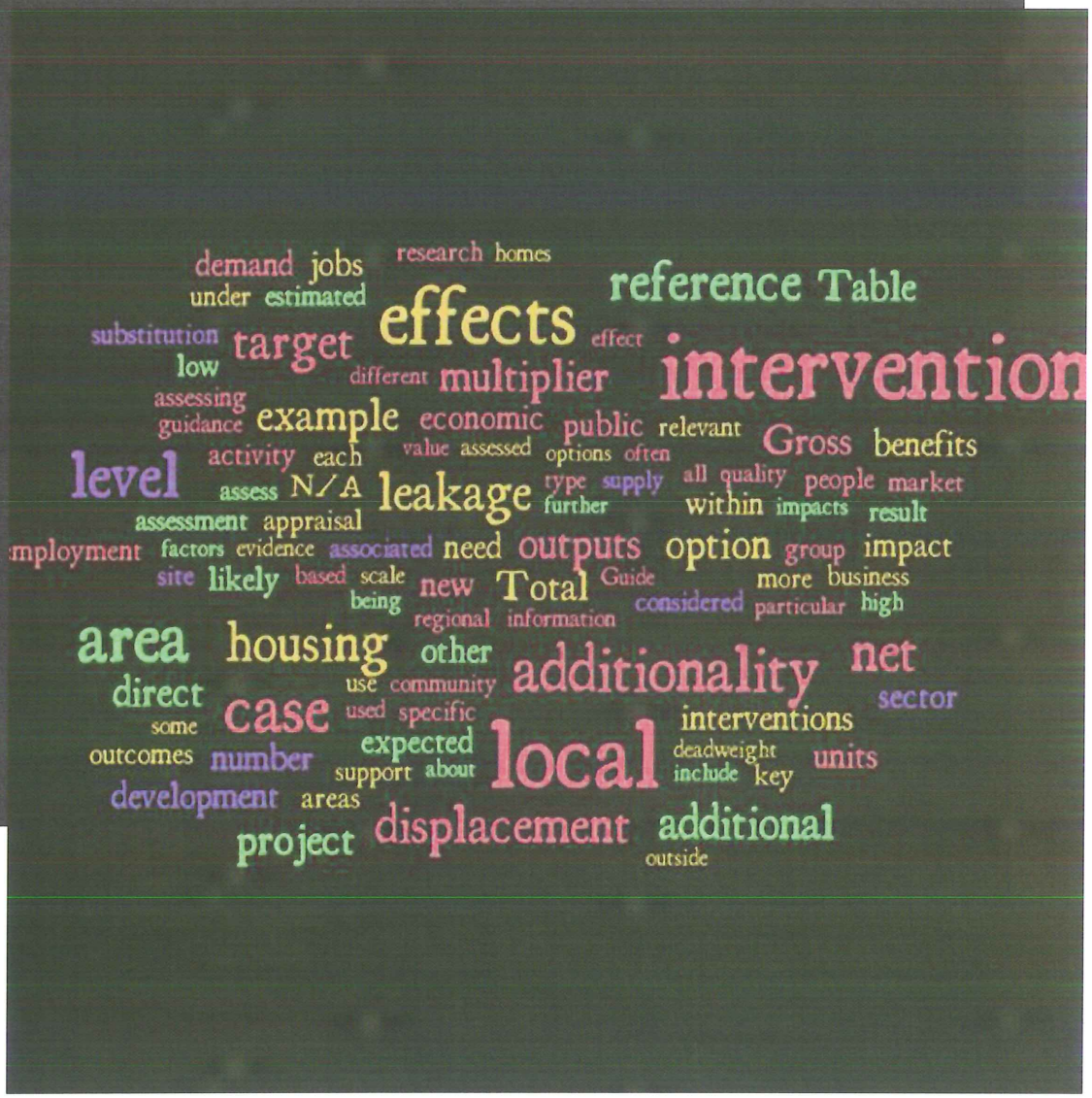
Homes &
Communities
Agency

ADDITIONALITY GUIDE

Fourth Edition 2014



4 Adjusting the reference case and intervention options

4.1 How to assess the additionality of each option – the factors explained

The Guide now goes on to consider leakage, displacement, substitution and multiplier effects in turn. For each type of effect we set out:

(i) a simple definition

(ii) a description of the factors influencing its scale. As we have already seen the size of the target area or area of benefit will significantly affect the various factors

(iii) a review of the various approaches available to estimating the scale of each factor

(iv) a brief review of the evidence available from evaluations and other research

(v) a ready reckoner – which simplifies the process of assessing the net additional impacts by providing a series of estimates of the scale of each effect. However, project specific information should always be used in preference to the ready reckoner, where it is available. In addition, evidence should be presented in an appraisal to justify the ready reckoner impact selected for each effect. The ready reckoner should never be used without reference to the project context. Where there is uncertainty, it may be helpful to use ranges.

