report.pdf [Last accessed May 2020]
- National Housing and Planning Advice Unit (NHPAU) (2008), Affordability still matters http://webarchive.nationalarchives.gov.uk/20081214215740/http://www.communities.gov.uk/documents/507390/pdf/86_7681.pdf [[Last accessed May 2020]
- PwC (2009), Impact of RDA spending – National report – Volume 1 – Main Report. <https://webarchive.nationalarchives.gov.uk/20090609050004/http://www.berr.gov.uk/files/file50735.pdf> [Last accessed May 2020]
- Rhodes, J., Tyler, P., Brennan, A., Stevens, S., Warnock, C., and Otero-Garcia, M. (2002), Neighbourhood regeneration: Lessons and evaluation evidence from ten single Regeneration Budget case studies. DTLR, London. <https://www.landecon.cam.ac.uk/pdf-files/urban-and-regional-analysis/srb-main.pdf> [Last accessed May 2020]
- RSM (2019), Review of Scotland's Enterprise Areas, A Final Report to Scottish Enterprise. <http://www.evaluationsonline.org.uk/evaluations/Search.do?ui=basic&action=showPromoted&id=701> [Last accessed May 2020]

- Savills (2019), *Additionality of Affordable Housing, Final Report. Savills Research Report to G15, NHF, HFN.* <https://thinkhouse.org.uk/site/assets/files/1471/savills0419.pdf> [Last accessed May 2020]
- Savills and SQW (2019), *A6MARR Evidence Paper B: Land Value Uplift Analysis (Residential), Final Report.*
- Scottish Enterprise (2014), *Economic Impact Assessment for Appraisal, Monitoring and Evaluation A Guidance Overview. Economic Impact Guidance.*
- What Works Centre for Local Economic Growth (2019), *Monitoring and evaluation case study: Transport, A note on monitoring and evaluation of dependent development schemes.* <https://whatworksgrowth.org/resources/monitoring-and-evaluation-case-study-transport/> [Last accessed May 2020]
- Whitehead, C., Sagor, E., Edge, A., and Walker, B. (2015), *Understanding the Local Impact of New Residential Development: A Pilot Study.* LSE, London. http://eprints.lse.ac.uk/63390/1/Understanding_the_Local_Impact_of_New_Residential_Development.pdf [Last accessed May 2020]
- Whitehead, C. and Williams, P. (2018), *Evaluation of the Help to Buy Equity Loan Scheme 2017.* DCLG. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/751359/Evaluation_of_the_Help_to_Buy_equity_loan_scheme_2017.pdf [Last accessed May 2020]
- Wren, C. (2007), *Reconciling practice with theory in the micro-evaluation of regional policy. International Review of Applied Economics*, Vol. 31, No. 3, pp.321–337.

Appendix C – Displacement and Placemaking Effects

Executive Summary

C1 Background

- C1.1 This Appendix summarises the results of research into the additional impacts (or additionality) of housing supply interventions. The research used econometric modelling to examine post-intervention trends in house prices in distance-based rings radiating out from the intervention sites relative to a ‘control’ ring beyond which any impacts were not anticipated to occur.¹⁷ Such trends were used to assess the extent to which interventions were resulting in the displacement of demand resulting in price falls in the surrounding areas (and by implication increased affordability) or placemaking effects (where resultant increased prices increased the commercial attractiveness of areas for developers). In total 72 projects were modelled. The research also drew on case study evidence to illustrate and verify findings from the modelling. It forms part of a research study to update guidance on assessing the additionality of supply-side housing interventions.
- C1.2 In 18% of cases there was no identified displacement (price reduction) or placemaking (price increase) effects associated with the public sector supported project. In 38% of the projects some level of net displacement (i.e. price fall) was noted, while 44% experienced net placemaking effects (i.e. price gains) in surrounding areas¹⁸.
- C1.3 A higher proportion of areas displayed evidence of an increase in prices in at least part of their surrounding areas than displayed a reduction. The average increase was also greater - 2.4% across the whole of the relevant areas - as opposed to a reduction of 1.9% in areas where prices fell. Overall, the net effect on house prices of the 72 modelled projects was estimated to be an increase of £79 million (constant 2016 prices).
- C1.4 In general impacts tended to be highest closer to the intervention site and then to decline with distance away. For example, the average mean gain in the two closest rings was 11.7% (of prices within those rings) compared with 2.3% in the two outermost rings. Similarly, average mean displacement (price decline) fell from 6.0% to 2.4%. The decline in values for both gains and losses appeared to level off beyond rings 5 / 6. However, there was inevitably variation between projects in the distribution of effects reflecting varying local circumstances unaccounted for within the modelling.
- C1.5 Projects providing grant and loan/equity support have been the most likely to result in price gains in surrounding localities – 43% and 48% respectively resulting in increases and 29% and 24% in significant (2% or more) growth. Acquisitions and disposals have been relatively restricted in terms of subsequent price impacts.
- C1.6 Significant levels of displacement (i.e. 2% or more) tended to be more apparent in areas where there were already relatively high levels of development activity. Conversely areas of lower development activity were more likely to experience price increases and placemaking effects.

¹⁷ Appendix D details the basis on which rings are constructed

¹⁸ A number of projects will have generated both gains and displacement in different rings within their surrounding areas.

- C1.7 Projects in the North had the greatest impact in terms of house price gains and thereby potential placemaking effects whereas projects in London and the South East were much more limited in their impacts – only 4 out of 27 such projects resulted in price gains or losses of more than 2%.
- C1.8 The largest house price impacts – both increases and decreases - have tended to be in areas where housing was already relatively affordable. There is limited evidence of support enhancing affordability through reductions in house prices in areas with already high house price to earnings ratios. It would appear that a sustained significant increase in supply is needed in such areas in order to effect affordability, whereas the projects modelled here are relatively small in scale.
- C1.9 The extent to which the projects examined might have undermined the viability of other developments through reduced developer return has also been assessed - using an average West Midlands brownfield scheme. This suggested a reduction in new house price values beyond 4% would render delivery of a scheme difficult and beyond 8% unviable. None of the modelled schemes have price-damping displacement effects of this magnitude across the whole of their areas and only 11% had reductions of greater than 2%.

C2. Introduction

- C2.1 AMION Consulting, in association with Mott MacDonald and Thomas Lister, were appointed by the now Department for Levelling Up, Housing and Communities (DLUHC) to undertake research into the additional impacts (or additionality) of housing supply interventions¹⁹. Additionality is the extent to which activity takes place at all, on a larger scale, earlier or within a specific designated area or target group because of a public sector intervention. The additional effect of a project is the difference between what would happen anyway, termed the counterfactual (do nothing or business as usual option), and the result if the project were implemented. To assess the additionality of specific housing interventions the following factors need to be considered:
 - C2.2 Displacement: the proportion of project outputs/outcomes accounted for by reduced outputs/outcomes elsewhere in the target area (i.e. fewer homes are built on other sites, as a result of the intervention); and
 - C2.3 Deadweight: outputs/outcomes which would have occurred without the project – this is assessed through the counterfactual case if the support were not forthcoming.
- C2.4 The research approach combines both top down (econometric modelling) and bottom up (case study) approaches to assess completed supply-side housing projects supported by Homes England or its predecessors (the Homes and Communities Agency (HCA) and English Partnerships). 100 projects were selected using a stratified sample. The top down modelling, which was based on the hedonic pricing method, has informed the analysis of displacement, while the bottom up has provided qualitative insights into both deadweight and displacement.
- C2.3 This paper sets out the results of the econometric modelling and draws on the case study evidence to assess displacement and, interestingly, placemaking effects. The latter were not the focus of the research question, but the modelling results have identified several projects where public sector intervention has had a positive impact

¹⁹ The research does not cover the entirety of displacement effects such as that associated with other types of public sector intervention including support to commercial development, business support and skills or directly other factors of production.

on adjacent house prices. The results are exploratory since they are based on a relatively limited number of projects but do appear to provide valuable insights into the price impacts and potential displacement and placemaking effects of public sector intervention. They are important since a review of the relevant literature²⁰ has identified that there is very limited relevant robust evidence in terms of the displacement effects of housing interventions.

- C2.4 The paper forms part of a research study to update guidance on assessing the additionality of supply-side housing interventions. Annex A contains a technical review of the econometric modelling.

C3. Econometric Modelling Methodology

- C3.1 The top down approach is based on a quasi-experimental, pooled-cross-section hedonic framework where post-intervention trends in house prices are assessed in distance-based rings proximate to the intervention relative to a 'control' ring beyond which any displacement impact is not anticipated to occur.
- C3.2 House prices and their trends are a rich source of information on housing in terms of demand and supply. They can be used to indicate market adjustments following interventions and as a proxy for displacement. Having controlled for other potential drivers of prices (see Appendix D), the implication is that evidence of negative post-intervention trends in close proximity will reflect displacement of demand. Typically, additionality assumptions in cost benefit analysis make a downwards adjustment for this potential effect on demand and prices which would adversely affect the viability of other sites not directly benefiting from government funding. A supported project may also have the opposite effect resulting in a rise in prices which is indicative of increasing demand and might, for example, be due to the enhancement of a former industrial site that was having a blighting effect. The implication would be that housing development might then be more attractive on sites nearby. Such effects have to date generally been captured as part of the wider benefits of a project, rather than as part of the additionality assessment. This study attempts to establish which of these effects dominates in particular circumstances.
- C3.3 As well as house prices being a rich source of information on these factors (when modelled), data availability is also good and observations are available over a long period with low-level spatial coverage. Information is also available on the characteristics of properties. There are also well established and accepted techniques to undertake hedonic modelling. Furthermore, the approach and techniques used have previously been successfully applied to housing schemes.
- C3.4 In order to test the level of displacement of house building, we considered using information on sites, as opposed to house prices. However, this approach was discounted because detailed, consistent, time-series data on sites and units was not available at a local level.
- C3.5 100 projects were selected to form the core evidence base using monitoring data provided by Homes England. The focus was on completed developments where a sufficient period had passed to ensure that enough market transactions had taken place. As well as timing, schemes were selected to ensure a broad coverage by type of intervention, location and scale.