(vi) the key questions to ask as part of a project appraisal in order to assess each factor

Each of the additionality factors will need to be applied to both the reference case and intervention option, so that the net additional impact can be calculated (see Section 5).

4.2 Leakage

4.2.1 Definition

> ***Leakage***
>
> The proportion of outputs that benefit those outside of the intervention's target area or group.

The target beneficiaries for many local economic growth and housing interventions are individuals, organisations or businesses who form a formal or informal group, based on a shared characteristic or characteristics. For individuals these characteristics may, for example, include key worker status, graduates, ethnic minority, gender and/or employment status. Frequently interventions are also designed to benefit groups and/or individuals living in a particular location/community or those in specific industries or with or without particular skills. The latter may or may not share other personal characteristics. Not all projects will have solely economic efficiency-type aims. Many will be focused on achieving redistributive objectives. Adjusting for leakage will help to ensure that the calculation of net additional impact takes account of these redistributive concerns. As such, leakage is used to make some allowance for distributional issues.

Given the range of local economic growth and housing type interventions and the contexts in which they are implemented, assessing the extent of benefit or output/outcome leakage is often not straightforward. A number of complex and inter-related issues need to be addressed, including:

- Users and beneficiaries: there are cases where the output/outcome under consideration may relate to the usage of a facility. In some cases the users and beneficiaries will be the same – for example, the users of a community facility. In others the target beneficiary may be indirectly related to users. The latter may include the number of tourists visiting a new facility, where the beneficiaries are local people gaining jobs as a result of visitor expenditure.
- Multiple target beneficiaries: many interventions will seek to benefit a range of beneficiary groups. For example, a new business incubator may wish to encourage graduates into employment and also to generate employment opportunities for disadvantaged local residents. The leakage rates for these would be different.
- Leakage of physical outputs: many appraisers have found it conceptually difficult to understand how leakage can relate to physical asset, such as commercial floorspace developed. Where users are from outside of the target group there is logic in reducing the floorspace claimed as being additional. However, this has not normally been done.
- Is the area or the individual the target? For example, how far is it the objective of relevant local policies to improve the lot of people who live in the area and how far to reduce the deprivation of the area? Thus, an appraiser would need to determine whether, if a resident secures employment as a result of the intervention and relocates, this is leakage or not.
- Sources/evidence for estimated leakage for geographic areas or target groups: the sources/evidence to inform an assessment of the level of leakage associated with a geographic area or a specific target group are different. In the case of the former leakage will usually relate to the place of residence of the beneficiary – for example, whether the person gaining a job lives within or outside of the target area. For jobs this can be informed by secondary source evidence on travel to work patterns. However, for specific target groups the sources upon which to make evidence-based judgements will often be less readily available. As such, in many cases, they will need to be drawn from project specific information (such as the project business plan), analogous interventions (where data is available), or primary research.
- Leakage implies that no value is attached to benefits that accrue to non-target beneficiaries: where interventions are concerned with distributional issues this can be argued to be logical. However, where the rationale relates to a market failure argument and therefore economic efficiency it is not obvious why these potential benefits should be discounted, although this may relate as much to how the beneficiary group is defined. The positive and negative impacts on other areas or groups should also be considered in an appraisal.
- Leakage in relation to outputs and outcomes: the leakage of benefits from target groups is likely to be relevant to all outcomes, but as the above discussion demonstrates, can be more of an issue in relation to outputs.

Past experience has been that leakage has been reasonably consistently applied in relation to employment outputs/outcomes. However, it has either not been applied or has been applied inconsistently in relation to other output/outcome areas. In view of the importance of targeting particular beneficiaries in relation to local economic growth and housing interventions, this guide recommends that leakage be applied consistently to all outputs/outcomes, including outputs such as the number of houses developed. As such the precise definition of the intended beneficiaries is a key part of the additionality assessment and project appraisal more generally. Where there is no specific target beneficiary then leakage will be zero. Thus, for example, if the objective is to increase

take-up of homes in an area and it does not matter who the occupiers are, then no leakage will occur in this case.

However, as with the other components, the level of analysis and resource devoted to assessing leakage should always be related to the nature of the investment. Thus, a novel, contentious, repercussive, large and/or complex intervention will require more effort, as will one where distributed effects are a particularly important objective.

4.2.2 *Examples of potential leakage effects*

The potential benefits of an intervention may be lost to an area or group in a number of ways and the following discussion considers the ways in which leakage may occur and may need to be assessed for a variety of intervention types.

(i) Housing

Interventions designed to provide new or refurbished housing units will normally need to consider the possibility of leakage. The key issue is the relationship between the character of the occupier and the target group. Where the housing units have been built with the intention of providing residences for particular groups or people from a particular area and it is possible that these intended beneficiaries will not take up the accommodation then leakage might occur and needs to be assessed.

Another form of leakage that might occur would be if existing local residents - who were the target beneficiaries - decided to "cash in" and move out of the area.

(ii) Commercial development

This usually involves the reclamation or refurbishment of existing land or buildings or the bringing forward of new developments to provide increased capacity for commercial activity.

In terms of the beneficiaries of the building, this may be either the immediate users of the building, that is, the companies occupying space or those employed by the tenant companies. Where the rationale for the intervention is to create job opportunities for people in a particular area or target group and not all the space or jobs are likely to be taken up by those targeted, then leakage will need to be assessed. Similarly, if the development was brought forward with the intention of providing space for particular industry sectors or businesses at a particular stage in their development and the eligibility criteria is such that the possibility exists that these businesses or sectors do not use all the space then 'leakage' may occur and needs to be assessed. However, different leakage rates would apply if the target beneficiaries were both local residents gaining jobs and businesses within a specific sector.

Where a development takes place with no objective of attracting a specific group or sector and indeed is keen to attract newcomers to an area then leakage will be zero.

(iii) Transport

Transport interventions designed to benefit particular areas or groups of individuals can also have leakage associated with the outputs and outcomes they generate. The important point is to be clear about the reasons why the intervention is to be undertaken and what is the target outcome. A new road built to improve access to an industrial area will not have leakage of outputs if the intention was purely to increase the uptake of development space on the site. However, if the primary objective was to increase uptake of jobs on the site by residents in a particular area then there is a likelihood that some leakage of benefits will occur and these will increase depending on how accessible the new road makes the site to non-target beneficiaries and whether their usage is at the expense of the target beneficiaries.

(iv) Business support

An intervention aimed at providing intensive business support to early stage, high-tech, start-ups in the bio-science sector located within a particular area, is, assuming the eligibility criteria for determining who can receive support are strictly applied, likely to have a very small amount of leakage associated with its outputs and outcomes. However, an intervention providing general business advice to an unspecified audience with the aim of generating jobs in a particular area is likely to have a greater degree of leakage associated with its activities as businesses may receive advice and generate jobs that do not go to target area residents or target groups.

(v) Community and social

Interventions aimed at improving the quality of life of a target group or those living in a particular area, such as provision of a community centre, playground or leisure facility may find it difficult to 'design out' all elements of leakage as it may be impracticable to develop or implement user policies that mean that non-target beneficiaries are excluded from using the facility provided. The level of leakage will depend on the degree to which access can be controlled. Other community interventions such as crèches or health centres have the potential to limit users more directly by allowing only those within a catchment/target area to register. Nonetheless, there is still the possibility of a degree of leakage as non-target beneficiaries may be able to benefit from literature/workshops/emergency provision offered by the Health Centre or other activities offered by the Crèche such as a summer play scheme. Where the Health Centre or Crèche serves an area wider than the target area, there is likely to be a high level of leakage. Again an important consideration will be the extent to which the usage by non-target beneficiaries is actually at the expense of use by target beneficiaries.

(vii) Training/Education

Training interventions can be developed with the objectives of improving skills and enabling trainees to gain a qualification. This can be aimed at the population as a whole, or, as is often the case the training will be targeted at a particular sub-set of the population - such as mothers returning to work, the unemployed, ethnic minorities, graduates, those working in a specific industry and those in a specified occupation. Training is also frequently targeted at those living in a priority area. Even for those interventions with a small target group it should be possible, in theory, to design out leakage with good project design and delivery using appropriate eligibility criteria, rigorously applied. In practice, of course, this is likely to prove difficult. Thus, the likelihood of non-target beneficiaries taking up training places should always be considered and the scale of potential leakage assessed.