²⁰ A separate Additionality Literature Review report has been produced as part of this research.

C3.6 The subsequent analysis focuses on the results of the modelling at the 5% statistical significance threshold and is based on a descriptive analysis. Details of the 1% and 10% significance model results are presented in Appendix D.

C4. Modelled projects

C4.1 Of the original 100 projects, 72 were successfully modelled, with completion dates between 2008 and 2016²¹. In total, the modelled projects supported the delivery of 8,515 new homes, with an average of 118 per project. The maximum number was 1,658 and the minimum was 10.

C4.2 Table C1 sets out the profile of modelled projects by type and number of dwellings. 40% of the projects were loan/equity investments, 29% grants and 26% acquisitions and disposal. The latter involved direct intervention in the site by the public sector, while in the former support was provided to the private sector developer due to an inability to access finance or a gap in the project's viability.

	Acquisition / Disposal	Advice	Grant	Loan / Equity	Off-site infrastructure	Total
<30 dwellings	1	1	10	10	0	22
30-100 dwellings	10	0	8	11	0	29
>100 dwellings	8	0	3	8	2	21
Total	19	1	21	29	2	72

C4.3 Table C2 sets out details of the modelled projects by region and size of development. Almost 40% of all projects were in London and the South East. Large scale modelled projects were primarily in London, the South East and the Midlands.

Table C2: Modelled projects by region and size of development

	East	East Midlands	London	North East	North West	South East	South West	West Midlands	Yorkshire & Humber	Total
<30 dwellings	0	1	3	3	5	5	1	2	2	22
30-100 dwellings	3	0	3	2	7	8	1	3	2	29
>100 dwellings	0	4	5	2	0	3	1	5	1	21
Total	3	5	11	7	12	16	3	10	5	72

C4.4 While 50% of projects were in local authorities defined by ONS as 'Urban Settlements' and 'Ethnically Diverse Metropolitan Living', they cover a broad mix of settings including rural, semi-rural and former industrial locations (see Table C3).

²¹ Issues such as limited property transaction data and problems with the spatial definition of projects meant that several models could not be used in the analysis.

Table C3: Modelled projects by type of local authority area (ONS classification)

Urban Settlements	22
Ethnically Diverse Metropolitan Living	14
Services and Industrial Legacy	9
Town and Country Living	9
Business, Education and Heritage Centre	6
Countryside Living	5
Affluent England	5
London Cosmopolitan	2

C4.5 The majority of developments were on brownfield land. Only 9 (13%) were greenfield sites of which 4 were developments of more than 100 dwellings.

C5. Displacement and Placemaking Impacts

Overall effects

C5.1 In 18% of cases there was no identified displacement (price reduction) or placemaking (price increase) effects associated with the public sector supported project. In 38% of the projects some level of net displacement (i.e. net price falls) was noted, while 44% experienced placemaking effects (i.e. net price gains) in surrounding areas²².

C5.2 Table C4 shows the number of projects where the econometric modelling has demonstrated that there has been an impact upon house prices in their surrounding areas since completion relative to their comparator areas taking displacement and gains separately (i.e. it does not reflect the net change in prices). The house price change figures in each case are the average change for all properties across the whole of each area (i.e. the defined 10 rings radiating out from the development). The figures in the table show the distribution of projects by range of displacement or gain separately.

Table C4: Modelled project areas where there has been an impact in house prices

Reduction in house prices							
Change	0	<-2%	-2% - -4%	-4% - -6%	-6% - -8%	Total	
Number	41	20	6	4	1	72	
Percentage	57%	28%	8%	6%	1%	100	
Increase in house prices							
Change	0	<+2%	+2% - +4%	+4% - +6%	+6% - +8%	+8% - +10%	Total
Number	37	18	11	4	0	2	72
Percentage	51%	25%	15%	7%	0%	3%	100

C5.3 In 43% of cases there has been an identifiable reduction in prices within parts of surrounding areas because of the supported development – in other words the development appears to have resulted in some displacement of demand (i.e. prices

²² A number of projects will have generated both gains and displacement in different rings within their surrounding areas.

have fallen). This may of course mean that the attractiveness of surrounding areas (or parts thereof) to developers is reduced and thus supply has been suppressed. It can also mean however that the affordability of housing in the area has improved.

- C5.4 A higher proportion of areas (49%) display evidence of an increase in prices within parts of the adjacent areas. The average change for each of these areas is also greater than that for those experiencing a reduction – an increase of 2.4% as opposed to a reduction of 1.9%.
- C5.5 An increase in relative prices would suggest that these areas are capable of generating greater returns on investment and have therefore become more attractive to developers. The highest identified impacts were associated with the Salford Langworthy and Newcastle-under-Lyme Lower Milehouse Lane developments (8.6% and 8.2% respectively). The former is a widely reported and award-winning regeneration project.
- C5.6 Impacts may of course be considerably greater or lesser within different rings (this distribution of impact is examined in more detail below). There is also the possibility that single developments can have both a displacement and a gain (or placemaking) effect in different rings. Table C5 shows the net impact on prices in different modelled project areas across the whole of an area of potential influence in those areas with rings showing a gain and rings showing a loss. It suggests again that projects overall have had slightly more of an upward impact on relative house prices across their zones of influence – the mean net impact per project being a 0.5% increase.

Table C5: Modelled project areas net change in house prices

	-6- 8%	-4- 6%	-2- 4%	0- - 2%	0	0- +2%	2- +4%	4- +6%	6- +8%	8- +10 %	Tota l
No.	1	3	5	18	13	17	9	4	0	2	72
%	1	4	7	25	18	24	13	6	0	3	100

- C5.7 Overall, the net effect on house prices of the 72 modelled projects was an increase of £79 million (constant 2016 prices). Table C6 sets out the location of the top five net displacement and gain projects and shows their estimated net impact on house prices in their areas. Where projects were resulting in attributable gains it is notable that in many instances, they were part of wider regeneration schemes and were in effect serving to help unlock the wider scheme. The Greenwich and Northampton projects are good examples of this. These developments were in effect creating new markets.

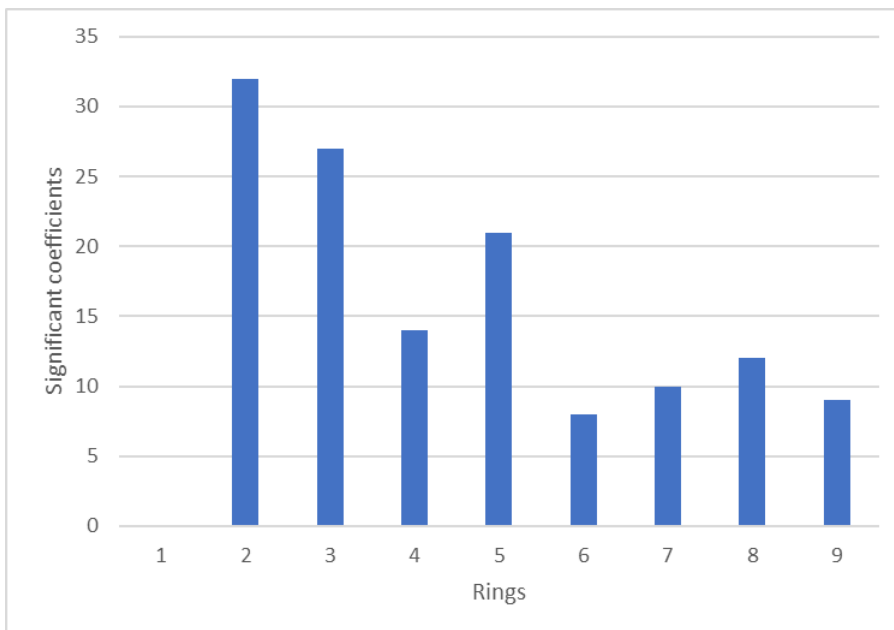
Table C6: Top five net displacement and placemaking projects (2016 prices)

Project	Net Displacement	Project	Net Placemaking
Hartlepool	-£9.6m	Greenwich	£23.9m
Birmingham	-£9.4m	Redbridge	£16.7m
Hounslow	-£7.2m	Newcastle under Lyme	£13.1m
Stockport	-£5.4m	Northampton	£12.7m
Basingstoke and Deane	-£4.7m	Harrow	£11.7m

Impacts by distance from development

C5.8 Figure C1 shows the profile of significant coefficients by ring – in other words the number of significant either negative or positive price movements in each of the nine rings beyond the site. In general, this shows what would be expected with a greater impact closer to the intervention site and then a decay as you move outwards. However, the number of significant coefficients levels off at ring 6 and remains at a broadly constant level. More detailed analysis indicates that this may, in part, be explained by several of the significant projects in the outer rings that have significant effects being part of wider housing schemes, such as Housing Market Renewal.

Figure C1: Significant coefficients by ring



C5.9 Table C7 shows the net average change in house prices in concentric rings for the modelled developments based on the average displacement and gains in each ring for all projects displaying price falls and/or gains (respectively). While there is some indication of higher gains closer to developments, there is considerable variation between projects in the distribution of effects thus resulting in some evening out of the average profile. Some projects display high levels of change close to the project and limited if any change further out. For example, the Salford Langworthy development showed an increase in house prices of 10.1% in Ring 2, 8.4% in Ring 3 and no

significant change in subsequent rings. The steeper 'gradient' of gains could reflect more localised impacts (through for example improvements to the image and environment of the immediate area) as opposed to the more spatially dispersed market impacts where displacement is resulting.

Table C7: Mean change in prices by distance from development (ring)

	Ring 2	Ring 3	Ring 4	Ring 5	Ring 6	Ring 7	Ring 8	Ring 9
Mean Displacement	2.76	3.27	2.08	2.79	0.83	1.35	1.04	1.41
Mean Gain	6.55	5.19	1.27	1.84	1.14	1.41	1.65	0.67

Impacts by size of development

C5.10 Table C8 shows the change in prices by size of project. Smaller projects appear to have had greater displacement and placemaking impacts. This is somewhat counterintuitive since we would generally expect larger schemes to have a greater impact but may reflect the specific objectives of the intervention in the case of placemaking effects. Furthermore, in terms of displacement effects, several of the smaller schemes appear to be part of much broader programmes of intervention across a wider area.