4.2.3 *Factors influencing the leakage effects*

The level of leakage will be influenced by factors such as:

- how accessible the intervention outputs are to people from outside of the target area or from outside of the target group. This will depend upon both road and public transport linkages, as well as policies to target usage:
- the nature of the output, such as new jobs, that will be created and the ability of local residents or a particular target group to access or to compete for these. In the case of jobs, for example, this would depend upon the skills of the target population. As an example, if an intervention created local employment in the retail sector, given the low required skills levels and low salaries associated with the sector, it is less likely that there would be significant interest in available positions from outside the local area. Coupled with this is the likelihood of their being a significant pool of suitable potential employees in the locality. Leakage would therefore be expected to be low. In contrast, the creation of higher quality jobs is

likely to lead to higher levels of leakage as they provide more incentive for people from outside the area to commute in order to access the employment opportunities; and

- the state of the economy in the target area - if the intervention is aimed at generating economic benefits and the economy in the target area is very buoyant with limited spare resources (labour, capital, etc) able to take up the opportunities offered by the intervention, then leakage may be high as capital and labour may have to be sourced from outside of the target area.

Interventions should be designed to limit the level of leakage. Thus, for example, development projects which will accommodate new employment opportunities, and where the objective is to increase local employment, will often need to be combined with a package of training support for local residents to ensure that they have the skills required by the businesses that will occupy the new developments.

4.2.4 *Approaches to estimating leakage*

In order to estimate the likely level of leakage, information can be used from the following sources:

- published secondary sources, such as travel to work information;
- local business surveys undertaken by, for example, local authorities, will sometimes ask about the place of residence of employees. The local JobCentre Plus is also an important source of information upon which to draw;
- labour market studies again produced by, for example, a Local Enterprise Partnership may also include information on skills and travel to work flows;
- evaluations of previous programmes may have included estimates of leakage; and
- surveys/primary research.

4.2.5 *Evidence from evaluations and research*

It is perhaps somewhat surprising that there is a relatively limited amount of research relating to the size of leakage effects. This undoubtedly reflects the difficult conceptual and measurement problems that exist in seeking to derive good estimates.

Research in the 1980s and 1990s into property driven regeneration initiatives (HMSO 1987, HMSO 1995A and 1995B) revealed that leakage effects depended heavily on the type of jobs created and thus the occupations of the people who got the jobs. Thus, the higher the number of managerial, professional and technical staff, the more likely it is that workers from outside the area targeted for regeneration would secure the jobs generated. Most other occupational groups had around 10% of staff recruited from outside the local area with the exception of skilled manual workers where the equivalent figure is around 20%. The study was also able to ascertain that in general companies in fairly deprived areas were filling about 40% of their vacancies from unemployed people in the local area.

The Final Evaluation of City Challenge (the, then, DETR, 2000) found that 38% of employees in businesses supported by City Challenge Partnerships lived outside of the City Challenge area and 11% outside of the local authority district.

Relatively low levels of leakage were identified through a review of Neighbourhood Renewal Fund projects (see Table 4.1) because the targeting of the interventions was effective.

Table 4.1: Estimate leakage – Neighbourhood Renewal Fund	
	Evaluator's view
Crime	5%
Education	9%
Health	9%
Housing and environment	6%
Worklessness	9%
Other (including community)	13%
Average	8%

Note: Unweighted averages
Source: AMION Consulting (2007)

Estimates of leakage have also been identified in the guidance on assessing additionality produced on behalf of BIS (see Table 4.2). The average (mean) leakage rate at the sub-regional level is 15.8%, compared to 11.3% at the regional level.

Table 4.2: Leakage factors by type of intervention – BIS/CEA guidance		
	Sub-regional (mean)	**Regional (mean)**
All observations	15.8%	11.3%
Business development & competitiveness	16.3%	11.5%
Regeneration through physical infrastructure	14.1%	10.4%
People and skills	13.5%	14.2%

Note 1: a more detailed breakdown by project type is contained within the BIS/CEA guidance
Note 2: Under the people and skills theme, the BIS/CEA average benchmark for leakage is higher at the regional level than the sub-regional level. This reflects that the averages calculated for each spatial level were not based entirely on the same set of projects. In reality, in relation to a given project you would expect the leakage rate to be lower at the regional level compared to the sub-regional level.

4.2.6 *Ready reckoners*

Leakage effects can be assessed as follows:

Table 4.3: Leakage		
Level	**Description**	**Leakage**
None	All of the benefits go to people living in the target area/the target group	0%
Low	The majority of benefits will go to people living within the target area/the target group	10%
Medium	A reasonably high proportion of the benefits will be retained within the target area/target group	25%
High	Many of the benefits will go to people living outside the area of benefit/outside of the target group	50%
Very high	A substantial proportion of those benefiting will live outside of the area of benefit/ be non-target group members	75%
Total	None of the benefits go to members of the target area/target group	100%

If leakage was anticipated to be very high (i.e. 75%) then only 25% of the intervention output (i.e. 100% – 75%) would be expected to benefit members of the target group or those living in the target area of benefit.

4.2.7 *Key Question - Leakage*

In order to address the issue of leakage in an appraisal, the following questions need to be answered:

> ***Who are the target beneficiaries?***
>
> ***Are the outputs/outcomes likely to benefit non-target group(s) at the expense of the target group(s)? If yes, by how much?***

4.3 Displacement

4.3.1 *Definition*

> ***Displacement***
>
> The proportion of intervention outputs/outcomes accounted for by reduced outputs/outcomes elsewhere in the target area.

4.3.2 *Examples of displacement*

Displacement arises where the intervention takes market share (called product market displacement) or labour, land or capital (referred to as factor market displacement) from other existing local firms or organisations. For example, an intervention may help a business to expand its operations. However, this business may take market share from other local firms producing the same goods or services, resulting in them losing trade and possibly staff. Alternatively, the supported business may use up scarce local factors of production (such as skilled labour) or bid up factor prices.

In terms of housing, a supported scheme may result in a decrease in demand in adjoining areas or elsewhere in the target area. Another longer term form of displacement could be the gentrification of an area, with low income residents being displaced. Displacement may also occur between tenures – for example, from private rented to social rented. In the latter case, issues such as the quality of accommodation would need to be considered in the appraisal.

Another form of displacement may occur if crime prevention initiatives cause criminal activities to happen elsewhere outside of the target area.

4.3.3 *Factors influencing the scale of displacement*

The scale of displacement effects will vary depending upon the nature of activity supported and local markets. For example, if the supported business has few local competitors then the level of product market displacement will be low. In terms of factor market displacement, an intervention may result in an increase in demand for construction workers. If these are in short supply, the result may be delays to this or other interventions or an increase in costs.

4.3.4 *Approaches to estimating displacement*

An assessment of the likely level of displacement can be informed by:

- **market analyses**: relevant local markets (including product, property and labour) will need to be carefully assessed;

- **surveys and studies**: some local business surveys will ask questions such as where are your competitors located and where are your main markets. This information can be used to inform an assessment of displacement; and
- **evaluations**.

4.3.5 *Evidence from evaluations and research*

There is a considerable body of evidence concerning estimates of the scale of displacement associated with initiatives at the local and regional level. The level of displacement at the regional level (North East) associated with various business support activities is set out in Table 4.4. A high level of variation is evident.

Table 4.4: Displacement – Objective Two Business Support

	Jobs	Turnover
Generic business support	49%	63%
Access to finance	19%	14%
Targeted support (including new markets, technological development and support for sectors and clusters)	42%	23%

Source: Regeneris (May 2006).

There is also evidence that smaller companies tend to be associated with higher displacement than larger companies. The reason for this is that small companies will have more tendency to trade a higher proportion of their output locally than larger companies (see, for example, the evaluation of TEC Delivered Services, HMSO, 1995).

The Final Evaluation of City Challenge assessed displacement for a number of intervention types. Displacement was considered to be low at the City Challenge level, but increased rapidly beyond the local area (see Table 4.5). The high levels of displacement at the county, region and UK level reflect the fact that City Challenge was concerned principally with redistribution, rather than removing major supply side constraints.

At the local level, displacement ranged from 8% for training and education and business support projects to 17% for commercial development schemes.

Table 4.5 : Displacement rates City Challenge

Intervention type	Within City Challenge	Immediately adjoining area	District	County	Region	UK
Development	17%	21%	38%	71%	89%	91%
Housing	10%	19%	38%	84%	100%	100%
Training and Education	8%	17%	31%	77%	78%	80%
Business support	8%	19%	31%	49%	75%	75%

Source: DETR (2000)
Note: Displacement/substitution in the case of Training and Education only applies to jobs created through training as opposed to qualifications gained.

The recent review of Neighbourhood Renewal Fund projects identified similarly low displacement rates to City Challenge at the local level (see Table 4.6). In relation to crime, displacement effects principally related to the adverse impacts of the intervention on levels of crime outside of the target area. The displacement effects in terms of education and health, on the other hand, were mainly concerned with the intervention replacing other public sector provision.

Table 4.6: Displacement rates – Neighbourhood Renewal Fund	
	Evaluator's view
Crime	9%
Education	13%
Health	11%
Housing and environment	15%
Worklessness	13%
Other (including community)	7%
Average	11%

Note: Unweighted averages
Source: AMION Consulting (2007)

The research undertaken on behalf of BIS has set out a range of average (mean) displacement rates at the sub-regional and regional levels (see Table 4.7). An overall displacement rate of 21.5% at the sub-regional level is identified, compared to an average of 29.6% at the regional level.