Table C8: Modelled project areas net change by size of project (number of dwellings)

		-6-8%	-4-6%	-2-4%	0--2%	0	0-+2%	2-+4%	4-+6%	8-+10%	Total
<30	No.	1	1	2	4	5	3	3	3	0	22
	%	5	5	9	19	23	14	14	13	0	100
30-100	No.	0	1	2	8	4	8	5	0	1	29
	%	0	4	7	28	14	28	17	0	3	100
>100	No.	0	1	1	6	4	6	1	1	1	21
	%	0	5	5	29	19	29	5	5	5	100

Impacts by support type

C5.11 Projects providing grant and loan/equity support have been the most likely to result in price gains in surrounding localities – 43% and 48% respectively resulting in increases and 29% and 24% in significant (2% or more) growth (see Table C9). Acquisitions and disposals have been relatively restricted in terms of subsequent price impacts.

Table C9: Modelled project areas net change by support type

	Acquisition / Disposal	Advice	Grant	Loan / Equity	Off-site infrastructure
-6% - -8%	0	0	0	1 (3%)	0
-4% - -6%	1 (5%)	0	1 (5%)	0	1 (50%)
-2% - -4%	1 (5%)	0	2 (10%)	2 (7%)	0
0 - -2%	5 (26%)	1 (100%)	4 (19%)	7 (24%)	1 (50%)
0	3 (16%)	0	5 (24%)	5 (17%)	0

0 - +2%	7 (37%)	0	3 (14%)	7 (24%)	0
+2% - +4%	2 (11%)	0	3 (14%)	4 (14%)	0
+4% - +6%	0	0	2 (10%)	2 (7%)	0
+8% - +10%	0	0	1 (5%)	1 (3%)	0
Total	19 (100%)	1 (100%)	21 (100%)	29 (100%)	2 (100%)

Impacts by prior development rate

C5.12 Modelled project areas have been categorised by levels of development activity over the 8 years prior to project completion. This analysis uses new postcodes added in a ring as a proxy for development activity and bands them in to low (up to 5% additional development by area based on new postcode added), medium (5% to 10% additional development by area) and high activity (over 10% additional development by area). The modelling results suggest a tendency for significant displacement (i.e. 2% or more) to result in areas with higher levels of recent development activity (see Table C10). Conversely more projects in areas of low and medium activity (51% and 48% respectively) resulted in price increases and placemaking effects than in areas already with high development activity (31%).

Table C10: Modelled project areas net change by prior development rates

	High development activity	Medium development activity	Low development activity	Total
-6% - -8%	1 (6%)	0	0	1 (1%)
-4% - -6%	2 (13%)	1 (4%)	0	3 (4%)
-2% - -4%	1 (6%)	2 (9%)	2 (6%)	5 (7%)
0 - -2%	4 (25%)	4 (17%)	10 (30%)	18 (25%)
0	3 (19%)	5 (22%)	5 (15%)	13 (18%)
0 - +2%	2 (13%)	5 (22%)	10 (30%)	17 (24%)
+2% - +4%	1 (6%)	3 (13%)	5 (15%)	9 (13%)
+4% - +6%	1 (6%)	2 (9%)	1 (3%)	4 (6%)
+8% - +10%	1 (6%)	1 (4%)	0	2 (3%)
Total	16 (100%)	23 (100%)	33 (100%)	72 (100%)

Impacts by region

C5.13 Projects in the North appear to have had a greater impact in terms of house price gains and thereby potential placemaking effects (see Table C11). 38% of case studies in the northern regions generated price gains in excess of 2% compared with 18% in the Midlands / East / South East area and only 7% in London and the South East. Projects in London and the South East were predominantly relatively neutral in their impacts – only 4 out of 27 resulting in price gains or losses of more than 2%. This may reflect the more significant levels of intervention required in buoyant housing market areas for prices to be affected.

Table C11: Modelled project areas net change by broad region

	London & South East	Midlands, East and South West	North	Total
-6% - -8%	0 (0%)	0 (0%)	1 (4%)	1 (1%)
-4% - -6%	1 (4%)	1 (5%)	1 (4%)	3 (4%)
-2% - -4%	1 (4%)	2 (10%)	2 (8%)	5 (7%)
0 - -2%	7 (26%)	6 (29%)	5 (21%)	18 (25%)
0	7 (26%)	2 (10%)	4 (17%)	13 (18%)
0 - +2%	9 (33%)	6 (29%)	2 (8%)	17 (24%)
+2% - +4%	2 (7%)	2 (10%)	5 (21%)	9 (13%)
+4% - +6%	0 (0%)	1 (5%)	3 (13%)	4 (6%)
+8% - +10%	0 (0%)	1 (3%)	1 (4%)	2 (3%)
Total	27 (100%)	21 (100%)	24 (100%)	72 (100%)

Impacts by brownfield status

C5.14 There was a limited sample size (9) for greenfield developments in the modelled projects. These have predominantly resulted in modest gains in prices (see Table C12). The effects of interventions on brownfield sites are more mixed.

Table C12: Modelled project areas net change by brownfield status

	Brownfield sites	Greenfield sites	Total
-6% - -8%	1 (2%)	0 (0%)	1 (1%)
-4% - -6%	3 (5%)	0 (0%)	3 (4%)
-2% - -4%	5 (8%)	0 (0%)	5 (7%)
0 - -2%	17 (27%)	1 (11%)	18 (25%)
0	11 (17%)	2 (22%)	13 (18%)
0 - +2%	14 (22%)	3 (33%)	17 (24%)
+2% - +4%	7 (11%)	2 (22%)	9 (13%)
+4% - +6%	3 (5%)	1 (11%)	4 (6%)
+8% - +10%	2 (3%)	0 (0%)	2 (3%)
Total	63 (100%)	9 (100%)	72 (100%)

Impacts by affordability of housing in area

C5.15 Table C13 examines variations in impacts depending on pre-existing affordability of housing in the area defined in three bands of the ratio of house prices to annual median earnings - High (prices more than 6 times earnings), Medium (4 to 6 times) and Low (less than 4 times). The largest positive house price impacts have tended to be in areas where housing was already relatively affordable. There is limited evidence of support enhancing affordability through reductions in house prices in areas with already high ratios. However, this might again be because a sustained significant increase in supply

is needed in those areas in order to affect affordability, whereas the projects modelled here are small in scale.

Table C13: Modelled project areas net change by local authority housing affordability ratio

	High ratio	Medium ratio	Low ratio	Total
-6% - -8%	0 (0%)	0 (0%)	1 (4%)	1 (1%)
-4% - -6%	0 (0%)	2 (7%)	1 (4%)	3 (4%)
-2% - -4%	0 (0%)	2 (7%)	3 (11%)	5 (7%)
0 - -2%	5 (29%)	9 (32%)	4 (15%)	18 (25%)
0	4 (24%)	6 (21%)	3 (11%)	13 (18%)
0 - +2%	7 (41%)	5 (18%)	5 (19%)	17 (24%)
+2% - +4%	1 (6%)	3 (11%)	5 (19%)	9 (13%)
+4% - +6%	0 (0%)	1 (4%)	3 (11%)	4 (6%)
+8% - +10%	0 (0%)	0 (0%)	2 (7%)	2 (3%)
Total	17 (100%)	28 (100%)	27 (100%)	72 (100%)

Implications for Development Viability

C5.16 The extent to which the viability of developments (in terms of developer return) is sensitive to changes in house values has been assessed using a standard development appraisal approach based on a hypothetical scheme of 100 homes in the West Midlands. The analysis has used the following standard assumptions:

- a target 20% profit on value for Open Market Sale properties;
- West Midlands residential land values 2019 – average (£1,990,500 per ha);
- 25% affordable – with an assumed 6.5% profit;
- BCIS latest Quarter estate housing costs;
- remediation – HCA guidance 2015 Residential (Non-Complex) – mid range values for: site clearance, removal of redundant services, fees;
- remediation – High Sensitivity / Low Potential (site Cat A); and
- values (average last 12 months new build).

C5.17 The impact of house value adjustments on profit levels is set out in Table C14. Based on the assumed average West Midlands brownfield scheme, a reduction in new house price values beyond 4% would render delivery of a scheme difficult, most likely with changes to the scheme sought. Beyond a 8% reduction in values the project would be unviable, all other matters remaining the same. It is noteworthy that in none of the modelled schemes have price-damping displacement effects of this magnitude been identified. In only 8 (11%) out of the 72 projects was the price displacement effect greater than 2%, although there were higher effects within specific rings.

Table C14: Impact of price adjustments on development profitability

House Values Adjustment	Profit Level
-10%	8.8%
-8%	11.3%
-6%	13.6%
-4%	15.8%
-2%	18.0%
0%	20.0%
2%	22.0%
4%	23.9%
6%	25.7%
8%	27.4%
10%	29.1%

5.18 Those projects that had a greater than 2% overall net reduction in prices included several that were part of wider housing market interventions across a larger area.