Table 4.7: Displacement factors by type of intervention – BIS/CEA guidance		
	Sub-regional (mean)	**Regional (mean)**
All observations	21.5%	29.6%
Business development & competitiveness	19.5%	29.3%
Regeneration through physical infrastructure	38.7%	37.4%
People and skills	17.9%	24.7%

Note 1: a more detailed breakdown by project type is contained within the BIS/CEA guidance
Note 2: Under the regeneration through physical infrastructure theme, the BIS/CEA average benchmark for displacement is lower at the regional level than the sub-regional level. This reflects that the averages calculated for each spatial level were not based entirely on the same set of projects. In reality, in relation to a given project you would expect the displacement rate to be higher at the regional level compared to the sub-regional level.

4.3.6 *Ready reckoners*

In the absence of specific local information the level of displacement can be assessed as follows:

Table 4.8: Displacement		
Level	**Displacement**	**Displacement effect**
None	No other firms/demand affected	0%
Low	There are expected to be some displacement effects, although only to a limited extent	25%
Medium	About half of the activity would be displaced	50%
High	A high level of displacement is expected to arise	75%
Total	All of the activity generated will be displaced	100%

If the level of displacement was estimated to be low (i.e. 25%), then 75% of the outputs would be taken forward (i.e. 100% – 25%).

4.3.7 *Displacement and crowding out*

There is often confusion between displacement effects and crowding out. The former relates to the impact of an intervention on other, normally similar, activities within the target area. The latter is concerned with macro-economic adjustments that result from an

intervention. Crowding out effects are normally only considered for very large interventions.

4.3.8 *Key question - displacement*

The following key question needs to be answered:

> ***Will the intervention/option reduce existing activity from within (or outside) the target group or area? If yes, by how much?***

4.4 Substitution

4.4.1 *Definition*

> This effect arises where a firm substitutes one activity for a similar one (such as recruiting a jobless person while another employee loses a job) to take advantage of public sector assistance. It can be thought of as "within firm" displacement.

4.4.2 *Examples of substitution*

Substitution is a very specific form of non-additionality that has in the past been largely subsumed within the displacement effect and as a result not considered sufficiently.

If a grant was introduced to encourage local employers to recruit long-term unemployed people, some employers may replace existing employees with new workers in order to secure the grant. Such substitution effects should be deducted in assessing the net output/outcome. However, care needs to be taken when assessing substitution effects if the target group are, for example, the long-term unemployed. In this case some degree of substitution may be considered acceptable.

Substitution has been an issue for wage subsidy programmes and work experience programmes. Employers have an incentive to dismiss unsubsidised workers and replace them with subsidised workers. A particular concern is that the finite duration of assistance could tempt employers to dismiss subsidised workers when subsidies run out and bring in a new cohort of subsidised workers.

Substitution could be an issue where the strategy is to persuade local employers to recruit more workers locally and fewer from outside the area. On the other hand, it might be argued that non-local workers could get other work anyway. However, it would be more of a concern if the attempt to increase local recruitment resulting in the new local workers taking the place of other local recruits.

Substitution could also arise in relation to other factor inputs such as land and property. A firm renting premises could, for example, take advantage of accommodation provided by the public sector at a reduced cost by relocating from its current building. In the case of a residential development, a developer could switch to undertake a public sector funded scheme, rather than an alternative scheme elsewhere in the local area. An individual could purchase a newly-built home, which was, in part, funded by the public sector, rather than acquire an older, existing property.

4.4.3 *Factors influencing the scale of substitution*

The scale of substitution effects will vary depending upon the nature of the activity supported, the degree to which substitution is an intended effect and the ability of recipients to engage in substitution where it is an unintended effect. Substitution will tend

to be larger, for example, where no controls have been established on recipients regarding the potential substitution activities.

4.4.4 *Approaches to estimating substitution*

An assessment of the likely level of displacement and substitution can be informed by:

- direct questioning of recipients – on their expected behaviour;
- surveys and studies – of previous initiatives;
- evaluations – for example, the Department for Work and Pensions has commissioned a number of evaluations that have assessed the level of substitution associated with an initiative. A full discussion of concepts and their application can be found in report ESR 14, available via http://webarchive.nationalarchives.gov.uk/+/http://www.dwp.gov.uk/jad/1999/esr14rep.pdf;
- evidence from evaluations and research;

4.4.5 *Evidence from evaluations and research*

There is a limited amount of research concerning the size of substitution effects. This is mainly due to, as noted, substitution often being subsumed within displacement. However, a range of substitution estimates are identified within the additionality guidance produced by BIS/CEA (see Table 4.9). These estimates are considered to be relatively low, which may be because many of the evaluations underpinning the BIS/CEA research did not fully assess the level of substitution as a separate factor to displacement.