Conclusions

5.19 The key conclusions of the analysis of displacement and placemaking effects are as follows:

- in 18% of the 72 modelled projects there were no discernable net price effects in the surrounding localities;
- 38% of the modelled projects involved net price displacement within the modelled area. The policy implications of this are complex. They may mean that the attractiveness to developers of the local area may have reduced and other developments may not have come forward as a result. However, analysis indicates that in only potentially 11% of the modelled projects was there a price movement that may have significantly affected viability (based on a reduction of 2% or more) - although it should be noted that this average figure will vary within areas. Conversely, price displacement effects can also mean that the affordability of housing in an area has improved;
- in 44% of cases, there was an indication of net price gains. These can often create 'placemaking' effects which can be beneficial in policy terms through, for example, the removal of blight or making a hitherto depressed housing market more attractive to new housing development or indeed creating new markets;
- the direction of impacts can vary from project to project and indeed may differ within different parts of their areas of influence – they can have both a displacement and a gain effect in different rings. Overall, however, the modelled projects have had slightly more of an upward than downward impact on relative house prices across their zones of influence. In total the 72 interventions are estimated to have resulted in a net increase in terms of house prices of some £79 million (2016 prices);

- displacement effects appear to be less localised than price gains. While both are more apparent in areas closer to the development, price gains appear to reflect more localised impacts (through for example improvements to the image and environment of the immediate area) than the more spatially dispersed market impacts where displacement is occurring;
- projects providing grant and loan/equity support have been the most likely to result in price gains in surrounding localities – 43% and 48% respectively resulting in increases and 29% and 24% in significant (2% or more) growth. Acquisitions and disposals have been relatively restricted in terms of subsequent price impacts;
- significant levels of displacement (i.e. 2% or more) tended to be more apparent in areas where there are already relatively high levels of development activity. Conversely areas of lower development activity were more likely to experience price increases and placemaking effects;
- projects in the North had the greatest impact in terms of house price gains and thereby potential placemaking effects whereas projects in London and the South East were much more limited in their impacts – only 4 out of 27 such projects resulted in price gains or losses of more than 2%; and
- the largest house price impacts – both increases and decreases - have tended to be in areas where housing was already relatively affordable. There is limited evidence of support enhancing affordability through reductions in house prices in areas with already high prices to earnings ratios. It would appear that a sustained significant increase in supply is needed in such areas in order to affect affordability, whereas the projects modelled here are small in scale. House price increases have tended to be in areas where housing was already relatively affordable.

Appendix D – Hedonic Price Model – Methodology and results

D1. Introduction

- D1.1 This Appendix provides an overview of the analysis undertaken to assess the existence or otherwise of spillovers in the wake of housing developments. The basis of the approach lies in an extension of the conventional Hedonic Price Model (HPM), which has a long pedigree, and remains widely used, in housing and real estate analysis.
- D1.2 The underlying premise is that properties represent a ‘bundle’ of attributes which contribute to the market values observed through price transactions. HPMs attempt to assign the contribution of property characteristics to price transactions taking into account a range of location and amenity influences that are also likely to contribute to market value. Over time, the approach has become less focussed on investigating property characteristics and has instead come to be used as a vehicle for valuing all manner of amenity features.
- D1.3 This exploratory study extends the use of the HPM and places it in a specific policy context, namely investigation of spillover effects in the wake of publicly funded housing development in England. Using data from Homes England (HE), the study seeks to provide evidence as to the magnitude and extent of spillovers across a sample of development schemes in which HE participated.

D2. Method

- D2.1 Our approach builds upon a framework of analysis outlined by Ahlfeldt and Kavetsos (2014) who examine the impact of new sports stadia on London Property prices²³. The authors point out that the key challenge in identifying the effect of a new stadium on surrounding property prices lies in the difficulty of separating the effect the facility exhibits on nearby properties from that of other locational characteristics.
- D2.2 They reference the similarities of the issue with broader experimental research where individuals are observed before and after a treatment and outcomes are contrasted with the level of treatment received. Focussing on change over time means that unobserved individual differences affecting an outcome, irrespective of treatment, can be differenced out, on average - a quasi-experimental methodology that corresponds to difference-in-differences (DiD) analysis.
- D2.3 The study compares changes in property prices in areas likely have been affected by the stadium (treatment) with changes in prices of properties located further away which are unlikely to have been affected (control), pre and post development.
- D2.4 A number of alternative metrics are examined as the basis of a distance measure from the stadium development among which is a series of consecutive, mutually exclusive, distance rings extending out to a ‘control’ ring. It is argued that the ring approach allows for a non-linear effect of development on surrounding properties with ring price differentials

²³ Ahlfeldt, Gabriel M. and Kavetsos, Georgios (2014) Form or function?: the effect of new sports stadia on property prices in London. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 177 (1). pp. 169-190.

effectively representing a series of DiD outcomes relative to the control ring. The close proximity of the rings to each other also provides a credible mechanism to address unobservable, local area heterogeneity²⁴ ²⁵.

Model

D2.5 Our analysis transports this quasi-experimental methodology to the assessment of spillover effects across a sample of HE funded schemes. Following HPM convention, the core of the model involves regressing the log price of property *i* transacted at time *t* (P_{it}) on a vector of property and location (amenity) characteristics (Y_m) but with the addition of ring location variables (X_{in}) and a post-completion indicator ($POST_t$) which takes a unit value after scheme completion and zero otherwise.

$$\log(P_{it}) = \beta_1(X_{in}) + \beta_2(X_{in} \times POST_t) + \sum_m Y_m Y_{itm} + \sum_t \phi_t Y_t + \sum_q \psi_q C_q + (\epsilon_{it})$$

D2.6 Year/time-of-year variables (yt) are included to control for broader macroeconomic and seasonal trends common to the local area. Location fixed effects (cq) are included to account for time-invariant location characteristics and standard errors are clustered on postcodes to account for potential serial correlation in the error term²⁶.

D2.7 Despite the inclusion of multiple years of transactions, the model is essentially cross-sectional in nature as detailed georeferenced data on most amenity variables are not available across the years covered within the exercise. While the fixed-effects procedures adopted, along with the spatial dependence adjustments (see below) address issues of heterogeneity, there remains (as in all hedonic studies of this nature) the potential for unobserved, time-varying heterogeneity within the models.

Rings

D2.8 There is no particular evidence as to the size or radius of the rings and no indication of the 'ring position' of the control ring that should be adopted for the current exercise. Ahlfeldt and Kavetsos (2014) take a pragmatic perspective and define rings on the basis of securing an adequate population of transactions across rings, extending rings outwards to a distance of some 5km.

D2.9 Our approach has been to assume a broad relationship between ring size and scheme size. Most of the schemes included in the analysis are low to medium, rather than large, in size and cover varying footprints. It is possible to find relatively low numbers of units in a development that has a larger footprint than a high volume development/conversion of single apartment block.

D2.10 This makes the selection of ring size somewhat complex and we have adopted a protocol of using a:

- 0.25km radius ring for schemes that have relatively small numbers of units or large unit numbers on a small footprint;

²⁴ This process seeks to satisfy conditional independence (CIA) and single unit treatment value (SUTVA) assumptions whereby, absent of intervention, the pattern of average outcomes/performance for treated and untreated 'units' is the same and intervention does not affect outcomes for the control group.

²⁵ The proximity of rings also helps to counter potential reverse-causal endogeneity (e.g. wider regeneration of an area may determine transactions/prices rather than the development under review) since we can assume that any such wider policies impact rings to broadly the same degree.

²⁶ Ahlfeldt and Kavetsos (2014) outline the basis of the specification.

- 0.5km radius ring for schemes that have moderate numbers of units or large unit numbers on a moderate footprint;
- 0.75km/1km ring for schemes that have large numbers of units on a typically large footprint.

D2.11 This process defines 62 schemes for the 0.25km ring model, 6 for the 0.5km model, 3 for the 0.75km model and 1 for the 1km model. The control ring is set at 10 rings from the development in all instances which implies a 'control' of just over 2km for the 0.25km rings, 4km for the 0.5km rings, and 6km or 8km for the 0.75km and 1km rings, respectively.

D2.12 The rings are also structured in a slightly different manner from Ahlfeldt and Kavetsos (2014). We have defined ring 1 to be the footprint of the scheme itself. Ring 2 is defined as including all transactions within a (0.25/0.5/0.75/1Km) radius of the development but not included within the footprint of the development. Rings beyond ring 2 are defined according to the radius model employed. In analysing spillovers we focus on rings 2 to 9.

D2.13 This approach to ring definition brings with it a risk of low transaction numbers in semi-urban or rural environments or in cases where the development footprint dominates small-radius inner rings. There are also occasions where low numbers occur within rings at a more extended range from developments, reflecting the nature of local topographies. We address the issue, in a limited number of instances, by combining rings to generate adequate numbers for modelling.

D2.14 Another complicating feature of the analysis is that it is occasionally unclear from the information available to us whether the scheme under review is part of a broader, phased development in which case it is feasible that units from the latter (earlier) phase are contained in surrounding rings. This may or may not impact on resulting outcomes but is a marker that any replication of the approach may require additional consideration of the issue.

D2.15 While we 'port' the methodology to the housing development environment, the approach is extended by including a broader set of amenity variables and introducing spatial filters to address potential spatial dependence.

Amenity Variables

D2.16 The increasing availability of geospatial datasets has significantly expanded the range of potential amenity variables to use in HPMs. Recent examples of studies such as the ITS27 and IFS28 display the array of such variables that can be added to large-scale HPM studies. The use of such datasets is, however, more nuanced in the case of the current exercise.

D2.17 We are dealing with some relatively small, compact schemes and we would not (*ceteris paribus*) anticipate spillovers to extend very far in such cases. A limited spatial footprint makes it more likely that some amenity variables will display a narrow range across an area, curtailing discriminatory capacity. In addition, the use of a distance-based ring structure imposes a framework within which conventional distance-based amenity variables may significantly correlate.

²⁷ Land Value and Transport (Phase 2): Modelling and Appraisal; Institute for Transport Studies, University Of Leeds, 2019.

²⁸ Property Value Uplift Tool: Final Report, Institute for Fiscal Studies, 2019.

- D2.18 Preliminary scrutiny of the relevant datasets illustrates the presence of extensive collinearity across amenity variables within many of the ring footprints. Rather than restrict the range of such variables, we use dimensionality reduction to reflect underlying patterns in the amenity dataset. This is a feasible procedure in this instance as we do not make any inferences about the latter within the analysis.
- D2.19 Transforming a dataset (of given dimensionality) into a new reduced dimension dataset that is orthogonal, and retains as much of the initial data geometry as is feasible, is a common undertaking in many disciplines. In practice, both linear and non-linear approaches are available within broader convex and non-convex frameworks.
- D2.20 Principal Component Analysis (PCA) is the most common of the more prevalent convex frameworks that typically require eigen-decomposition of full or sparse (spectral) matrices. Reduction is achieved by embedding datasets into a linear subspace of lower dimensionality with the projection maintaining as much data variance as possible. The leading eigenvectors outline a series of uncorrelated linear combinations of the variables and typically contain most of the variance in the dataset.
- D2.21 We use PCA to construct principal components for the amenity dataset and effectively undertake a PCA for specific ring models within each scheme modelled. While it is common practice to focus on only the primary components, we avoid the misconception that components with small variance are no value in regression frameworks and include more than just those with eigenvalues higher than 1. We do, however, limit the maximum number of components for any model to 2029. We do not rotate components.

Spatial Dependence

- D2.22 It is common for observations to be correlated in terms of time, subgroup clusters or spatial distribution. One means of encompassing spatial dependencies is to specify autoregressive models but another modus operandi is that of eigenvector spatial filtering (ESF). The latter uses a set of synthetic proxy variates, based on some ‘articulation’ (typically a spatial weights matrix) that ties observations together as control variables in a model specification. These controls identify and isolate stochastic dependencies among the observations allowing modelling to proceed ‘as if’ these observations are independent.
- D2.23 The ESF approach uses a mathematical decomposition of the transformed spatial weight matrix \mathbf{C} :

$$(\mathbf{I} - \mathbf{1}\mathbf{1}^T/n) \mathbf{C} (\mathbf{I} - \mathbf{1}\mathbf{1}^T/n)$$

where $\mathbf{1}$ is an n-by-1 vector of ones, and T denotes the matrix transpose operator.

- D2.24 The decomposition generates n eigenvectors and eigenvalues. In descending order, the n eigenvalues can be denoted as $\boldsymbol{\lambda} = (\lambda_1, \lambda_2, \lambda_3, \dots, \lambda_n)$ - that is, the eigenvalues range between the largest eigenvalue that is positive, λ_1 , and the smallest eigenvalue that is negative, λ_n . The corresponding n eigenvectors can be denoted as $\mathbf{E}=(\mathbf{E}_1, \mathbf{E}_2, \mathbf{E}_3, \dots, \mathbf{E}_n)$, where each eigenvector, \mathbf{E}_j , is an n-by-1 vector. In matrix notation, the decomposition can be expressed as

$$\mathbf{MCM} = \mathbf{E} \boldsymbol{\Lambda} \mathbf{E}^T$$

²⁹ Jolliffe, I T. (1982) A Note on the Use of Principal Components in Regression, Journal of the Royal Statistical Society, Series C, Vol 31, 3, 300-303

where $\mathbf{M} = (\mathbf{I} - \mathbf{1}\mathbf{1}^T/n)$, the projection matrix that centres a variable and $\mathbf{\Lambda}$ is an n-by-n diagonal matrix whose diagonal elements are the set of n eigenvalues ($\lambda_1, \lambda_2, \lambda_3, \dots, \lambda_n$). The eigenfunctions have some important properties:

- eigenvectors are orthogonal and uncorrelated as the symmetry of matrix \mathbf{C} ensures orthogonality and the projection matrix \mathbf{M} ensures eigenvectors with zero means. That is, $\mathbf{E}\mathbf{E}^T = \mathbf{I}$ and $\mathbf{E}^T\mathbf{1} = 0$, and the correlation between any pair of eigenvectors (e.g. \mathbf{E}_i and \mathbf{E}_j) is zero when $i \neq j$;
- the eigenvectors themselves portray distinct map patterns. Each eigenvector portrays a different map pattern exhibiting a specified level of spatial correlation when it is mapped onto the areal units associated with the corresponding spatial weight matrix \mathbf{C} ; and
- given a spatial weight matrix, the feasible range of \mathbf{MC} values is determined by the largest and smallest eigenvalues; that is, by λ_1 and λ_n .

D2.25 Based upon these properties, the first eigenvector, \mathbf{E}_1 , is the set of real numbers that has the largest \mathbf{MC} value achievable by any set of real numbers for the spatial arrangement defined by the spatial weight matrix \mathbf{C} ; the second eigenvector, \mathbf{E}_2 , is the set of real numbers that has the largest achievable \mathbf{MC} value by any set that is uncorrelated with \mathbf{E}_1 ; the third eigenvector, \mathbf{E}_3 , is the set of real numbers that has the largest achievable \mathbf{MC} value by any set that is uncorrelated with both \mathbf{E}_1 and \mathbf{E}_2 and so on through \mathbf{E}_n . As such, these eigenvectors furnish distinct map pattern descriptions of latent correlation in spatial variables because they are both orthogonal and uncorrelated.

D2.26 In practice, ESF accounts for spatial correlation with a linear combination of the eigenvectors. As the combination accounts for spatial correlation, the ESF regression specification does not suffer from such correlation in its residuals. In other words, addition of the eigenvectors in the regression equation does not change the expected conditional mean of Y because the mean of each eigenvector is zero.

D2.27 Classical ESF considers eigenvector parameters as fixed with \mathbf{E} defined by a subset of L eigenvectors chosen by a stepwise eigenvector selection based on accuracy maximisation or residual spatial dependence minimisation (Griffith and Chun, 2014, 2016)³⁰. In contrast, modern variants of ESF approaches allow consideration of random effects ESF (RE-ESF) (Murakami and Griffith, 2015, 2018)³¹. RE-ESF models extract eigenvectors whose eigenvalues exceeds a defined threshold from \mathbf{MCM} with parameters preferably estimated by a restricted maximum likelihood (REML) method as it accounts for degrees of freedom lost in estimating regression coefficients.

D2.28 We construct a series of spatial filters reflecting the range of ring footprints feasible for each individual scheme. One complexity of ESF and RE-ESF is that they are not particularly suitable for larger samples. Parameter estimation is computationally demanding and classical ESF requires stepwise eigenvector selection which can be very slow for large samples.

³⁰ Griffith and Chan (2014) Spatial Autocorrelation and Spatial Filtering in M.M. Fischer, P. Nijkamp (eds.), Handbook of Regional Science, Springer-Verlag Berlin Heidelberg 2014. Griffith D, and Chun Y (2016) Evaluating Eigenvector Spatial Filter Corrections for Omitted Georeferenced Variables, *Econometrics*, 4(2)

³¹ Murakami, D. and Griffith, D.A. (2015) Random effects specifications in eigenvector spatial filtering: a simulation study. *Journal of Geographical Systems*, 17 (4), 311-331. Murakami, D. and Griffith, D.A. (2018) Eigenvector spatial filtering for large data sets: fixed and random effects approaches. *Geographical Analysis*.

- D2.29 Murakami and Griffith, (2019) provide a basis for accelerating large ESF and RE-ESF frameworks with Monte Carlo evidence suggesting that approximation errors for selection of 200 or more eigenvectors are relatively modest³². We implement these routines in our analysis.
- D2.30 We also consider the fact that the property transactions dataset geocodes properties to postcodes. As such, multiple transactions are coded to the same coordinates. We address the issue by adjusting filters to allow for spatial grouping of observations using the routines developed by Daisuke Murakami in the *spmoran* R package³³.

Data

- D2.31 The transactions data used in the study is sourced from the UK Land Registry prices paid (PP) dataset. The dataset contains all domestic transactions since 1995 and includes information relating to type of property, whether a new build, nature of tenure, date of sale and postcode.
- D2.32 Land Registry data does not provide any indication of other property attributes that are available in bank/building society databases (number of rooms/bathroom etc) but it has coverage across all geographies whereas the coverage of the latter, at small area level, will reflect the market position of the mortgage provider³⁴.
- D2.33 We partially compensate for the absence of more detailed property characteristics by merging Land Registry transactions with MHCLG Energy Performance Certificate (EPC) data. The EPC dataset contains a range of intelligence, the most important of which for our purposes is the floorspace of properties. Matching the PP and EPC datasets on the basis of address data, we achieve a match rate of some 80% on average, broadly comparable with other studies that have performed the same task.
- D2.34 Property size is a reasonable proxy for number of characteristics not included in the PP data but is only effectively available from 2008/09. Since our sample of schemes has completion dates either side of 2008/09 we are obliged to run versions of the models with floorspace included/excluded.
- D2.35 This does bring to the fore the issue of potential bias through omitted variables though there are very few hedonic approaches that can legitimately claim to be free of such risk. Adjustment for spatial dependence, to the extent there are pronounced spatial patterns in the size/scale of properties, may partially compensate as may fixed effects procedures.
- D2.36 In addition, the fact that we are operating, for the most part, in compressed geographies leads us to the a-priori expectation that general price trends prior to development will be broadly similar across rings. Scrutiny of median transaction prices across rings illustrates that trends are broadly similar prior to intervention across relevant time frames with rings following the housing market cycle and typically bunching together. Not surprisingly, on the other hand, the range of prices narrows/expands at different points in the cycle. For

³² Murakami, D. and Griffith, D.A. (2019) Eigenvector spatial filtering for large data sets: fixed and random effects approaches. *Geographical Analysis*, 51 (1), 23-49.

³³ <https://arxiv.org/abs/1703.04467>

³⁴ More recently, ONS has partnered with Zoopla to gather information on property attributes in modelling the impact of proximity to greenspace, <https://www.ons.gov.uk/economy/environmentalaccounts/articles/urbangreenspacesraisenearbyhousepricesbyanaverageof2500/2019-10-14>

the most part, therefore, we are content that any bias related to differential prior trends is likely to be modest.

D2.37 In common with other studies, we assemble a dataset of amenity variables that we use to reflect potential location specific (observable) influences on transaction prices. As noted above, despite the inclusion of multiple years of transactions, the model is essentially cross-sectional in nature as detailed georeferenced data on most amenity variables are not available across the years covered within the exercise. Variables assembled include:

- Index of Multiple Deprivation (IMD) ranking position (LSOA);
- Household income (MSOA)
- Journey times:
 - walking to nearest primary/secondary schools, town centre (LSOA),
 - driving to nearest primary/secondary schools, food source, GP, town centre, station, location with up to 5000 jobs, location with 5000+ jobs (LSOA);
- Distance to nearest bus stop, underground or DLR (Postcode);
- Ofsted rating of nearest primary/secondary schools;
- PM_{2.5} pollution (Postcode)
- Crime density (Postcode)
- Property density by property type (LSOA)
- Proportion of properties in Council Tax bands A/B and F to H (LSOA)
- Age profile of properties (LSOA)

D2.38 Our scheme sample contains 72 schemes with completion dates covering the period 2008 to 2016. Table D1 highlights scheme level characteristics by year of completion and shows that around 30% of the frame is sized either under 30 units or over 100 units with closer to 40% between these two points.