Table 4.9: Substitution factors by type of intervention – BIS/CEA guidance

	Sub-regional (mean)	Regional (mean)
All observations	2.7%	3.5%
Business development & competitiveness	2.7%	3.4%
Regeneration through physical infrastructure	-	2.2%
People and skills	-	4.4%

Note: a more detailed breakdown by project type is contained within the BIS/CEA guidance

4.4.6 *Ready reckoners*

Where there is no specific information on substitution the following effects could be applied appropriately:

Table 4.10: Substitution		
Level	**Substitution**	**Substitution effect**
None	No substitution takes place	0%
Low	There are expected to be some substitution effects, although relatively limited	25%
Medium	About half of the activity would be substituted	50%
High	A high level of substitution is expected to arise	75%
Total	All of the activity would be affected by substitution	100%

4.4.7 *Key question - substitution*

The key question in relation to substitution is as follows:

Will the intervention/option result in a firm substituting one activity or input for a similar one to take advantage of public funding? If yes, where and by how much?

4.5 Economic multiplier effects

4.5.1 *Definition*

Multiplier Effects

Further economic activity (jobs, expenditure or income) associated with additional local income and local supplier purchases.

4.5.2 *Types of economic multiplier*

The economic impact (jobs, expenditure or income) of an intervention is multiplied because of knock-on effects within the local economy. Two types of multiplier can be identified:

- a **supply linkage multiplier** (sometimes referred to as an indirect multiplier) due to purchases made as a result of the intervention and further purchases associated with linked firms along the supply chain.
- an **income multiplier** (also referred to as a consumption or induced multiplier) associated with local expenditure as a result of those who derive incomes from the direct and supply linkage impacts of the intervention.

A number of impact studies have also identified a longer-term development multiplier associated with the retention of expenditure and population in an area.

Many appraisals use a combined or composite multiplier. Thus, for example, if at the regional level the supply linkage multiplier was 1.1 and the income multiplier 1.2, the composite multiplier would be 1.32 (i.e. 1.1 x 1.2). Applying the multiplier gives an estimate of the total direct and multiplier effects. For example, say an intervention created 100 jobs, then the total direct and multiplier effects would be 132, if the composite multiplier were 1.32. The multiplier effects alone would be 32 (i.e. 100 x 0.32).

4.5.3 *Factors influencing the scale of multiplier effects*

The scale of the multiplier effects will be influenced in particular by:

- supply linkage multiplier: the extent of supply chain linkages in area of analysis. These linkages vary substantially by sector and area;
- income multiplier: the proportion of additional income spent within area of analysis.

4.5.4 *Approaches to estimating multiplier effects*

There are a number of ways in which multipliers can be estimated, including:

- Surveys of businesses and employees: businesses can be asked about the local content of the purchases they make and this information can be used to calculate the local supply linkage multiplier effects, assuming that the proportion of expenditure net of non-recoverable indirect taxes incurred on local goods and services is similar throughout the supply chain. If the purchases made at a particular point in the supply chain is x per annum and a proportion S is spent on local inputs the effects down the remainder of the chain is estimated as: $x (1+S+S^2+S^3.....S^n)$ or $x.1/(1-S)$. In addition, estimates can be calculated of the income multiplier using data on local consumption patterns in the local economy. If the total net direct and supply multiplier increase in local business turnover is E, a proportion m of this turnover is paid on average in net local incomes, and a proportion q of net local incomes is on average spent on the products of local businesses, then the total impact on turnover, including induced effects, may be estimated as $E(1+mq+m^2q^2+m^3q^3...m^nq^n)$ or $E.1/(1-mq)$.
- Again the assumption is that behaviour is similar at each point in the supply chain.
- Previous research/evaluations: a number of previous studies have assessed the scale of multiplier effects- see, for example, research by Oxford Economics (2012) into the economic impact of the UK film industry.
- Economic models: various commercial and academic organisations have developed models of the national economy and of local economies. For example, one such model is LM3. These can be used to assess the scale of multiplier effects resulting from a particular investment or change in the level of employment.
- Input-output tables: these tables provide estimates of supply linkages between sectors and can be used to estimate the supply linkage or indirect multiplier effects.