Table D1: Sample Scheme Characteristics										
Completion	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Schemes	3	16	4	5	2	4	10	16	12	72
Units										
<30	1	5	1	1	-	2	2	7	3	22
30/99	-	7	3	3	1	-	6	6	3	29
100+	2	4	-	1	1	2	2	3	6	13
Project Type										
A/D	2	8	-	2	-	1	1	1	4	19
ADV	-	-	-	-	-	1	-	-	-	1
GNT	1	8	4	2	1	1	1	1	2	21

LE		-	-	1	-	-	8	14	6	29
OS	-	-	-	-	1	1	-	-	-	2
Region										
EAST		1	-	1	-	-	1	-		3
EM	1	2	-	-	-	-	-	-	2	5
LON		4	1	1	-	-	2	3		11
NE	-	1	-	1	1	1	-	2	1	7
NW	-	4	1	-	-	1	2	2	2	12
SE	2	4	-	2	-	1	-	3	4	16
SW			1	-	-	-	1	1		3
WM	-	-	-	-	-	1	4	2	3	10
YH			1	-	1	-	-	3		5
Ring Model										
0.25km	2	13	4	5	1	3	10	15	9	62
0.5km	1	1	-	-	-	1	-	1	2	6
0.75km	-	1	-	-	1	-	-	-	1	3
1km	-	1	-	-	-	-	-	-	-	1
Model Period										
Period	2000 /19	2000 /19	2000 /19	2000 /19	2000 /19	2009 /19	2009 /19	200 9/ 19	2009/ 19	

- D2.39 Some 22% are located in the South East, 17% in the North West, 15% in London, 14% in the West Midlands with other schemes spread across England. The East and South West have the smallest number of schemes. In terms of other dimensions, some 40% of the schemes are loan/equity in nature, 29% are grant-based and 26% involve acquisition and disposal.
- D2.40 More generally, scrutiny of the data underlying the Table shows that of the larger (100+ units) schemes, the bulk are located in London, East Midlands and West Midlands. Middle-size schemes are dominated by the North West and South East (51% combined) with these two regions also accounting for some 45% of the small size group. Loan/equity schemes are broadly balanced across size-bands while those for acquisition and disposal are primarily the middle and upper bands. In contrast, grant schemes are more prominent in the middle and lower size bands.
- D2.41 Table D1 also illustrates the ring models and the time periods used in the analysis. Some 62 of the 72 models use 0.25km ring structures, slightly more than the number of schemes with less than 100 units (51) reflecting the fact that some narrow ring models are employed in the case of larger unit developments with small footprints.
- D2.42 The Table also confirms the timeframes over which models are estimated. For the 2008 to 2012 period we use a timeframe that runs from 2000 through to 2019. While there exists EPC data from 2009, we view the series to be of insufficient length to include in this

period. Where EPC data is included in the modelling process, we run the modelling timeframe from 2009.

D3. Results/Outcomes

D3.1 The tables over the following pages provide a summary of outcomes across the 72 models of which Figure D1 provides a number of sample outputs. The coefficients reported, in each instance, provide an approximate indication of sign and percent impact of prices post completion, relative to the control ring³⁵. It is important to recognise that model outcomes are relative in the sense that they indicate the pattern of change in post-completion ring prices (for broadly comparable properties) relative to price patterns in the control ring. As such, negative outcomes should not be interpreted as an (absolute) price adjustment.

Figure D1: Summary of outputs

Sample Output: 248 Unit Scheme, 0.25km Ring Model, Completion Date 2016						
Linear regression			Number of obs	=	6,748	
			R-squared	=	0.8764	
			Root MSE	=	.1483	
lp	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
prlt2	-.081734	.0164385	-4.97	0.003	-.1219577	-.0415104
prlt3	-.0408426	.0210254	-1.94	0.100	-.09229	.0106047
prlt4	.0147227	.0247759	0.59	0.574	-.0459017	.0753472
prlt5	.0294285	.0188075	1.56	0.169	-.0165917	.0754488
prlt6	.0111574	.0215115	0.52	0.623	-.0414794	.0637942
prlt7	-.0107361	.0185912	-0.58	0.585	-.056227	.0347548
prlt8	.000935	.0155963	0.06	0.954	-.0372277	.0390978
prlt9	-.0024951	.0176385	-0.14	0.892	-.0456551	.0406648
Sample Output: 30 Unit Scheme, 0.25km Ring Model, Completion Date 2015						
Linear regression			Number of obs	=	4,005	
			R-squared	=	0.8773	
			Root MSE	=	.13812	
lp	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
prlt2	.1085967	.0360676	3.01	0.040	.0084571	.2087363
prlt3	.0674887	.0239033	2.82	0.048	.0011224	.133855
prlt4	.0588605	.0218876	2.69	0.055	-.0019093	.1196304
prlt5	-.0015532	.0175145	-0.09	0.934	-.0501812	.0470748
prlt6	.0199326	.0212951	0.94	0.402	-.039192	.0790572
prlt7	.0188119	.0080774	2.33	0.080	-.0036146	.0412385
prlt8	.0821571	.0340012	2.42	0.073	-.0122454	.1765596
prlt9	.0331144	.0184602	1.79	0.147	-.0181395	.0843682

³⁵ The nature of the specification requires a further adjustment to construct accurate percent profiles.

						Root MSE	=	.32424
lp	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]			
pr1t2	-.0570065	.0218579	-2.61	0.016	-.1023371	-.0116759		
pr1t3	-.0313583	.0193964	-1.62	0.120	-.0715839	.0088674		
pr1t4	.0136607	.0216828	0.63	0.535	-.0313067	.0586281		
pr1t5	-.0115863	.0254052	-0.46	0.653	-.0642735	.041101		
pr1t6	.0008456	.0301924	0.03	0.978	-.0617696	.0634609		
pr1t7	.0072606	.0302532	0.24	0.813	-.0554806	.0700019		
pr1t8	-.0121792	.020159	-0.60	0.552	-.0539864	.029628		
pr1t9	.0220406	.0183239	1.20	0.242	-.0159609	.0600421		
Sample Output: 215 Unit Scheme, 0.5km Ring Model,								
Completion Date 2008								
Linear regression						Number of obs	=	50,540
						R-squared	=	0.7439
						Root MSE	=	.24606
lp	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]			
pr2t2	.0432693	.0149534	2.89	0.010	.0118533	.0746852		
pr2t3	.0562598	.0320156	1.76	0.096	-.0110025	.1235221		
pr2t4	.0022034	.0410754	0.05	0.958	-.0840929	.0884997		
pr2t5	.0153842	.0241518	0.64	0.532	-.0353568	.0661252		
pr2t6	.02962	.0210385	1.41	0.176	-.0145803	.0738203		
pr2t7	.0223129	.0225274	0.99	0.335	-.0250154	.0696413		
pr2t8	-.0095093	.0324626	-0.29	0.773	-.0777107	.058692		
pr2t9	-.0201676	.0222046	-0.91	0.376	-.0668177	.0264826		
<p>Note: Pr1t2-9 are the post completion coefficients - Pr1 signifies a 0.25km model, Pr2 signifies a 0.5km model; All models include controls for property attributes, year and month of sale, floor area and area² for completions between 2013 and 2016, principal component amenity variables, location fixed effects and spatial filters with standard errors clustered on postcodes. Dependent variable (lp) is log price paid.</p>								

- D3.2 Table D2 details the distribution of observations across models by completion year, coefficient of determination values (R^2) and root mean square error values (RMSE).
- D3.3 The smallest samples occur in 2013 and 2015 - the first contains 1,084 observations and reflects a 199 unit development on a very small footprint while the second is a small-scale 22 unit development in a rural area. At the other end of the scale lies the 468,000 sample which reflects a very large scheme in a dense urban area.
- D3.4 R^2 values are typically in the 0.7 to 0.9 range. The one exception in the table (0.564) relates to a relatively small scheme with a very small footprint in a very dense urban area and may well imply that the amenity variables struggle to accommodate the complexity of the local area. The 2013 0.482 RMSE unsurprisingly also refers to this scheme and is the highest value in the table. Typically, RMSE values range between 0.13 and 0.3.

Table D2: Model Performance profiles									
Completion	2008	2009	2010	2011	2012	2013	2014	2015	2016
Schemes	3	16	4	5	2	4	10	16	12
Observations									
Min	10,339	4,067	8,841	6,488	13,635	1,084	1,866	1,068	1,785
Max	50,540	468,284	17,897	24,429	37,702	16,420	10,819	10,664	18,134
R²									
Min	0.744	0.564	0.709	0.747	0.729	0.678	0.693	0.755	0.727
Max	0.852	0.852	0.801	0.864	0.754	0.842	0.891	0.897	0.905
RMSE									
Min	0.185	0.195	0.238	0.182	0.320	0.143	0.121	0.135	0.128
Max	0.270	0.482	0.307	0.317	0.265	0.313	0.267	0.233	0.252

- D3.5 Table D3 summarises the pattern of significant post development ring coefficients across all models and for the conventional three levels of significance. It shows that there exist 133 significant post development coefficients at the $p < 0.05$ threshold, some 21% of the 648 coefficients modelled, a figure that declines to 66(10%) at the $p < 0.01$ threshold.
- D3.6 Significant coefficients tend to be clustered towards the inner rings of the models, as one might expect if there exist spillover effects. Forty four percent of such coefficients lie in rings 2 and 3 for the 5% threshold with 53% at the 1% threshold, which contrasts with around 20% in the bottom three rings. Around 60% of significant coefficients in inner rings 2 to 5 are in rings 2 and 3 while between 54% and 70% of such coefficients in rings 6 to 9 are in rings 8 and 9.
- D3.7 The presence of significant coefficients in rings 6 to 9 is unexpected, a priori. Further scrutiny of the profiles shows that close to half of the total are positive gains which is less of a surprise in that we would typically expect gains either to be clustered in the immediate vicinity of a development or spread across more peripheral rings depending on the nature/scale of development in a small ring setting and local housing market conditions.
- D3.8 The presence of significant displacement is less easily explained though analysis shows that many of these are multi-ring displacement coefficients within the same projects, most of which also have significant displacement coefficients in earlier rings. It is noticeable that many of these are schemes that we suspect are small developments alongside/within larger, phased developments, an issue noted earlier.

Table D3: Model Performance profiles - Significant Ring Coefficient Summary									
Rings	R2	R3	R4	R5	R6	R7	R8	R9	Total
Significant Ring Coefficients									
1% Level	19	16	7	11	-	4	6	3	66
5% Level	32	27	14	21	8	10	12	9	133
10% Level	34	31	21	28	13	16	18	13	174
Significant Ring Coefficients (% of Total)									
1% Level	28.8	24.2	10.6	16.7	0.0	6.1	4.5	9.1	100
5% Level	24.1	20.3	10.5	15.8	6.0	7.5	9.0	6.8	100
10% Level	19.5	17.8	12.1	16.1	7.5	9.2	10.3	7.5	100
Significant Ring Coefficients (% of R2/R5)									
1% Level	35.8	30.2	13.2	20.8	-	-	-	-	100
5% Level	34.0	28.7	14.9	22.3	-	-	-	-	100
10% Level	29.8	27.2	18.4	24.6	-	-	-	-	100
Significant Ring Coefficients (% of R6/R9)									
1% Level	-	-	-	-	0.0	30.8	23.1	46.2	100
5% Level	-	-	-	-	20.5	25.6	30.8	23.1	100
10% Level	-	-	-	-	21.7	26.7	30.0	21.7	100

D3.9 Tables D4 and D5 extend the significant coefficient analysis by reporting the minimum and maximum coefficient values across years and by significance thresholds³⁶. In terms of the minimum profile, values are generally modest in scale with relatively few higher than -0.1 (or -10%). The largest negative (-0.225/-23%) relates to a small scheme (22 units) on a small footprint but does also occur in ring 3, the ring nearest to the development beyond the immediate vicinity ring 2.

³⁶ Due to nature of construction, it is possible to have positive numbers in the minimum table and negative numbers in the maximum table.

Table D4: Model Performance profiles - Significant Coefficient Summary by Ring									
Completion	2008	2009	2010	2011	2012	2013	2014	2015	2016
Schemes	3	16	4	5	2	4	10	16	12
Minimum Value Significant Ring Coefficients Ring 2									
1% Level	-	- 0.138	0.165	- 0.079	-	- 0.082	-	061	182
5% Level	0.043	- 0.138	0.165	- 0.079	-	- 0.082	- 0.063	082	182
10% Level	0.043	- 0.138	0.165	- 0.079	-	- 0.082	- 0.063	082	182
Minimum Value Significant Ring Coefficients Ring 3									
1% Level	-	- 0.054	0.350	0.139	-	- 0.055	- 0.046	225	106
5% Level	-	- 0.054	0.061	0.133	--	- 0.210	- 0.087	225	106
10% Level	0.056	- 0.054	0.061	0.133	-	- 0.210	- 0.087	225	106
Minimum Value Significant Ring Coefficients Ring 4									
1% Level	-	-	0.063	-	-	-	-	091	080
5% Level	-	- 0.146	- 0.037	-	-	-	- 0.106	091	080
10% Level	- 0.034	- 0.146	- 0.037	- 0.072	-	-	- 0.106	091	080
Minimum Value Significant Coefficients: Ring 5									
1% Level	- 0.058	- 0.090	-	0.083	- 0.037	-	-	180	197
5% Level	- 0.058	- 0.090	-	- 0.042	- 0.037	0.028	0.098	180	197
10% Level	- 0.058	- 0.090	-	- 0.052	- 0.037	- 0.126	- 0.048	180	197
Minimum Value Significant Coefficients: Ring 6									
1% Level		-	-	-	-	-	-	-	-
5% Level	-	- 0.076	-	- 0.068	-	-	- 0.039	-	-
10% Level	-	- 0.087	-	- 0.068	-	- 0.152	- 0.039	-	-

Minimum Value Significant Coefficients: Ring 7									
1% Level	-	-	-	-	-	-	-	105	048
		0.063							
5% Level	0.017	-	-	-	-	-	-	105	048
		0.101							
10% Level	0.017	-	-	0.043	-	-	0.013	105	048
Minimum Value Significant Coefficients: Ring 8									
1% Level	-	-	-	-	-	-	-	059	050
5% Level	-	-	-	-	-	-	-	059	070
	0.035	0.026		0.080			0.050		
10% Level	-	-	-	-	-	0.034	-	077	070
	0.035	0.026		0.080			0.050		
Minimum Value Significant Coefficients: Ring 9									
1% Level	-	-	-	-	-	-	-	049	055
		0.078		0.077					
5% Level	-	-	-	-	--	-	-	049	055
		0.078		0.077					
10% Level	-	-	0.101	-	-	-	-	049	055
		0.078		0.077			0.047		

D3.10 The maximum value profiles are again mostly small to moderate in size though there are 4 values in excess of 0.3 (+30%), all of which lie in bands 2 and 3. The 2016, 0.41 (+41%) value refers to a 100+ unit development on a small footprint and occurs in ring 2. The two 0.3+/30%+ values for 2010 occur in rings 2 and 3 and relate to the same scheme, a 100 unit development on a very small footprint in a very highly deprived urban area. The final 0.3+ /30%+ value for 2009 lies in ring 3 and refers to a very small development in a deprived area close to a major city centre.

Table D5: Model Performance profiles - Significant Coefficient Summary by Ring									
Completion	2008	2009	2010	2011	2012	2013	2014	2015	2016
Schemes	3	16	4	5	2	4	10	16	12
Maximum Value Significant Ring Coefficients Ring 2									
1% Level	-	0.149	0.335	0.061	0.241	-0.082	0.160	0.116	0.410
5% Level	0.043	0.149	0.335	0.061	0.241	-0.043	0.160	0.116	0.410
10% Level	0.043	0.149	0.335	0.061	0.241	-0.043	0.160	0.116	0.410
Maximum Value Significant Ring Coefficients Ring 3									
1% Level	-	0.317	0.350	0.139	0.257	-0.055	-0.046	0.049	0.117
5% Level	-	0.317	0.350	0.139	0.257	-0.055	0.030	0.067	0.117
10% Level	0.056	0.317	0.350	0.139	0.257	-0.055	0.030	0.067	0.117

Maximum Value Significant Ring Coefficients Ring 4									
1% Level	-	0.101	0.063	-	-	-	-	0.078	0.049
5% Level	-	0.101	0.063	-	-	-	-0.106	0.078	0.049
10% Level	-0.034	0.101	0.063	-0.072	-	-	-0.106	0.078	0.049
Maximum Value Significant Coefficients: Ring 5									
1% Level	-0.058	-	-	0.083	-0.037	-	-	-	0.135
5% Level	-0.058	0.070	-	0.083	-0.037	0.028	0.121	0.039	0.135
10% Level	-0.058	0.070	-	0.083	-0.037	0.028	0.121	0.039	0.135
Maximum Value Significant Coefficients: Ring 6									
1% Level	-	-	-	-	-	-	-	-	0.000
5% Level	-	-0.076	-	0.195	-	-	0.052	0.039	0.000
10% Level	-	0.058	-	0.195	-	-0.152	0.052	0.039	0.033
Maximum Value Significant Coefficients: Ring 7									
1% Level	-	-0.063	-	-	-	-	-	-	0.165
5% Level	0.018	0.094	-	-	-	-	-	-	0.165
10% Level	0.018	0.094	-	0.043	-	-	0.013	0.150	0.165
Maximum Value Significant Coefficients: Ring 8									
1% Level	-	-	-	-	-	-	-	0.070	0.050
5% Level	-0.035	-0.026	-	-0.080	-	-	-0.050	0.136	0.147
10% Level	-0.035	0.040	-	-0.080	-	0.034	-0.050	0.136	0.147
Maximum Value Significant Coefficients: Ring 9									
1% Level	-	-0.078	-	-0.060	-	-	-	0.045	-0.055
5% Level	-	-0.069	-	-0.049	-	-	-	0.109	-0.055
10% Level	0.032	-0.069	0.101	0.055	-	-	-	0.109	-0.055

Impact Scale

D3.11 While analysis of coefficients provides information as to the range and scale of individual ring effects, it does not inform on impact across complete ring footprints. To evaluate this profile we place the sum of projected change in ring property stock values – using coefficient parameters relative to the mean ring value in the year of completion – against total ring footprint values at the same point in time³⁷. Table D6 provides the outcome of these calculations in terms of the gross displacement and gain estimates, alongside the net position across rings, under different significance (p-value) thresholds.

³⁷ Coefficients are adjusted to reflect the use of binary variables in semilog models.

D3.12 The immediate insight from the analysis is the relatively limited scale of material impacts in both displacement and gains. In terms of displacement, and setting 10% level results aside, between:

- 57% and 75% of the projects do not display any level of displacement;
- 19% and 28% display displacement in the 0% to 2% range;
- 3% and 8% display displacement in the 2% to 4% range; and
- 1% and 6% display displacement in the 4% to 6% range.

D3.13 Only 1 project is evaluated as having a displacement value higher than 6% (and less than 8%). It is noticeable that the number of zero displacement projects increases as p-value thresholds decline while the number of defined displacement projects decreases.