4.5.5 *Evidence from evaluations and research*

The scale of income and supply linkage multiplier effects vary according to the mix of economic activity that exists in an area and the type of intervention that is being undertaken. The Scottish Government provides information on multiplier effects for individual Scottish industries, which demonstrates the extent of the difference between various sectors. For example, the composite employment multiplier effect at the Scottish level for the refined petroleum and nuclear fuel industry is 13.41, compared to a composite multiplier of 1.47 for other service activities. Construction has a compositive multiplier of 2.19, while retail distribution is 1.31 and Research and Development is 1.46. Further data from the Input-Output tables can be accessed via the following link:

http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output.

As an example of evidence from econometric studies, Oxford Economics recently produced a set of output multiplier estimates at the UK level, using data from the ONS Annual Business Survey and their own detailed econometric model of the UK economy (see Table 4.11). In using data from secondary sources such as the Scottish Input-Output tables or from econometric studies, care should be taken to consider the spatial level at which the multipliers relate to. As noted in Section 2, the size of the multiplier effects is likely to be greater the larger the area over which the benefits of an intervention are being assessed.

Table 4.11: Output multipliers (UK, 2011)

Sector	Composite output multiplier
Electricity production and distribution	2.8
Construction	2.7
Iron and steel	2.2
Motor vehicles	2.1
Sports goods and toys	2.3
Machine tools	2.0
Hotels, catering, pubs etc	2.2
Computer services	1.9
Legal activities	1.8
Education	1.8
Economy average	2.2

Source: ONS, Oxford Economics (2012)

Table 4.12 below is based on the extensive evidence generated by a number of studies including the Evaluation of the Enterprise Zone Experiment. It provides composite income and supply linkage multiplier estimates that are appropriate for four types of property related activity, namely B1 Office, B2/B8 (general industrial/warehousing), Recreation and Retailing. The estimates are provided for the local area and regional level. At the local level the range is between 1.21 and 1.38. At the regional level the range is between 1.38 and 1.56. Generally speaking retailing projects generate the lowest combined income and supply linkage effects.

Table 4.12: Composite multiplier effect by type of area: site related problems but active private sector

Intervention type	Local area	Region
B1 Office	1.29	1.44
B2/B8	1.29	1.44
Recreation	1.38	1.56
Retailing	1.21	1.38

Source: Based on Rhodes et al, (1994) and Enterprise Zone research (HMSO, 1995).

For specific sectors and interventions, multiplier values can be higher than those shown in the table. For example, The Toyota Impact Study identified a composite employment multiplier at the level of Derbyshire, Nottinghamshire, Leicestershire, Staffordshire and the West Midlands of 1.6. Research by the then Dti into broadband projects identified multiplier effects ranging between two to four times the direct effect.

Sub-regional and regional multipliers for a range of intervention types are set out within the BIS/CEA additionality guidance (see Table 4.13). At the sub-regional level, an overall

average composite multiplier of 1.25 is identified, while at the regional level the overall average is 1.45.

Table 4.13: Composite multipliers by type of intervention – BIS/CEA guidance		
	Sub-regional (mean)	**Regional (mean)**
All observations	1.25	1.45
Business development & competitiveness	1.25	1.51
Regeneration through physical infrastructure	1.33	1.40
People and skills	1.66	1.36

Note 1: a more detailed breakdown by project type is contained within the BIS/CEA guidance

Note 2: Care should be taken in applying the sub-regional estimate under the people and skills theme, as this is based on fewer than 10 observations. In addition, the BIS/CEA average multiplier benchmark for people and skills is lower at the regional level than the sub-regional level. This reflects that the averages calculated for each spatial level were not based entirely on the same set of projects. In reality, in relation to a given project you would expect the multiplier to be higher at the regional level compared to the sub-regional level.

4.5.6 *Ready reckoners*

The ready reckoner values below express general ranges at the very local (neighbourhood) level, and the regional level. The following range of multiplier effects can be used:

Table 4.14: Multiplier effects			
Level	**Multiplier**	**Composite multiplier (Neighbourhood level)**	**Composite multiplier (Regional level)**
Low	Limited local supply linkages and induced or income effects	1.05	1.3
Medium	Average linkages. The majority of interventions will be in this category	1.1	1.5
High	Strong local supply linkages and income or induced effects	1.15	1.7

Source: Based upon the, then, DETR (October 2000)

4.5.7 Key question – multipliers

The following key question needs to be answered in relation to multiplier effects:

How many, if any, additional outputs and outcomes will occur through purchases along local supply chains, employee spending rounds and longer term effects as a result of the intervention/option?