Table D6: Impact Summary: Number & % of Projects						
	10% Level	5% Level	1% Level	10% Level	5% Level	1% Level
	(no)	(no)	(no)	(%)	(%)	(%)
Displacement						
0%	35	41	54	48.6	56.9	75.0
0% - -2%	25	20	14	34.7	27.7	19.4
-2% - -4%	7	6	2	9.7	8.3	2.8
-4% - -6%	4	4	1	5.6	5.6	1.4
-6% - -8%	1	1	1	1.4	1.4	1.4
-8% - -10%	0	0	0	0	0	0
Gain						
0%	35	37	51	48.6	51.4	70.8
0% - +2%	19	18	10	26.4	25.0	13.8
+2% - +4%	9	11	8	12.5	15.3	11.1
+4% - +6%	6	4	1	8.3	5.6	1.4
+6% - +8%	1	0	0	1.4	0	0
+8% - +10%	2	2	2	0	2.8	2.8
Net						
+8% - +10%	2	2	2	2.8	2.8	2.8
+6% - +8%	1	0	0	0	0	-
+4% - +6%	6	4	1	1.4	5.6	1.4
+2% - +4%	6	9	7	8.3	12.5	9.7
0% - +2%	16	17	9	8.3	23.6	12.5
0%	11	13	36	15.3	18.1	50.0
0% - -2%	19	18	14	26.4	25.0	19.4

-2% - -4%	7	5	2	9.7	6.9	2.8
-4% - -6%	3	3	-	4.2	4.2	-
-6% - -8%	1	1	1	1.4	1.4	1.4
-8% - -10%	0	0	0	0	0	0

D3.14 A broadly similar pattern exists in terms of gains. Setting 10% level results aside once more, between:

- 51% and 71% of the projects do not display any evidence of gain;
- 14% and 25% display gain in the 0% to 2% range;
- 11% and 15% display gain in the 2% to 4% range;
- 1% and 6% display gain in the 4% to 6% range.

D3.15 Two projects are evaluated as having gains more than 8% (and less than 10%). As previously, the number of zero gain projects increases as the p-value threshold declines while the number of defined gain projects decreases. Bringing displacement and gains together further illustrates the concentration of projects around the zero centre. Between 68% and 82% of projects display either no net change or a change within a 2% band either side of zero. The two schemes within the positive 8% to 10% band are the 2016 and 2010 schemes with high coefficient values referred to earlier. The scheme in the negative 6% to 8% band does not reflect high value coefficients but a series of negative coefficients across a number of rings resulting in a cumulative negative effect.

D3.16 Table D7 provides additional detail in the form of displacement and gain combinations across projects and shows that combinations vary across different significance thresholds. At the 5%/10% level, around 70% of schemes are either displacement or gain orientated rather than a combination of both with 14% to 18% showing no impacts in either direction and 10% to 17% displaying both.

D3.17 This changes at the 1% level where more stringent significance criteria reduces the number of significant coefficients across the model set and more models show neither displacement or gains. Non-zero impact models, on the other hand, still indicate a tendency towards either displacement or gains rather than a combination.

Table D7: Displacement/Gain Mix		
10% Level (p<=0.1)	Gain=0	Gain>0
Disp=0	10/14%	25/35%
Disp<0	25/35%	12/17%
5% Level (p<=0.05)	Gain=0	Gain>0
Disp=0	13/18%	28/39%
Disp<0	24/33%	7/10%
1% Level (p<=0.01)	Gain=0	Gain>0
Disp=0	36/49%	18/25%
Disp<0	15/21%	3/4%

Appendix E – Development Appraisal Analysis

E1. Introduction

- E1.1 Thomas Lister are a firm of Chartered Surveyors and Development Consultants based in the Midlands. Formed in 2002, our clients include Homes England being represented on both the Property Panel and the Multi-Disciplinary Panels, Local Enterprise Partnerships, the West Midlands Combined Authority, a wide range of Local Authorities as well as national property developers such as St. Modwen and Stoford.
- E1.2 Thomas Lister were appointed by AMION Consulting to provide Development Appraisal advice to inform Economic Analysis and Additionality Guidance, which is in preparation on behalf of the now DLUHC.
- E1.3 This Appendix sets out how the Financial Development Appraisal Model functions as well as those Standard Assumptions that have been applied and Sensitivity Analysis undertaken.

E2. The Development Appraisal Model

- E2.1 The Development Appraisal model has been prepared based on a standard development appraisal format for residential development schemes. The development appraisal sets out all cost inputs followed by all value inputs and then calculates the amount of developer return (profit) with the variable of house prices included in order to provide Sensitivity Analysis, after taking into account cash flowed interest.
- E2.2 The development appraisal has been replicated with accompanying cash flows to inform the Sensitivity Analysis with each of the individual appraisals feeding into a summary results table.
- E2.3 The development appraisal has been constructed on the basis of an assumed standard 100 home development, on an average brownfield site, within the West Midlands. Cost and value assumptions have been applied, which are based on standardised and average figures, together with expectations based on Benchmark Schemes.
- E2.4 The development appraisal model has been prepared in Microsoft Excel format and is available in its working form to assist interrogation.
- E2.5 The following sections relate to the main headings included within the development appraisal and assumptions applied.

E3. Initial Land Value

- E3.1 The applied initial land value is based upon Valuation Office Agency (VOA) advice as to residential land values throughout the West Midlands, which have been averaged out.
- E3.2 This rate has been applied to the assumed required scale of site in order to deliver a scheme of 100 units based upon an assumed density of 60 units per hectare, i.e. 1.67 hectares (4.12 acres).

E4. Acquisition Costs

- E4.1 Site acquisition costs are assumed to include Stamp Duty Land Tax, calculated based upon the initial land value at the current Statutory Rate.
- E4.2 Purchaser's legal and surveyor's fees have been included at a rate of 1.75% of the land value.

E5. Pre-Development Costs

- E5.1 Planning and Building Regulation (Statutory) Costs have been applied. These assume an existing outline planning consent for residential development requiring reserved matters to be resolved. The applied rate of £50,000 is included based on the scale of scheme.
- E5.2 As the appraisal relates to an assumed brownfield site, it is considered appropriate to include site clearance, removal of redundant services, site investigations to be undertaken, followed by site remediation. The cost assumptions applied have been based upon HCA (2015) Guidance on dereliction, demolition and remediation costs, relating to a category A residential site within the West Midlands of high sensitivity (residential with gardens) and negligible to low water risk.
- E5.3 The figures applied are as follows:
- Removal of redundant services £ 60,000
 - Site Clearance £150,000 per hectare
 - Site Investigation £ 60,000
 - Remediation £140,000 per hectare

E6. Quantum of Proposed Development

- E6.1 Detail as to the anticipated scale of development has been assessed based on an assumed standard residential estate, developed on a brownfield site, with a proportion of apartments and predominantly smaller family homes.
- E6.2 The following table sets out those assumptions applied:

Unit Type	Unit Size	No. of Units	Total Scheme
1 Bed Appt	633 sq ft	5 units	3,166 sq ft
2 Bed Appt	760 sq ft	15 units	11,397 sq ft
2 Bed House	753 sq ft	30 units	22,604 sq ft
3 Bed House	1,023 sq ft	35 units	35,790 sq ft
4 Bed House	1,378 sq ft	15 units	20,667 sq ft
		100 units	93,625 sq ft
			8,698 m ²

E7. Construction Costs

- E7.1 Construction costs are based upon BCIS Estate Housing Figures, adjusted to the West Midlands region.

E7.2 External costs have been included at a rate of 8% of construction costs and a contingency rate of 3% applied to all site and construction costs.

E8. Professional Fees

E8.1 Professional fees have been calculated within the model based generally upon an assumed rate of 6% calculated as a proportion of the above build and external costs, including contingency.

E9. Planning Gain

E9.1 Section 106 financial contributions have been assumed, based upon the delivery of housing and calculated contributions are assumed to be £500 per home delivered plus a further £3,000 per market home delivered.

E10. Affordable Housing

E10.1 A standard assumed policy compliant basis of 25% housing to be affordable has been applied. This is assumed to be delivered with 50% Affordable Rent and 50% Shared Equity with values applied at 45% and 70% of market value respectively.

E11. Sales Costs

E11.1 Sales cost allowances have been included and relate to those costs associated with agency fees and legal costs for the delivery of market housing units.

E11.2 These have been included at an overall rate of 2% of gross development value, which sum relates to 1.5% for sales agents' fees and 0.5% for sales legal fees.

E11.3 These costs are based upon benchmark scheme data and market expectations.

E12. Finance Costs

E11.4 Interest rates have been applied at an assumed current rate of 5.5%, reflecting current average market expectations for a scheme of the subject scale.

E11.5 Interest has been calculated based upon cash flowed costs and values, on a monthly basis throughout the development and sales periods.

E13. Developer's Required Rate of Return

E13.1 Developer profit has been calculated within the financial modelling with a standard rate of 20% of market value in relation to market housing and 6.5% in relation to affordable housing provision. These rates reflect standard current market expectation.

E14. Values and Take-Up Rates

E14.1 Gross Development Value (GDV) in relation to the overall scheme has been assessed based upon average new build values, calculated based upon Land Registry evidence relating to recent West Midlands transactions.

E14.2 In summary, GDV's have been assessed based upon the net internal areas with applied valuation rates.

E14.3 Market Value rates have been informed through comparable evidence and analysis of Land Registry data, with appropriate assumptions applied in relation to new build elements.

E14.4 The average standard value rate per square foot has been applied across the completed properties on a consistent basis as set out below:

Value	Net Area	Units	Area / Unit	Value psf	Value per unit
<i>Market Housing</i>					
1 Bed Appt	85%	4 units	538 sq ft	£270	£145,314
2 Bed Appt	85%	11 units	646 sq ft	£270	£174,377
2 Bed House	100%	23 units	753 sq ft	£270	£203,440
3 Bed House	100%	26 units	1,023 sq ft	£270	£276,097
4 Bed House	100%	11 units	1,378 sq ft	£270	£372,004

E15. Sensitivity Analysis

E15.1 Sensitivity analysis has been applied through the preparation of multiple variations of the base appraisal, with the market value of the completed scheme adjusted by +/- 10% in 2 percentage point stages. The results are expressed within a table included within the Assumption worksheet and as shown below:

House Values Adjustment	Profit Level
-10%	8.8%
-8%	11.3%
-6%	13.6%
-4%	15.8%
-2%	18.0%
0%	20.0%
2%	22.0%
4%	23.9%
6%	25.7%
8%	27.4%
10%	29.1%

E15.2 The results shown within the above table suggest that, based on an assumed average West Midlands brownfield scheme, a reduction in new house price values beyond 4% would start to render delivery of a scheme marginal / difficult, most likely with changes to the scheme being required to be sought so as to enhance viability. Beyond 8% reduction in values the same scheme would be considered unviable within present market conditions, all other matters remaining the same.